arihant

JAWAHAR NAVODAYA VIDYALAYA

Entrance Exam 2021

Conducted by
Navodaya Vidyalaya Samiti

Mental Ability Test

Arithmetic Test

Language Test

6

JAWAHAR NAVODAYA VIDYALAYA

Entrance Exam 2021

Conducted by
Navodaya Vidyalaya Samiti

JAWAHAR NAVODAYA VIDYALAYA

Entrance Exam 2021

Conducted by
Navodaya Vidyalaya Samiti

Complied & Edited by
Arihant 'Expert Team'

6

arihant
Arihant Publications (India) Ltd.

arihant
ARIHANT PUBLICATIONS (INDIA) LIMITED

All Rights Reserved

© Publisher

No part of this publication may be re-produced, stored in a retrieval system or by any means, electronic, mechanical, photocopying, recording, scanning, web or otherwise without the written permission of the publisher. Arihant has obtained all the information in this book from the sources believed to be reliable and true. However, Arihant or its editors or authors or illustrators don't take any responsibility for the absolute accuracy of any information published and the damage or loss suffered thereupon.

All disputes subject to Meerut (UP) jurisdiction only.

卐 **Administrative & Production Offices**

Regd. Office

'Ramchhaya' 4577/15, Agarwal Road, Darya Ganj, New Delhi -110002
Tele: 011- 47630600, 43518550

卐 **Head Office**

Kalindi, TP Nagar, Meerut (UP) - 250002
Tel: 0121-7156203, 7156204

卐 **Sales & Support Offices**

Agra, Ahmedabad, Bengaluru, Bareilly, Chennai, Delhi, Guwahati, Hyderabad, Jaipur, Jhansi, Kolkata, Lucknow, Nagpur & Pune.

卐 **ISBN** 978-93-24194-94-7

PO No : TXT-XX-XXXXXXX-X-XX

Published by Arihant Publications (India) Ltd.

For further information about the books published by Arihant, log on to www.arihantbooks.com or e-mail at info@arihantbooks.com

Follow us on

CONTENTS

Solved Paper 2020	**3-15**
Solved Paper 2019	**1-12**
Solved Paper 2018	**1-16**
Solved Paper 2017	**1-16**
MENTAL ABILITY TEST	**1-112**
1. Odd-Man Out	3-15
2. Figure Matching	16-24
3. Pattern Completion	25-32
4. Figure Series Completion	33-55
5. Analogy	56-75
6. Geometrical Figure Completion	76-83
7. Mirror Image	84-89
8. Punched Hole Pattern	90-100
9. Space Visualisation	101-107
10. Embedded Figure	108-112
ARITHMETIC TEST	**1-156**
1. Number and Numeric System	3-9
2. Four Fundamental Operations on Whole Numbers	10-17
3. Fractional Number and Fundamental Operations	18-26
4. Factors and Multiples including their Properties	27-32
5. LCM and HCF of Numbers	33-42
6. Decimal and Fundamental Operations on them	43-50
7. Square-Square Root and Cube-Cube Root	51-58
8. Measurement	59-68
9. Approximation of Expressions	69-73
10. Simplification of Numerical Expressions	74-80

11. Average 81-87
12. Percentage and its Applications 88-95
13. Profit, Loss and Discount 96-105
14. Simple Interest 106-113
15. Ratio and Proportion 114-120
16. Speed, Distance and Time 121-128
17. Area, Perimeter and Volume 129-138
18. Pattern 139-145
19. Data Interpretation 146-156

LANGUAGE TEST (ENGLISH) **1-46**

1. Synonym, Antonym and Word-Meaning 3-7
2. Comprehension 8-46

PRACTICE SETS (1-5) **3-68**

Distribution of Marks and Examination Time

The selection examination is of two hours. The question paper is divided into three parts and all the questions are of objective type. For 80 questions, the full marks allotted are 100.

Section	Questions	Marks
Mental Ability Test	40	50
Arithmetic Test	20	25
Language Ability Test	20	25
Total	**80**	**100**

Jawahar Navodaya
Vidyalaya

SOLVED PAPER
2020

Jawahar Navodaya Vidyalaya

Entrance Exam (Class-VIth)

Solved Paper 2020

SECTION I : Mental Ability Test

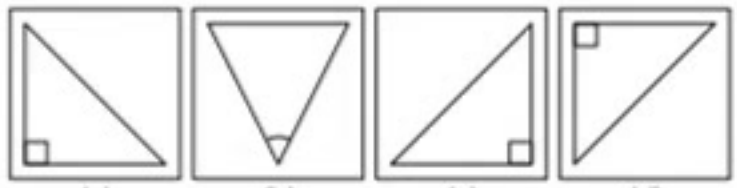
Part I

Directions *In Question Nos.* 1 *to* 4 *four figures* (a), (b), (c) *and* (d) *have been given in each question. Of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different. Darken the circle for answer in the OMR Answer Sheet against the number corresponding to the question.*

1.

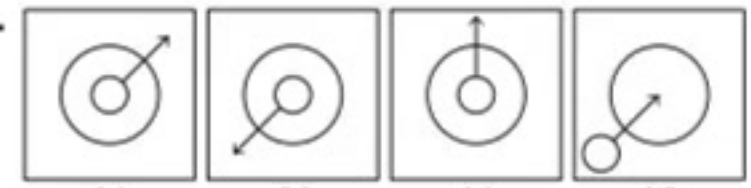
(a) (b) (c) (d)

2.



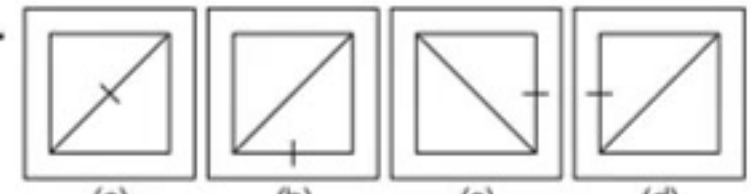
(a) (b) (c) (d)

3.



(a) (b) (c) (d)

4.

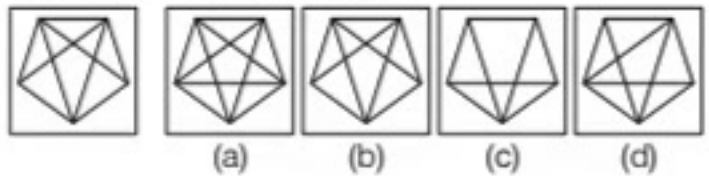


(a) (b) (c) (d)

Part II

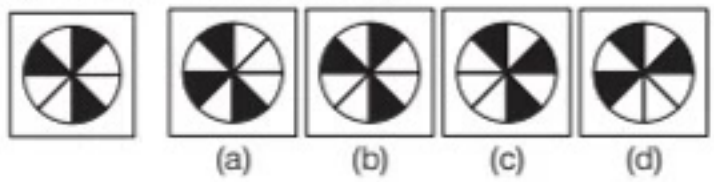
Directions *In Question Nos. 5 to 8, a question figure is given on the left side and four answer figures marked* (a), (b), (c) *and* (d) *are given on the right side. Select the answer figure which is exactly the same as the question figure and darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

5. Que. Fig Answer Fig.



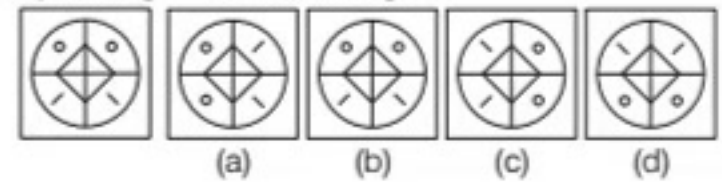
(a) (b) (c) (d)

6. Que. Fig Answer Fig.



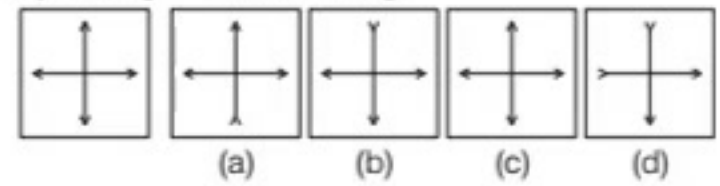
(a) (b) (c) (d)

7. Que. Fig Answer Fig.



(a) (b) (c) (d)

8. Que. Fig Answer Fig.

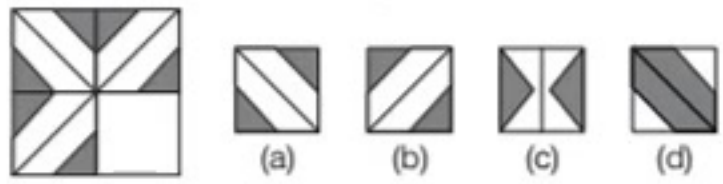


(a) (b) (c) (d)

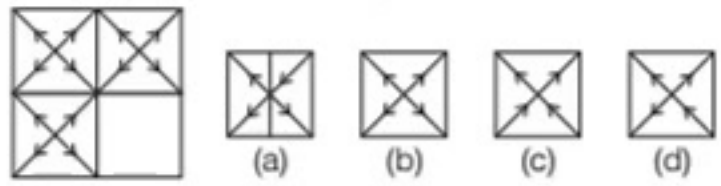
Part III

Directions *In Question Nos. 9 to 12, there is a question figure on the left side, a part of which is missing. Observe the answer figure* (a), (b), (c) *and* (d) *on the right side and find out the answer figure which, without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure. Indicate your answer by darkening the circle in the OMR Answer Sheet against the number corresponding to the question.*

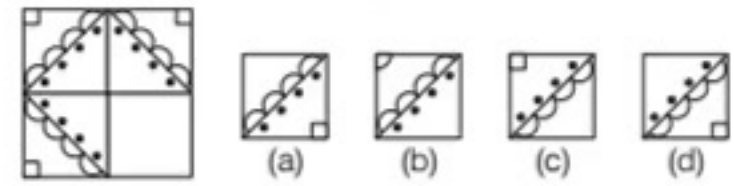
9. Que. Fig Answer Fig.



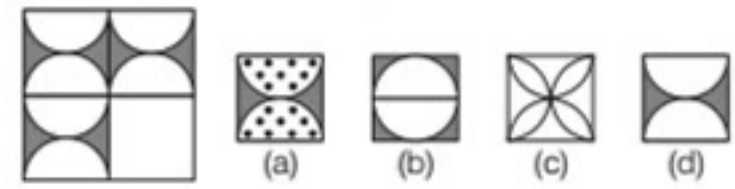
10. Que. Fig Answer Fig.



11. Que. Fig Answer Fig.



12. Que. Fig Answer Fig.

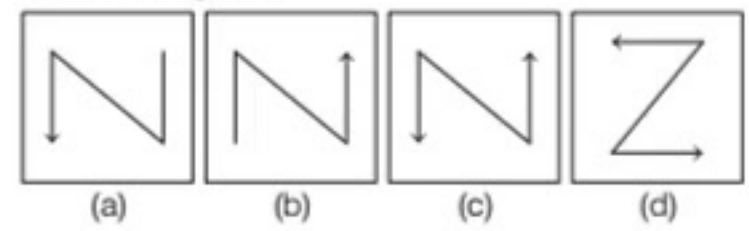


Part IV

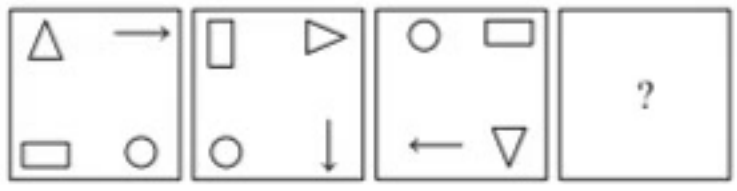
Directions *In Question Nos.* 13 *to* 16, *there are three question figures on the left side and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure from among the answer figures given on the right side which occupies the blank space for the fourth figure on the left side and completes the series. Indicate your answer by darkening the circle in the OMR Answer Sheet against the number corresponding to the question.*

13. Question Figures

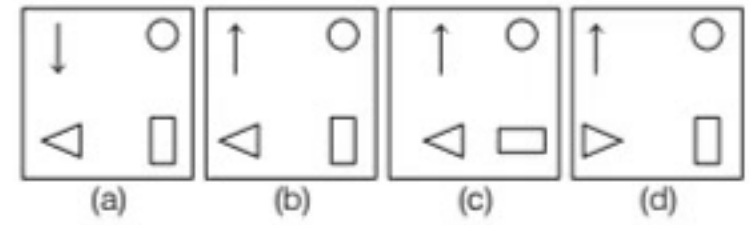
Answer Figures



14. Question Figures

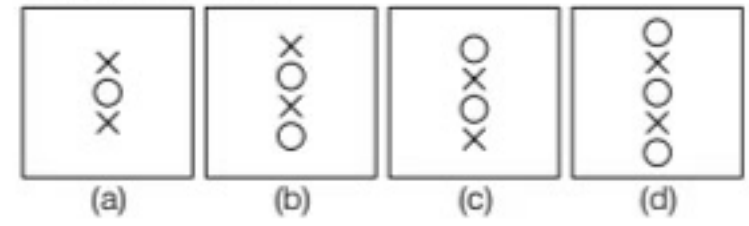


Answer Figures

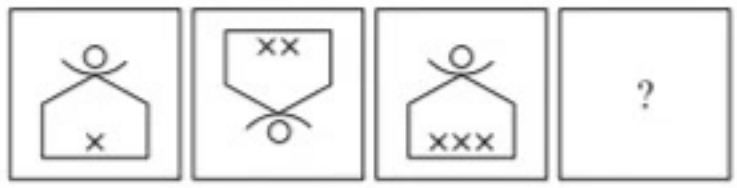


15. Question Figures

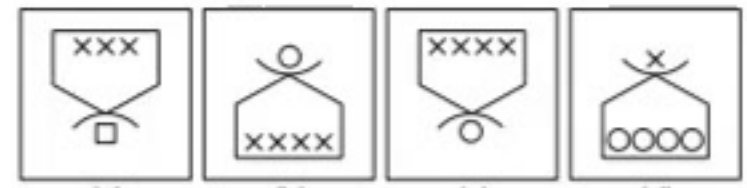
Answer Figures



16. Question Figures



Answer Figures

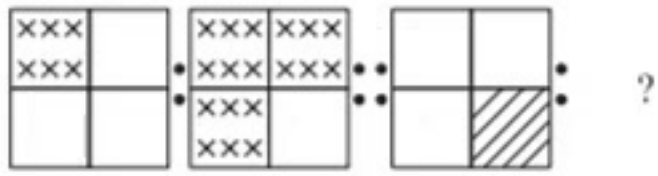


(a) (b) (c) (d)

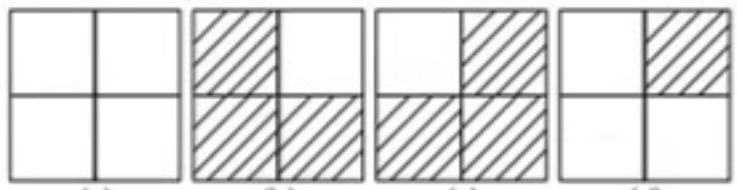
Part V

Directions *In Question Nos.* 17 *to* 20, *there are two sets of two question figures each. The second set has an interrogation mark (?). There exists a relationship between the first two question figures. Similar relationship should exist between the third and the fourth question figure. Select one of the answer figures which replaces the mark of interrogation. Darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

17. Question Figures

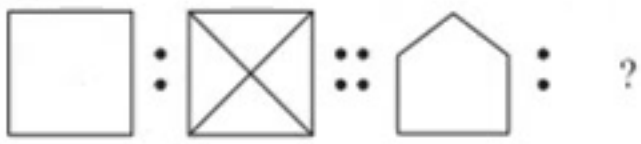


Answer Figures

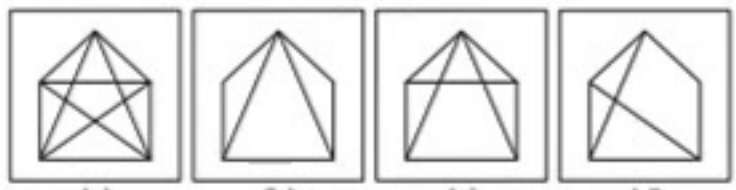


(a) (b) (c) (d)

18. Question Figures

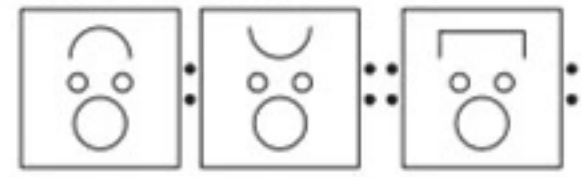


Answer Figures



(a) (b) (c) (d)

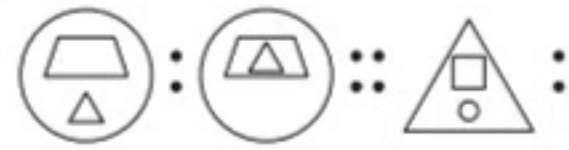
19. Question Figures



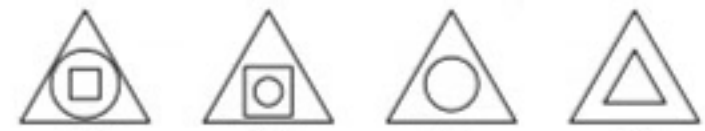
Answer Figures

(a) (b) (c) (d)

20. Question Figures



Answer Figures

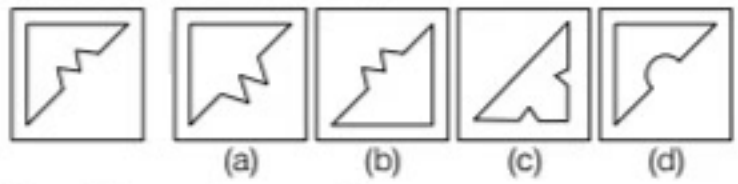


(a) (b) (c) (d)

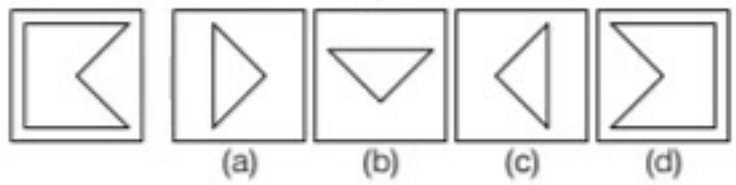
Part VI

Directions *In Question Nos.* 21 *to* 24, *one part of a geometrical figure (Triangle, Square, Circle) is on the left side as question figure and the other one is among the four answer figures (a), (b), (c) and (d) on the right side. Find the figure on the right side that completes the geometrical figure and darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

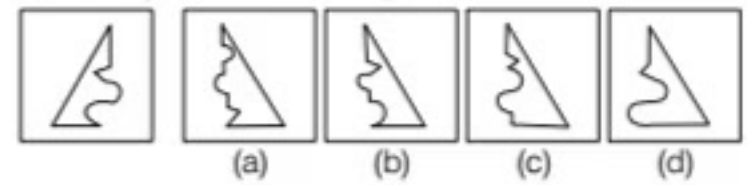
21. Que. Fig. Answer Fig.



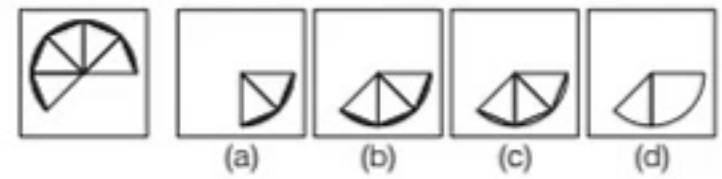
22. Que. Fig. Answer Fig.



23. Que. Fig. Answer Fig.



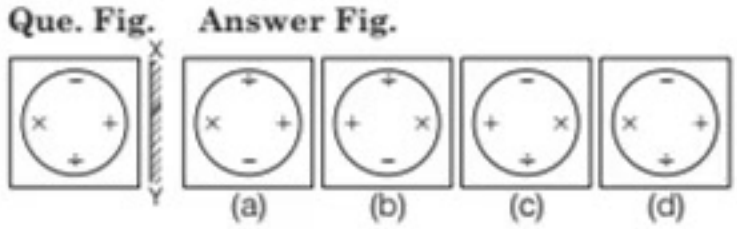
24. Que. Fig. Answer Fig.



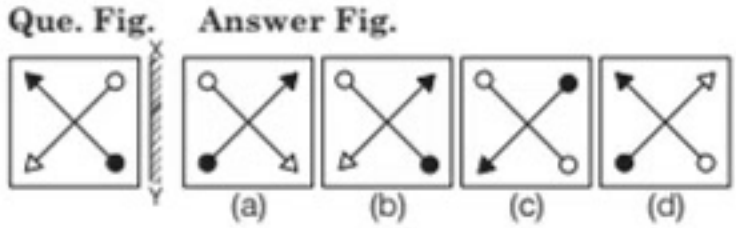
Part VII

Directions *In Question Nos. 25 to 28, there is a question figure on the left side and four answer figures marked* (a), (b), (c) *and* (d) *are given on the right side. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at XY. Indicate your answer by darkening the circle in the OMR Answer Sheet against the number corresponding to the question.*

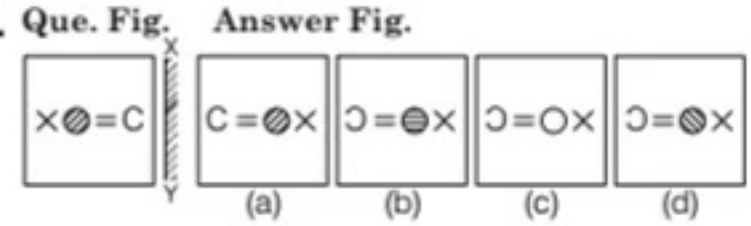
25. Que. Fig. Answer Fig.



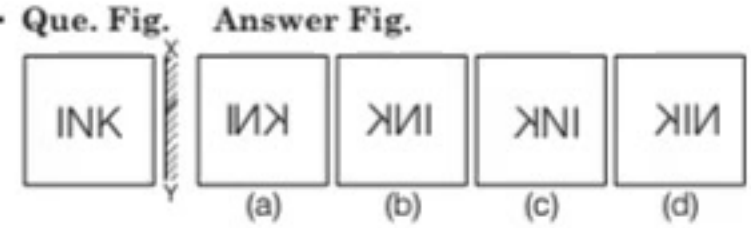
26. Que. Fig. Answer Fig.



27. Que. Fig. Answer Fig.



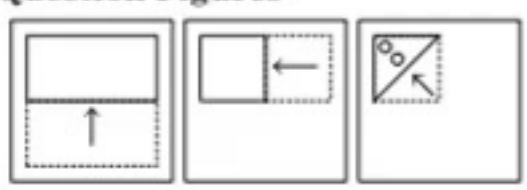
28. Que. Fig. Answer Fig.



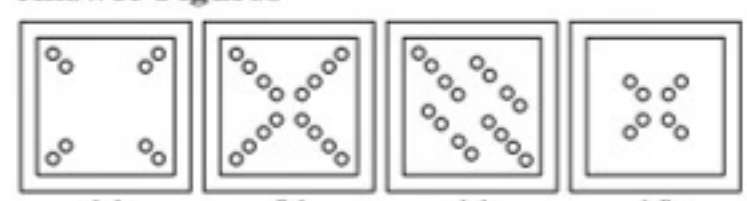
Part VIII

Directions *In Question Nos. 29 to 32, a piece of paper is folded and punched as shown in question figures on the left side and four answer figures marked* (a), (b), (c) *and* (d) *are given on the right side. Select the answer figure which indicates how the paper will appear when opened (unfolded). Indicate your answer by darkening the circle in the OMR Answer Sheet against the number corresponding to the question.*

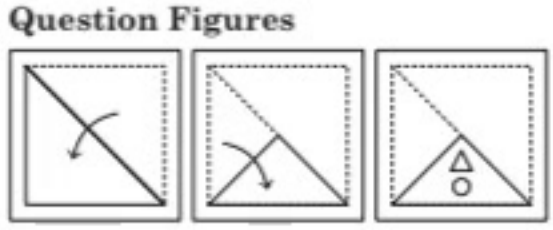
29. Question Figures



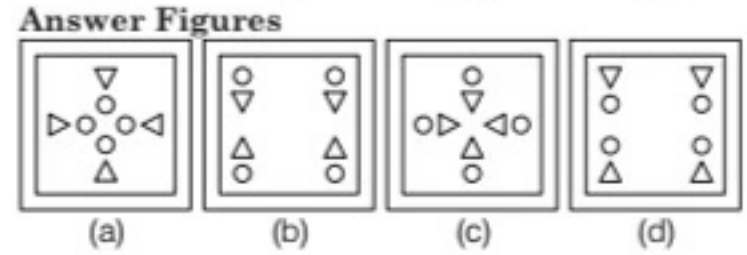
Answer Figures



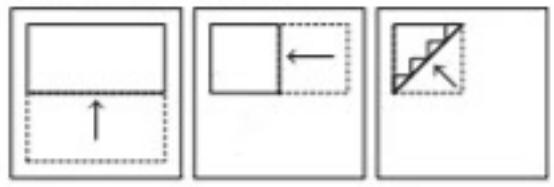
30. Question Figures



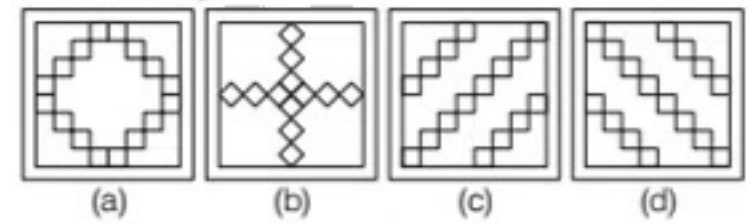
Answer Figures



31. Question Figures



Answer Figures



(a) (b) (c) (d)

32. Question Figures

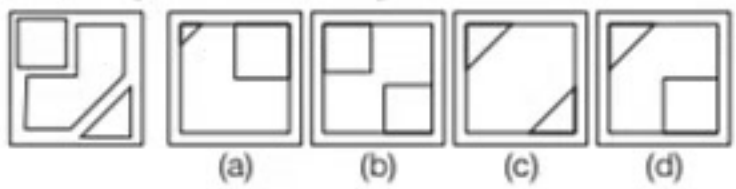
Answer Figures

(a) (b) (c) (d)

Part IX

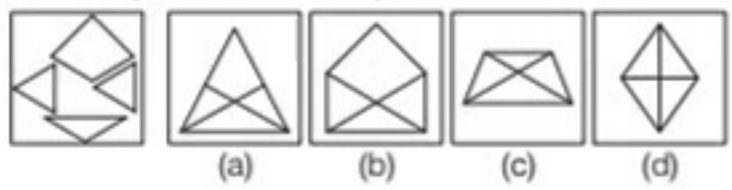
Directions *In Question Nos.* 33 *to* 36, *a question figure is given on the left side and four answer figures marked* (a), (b), (c) *and* (d) *are given on the right side. Select the answer figure which can be formed from the cut-out pieces given in the question figure. Darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

33. Que. Fig Answer Fig.



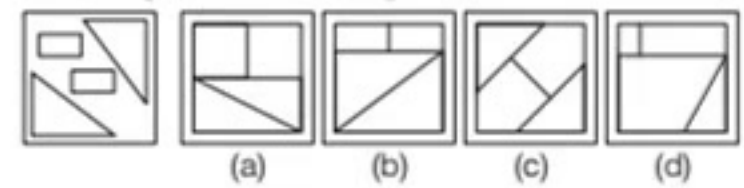
(a) (b) (c) (d)

34. Que. Fig Answer Fig.



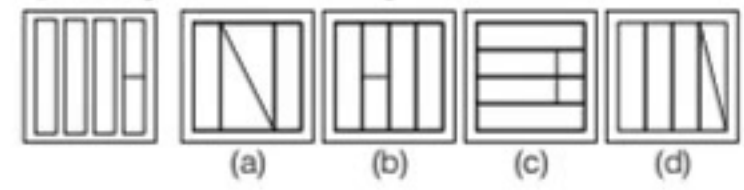
(a) (b) (c) (d)

35. Que. Fig Answer Fig.



(a) (b) (c) (d)

36. Que. Fig Answer Fig.

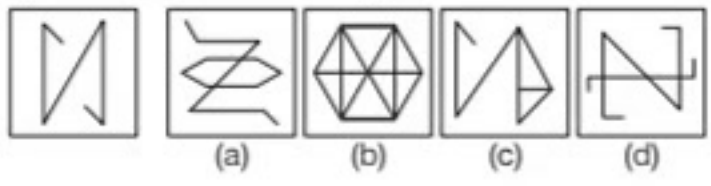


(a) (b) (c) (d)

Part X

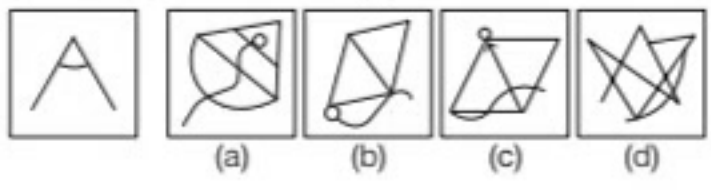
Directions *In Question Nos.* 37 *to* 40, *a question figure is given on the left side and four answer figures marked* (a), (b), (c) *and* (d) *are given on the right side. Select the answer figure in which the question figure is hidden / embedded. Darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

37. Que. Fig Answer Fig.



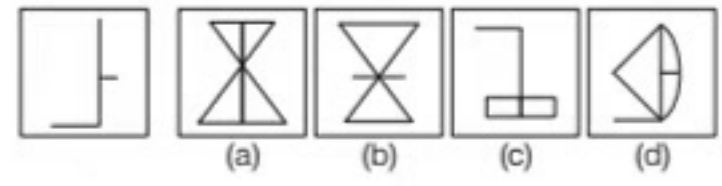
(a) (b) (c) (d)

38. Que. Fig Answer Fig.



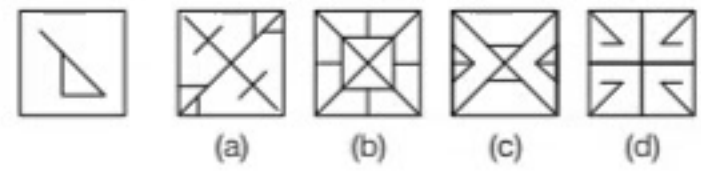
(a) (b) (c) (d)

39. Que. Fig Answer Fig.



(a) (b) (c) (d)

40. Que. Fig Answer Fig.



(a) (b) (c) (d)

SECTION II : Arithmetic Test

Directions *For every question, four probable answers as* (a), (b), (c) *and* (d) *are given. Only one out of these is correct. Choose the correct answer and darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

41. What is the difference between the greatest 7-digit number and the smallest 4-digit number?
(a) 9990999 (b) 9993999
(c) 9996999 (d) 9998999

42. What will be the difference between the greatest 6-digit number and the greatest 5-digit number?
(a) 100000 (b) 100001
(c) 99999 (d) 900000

43. Which of the following is not equal to 25?
(a) $50 - (100 \div 4)$
(b) $20 + (20 \div 4)$
(c) $10 + (5 \times 2) + (10 - 5)$
(d) $24 + (2 \times 1)$

44. The value of x which makes the following statement true is $\left(3\frac{7}{11} \times \frac{11}{5}\right) \div \left(\frac{3}{7} \times x\right) = \frac{4}{3}$
(a) $\frac{7}{2}$ (b) 14 (c) 7 (d) 28

45. The sum of HCF and LCM of 45, 60 and 75 is
(a) 330 (b) 960 (c) 915 (d) 630

46. $\frac{3}{8} \div \left(\frac{5}{3} - \frac{1}{6}\right) + \frac{5}{8}$ is equal to
(a) $\frac{3}{8}$ (b) $2\frac{5}{8}$ (c) $\frac{7}{8}$ (d) $1\frac{1}{8}$

47. If $15 - 15 \div 15 \times 6 = x$, then the value of x is
(a) 6 (b) 0 (c) 9 (d) 84

48. The value of $0.9 \div (0.3 \times 0.3)$ is
(a) 0.01 (b) 0.1 (c) 1 (d) 10

49. If the number B is 10% less than another number C and C is 5% more than 150, then B is equal to
(a) 157.85 (b) 153.85
(c) 151.75 (d) 141.75

50. 5% of 10% of 175 grams is equal to
(a) 8.75 gm (b) 0.5 gm
(c) 0.875 gm (d) 17.5 gm

51. Find the approximate result of the following expression (in whole numbers).
$49.6 \times 10.2 - 7.1 \times 29.7 - 5.1 \times 20.1$
(a) 390 (b) 290
(c) 209 (d) 190

52. A park is 1500 m long and 750 m wide. A cyclist has to take four rounds of this park. How much time will he take at the speed of 4.5 km/h?
(a) 40 h (b) 20 h (c) 10 h (d) 4 h

53. One-fourth of birds of a flock are at a river bank and one-fifth of that flock are in their nest. Remaining 22 birds are wandering in search of food. What is the number of birds which are in their nest?
(a) 40 (b) 18 (c) 10 (d) 8

54. Amit bought a table for ₹ 1200 and spent ₹ 200 on its repair. He sold if for ₹ 1680. His profit or loss per cent is
(a) 12% profit (b) $16\frac{2}{3}$% profit
(c) 20% loss (d) 20% profit

55. A square and a rectangle have the same perimeter. If the side of the square is 16 m and the length of the rectangle is 18 m, the breadth of the rectangle is
(a) 14 m (b) 15 m (c) 16 m (d) 17 m

56. How many bricks will be required for a wall 8 m long, 6 m high and 22.5 cm thick, if each brick measures 25 cm × 11.25 cm × 6 cm?
(a) 640 (b) 1380 (c) 6400 (d) 7600

57. We reached our destination at 2:45 pm after travelling for $4\frac{1}{2}$ h. When did we start?
(a) 9 : 00 am (b) 10 : 00 am
(c) 10 : 15 am (d) 8 : 15 am

58. The prime factorisation of 640 is
(a) $2 \times 2 \times 2 \times 2 \times 2 \times 5$
(b) $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5$
(c) $2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5$
(d) $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5$

59. In how many years does the sum of ₹ 1200 become ₹ 1800 at the rate of simple interest of 5% per annum?
(a) 10 (b) 20
(c) 15 (d) 25

60. 140.75×0.01 is equal to
(a) 140.75 (b) 14000.75
(c) 1.4075 (d) 0.14075

SECTION III : Language Test

Directions *There are four passages in this Section. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each question, four probable answers as* (a), (b), (c) *and* (d) *are given. Only one out of these is correct. Choose the correct answer and darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

Passage 1

Travelling is both recreational and educative. It has always been regarded as an important part of education. In Europe, a young man is considered fully educated only when he has travelled through many countries of Europe. In ancient India also, our sages understood the great value of travelling. They made it a pious duty to visit various pilgrim centres situated in different parts of India. This encouraged the feeling of oneness among Indians.

61. It is important to ..... if one wants to get real education.
(a) study (b) work
(c) travel (d) meditate

62. Which one of the following words is a synonym of "recreational"?
(a) educational (b) thrilling
(c) tiring (d) sight-seeing

63. Visiting the ..... centres was considered holy in ancient India.
(a) training (b) pilgrim
(c) city (d) business

64. People have a feeling of oneness with others if they ..... a lot.
(a) travel (b) talk
(c) play (d) question

65. A sage is a person who is ..... .
(a) learned (b) smart
(c) free (d) wicked

Passage 2

Fire is to blame for the loss of countless lives and billions of rupees each and every year. Firefighters help protect people and their property from injury and damage. They put their lives on the line every time they respond to a call.

While on duty, firefighters must be ready to respond in a matter of minutes to just about any disaster that may occur. At every fire scene, a superior fire officer takes command and directs the jobs of all the people at the scene. Some firemen connect the hose lines to hydrants. Others manually operate the pumps to send water to the hoses. Teams of firefighters also operate ladders used to reach distances high in the air.

66. Which is not true about the firefighters?
(a) They are brave
(b) They often put their lives in danger
(c) They never put their lives in danger
(d) They are highly trained.

67. A firefighter has to prepare to extinguish a fire in
(a) minutes (b) hours
(c) days (d) weeks

68. Firefighters put their lives on the line means
(a) they stand in a line
(b) they fight fire
(c) they put their lives in danger
(d) they connect the hose line to hydrant

69. To 'operate manually' means to
(a) make a man work
(b) work with their hands
(c) use a machine
(d) use one's body

70. The word 'occur' means the same as
(a) come
(b) happen
(c) call
(d) fire

Passage 3

Hema lay on her bed staring at the stars stuck on the ceiling of her room. She was upset as none of the clothes seemed to fit her. She wore them again one by one but they were either too tight or too short. A cupboard full of clothes and she could not wear any of them. She then had a bright idea, her eyes lit up and she ran to her mother's room. "Ma, I need new clothes," she said, "but only after I donate all my old clothes to charity. No more amassing of clothes". Her mother smiled and hugged her. She did have a kind daughter!

71. Hema lay on her bed because she
(a) was tired
(b) liked looking at the stars
(c) was wondering what to wear
(d) was a lazy girl

72. She could not wear any of her clothes because
(a) they were not fashionable
(b) they were too colourful
(c) she did not know what to choose
(d) none of them fitted her

73. The synonym of the word, 'amassing' is
(a) collecting (b) distributing
(c) sharing (d) gifting

74. Hema is
(a) greedy (b) charitable
(c) selfish (d) miserly

75. The opposite of the word 'donate' is
(a) give (b) receive
(c) distribute (d) spend

Passage 4

To be fit and healthy, you need to be physically active. Regular physical activity protects you from serious diseases such as obesity, heart disease, cancer, mental illness, diabetes and arthritis. Riding a bicycle regularly is one of the best ways to reduce your risk of health problems associated with a sedentary lifestyle. Cycling is a healthy, low-impact exercise that can be enjoyed by people of all ages, from young children to older adults. It is also fun, cheap and good for the environment. Riding to work or the shop is one of the most time-efficient ways to combine regular exercise with everyday routine. An estimated one billion people ride bicycles every day for transport, recreation and sport. Cyclinig is a good way to reduce weight as it builds muscle and burns body fat. Research suggests that by cycling for half an hour everyday we can shed atleast five kilos of weight in a year.

76. The main focus of the passage is to tell us the advantages of
(a) keeping fit
(b) cycling
(c) exercising
(d) reducing weight

77. When the writer says "Cycling is good for the environment", which of the following is not correct?
(a) It does not emit any unhealthy gas
(b) It can be run without petrol or diesel
(c) It does not pollute air
(d) It can be ridden by all age groups

78. The word which means the opposite of the word 'sedentary' is
(a) active (b) lazy
(c) inactive (d) deskbound

79. A low-impact exercise is one which is
(a) not tiring (b) not costly
(c) not efficient (d) not boring

80. Regular cycling helps us in all of the following except to
(a) reduce fat and strengthen muscles
(b) combine fun with work
(c) prevent serious accidents
(d) remain healthy

Answers

1	(d)	**2**	(b)	**3**	(d)	**4**	(a)	**5**	(b)	**6**	(b)	**7**	(b)	**8**	(c)	**9**	(a)	**10**	(b)
11	(d)	**12**	(d)	**13**	(b)	**14**	(b)	**15**	(c)	**16**	(c)	**17**	(c)	**18**	(a)	**19**	(c)	**20**	(b)
21	(b)	**22**	(c)	**23**	(d)	**24**	(b)	**25**	(c)	**26**	(a)	**27**	(d)	**28**	(b)	**29**	(b)	**30**	(c)
31	(a)	**32**	(d)	**33**	(d)	**34**	(b)	**35**	(b)	**36**	(b)	**37**	(b)	**38**	(c)	**39**	(d)	**40**	(b)
41	(d)	**42**	(d)	**43**	(d)	**44**	(b)	**45**	(c)	**46**	(c)	**47**	(c)	**48**	(d)	**49**	(d)	**50**	(c)
51	(d)	**52**	(d)	**53**	(d)	**54**	(d)	**55**	(a)	**56**	(c)	**57**	(c)	**58**	(d)	**59**	(a)	**60**	(c)
61	(c)	**62**	(b)	**63**	(b)	**64**	(a)	**65**	(a)	**66**	(c)	**67**	(a)	**68**	(c)	**69**	(b)	**70**	(b)
71	(c)	**72**	(d)	**73**	(a)	**74**	(b)	**75**	(b)	**76**	(b)	**77**	(d)	**78**	(a)	**79**	(a)	**80**	(b)

Hints and Solutions

1. (d) Except option (d), in all the other options, letters 'K', 'I' and 'T' are used but in option (d) letter 'C' is used in place of letter 'T'.

2. (b) Except figure (b), in all the other figures, an angle of 90° is marked within the triangle.

3. (d) Except figure (d), all the other figures are same and can be obtained by rotating the other figure.

4. (a) Except figure (a), in all the other figures, a small line is intersecting the side of the square but in figure (a), the small line is intersecting the diagonal inside the square.

5. (b) Answer figure (b) is exactly the same as the question figure.

Question Figure

Answer Figure (b)

6. (b) Answer figure (b) is exactly the same as the question figure.

Question Figure

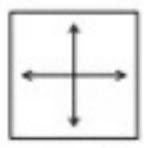
Answer Figure (b)

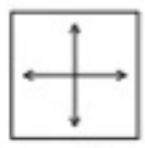
7. (b) Answer figure (b) is exactly the same as the question figure.

Question Figure

Answer Figure (b)

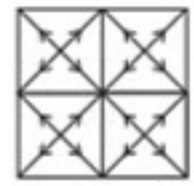
8. (c) Answer figure (c) is exactly the same as the question figure.


Question Figure

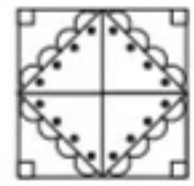

Answer Figure (c)

9. (a) Answer figure (a) will complete the pattern of the question figure.

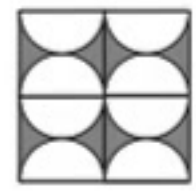
10. (b) Answer figure (b) will complete the pattern of the question figure.



11. (d) Answer figure (d) will complete the pattern of the question figure.



12. (d) Answer figure (d) will complete the pattero of the question figure.



13. (b) In each step, the given figure is rotating 90° in anti-clockwise direction.

Hence, answer figure (b) will complete the given series.

14. (b) In each step all the four designs are moving from one corner to the other in clockwise direction. Also, each design is rotating 90° in clockwise direction. Hence, answer figure (b) will complete the given series.

15. (c) A sign of multiplication (×) and a sign of circle (O) is increasing alternatively. Hence, answer figure (c) will complete the given series.

16. (c) In each step, the main figure is inverted and also a sign of cross (×) is increasing within the main figure. Hence, answer figure (c) will complete the given series.

17. (c) In second figure the design appeared in all the blocks except the block which is diagonally opposite to the block which has design in first figure. Following the same pattern from figure third to forth answer figure (c) will replace the question mark.

18. (a) From the first figure to the second, lines meeting all the corners with each other are drawn with in the figure. Similarly, in third figure on drawing the lines from one corner to the others, we get answer figure (a).

19. (c) The topmost curved line in first figure is inverted in second figure. Similarly, the topmost design in third figure will be inverted in four figure as shown in answer figure (c).

20. (b) From first figure to second figure, the lower design within the circle is placed inside the upper design. Similarly, from third figure to fourth the lower designed i.e. circle within the triangle will be placed inside the upper design i.e. square as shown in answer figure (b).

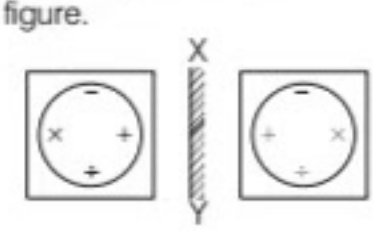
21. (b) Answer figure (b) will complete the incomplete square given in question figure.

22. (c) Answer figure (c) will complete the incomplete square given in question figure.

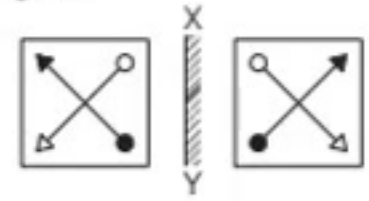
23. (d) Answer figure (d) will complete the incomplete triangle given in question figure.

24. (b) Answer figure (b) will complete the incomplete circle given in question figure.

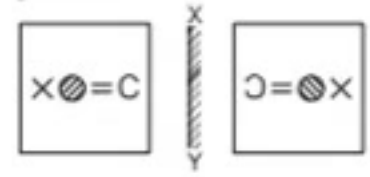
25. (c) Answer figure (c) is the correct mirror image of the question figure.



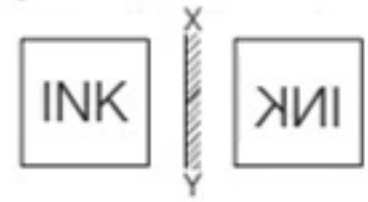
26. (a) Answer figure (a) is the correct mirror image of the question figure.



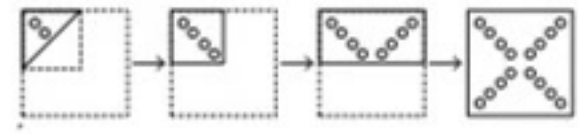
27. (d) Answer figure (d) is the correct mirror image of the question figure.



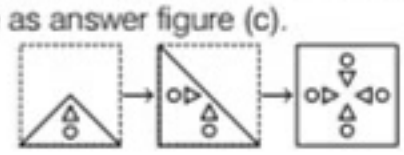
28. (b) Answer figure (b) is the correct mirror of the question figure.



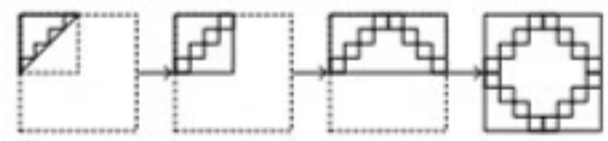
29. (b) After unfolding the folded and punched sheet it will look like as answer figure (b).



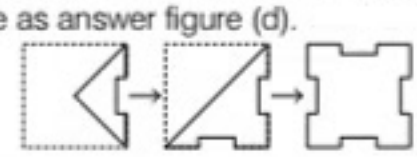
30. (c) After unfolding the folded and punched sheet it will look like as answer figure (c).



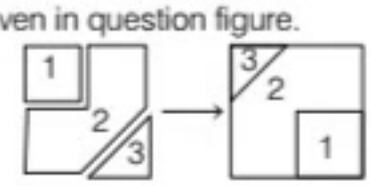
31. (a) After unfolding the folded and punched sheet it will look like as answer figure (a).



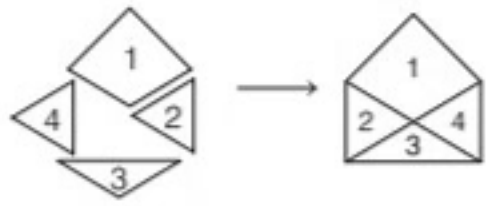
32. (d) After unfolding the folded and punched sheet it will look like as answer figure (d).



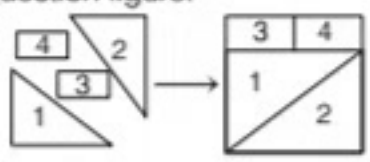
33. (d) Answer figure (d) can be formed from the cut-out pieces given in question figure.



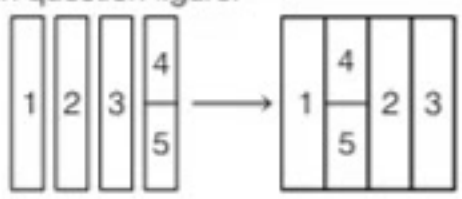
34. (b) Answer figure (b) can be formed from the cut pieces given in question figure.



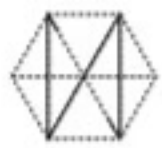
35. (b) Answer figure (b) can be formed from the cut pieces given in question figure.



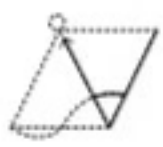
36. (b) Answer figure (b) can be formed from the cut pieces given in question figure.



37. (b) The question figure is embedded in answer figure (b).

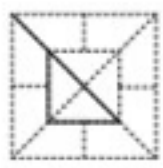


38. (c) The question figure is embedded in answer figure (c).



39. (d) The question figure is embedded in answer figure (d).

40. (b) The question figure is embedded in answer figure (b).



41. (d) The greatest 7-digit number = 9999999

The smallest 4-digit number = 1000

∴ Required difference (difference of these both numbers) = 9999999 − 1000 = 9998999

42. (d) The greatest 6-digit number = 999999

The greatest 5-digit number = 99999

∴ Required difference (difference of these both number) = 999999 − 99999 = 900000

43. (d) Option (a), 50 − (100 ÷ 4) = 50 − 25 = 25, this option is not the answer.

option (b), 20 + (20 ÷ 4) = 20 + 5 = 25, this option is not the answer.

option (c), 10 + (5 × 2) + (10 − 5)

$= 10 + 10 + 5 = 25$,

this option is not the answer.

Option (d), 24 + (2 × 1) = 24 + 2 = 26 ≠ 25, this option is the answer.

44. (b) $\left(3\frac{7}{11} \times \frac{11}{5}\right) \div \left(\frac{3}{7} \times x\right) = \frac{4}{3}$

$\Rightarrow \quad \left(\frac{40}{11} \times \frac{11}{5}\right) \div \left(\frac{3x}{7}\right) = \frac{4}{3}$

$\Rightarrow \quad 8 \times \frac{7}{3x} = \frac{4}{3}$

$\Rightarrow \quad 12x = 8 \times 7 \times 3$

$\Rightarrow \quad x = \frac{8 \times 7 \times 3}{12} = 14$

45. (c) Prime factors of 45, 60 and 75

$45 = 3 \times 3 \times 5$; $60 = 2 \times 2 \times 3 \times 5$; $75 = 3 \times 5 \times 5$

∴ HCF = 3 × 5 [to take common factors]

= 15

LCM = 2 × 2 × 3 × 3 × 5 × 5

(to take the higest power of prime factor)

= 900

∴ Sum of HCF and LCM = 15 + 900 = 915

46. (c) $\frac{3}{8} \div \left(\frac{5}{3} - \frac{1}{6}\right) + \frac{5}{8} = \frac{3}{8} \div \left(\frac{10-1}{6}\right) + \frac{5}{8}$

$= \frac{3}{8} \times \frac{6}{9} + \frac{5}{8} = \frac{1}{4} + \frac{5}{8}$

$= \frac{2+5}{8} = \frac{7}{8}$

47. (c) $15 - 15 \div 15 \times 6 = x$

$\Rightarrow \quad 15 - 15 \times \frac{1}{15} \times 6 = x$

$\Rightarrow \quad 15 - 1 \times 6 = x$

$\Rightarrow \quad 15 - 6 = x \Rightarrow x = 9$

48. (d) 0.9 ÷ (0.3 × 0.3)

= 0.9 ÷ (0.09)

$= \frac{0.9}{0.09} = \frac{90}{9} = 10$

49. (d) According to the question,

C = 5% more than 150

$= 150 + 150 \times \frac{5}{100}$

$= 150 + 7.5 = 157.5$

and B = 10% less than C $= 157.5 - 157.5 \times \frac{10}{100}$

[∵ $C = 157.5$]

$= 157.5 - 15.75$

$= 141.75$

50. (c) 5% of 10% of 175 g

$$= 175 \times \frac{10}{100} \times \frac{5}{100}$$

$$= \frac{175 \times 5}{1000} = \frac{875}{1000} = 0.875 \text{ g}$$

51. (d) $49.6 \times 10.2 - 7.1 \times 29.7 - 5.1 \times 20.1$

$$= 50 \times 10 - 7 \times 30 - 5 \times 20$$

[to take value in nearest integer]

$$= 500 - 210 - 100$$

$$= 500 - 310 = 190$$

52. (d) Length of park = 1500 m

Breadth of park = 750 m

Cover distance in 1 round of park = Perimeter of park

$$= 2 \text{ (Length + Breadth)}$$

$$= 2(1500 + 750)$$

$$= 2 \times 2250 = 4500 \text{ m}$$

∴ Cover distance in 4 rounds = 4 × cover distance in 1 round = 4 × 4500 = 18000 m

$$= \frac{18000}{1000} \text{ km} \quad [\because 1 \text{ km} = 1000 \text{ m}]$$

$$= 18 \text{ km}$$

To take time in complete 4 rounds of park of cyclist

$$= \frac{\text{Distance}}{\text{Speed}} = \frac{18}{4.5} = \frac{180}{45} = 4 \text{ h}$$

53. (d) Let total number of birds be x,

According to the question,

$$\frac{x}{4} + \frac{x}{5} + 22 = x$$

$$\Rightarrow \quad \frac{5x + 4x}{20} + 22 = x$$

$$\Rightarrow \quad x - \frac{9x}{20} = 22$$

$$\Rightarrow \quad \frac{20x - 9x}{20} = 22$$

$$\Rightarrow \quad \frac{11x}{20} = 22$$

$$\Rightarrow \quad x = \frac{22 \times 20}{11} = 40$$

Hence, total number of birds are 40.

Number of birds in their nest $= \frac{1}{5} \times x$

$$= \frac{1}{5} \times 40 = 8$$

Hence, the birds in their nest are 8.

54. (d) Amit bought a table = ₹ 1200

Spent on its repair = ₹ 200

∴ Total cost price of table = ₹ (1200 + 200) = ₹ 1400

Selling price of table = ₹ 1680

∴ Profit = Selling price − Cost price $[\because SP > CP]$

$$= 1680 - 1400 = ₹\ 280$$

∴ Profit per cent

$$= \frac{\text{Profit}}{\text{Total cost price}} \times 100$$

$$= \frac{280}{1400} \times 100 = 20\%$$

55. (a) Given, side of square = 16 m

Length of rectangle = 18 m

According to the question,

Perimeter of rectangle = Perimeter of square

⇒ 2 (Length + Breadth) = 4 × side

⇒ 2 (18 + Breadth) = 4 × 16

$$18 + \text{Breadth} = \frac{4 \times 16}{2}$$

⇒ Breadth = 32 − 18 = 14 m

56. (c) Length of wall = 8 m = 800 cm $[\because 1 \text{ m} = 100 \text{ cm}]$

Breadth of wall = 6 m = 600 cm

Height of wall = 22.5 cm

∴ Volume of wall = Length × Breadth × Height

$= 800 \times 600 \times 22.5 \text{ cm}^3$

Volume of 1 brick $= 25 \times 11.25 \times 6 \text{ cm}^3$

∴ Required number of bricks of wall

$$= \frac{\text{Volume of wall}}{\text{Volume of 1 brick}}$$

$$= \frac{800 \times 600 \times 22.5}{25 \times 11.25 \times 6}$$

= 6400 bricks

57. (c) Time for travel begin

$$= \text{Time for reaching place} - 4\frac{1}{2} \text{ h}$$

= 2 : 45 pm − 4 : 30

= 14 : 45 − 4 : 30

= 10 : 15 am

58. (d) Prime factorisation of 640

2	640
2	320
2	160
2	80
2	40
2	20
2	10
5	5
	1

$\therefore 640 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5$

59. (a) Principal = ₹ 1200, Rate = 5% per annum (rate of SI)

Amount = ₹ 1800

∴ Simple interest = Amount − Principal

$$\Rightarrow \quad \frac{P \times r \times t}{100} = 1800 - 1200$$

$$\Rightarrow \quad 1200 \times 5 \times t = 600 \times 100$$

$$\Rightarrow \quad t = \frac{600 \times 100}{1200 \times 5} = 10 \text{ yr}$$

60. (c) $140.75 \times 0.01 = 1.4075$

[decimal in product is the sum of digits after decimal in both numbers]

61. (c) According to the passage, it is important to travel if one wants to get real education. So, option (c) 'travel' is the correct choice.

62. (b) 'Recreational' means 'connected with ways of enjoying oneself when one is not working'. So, its correct synonym will be 'thrilling', which means 'causing excitement and pleasure'.

63. (b) 'Pilgrim' is the suitable word to fill the blank as visiting the pilgrim centres was considered holy in ancient India.

64. (a) According to the passage, people have a feeling of oneness with others if they travel a lot. So, option (a) 'travel' is the correct choice.

65. (a) A sage is a person who is learned and wise.
So, option (a) is the correct choice.

66. (c) Fire fighters are brave and highly trained persons who often put their lives in danger. So, option (c) 'They never put their lives in danger' is not true about the fire fighters.

67. (a) A fire fighter has to prepare to extinguish a fire in minutes. So, option (a) is the correct choice.

68. (c) Idiom 'Put life on line' means 'to put one's life in danger'. So, firefighters put their lives on the line means that they put their lives in danger.

69. (b) To 'operate manually' means 'to work or operate with one's hands'. So, option (b) is the correct choice.

70. (b) The word 'occur' means 'happen or take place'.
So, option (b) 'happen' is the correct choice.

71. (c) Hema lay on her bed because she was wondering what to wear.

72. (d) Hema could not wear any of her clothes because none of them fitted her and were either too tight or too short for her.

73. (a) 'Amassing' means 'to gather or collect something in large amount'. So, option (a) 'collecting' is the correct synonym of the given word.

74. (b) Hema is a charitable person as she wanted to donate all her old clothes.

75. (b) The word 'donate' means 'to give something like money or goods to some cause such as charity'.
So, option (b), 'receive' is its correct antonym which means 'to take or accept something'.

76. (b) The main focus of the passage is to tell us the advantages of cycling. In the passage, the author tells about the benefits of cycling and how it helps in reducing the health related problems.

77. (d) When the writer says that "Cycling is good for the environment". He means that it does not emit any unhealthy gas, can be run without petrol or diesel and does not pollute air.
So, option (d) "It can be ridden by all age groups" is not correct in the context of the given statement.

78. (a) 'Sedentary' means 'involving' little exercise or physical activity'. So, option (a) 'active' is its correct antonym which means 'involving physical effort and action'.

79. (a) A low-impact exercise is one which is not tiring. Cycling is one of the best example of low-impact exercises that can be enjoyed by people of all ages.

80. (b) Regular cycling helps us to reduce fat and strengthen then muscles and remain healthy and preventing serious accidents. It does not help in combine fun with work, so option (b) is the correct choice.

Jawahar Navodaya Vidyalaya

Entrance Exam, (Class-VIth)

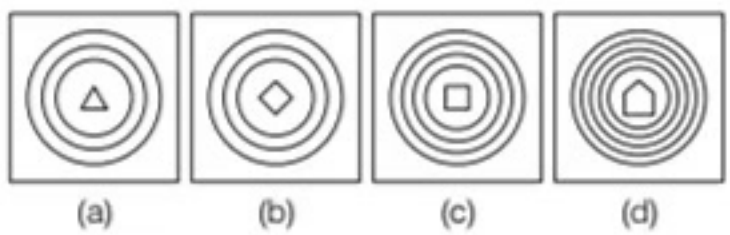
Solved Paper 2019

SECTION I : Mental Ability Test

Part I

Directions *In Question Nos.* 1 *to* 4, *four figures* (a), (b), (c) *and* (d) *have been given in each question. Of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different.*

1.

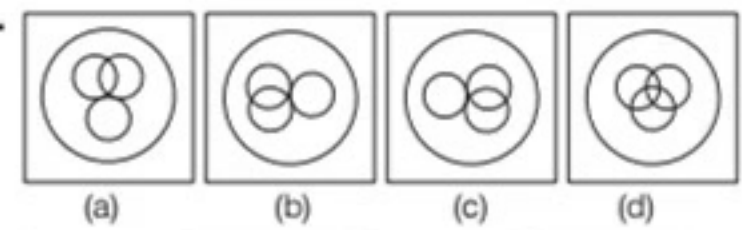


(a) (b) (c) (d)

2.

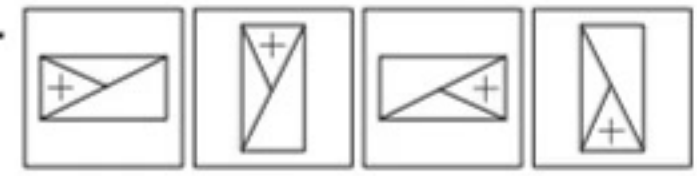
(a) (b) (c) (d)

3.



(a) (b) (c) (d)

4.

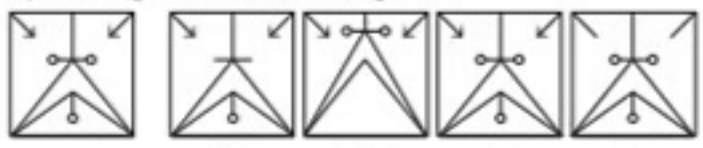


(a) (b) (c) (d)

Part II

Directions *In Question Nos.* 5 *to* 8, *a question figure is given on the left side and four answer figures marked* (a), (b), (c) *and* (d) *are given in right side. Select the answer figure which is exactly the same as the question figure.*

5. Que. Fig Answer Fig.

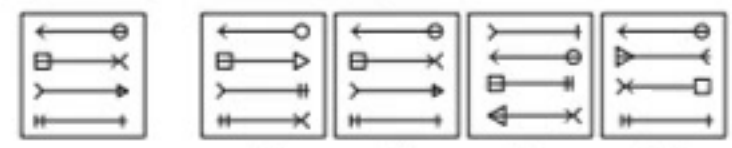


(a) (b) (c) (d)

6. Que. Fig Answer Fig.

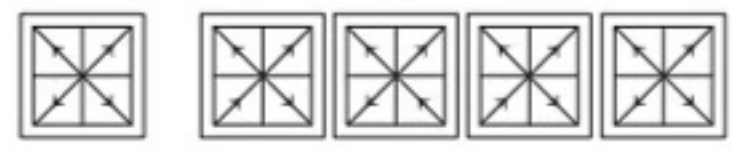
(a) (b) (c) (d)

7. Que. Fig. Answer Fig.



(a) (b) (c) (d)

8. Que. Fig. Answer Fig.

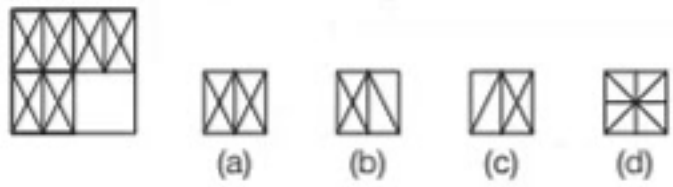


(a) (b) (c) (d)

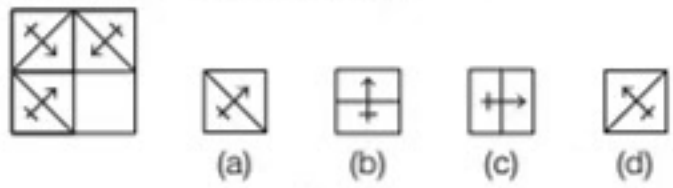
Part III

Directions *In Question Nos.* 9 *to* 12, *there is a question figure on the left side, a part of which is missing. Observe the answer figures* (a), (b), (c) *and* (d) *on the right side and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to the complete pattern in the question figure.*

9. Que. Fig. Answer Fig.



10. Que. Fig. Answer Fig.



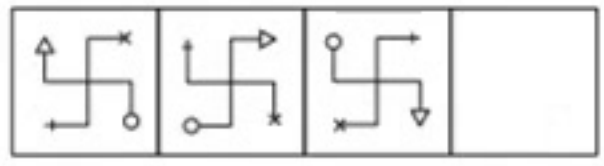
11. Que. Fig. Answer Fig.

12. Que. Fig. Answer Fig.

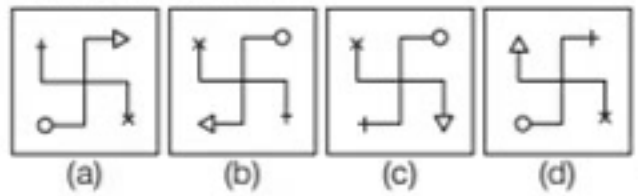
Part IV

Directions *In Question Nos.* 13 *to* 16 *there are three question figures and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure among the answer given which occupies the blank space for the fourth figure and completes the series.*

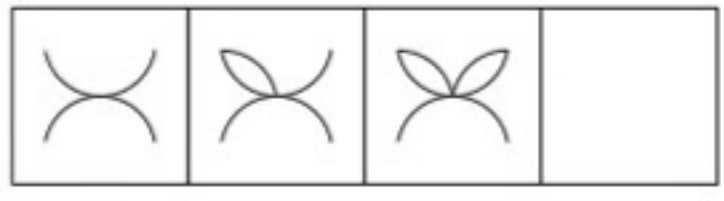
13. Question Figures



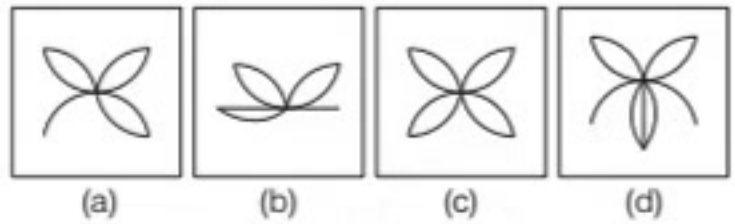
Answer Figures



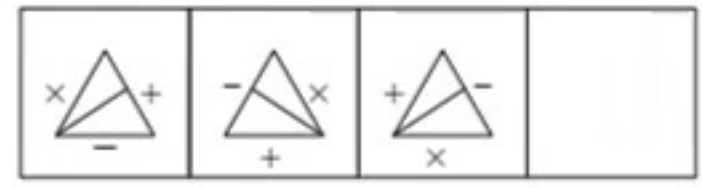
14. Question Figures



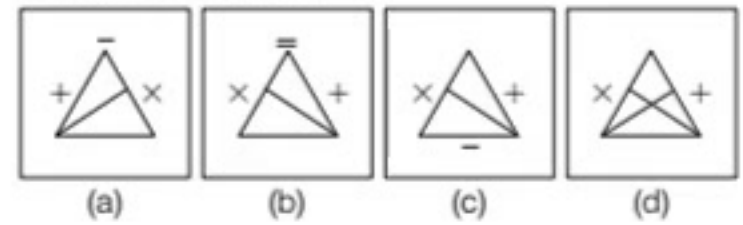
Answer Figures



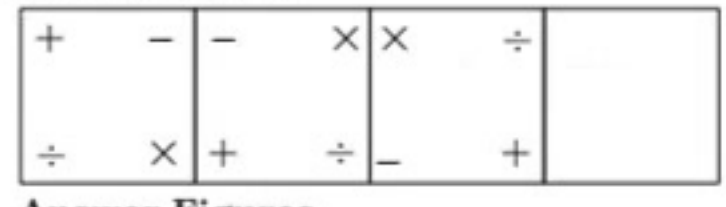
15. Question Figures



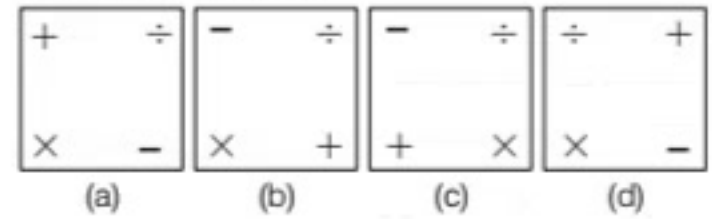
Answer Figures



16. Question Figures



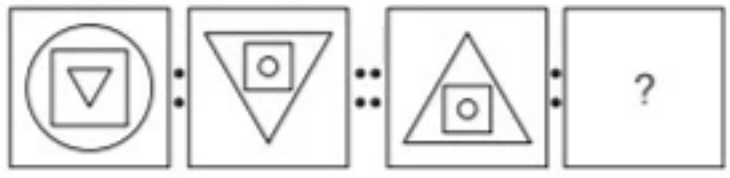
Answer Figures



Part V

Directions *In Question Nos. 17 to 20, there are two sets of two question figures each. The second set has an interrogation mark (?). There exists a relationship between the first two question figures. Similar relationship should exist between the third and fourth question figures. Select one of the answer figures which replaces the mark of interrogation.*

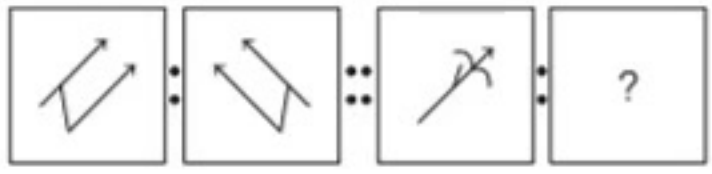
17. **Question Figures**



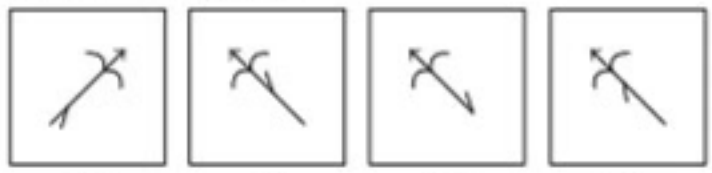
Answer Figures

(a) (b) (c) (d)

18. **Question Figures**

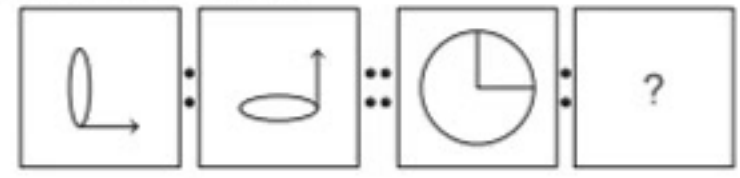


Answer Figures



(a) (b) (c) (d)

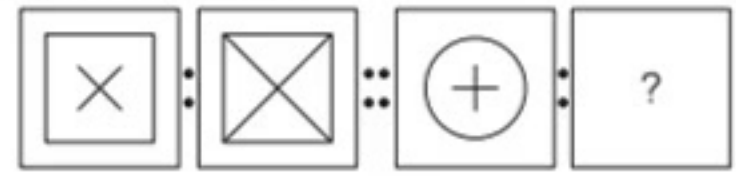
19. **Question Figures**



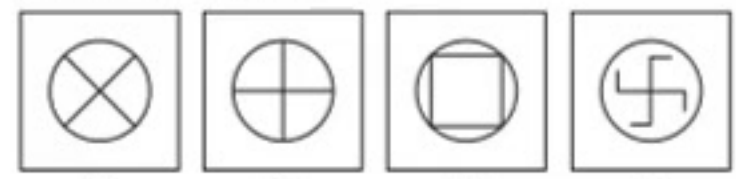
Answer Figures

(a) (b) (c) (d)

20. **Question Figures**



Answer Figures



(a) (b) (c) (d)

Part VI

Directions *In Question Nos.* 21-24, *one part of a geometrical figure (Triangle, Square, Circle) is on the left side as question figure and the other one is among the four answer figures* (a), (b), (c) *and* (d). *Find the figure on the right side that completes the geometrical figure.*

21. **Que. Fig.** **Answer Fig.**

(a) (b) (c) (d)

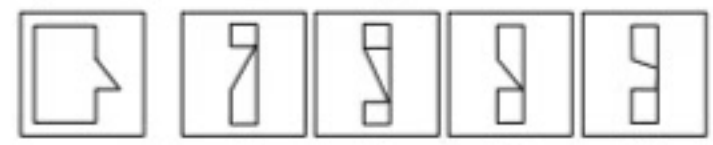
22. **Que. Fig.** **Answer Fig.**

(a) (b) (c) (d)

23. **Que. Fig.** **Answer Fig.**

(a) (b) (c) (d)

24. **Que. Fig.** **Answer Fig.**

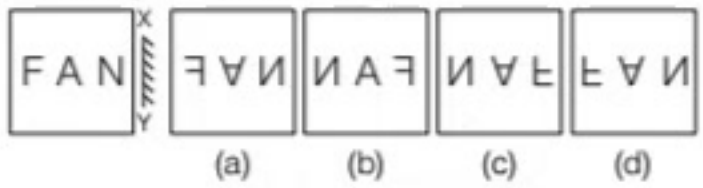


(a) (b) (c) (d)

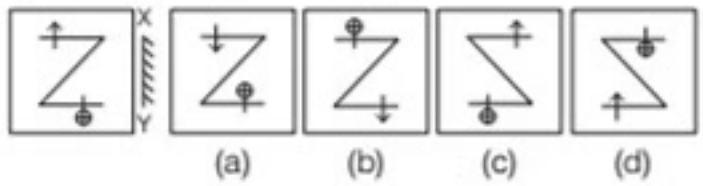
Part VII

Directions *In Question Nos. 25-28, there is a question figure is given on left side and four answer figures marked* (a), (b), (c) *and* (d) *are given. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at XY.*

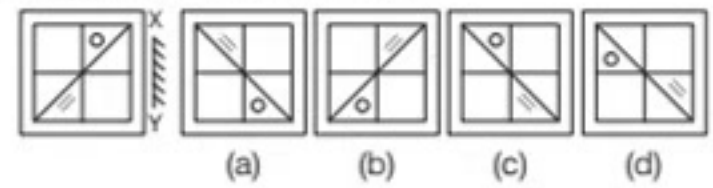
25. Que. Fig. Answer Fig.



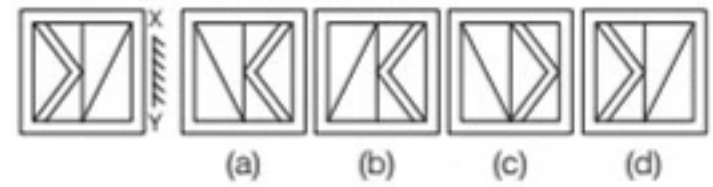
26. Que. Fig. Answer Fig.



27. Que. Fig. Answer Fig.



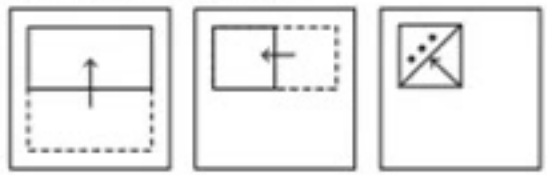
28. Que. Fig. Answer Fig.



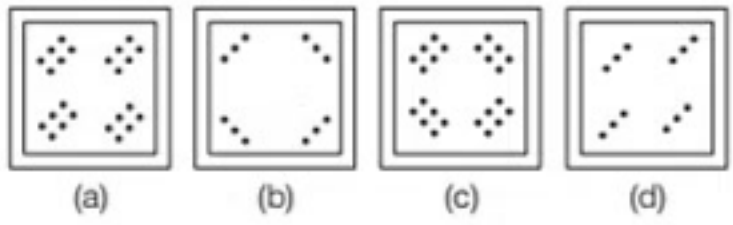
Part VIII

Directions *In Question Nos. 29 to 32, a piece of paper is folded and punched as shown in question figures and four answer figures marked* (a), (b), (c) *and* (d) *are given. Select the answer figure which indicates how the paper will appear when opened (unfolded).*

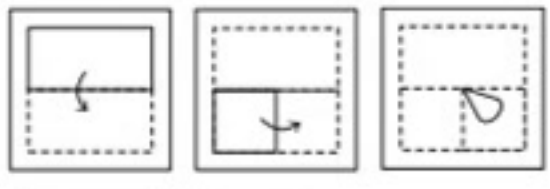
29. Question Figures



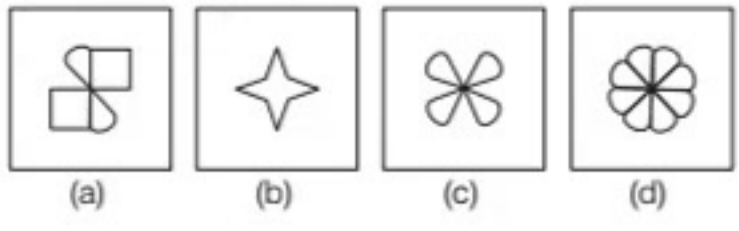
Answer Figures



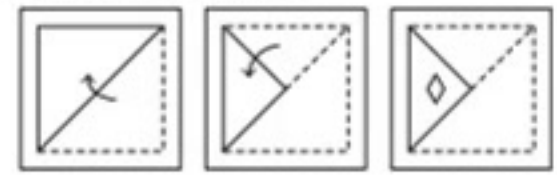
30. Question Figures



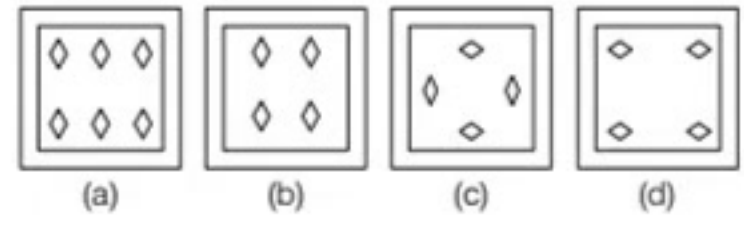
Answer Figures



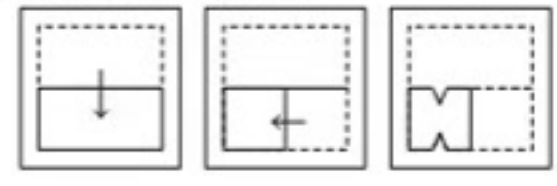
31. Question Figures



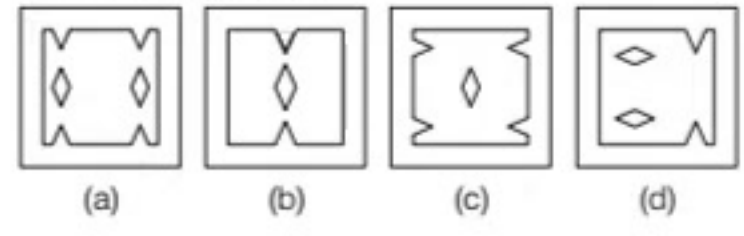
Answer Figures



32. Question Figures



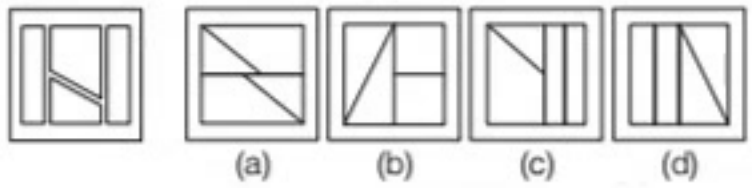
Answer Figures



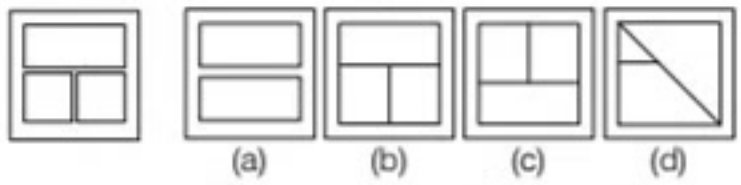
Part IX

Directions *In Question Nos.* 33 *to* 36, *a question figure is given and four answer figures marked* (a), (b), (c) *and* (d) *are given. Select the answer figure which can be formed from the cut-out pieces given in the question figure.*

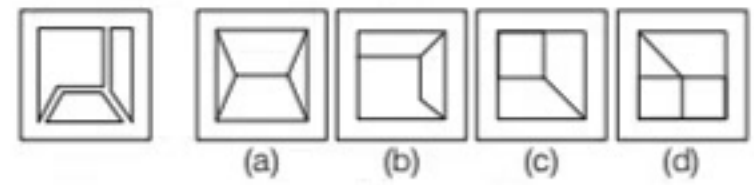
33. Que. Fig. Answer Fig.



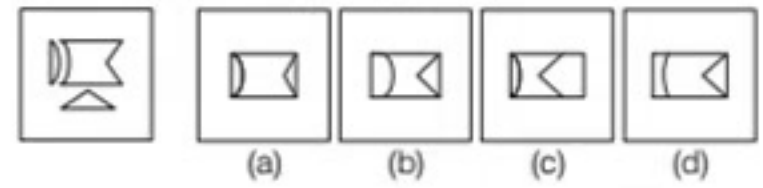
34. Que. Fig. Answer Fig.



35. Que. Fig. Answer Fig.



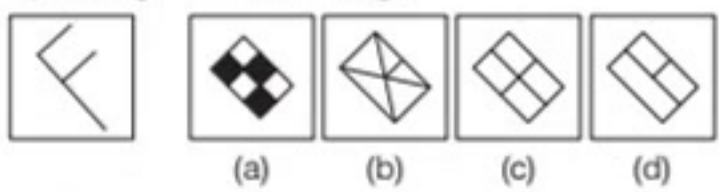
36. Que. Fig. Answer Fig.



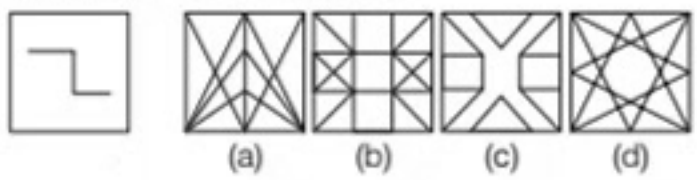
Part X

Directions *In question nos.* 37 *to* 40, *a question figure is given and four answer figures marked* (a), (b), (c) *and* (d). *Select the answer figure in which the question figure is hidden / embedded.*

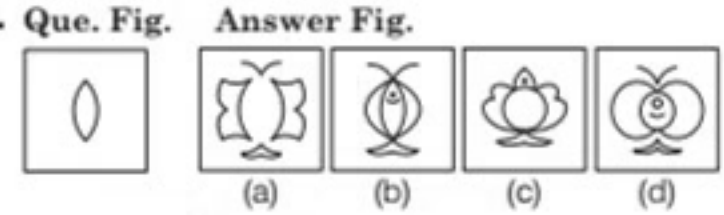
37. Que. Fig. Answer Fig.



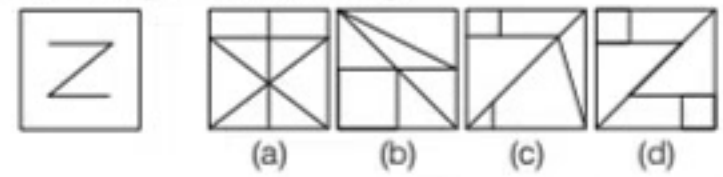
38. Que. Fig. Answer Fig.



39. Que. Fig. Answer Fig.



40. Que. Fig. Answer Fig.



SECTION II : Arithmetic Test

Directions (Q. Nos. 41-60) *For every question, four probable answers as (a), (b), (c) and (d) are given. Only one out of these is correct. Choose the correct answer and darken the circle in the OMR Answer Sheet against the number corresponding to the question.*

41. Simplification of the following gives

$$15\frac{1}{2}-\left[\frac{12}{5}\times\frac{5}{8}+\left(7\div 1\frac{3}{4}\right)\right]\times 2$$

(a) $\frac{2}{9}$ (b) $\frac{7}{2}$

(c) $\frac{9}{2}$ (d) $\frac{11}{2}$

42. The number of numbers which are multiples of both 3 and 5 in the first 100 natural numbers is

(a) 10 (b) 9 (c) 7 (d) 6

43. Which of the following statements is correct?

(a) Zero is an odd number

(b) Zero is an even number

(c) Zero is a prime number

(d) Zero is neither odd nor even number

44. If a man travels at a speed of 30 km/h, he reaches his destination 10 min late and if he travels at a speed of 42 km/h, he reaches his destination 10min early. The distance travelled is
(a) 36 km (b) 35 km (c) 40 km (d) 42 km

45. A passenger train, running at a speed of 80 km/h leaves a railway station 6h after a goods train leaves and overtakes it in 4 h. What is the speed of the goods train?
(a) 32 km/h (b) 48 km/h (c) 60 km/h (d) 50 km/h

46. What sum will amount to ₹ 6600 in 4 yrs at 8% per annum simple interest?
(a) ₹ 6000 (b) ₹ 5000 (c) ₹ 4000 (d) ₹ 6200

47. 5045 grams is equal to
(a) 50 kg, 45 gm (b) 5 kg, 45 gm
(c) 5 kg, 450 gm (d) 50 kg, 450 gm

48. How many rectangular slabs of 10 cm × 8 cm are required to cover the floor of a hall of 12 m × 10 m?
(a) 12000 (b) 15000 (c) 10000 (d) 18000

49. What is the sum of the place value of 5 in the number 584356?
(a) 10 (b) 50050 (c) 5050 (d) 500050

50. Two solid cubes of side 10 cm each are joined end to end. What is the volume of the resulting cuboid?
(a) 500 cm^3 (b) 2000 cm^3
(c) 1000 cm^3 (d) 10000 cm^3

51. 150% is equal to
(a) 1.5 (b) 5.1 (c) 0.15 (d) 15.0

52. A fruit seller buys lemons at 2 for a rupee and sells them at 5 for three rupees. What is his profit per cent?
(a) 8% (b) 10% (c) 15% (d) 20%

53. Which of the following numbers is divisible by 3, 4, 5 and 6?
(a) 36 (b) 60 (c) 80 (d) 90

54. There are 500 eggs in a box. $\frac{3}{25}$ got broken, $\frac{4}{5}$ of the remaining eggs were sold. The number of eggs left is
(a) 80 (b) 88 (c) 40 (d) 36

55. 5 minutes past 3, in the afternoon, is written as
(a) 5 : 30 am (b) 5 : 30 pm
(c) 3 : 50 pm (d) 3 : 05 pm

56. The difference between the greatest and the smallest 5-digit numbers, formed by the digits 0, 3, 6, 7 and 9 without repetition, is
(a) 93951 (b) 67061
(c) 66951 (d) 60840

57. An article is sold for ₹ 500 and hence a loss is incurred. Had the article been sold for ₹ 700, the shopkeeper would have gained three times the former loss. What is the cost price of the article?
(a) ₹ 525 (b) ₹ 550 (c) ₹ 600 (d) ₹ 650

58. When −1 is multiplied by itself 100 times, the product is
(a) 1 (b) −1 (c) 100 (d) −100

59. Simplification of 2.75 − 1.25 + 4.75 − 3.80 in fractional form is
(a) $2\frac{9}{20}$ (b) $2\frac{9}{10}$ (c) $1\frac{9}{10}$ (d) $5\frac{9}{20}$

60. The length of a rectangular plot of land is twice its breadth. A square swimming pool of side 8 m, occupies one-eighth part of the plot. The length of the plot is
(a) 64 m (b) 32 m (c) 16 m (d) 12 m

SECTION III : Language Test

Directions (Q. Nos. 61-80) *There are four passages in this Section. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each question four probable answers as* (a), (b), (c) *and* (d) *are given. Only one out of these is correct.*

Passage I

Chewing gum was discovered a thousand years ago by the Mayans in the Mexican jungles. They found a liquid leaking from a sapodilla tree. As it oozed out, it thickened into something that they called chicle which was chewable and tasty. Today, workers called chicleros still collect chicle. The chicle is boiled to remove the water. It is then made into slabs about 30 pounds each or 14 kilograms each. These slabs are sent to gum factories. There it is mixed with several ingredients to sweeten, soften, flavour and colour the gum.

61. ..... discovered chewing gum.
(a) The Mayans (b) Sapodillas
(c) Chicleros (d) Gum factories

62. ..... are the workers who collect chicle.
(a) Sapodillas (b) The Mayans
(c) Chicleros (d) Gummers

63. Slabs of chicle are sent to
(a) recycling centers (b) gum factories
(c) the Mexican jungles (d) candy stores

64. Several ingredients are added to chicle to do all of the following except to ..... it.
(a) soften (b) flavour
(c) thicken (d) sweeten

65. A suitable title for the passage will be
(a) The Gum
(b) Chiclero
(c) The Story of Chiclero
(d) The Story of Chewing Gum

Passage 2

India is a land of pilgrims and pilgrimages. These holy places, whether in the hills or in the plains, are **generally** situated on river banks or by the sea. It is not only the religious people who visit these places of pilgrimages, but also travellers and sight-seers from all over India and abroad. Wherever two or more rivers meet, pilgrims come to bathe and worship because that place is supposed to be holy. One such place is Haridwar which is situated on the bank of river Ganga.

66. Holy places are visited by religious people, sight-seers as well as ..... .
(a) children
(b) travellers
(c) traders
(d) voyagers

67. Which one of the following is a synonym of the word 'generally'?
(a) usually
(b) publicly
(c) occasionally
(d) eventually

68. The place is considered 'holy' where two or more rivers meet.
Here the antonym of the word 'holy' is
(a) godly (b) religious
(c) cursed (d) pious

69. People come to bathe and worship in the Ganga as its water is
(a) holy (b) clear and clean
(c) cool (d) healthy

70. People go on a pilgrimage because they are
(a) curious (b) religious
(c) explorers (d) old

Passage 3

It was Ajit's birthday. All his friends and relatives had gathered. He received many gifts. There were books, toys and clothes. Ajit's aunt gave him a surprise gift-a rose sapling. Ajit liked his aunt's gift the best and at once ran to the garden and planted the sapling. Ajit watered the plant everyday. As soon as he woke up in the morning, he would rush to see how much the plant had grown. One day he saw two little rose buds peeping out. He kept watching the buds bloom into beautiful yellow roses. He was happy and thrilled. With his mother's help, he plucked the flowers. He gifted the first two roses to his mother and sister. Ajit decided to plant more saplings in his garden.

71. Ajit's best birthday gift was a
(a) race car
(b) shirt
(c) rose sapling
(d) book

72. As soon as Ajit woke up he
(a) started studying
(b) rushed to see the sapling
(c) had a bath
(d) went to school

73. How many rose buds appeared first?
(a) one (b) four
(c) two (d) many

74. Ajit gifted the first two roses to
(a) his friends (b) his aunt
(c) his mother and sister (d) his mother and aunt

75. The word 'thrilled' means
(a) sad (b) excited
(c) afraid (d) surprised

Passage 4

The neem tree is known as a village pharmacy due to the medicinal benefits of its seeds, bark and leaves. It is called *arista* in Sanskrit which means perfect, imperishable and complete. Neem oil plays an important role in pest control and can also be used as a replacement for mosquito repellent. Neem seed cakes are used as fertilizer. A paste of neem leaves is used to treat chickenpox. Neem twigs commonly referred to as 'datun' are used as toothbrushes in villages. The bark and roots are also used, in powdered form, to control fleas and ticks on pets.

76. A pharmacy is
(a) farm land (b) a medical store
(c) a playground (d) a farm house

77. The part of the neem tree that is useful to the farmers is
(a) seeds (b) bark (c) twigs (d) leaves

78. Which one of the following is not a synonym of 'perfect'?
(a) faultless (b) flawless
(c) seamless (d) blemished

79. The word 'pest' in the passage means
(a) an insect that destroys crops
(b) an angry person
(c) dirty water
(d) pollution

80. Neem ... are used as toothbrushes in villages.
(a) roots
(b) leaves
(c) twigs
(d) seed cakes

Answers

1	(b)	**2**	(c)	**3**	(d)	**4**	(b)	**5**	(c)	**6**	(c)	**7**	(b)	**8**	(d)	**9**	(a)	**10**	(d)
11	(c)	**12**	(d)	**13**	(b)	**14**	(a)	**15**	(c)	**16**	(d)	**17**	(c)	**18**	(b)	**19**	(d)	**20**	(b)
21	(a)	**22**	(b)	**23**	(a)	**24**	(c)	**25**	(b)	**26**	(c)	**27**	(c)	**28**	(a)	**29**	(c)	**30**	(c)
31	(c)	**32**	(a)	**33**	(c)	**34**	(b)	**35**	(b)	**36**	(a)	**37**	(c)	**38**	(b)	**39**	(b)	**40**	(d)
41	(c)	**42**	(d)	**43**	(d)	**44**	(b)	**45**	(a)	**46**	(b)	**47**	(b)	**48**	(b)	**49**	(d)	**50**	(b)
51	(a)	**52**	(d)	**53**	(b)	**54**	(b)	**55**	(d)	**56**	(c)	**57**	(b)	**58**	(a)	**59**	(a)	**60**	(b)
61	(a)	**62**	(c)	**63**	(b)	**64**	(c)	**65**	(d)	**66**	(b)	**67**	(a)	**68**	(c)	**69**	(a)	**70**	(b)
71	(c)	**72**	(b)	**73**	(c)	**74**	(c)	**75**	(b)	**76**	(b)	**77**	(a)	**78**	(d)	**79**	(a)	**80**	(c)

Hints and Solutions

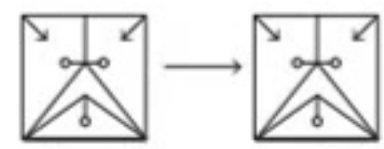
1. (b) Except figure (b), in all other figures the innermost geometrical figure is made up of similar number staight lines as there are circles.
Hence, figure (b) is different.

2. (c) Except figure (c), all other figures consist of three letters R, U and N. But in figure (c), letter 'K' is used in place of 'R'.
Hence, figure (c) is different.

3. (d) Except figure (d), all other figures have only two intersecting circles. But in figure (d), all the three circles are intersecting each other.
Hence, figure (d) is different.

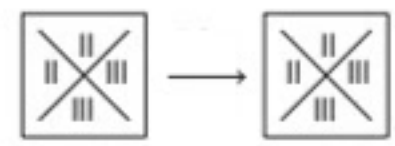
4. (b) Except figure (b), all other figures are same when rotated.

5. (c) Answer figure (c) is similar to the given question figure.



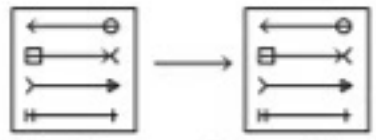
Que. Fig. Answer Fig. (c)

6. (c) Answer figure (c) is similar to the given question figure.



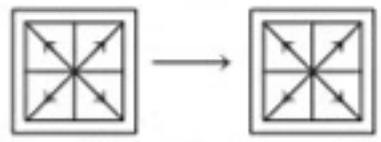
Que. Fig. Answer Fig. (c)

7. (b) Answer figure (b) is similar to the given question figure.



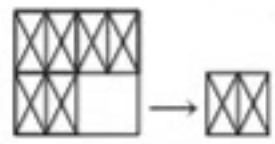
Que. Fig. Answer Fig. (b)

8. (d) Answer figure (d) is similar to the given question figure.

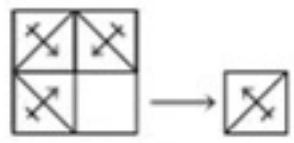


Que. Fig. Answer Fig.

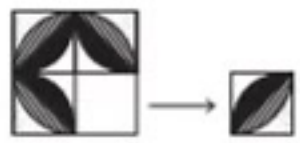
9. (a) Answer figure (a) will complete the given question figure.



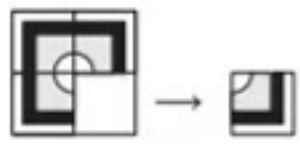
10. (d) Answer figure (d) will complete the given question figure.



11. (c) Answer figure (c) will complete the given question figure.



12. (d) Answer figure (d) will complete the given question figure.



13. (b) The elements are moving from one corner to other in clockwise direction in each step. Hence, answer figure (b) will complete the given series.

14. (a) One half-leaf is added in each step in clockwise direction. Hence, answer figure (a) will complete the given series.

15. (c) The symbols are moving from one side of triangle to other in clockwise direction in each step and the line inside the triangle is same in each alternative figure. Hence, answer figure (c) will complete the series.

16. (d) The symbols are changing their position from one corner to other in anti-clockwise direction in each step. Hence, answer figure (d) will complete the given series.

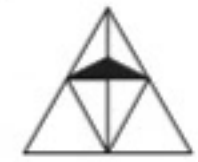
17. (c) The innermost element is enlarged and becomes the outermost element. The outermost element reduces in size and becomes the inner most element. Hence, figure (c) is the correct answer.

18. (b) Second figure is the mirror image of first figure. Hence, answer figure (b) will replace the question mark.

19. (d) From first figure to second figure, whole figure is rotated 90° anti-clockwise. Hence, answer figure (d) is correct choice.

20. (b) From first figure to second the inner element is enlarged. Hence, answer figure (b) is the correct choice.

21. (a) Answer figure (a) will complete the geometrical figure as follows

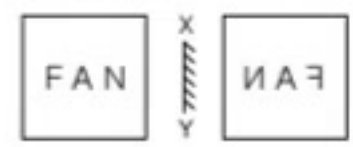


22. (b) Answer figure (b) will complete the geometrical figure as follows

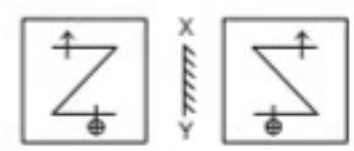
23. (a) Answer figure (a) will complete the geometrical figure as follows

24. (c) Answer figure (c) will complete the geometrical figure as follows

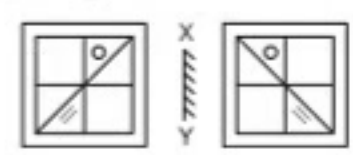
25. (b) Answer figure (b) is the correct mirror image of the given question figure.



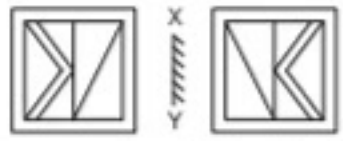
26. (c) Answer figure (c) is the correct mirror image of the given question figure.



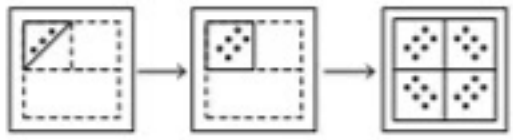
27. (c) Answer figure (c) is the correct mirror image of the given question figure.



28. (a) Answer figure (a) is the correct mirror image of the given question figure.



29. (c) When the paper is unfolded, it will appear as shown in answer figure (c).

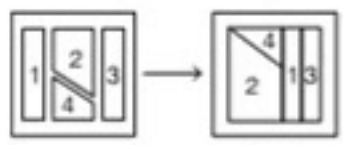


30. (c) When the paper is unfolded, it will appear as shown in answer figure (c).

31. (c) When the paper is unfolded, it will appear as shown in answer figure (c).

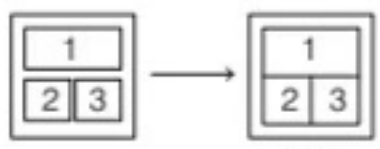
32. (a) When the paper is unfolded, it will appear as shown in answer figure (a).

33. (c) Answer figure (c) can be formed from the cut out pieces given in the question figure.



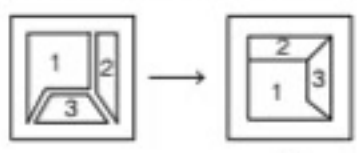
(c)

34. (b) Answer figure (b) can be formed from the cut out pieces given in the question figure.



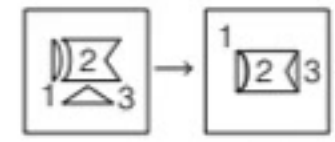
(b)

35. (b) Answer figure (b) can be formed from the cut out pieces given in the question figure.



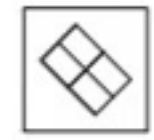
(b)

36. (a) Answer figure (a) can be formed from the cut out pieces given in the question figure.

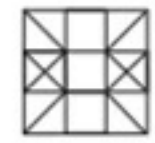


(a)

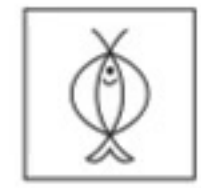
37. (c) The question figure is embedded in the answer figure (c).



38. (b) The question figure is embedded in the answer figure (b).



39. (b) The question figure is embedded in the answer figure (b).



40. (d) The question figure is embedded in the answer figure (d).

41. (c) Given expression,

$$15\frac{1}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div 1\frac{3}{4}\right)\right] \times 2$$

By applying VBODMAS,

$$= \frac{31}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div \frac{7}{4}\right)\right] \times 2$$

$$= \frac{31}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \frac{7 \times 4}{7}\right] \times 2 = \frac{31}{2} - \left[\frac{3}{2} + 4\right] \times 2$$

$$= \frac{31}{2} - \left[\frac{11}{2}\right] \times 2 = \frac{31}{2} - 11 = \frac{31 - 22}{2} = \frac{9}{2}$$

42. (d) $\because$ LCM of 3 and 5 = 15

The numbers which are multiples of both 3 and 5

$= 15 \times 1, 15 \times 2, 15 \times 3, 15 \times 4, 15 \times 5, 15 \times 6$

$= 15, 30, 45, 60, 75, 90$

Total numbers = 6

43. (d) Zero is neither odd nor even number.

44. (b) According to the question, speed = 30 km/h,

$$\text{time} = \left(t + \frac{10}{60}\right)\text{h} = \left(t + \frac{1}{6}\right)\text{h}$$

By using, $\text{Speed} = \dfrac{\text{Distance}}{\text{Time}}$

Distance $(S) = 30 \times \left(t + \frac{1}{6}\right)$ ...(i)

According to the question,

Speed = 42 km/h

Time $= \left(t - \frac{10}{60}\right)$h $= \left(t - \frac{1}{6}\right)$h

$\Rightarrow$ Distance $(S) = 42 \times \left(t - \frac{1}{6}\right)$ ...(ii)

From Eqs. (i) and (ii),

Distance $(S) = 30\left(t + \frac{1}{6}\right) = 42 \times \left(t - \frac{1}{6}\right)$

$\Rightarrow \quad 5\left(t + \frac{1}{6}\right) = 7\left(t - \frac{1}{6}\right)$

$\Rightarrow \quad 5t + \frac{5}{6} = 7t - \frac{7}{6} \Rightarrow 2t = \frac{12}{6}$

$\therefore \quad t = 1$ h

Hence, distance $(S) = 30\left(t + \frac{1}{6}\right)$

$= 30\left(1 + \frac{1}{6}\right) = 30 \times \frac{7}{6} = 35$ km

45. (a) According to the question,

Speed of passenger train = 80 km/h

Time taken by passenger train = 4 h

Let, speed of goods train = v

Time taken by goods train = 6 + 4 = 10 h

$\because$ Distance covered by both the trains is same.

Now, by using, Speed $= \frac{\text{Distance}}{\text{Time}}$

Distance = Speed × Time

Distance $= 80 \times 4 = v \times 10 \Rightarrow v = 32$ km/h

46. (b) According to the question,

Amount (A) = ₹ 6600

time (t) = 4 yr

rate (r) = 8%

By using, Simple Interest $= \frac{\text{Principal} \times \text{rate} \times \text{time}}{100}$

$$\text{SI} = \frac{Prt}{100}$$

$$\Rightarrow \quad \text{SI} = \frac{P \times 4 \times 8}{100} \quad \text{...(i)}$$

But, Amount $(A) = P + \text{SI}$

From Eq. (i),

$$A = P + \frac{P \times 4 \times 8}{100}$$

$$\Rightarrow \quad 6600 = P + \frac{8P}{25}$$

$$\Rightarrow \quad 6600 = \frac{33P}{25} \Rightarrow P = 200 \times 25$$

$\therefore \quad P$ = ₹ 5000

47. (b) 1 kg = 1000 gm

Given, 5045 gm = (5000 + 45) gm

This can be written as 5 × 1000 × 45 gm

i.e. 5 kg. 45 gm

48. (b) According to the question,

Size of a rectangular slab = Length × Breadth

= 10 cm × 8 cm

Size of a hall = Length × Breadth = 12 m × 10 m

= 1200 cm × 1000 cm [$\because$ 1 m = 100 cm]

Total number of slabs $= \frac{\text{Size of a hall}}{\text{Size of a rectangular slab}}$

$$= \frac{1200 \times 1000}{10 \times 8} = 15000$$

$\therefore$ Total number of rectangular slabs = 15000

49. (d) Given, 5 84 356

Place values of 5 → $\boxed{5}$ 84 3 $\boxed{5}$ 6

i.e. 500000 and 50

Sum of place values of 5 = 500000 + 50 = 500050

50. (b) According to the question,

Side of a cube = 10 cm

When, two cubes are joined end to end

Length of a cuboid (l) = 20 cm, breadth (b) = 10 cm,

height (h) = 10 cm

By using, volume of a cuboid $= l \times b \times h$

$= 20 \times 10 \times 10 = 2000$ cm^3

51. (a) Given, 150%

150% is written as $\frac{150}{100} = \frac{15}{10} = 1.5$

52. (d) Seller buys 2 lemons in = ₹ 1

Cost price of 1 lemon (CP) $= \frac{1}{2}$ ...(i)

Seller sells 5 lemon in = ₹ 3

Selling price of 1 lemon (SP) $= \frac{3}{5}$ ...(ii)

But, profit % $= \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100 = \frac{\frac{3}{5} - \frac{1}{2}}{\frac{1}{2}} \times 100$

$$= \frac{\frac{6-5}{10}}{\frac{1}{2}} \times 100 = \frac{2}{10} \times 100 = 20\%$$

53. (b) From the options,

Multiples of 60 = 2 × 2 × 3 × 5 or 4 × 3 × 5 or 6 × 10

Hence, number 60 is divisible by 3, 4, 5 and 6.

54. (b) According to the question,

Total eggs = 500 $\Rightarrow \frac{3}{25}$ got broken

i.e. broken eggs $= \frac{3}{25} \times 500 = 60$

$\therefore$ Remaining eggs = 500 − 60 = 440

Now, $\frac{4}{5}$ of the remaining eggs were sold i.e.

$$= \frac{4}{5} \times 440 = 88 \times 4 = 352$$

Hence, number of eggs left = 500 − (60 + 352)

$$= 500 - 412 = 88$$

55. (d) According to the question,

$\Rightarrow$ 5 min past 3 in the afternoon is written as 3 : 05 pm.

i.e. 3 hrs 5 minutes in the afternoon.

56. (c) Given digits = 0, 3, 6, 7, 9

Greatest 5-digit number = 97630

Smallest 5-digit number = 30679

$\therefore$ The difference between the greatest and the smallest numbers = 97630 − 30679 = 66951

57. (b) According to the question,

When Selling Price (SP_1) = ₹ 500, there is a loss L.

When Selling Price (SP_2) = ₹ 700, there is a profit i.e. 3 times the former loss = $3L$

By using,

$$SP = \left(\frac{100 \pm \text{Profit / Loss}}{100}\right) \times \text{Cost price}$$

$$SP_1 = 500 = \frac{100 - L}{100} \times CP \quad \ldots(i)$$

$$SP_2 = 700 = \frac{100 + 3L}{100} \times CP \quad \ldots(ii)$$

From Eqs. (i) and (ii),

$$\frac{500}{700} = \frac{100 - L}{100 + 3L}$$

$$500 + 15L = 700 - 7L$$

$$22L = 200$$

$$L = \frac{200}{22} = 9.09$$

From Eq. (i),

$$SP_1 = 500 = \frac{100 - 9.09}{100} \times CP$$

$$CP = \frac{500 \times 100}{90.91} = 550$$

Hence, the CP of the article = ₹ 550

58. (b) According to the question,

$\therefore$ Required answer = $(-1) \times (1)^{100} = (-1)^{101} = -1$

59. (a) According to the question,

Given expression = 2.75 − 1.25 + 4.75 − 3.80

By BODMAS rule,

$$= 2.75 + 4.75 - 1.25 - 3.80$$

$$= 7.5 - 5.05 = 2.45 = \frac{245}{100} = \frac{49}{20} = 2\frac{9}{20}$$

60. (b) According to the question,

Let breadth of a rectangular plot = B

Length of a rectangular plot (l) = $2B$

$\therefore$ A square swimming pool of side 8 m occupies one-eighth part of the plot.

$\therefore$ Area of swimming pool

$$= \frac{1}{8} \times \text{area of a rectangular plot}$$

$$\text{or } (\text{Side})^2 = \frac{1}{8} \times l \times b$$

$$(8)^2 = \frac{1}{8} \times 2B \times B$$

$$64 = \frac{1}{4} \times B^2$$

$$B^2 = 64 \times 4$$

$$= 256$$

$$B = 16 \text{ m}$$

Hence, length of the plot = 2 × 16 = 32 m

61. (a) The Mayans discovered chewing gum.

62. (c) Chicleros are the workers who collect chicle.

63. (b) Slabs of chicle are sent to gum factories.

64. (c) Except to thicken it several ingredients are added to chicle to soften, add flavour and colour to the gum.

65. (d) A suitable title for the passage will be 'The story of Chewing Gum'.

66. (b) Holy places are visited by religious people, sight-seers as well as travellers.

67. (a) 'Generally' means 'usually'. So, 'usually' is the correct synonym of 'generally'.

68. (c) 'Holy' means 'religious', its antonym is 'cursed'.

69. (a) People come to bathe and worship in the Ganga as its water is holy.

70. (b) According to the passage, people go on a pilgrimage because they are religious.

71. (c) Ajit's best birthday gift was a rose sapling.

72. (b) As soon as Ajit woke up, he rushed to see the sapling.

73. (c) Firstly, two rose buds are appeared.

74. (c) Ajit gifted the first two roses to his mother and sister.

75. (b) The word 'thrilled' means excited.

76. (b) A pharmacy is a medical store.

77. (a) The part of the neem tree that is useful to the farmers is its seeds.

78. (d) 'Perfect' means faultless, flawless, seamless etc. Blemished is not a synonym of 'Perfect'.

79. (a) The word 'Pest' in the passage means, an insect that destroys crops.

80. (c) Neem twigs are used as toothbrushes in villages.

Jawahar Navodaya Vidyalaya

Entrance Exam

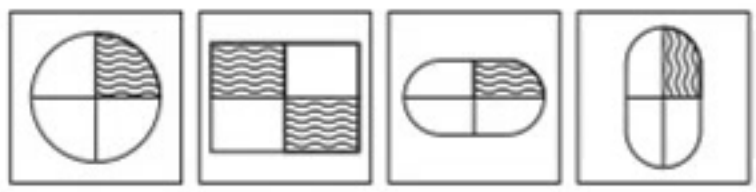
Solved Paper 2018

SECTION I : Mental Ability Test

Part I

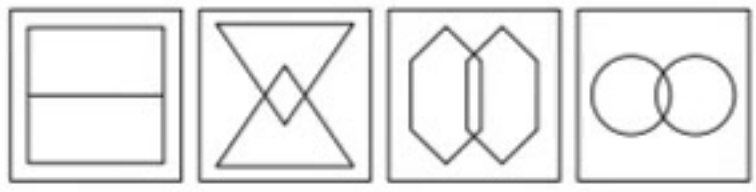
Directions (Q. Nos. 1-5) *Four figures* (1), (2), (3) *and* 4 *have been given in the each question of these four figures three figures, are similar in some way and one figure is different. Select the figures which is different and write your answer only in english numbers* (*i.e.* 1,2,3,4) *in the box against the number corresponding to the question.*

1.



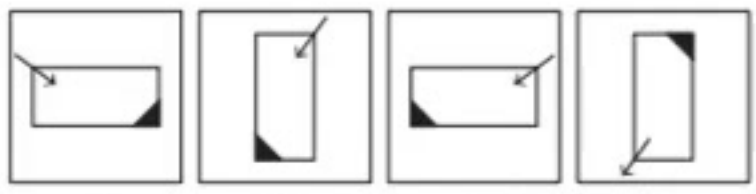
(1) (2) (3) (4)

2.



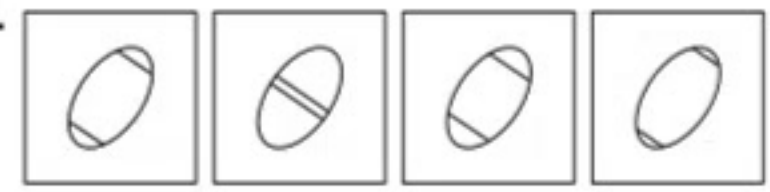
(1) (2) (3) (4)

3.



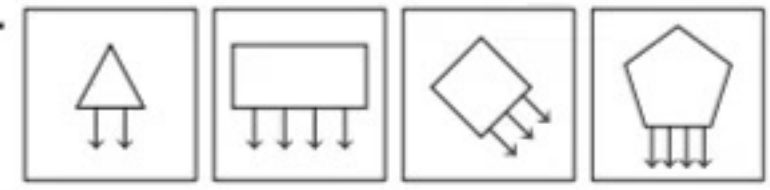
(1) (2) (3) (4)

4.



(1) (2) (3) (4)

5.

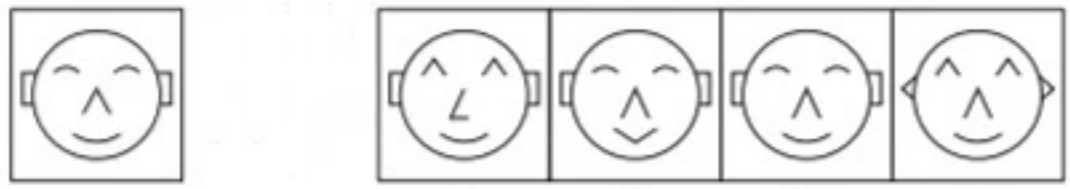


(1) (2) (3) (4)

Part II

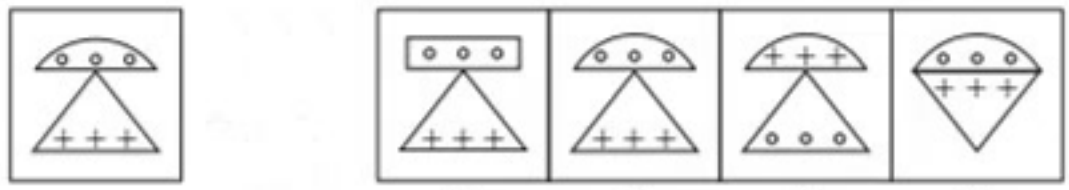
Directions (Q. Nos. 6-10) *A question figure is given on the left side and four answer figures marked* (1), (2), (3) *and* (4) *are given on the right side. Select the answer figure which is exactly the same as question figure and write your answer only in english numbers* (*i.e* 1, 2, 3, 4) *in the box against the number corresponding to the question.* .

6. **Question Figure** **Answer Figures**



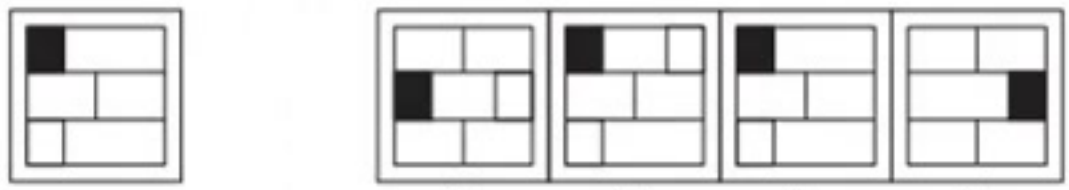
(1) (2) (3) (4)

7.



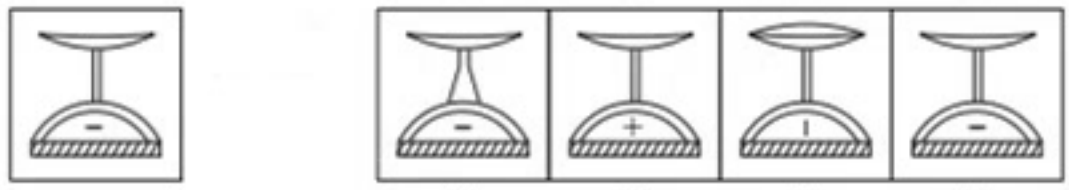
(1) (2) (3) (4)

8.



(1) (2) (3) (4)

9.



(1) (2) (3) (4)

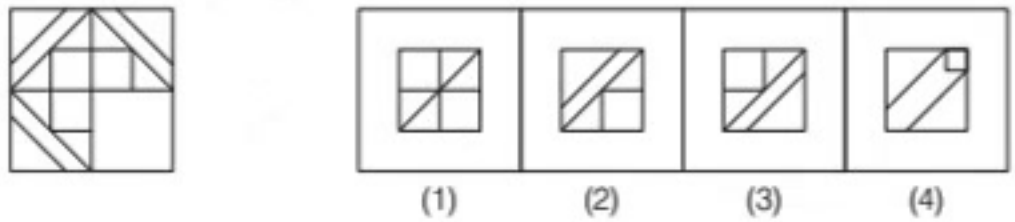
10.

(1) (2) (3) (4)

Part III

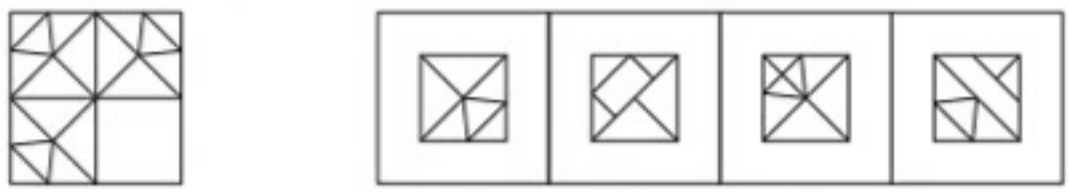
Directions (Q. Nos. 11-15) *There is a question figure on the left hand side, a part of which is missing. Observed the answer figures* 1,2,3,4 *on the right hand side and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure. Indicate your answer by number of the answer figure chosen by your in the box against the number corresponding to the question.*

11. **Question Figure** **Answer Figures**



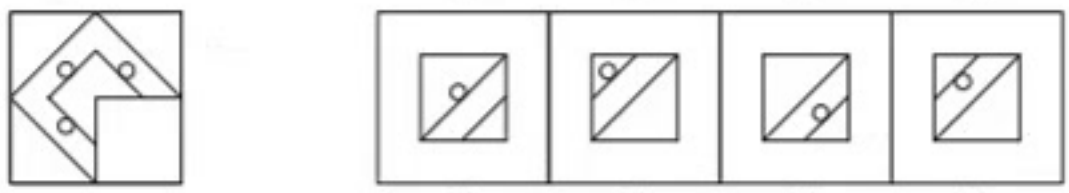
(1) (2) (3) (4)

12. **Question Figure** **Answer Figures**



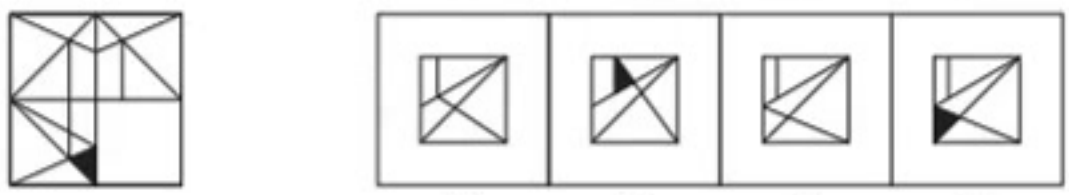
(1) (2) (3) (4)

13.



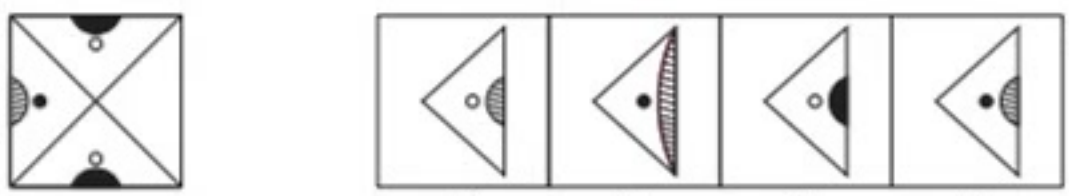
(1) (2) (3) (4)

14.



(1) (2) (3) (4)

15.



(1) (2) (3) (4)

Part IV

Directions (Q. Nos. 16-20) *There are three questions figures on the left hand side and the space for the fourth figure is left blank. Question figures are in a series. Find out one figure from among the answer figures given on the right hand side which occupies the blank space for the fourth figure on the left hand side and completes the series. Indicate your answer by number to the answer figure chosen by you in the box against the number corresponding to the question.*

16. **Question Figures** **Answer Figures**

(1) (2) (3) (4)

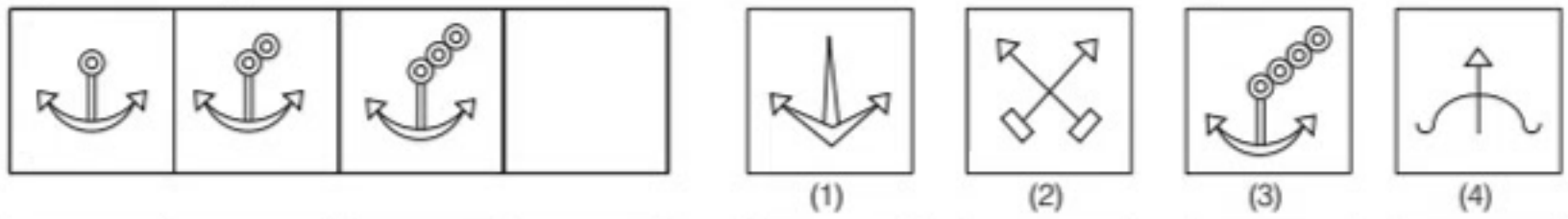
17.

(1) (2) (3) (4)

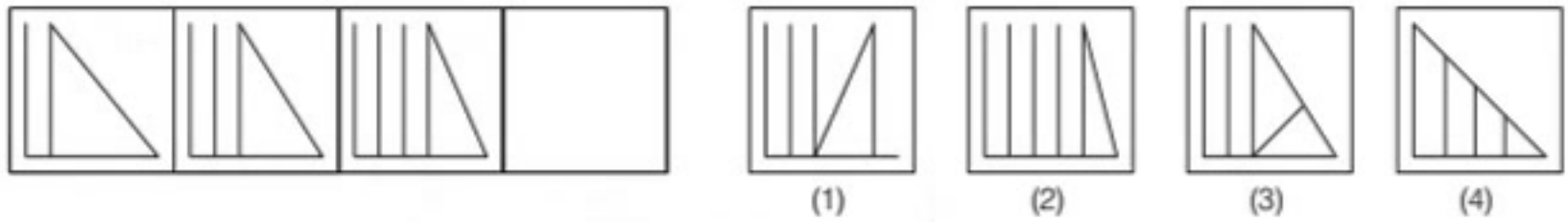
18.

(1) (2) (3) (4)

19. **Question Figure** **Answer Figures**



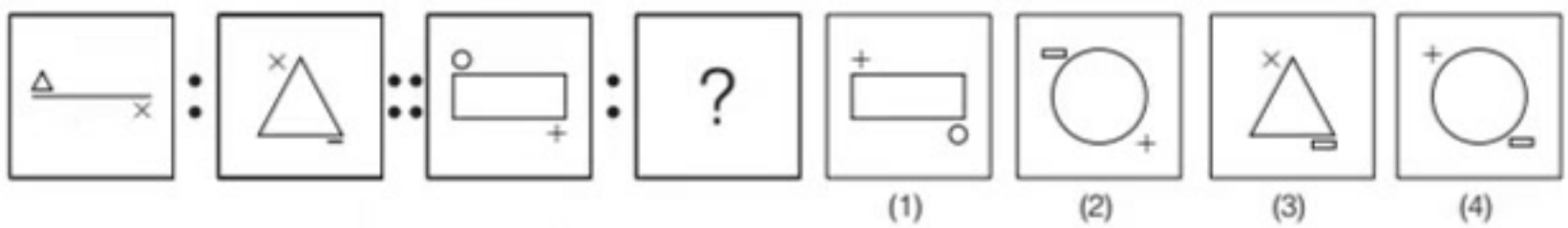
20.



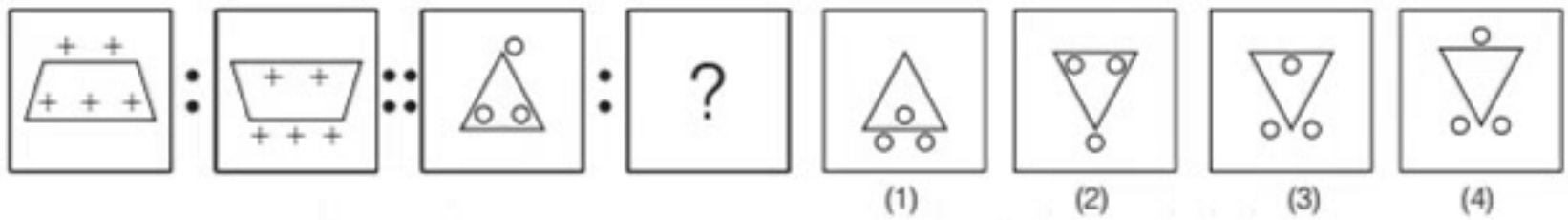
Part V

Directions (Q. Nos. 21-25) *There are two sets of two question figures each. The second set has a question mark '?'. There exists a relationship between the first two question figures. Similar relationship should exist between the third and fourth question figure. Select one of the answer figures which replaces the question mark. Write the number of the answer figure selected by you in the box against the number corresponding the question.*

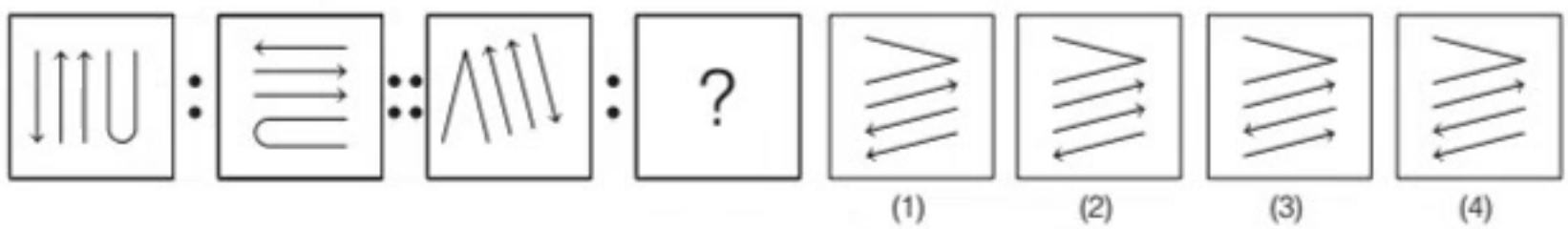
21. **Question Figures** **Answer Figures**



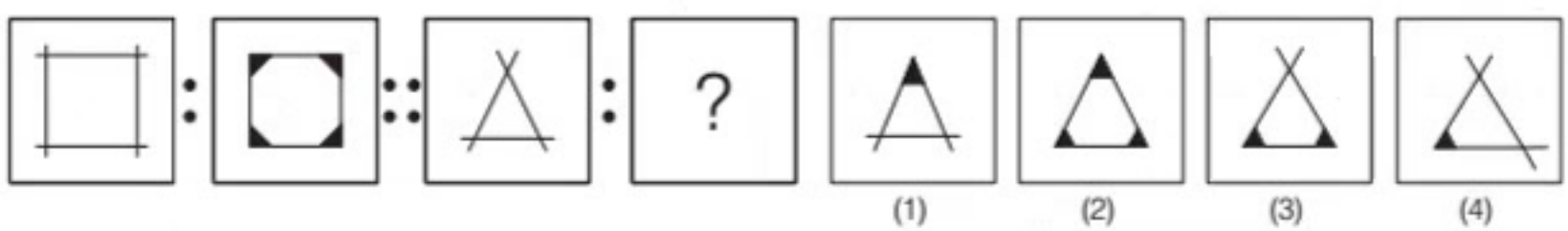
22.



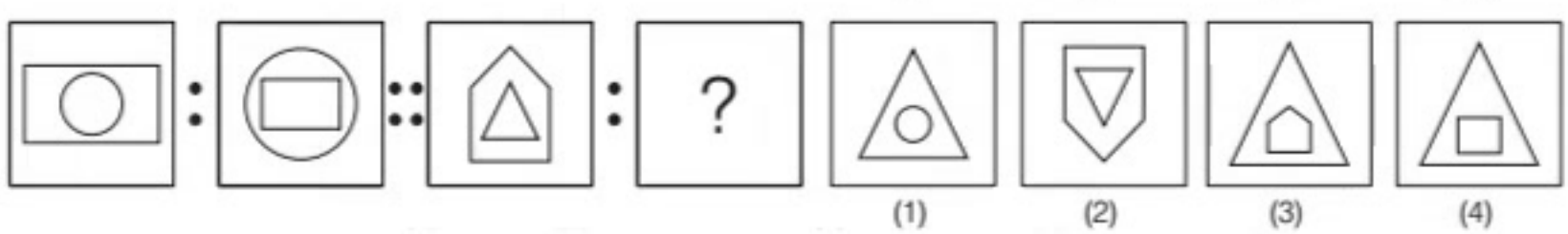
23.



24.



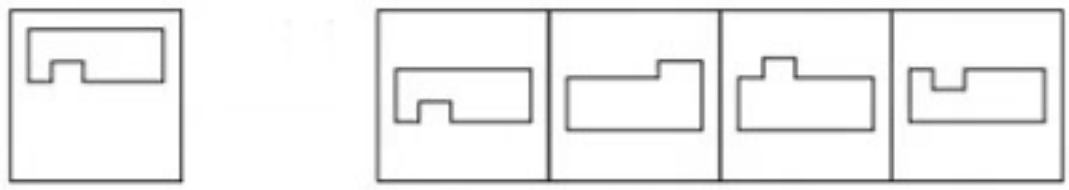
25.



Part VI

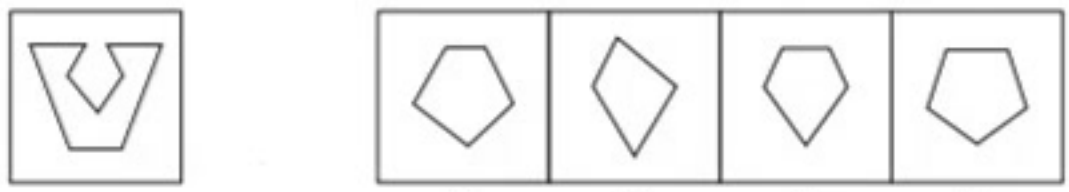
Directions (Q. Nos. 26-30) *One part of a geometrical figure is on left hand side as question figure and the other one is among the four answer figures* (1), (2), (3), (4), *on the right hand side. Find the figure on the right hand side that complete the geometrical figure and write the number given below that figure in the box against the number corresponding to the question.*

26. **Question Figure** **Answer Figures**



(1) (2) (3) (4)

27.

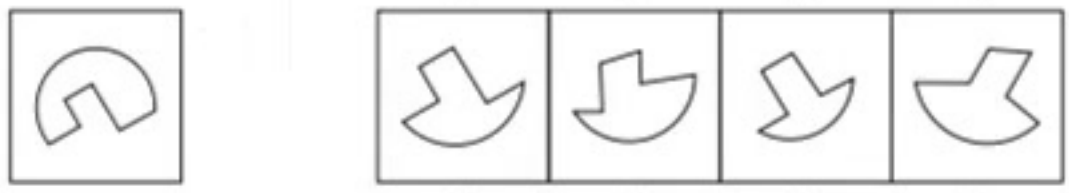


(1) (2) (3) (4)

28.

(1) (2) (3) (4)

29.



(1) (2) (3) (4)

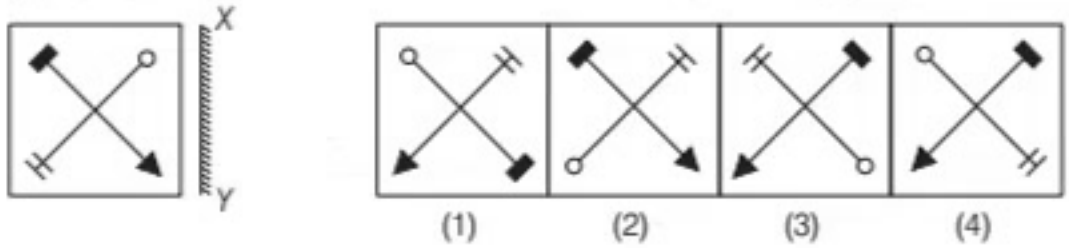
30.

(1) (2) (3) (4)

Part VII

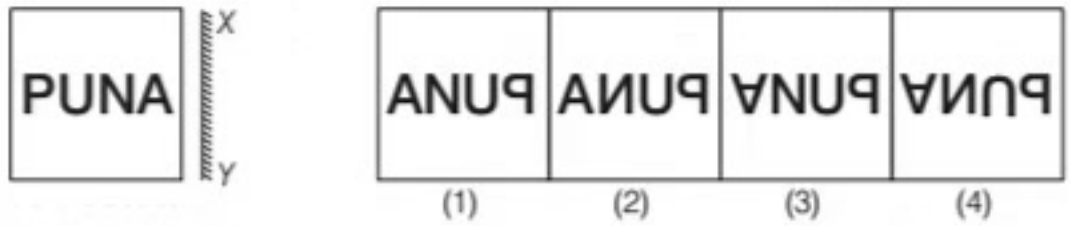
Directions (Q. Nos. 31-35) *There is a question figure on the left side and four answer figures marked* 1, 2, 3, 4 *are given on the right side. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at XY. Indicate your answer by number of the answer figure chosen by you in the box against the number corresponding to the question.*

31. **Question Figure** **Answer Figures**

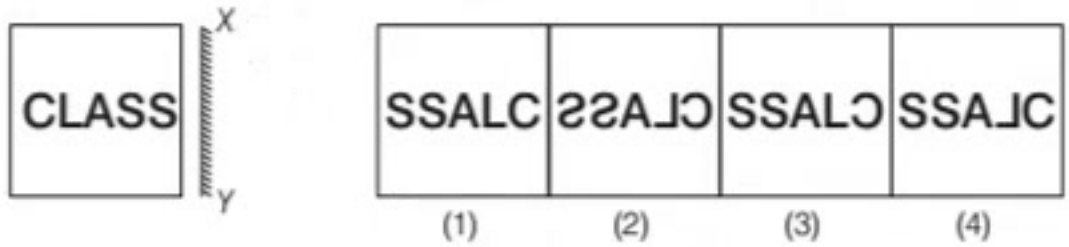


(1) (2) (3) (4)

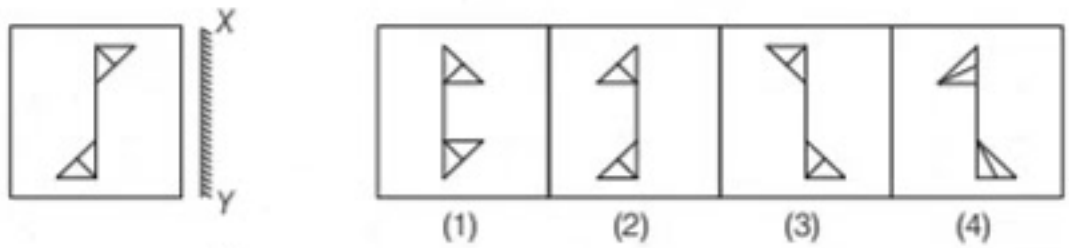
32. **Question Figure** **Answer Figures**



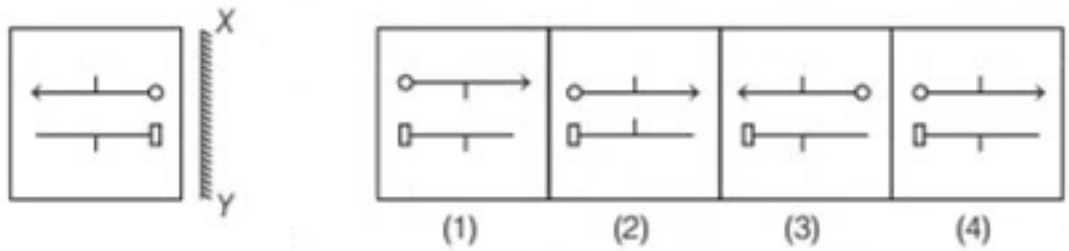
33.



34.



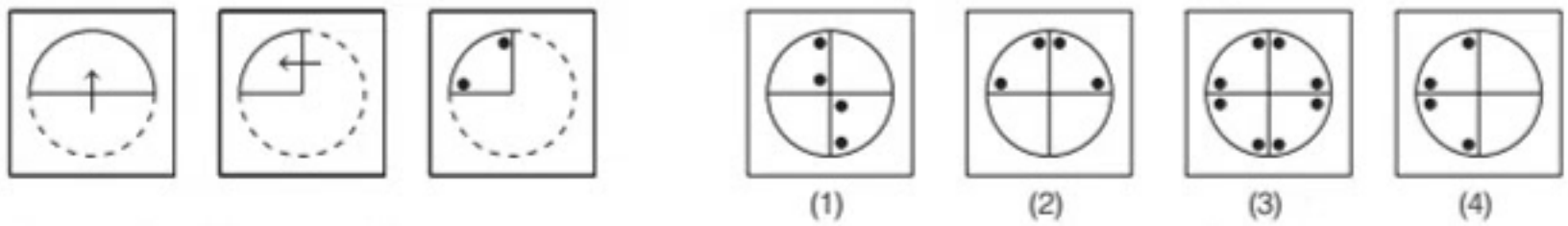
35.



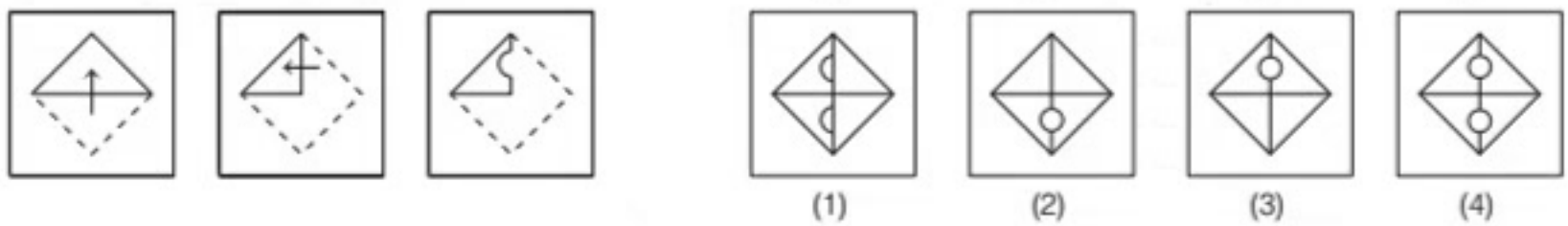
Part VIII

Directions (Q. Nos. 36-40) *A piece of paper is folded and punched as shown in question figures on the left side and four answer figures marked,* 1, 2, 3, 4 *are given on right side. Select the answer figure which indicate how the paper will appear when opened (unfolded). Indicate your answer by number of the answer figure chosen by you in the box against the number corresponding to the question.*

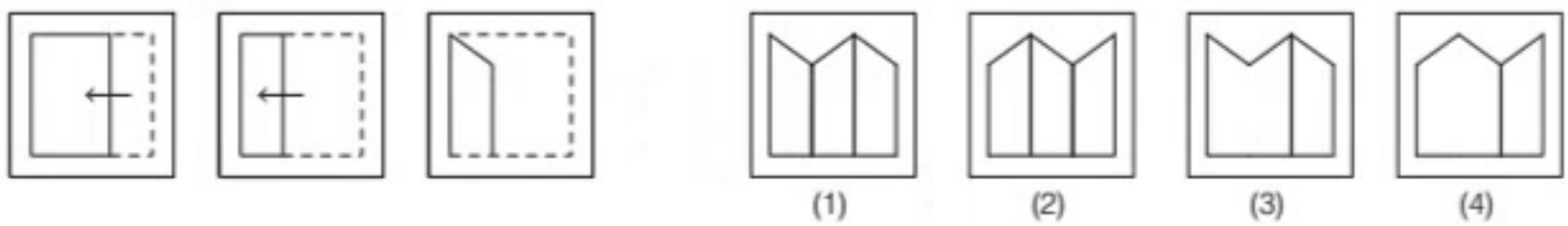
36. **Question Figures** **Answer Figures**



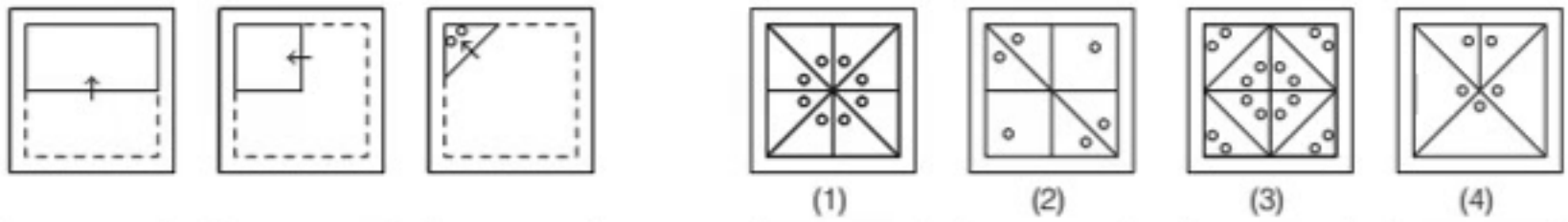
37.



38.

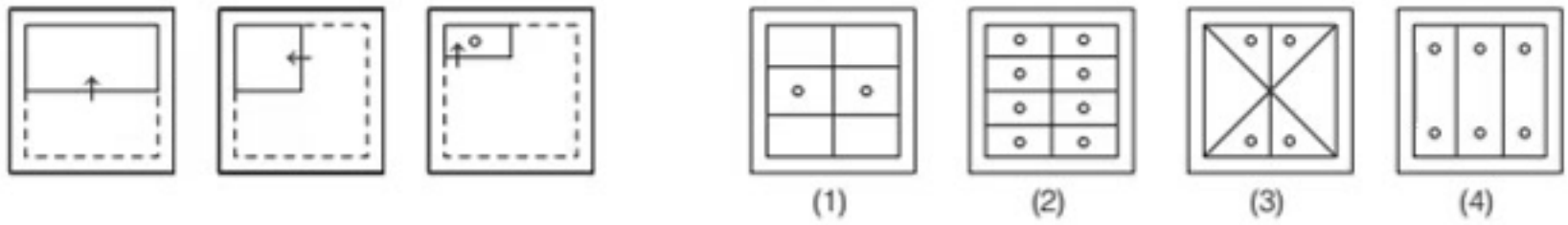


39. **Question Figures** **Answer Figures**



(1) (2) (3) (4)

40.

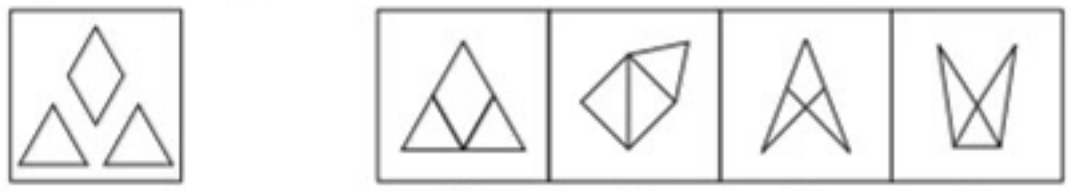


(1) (2) (3) (4)

Part IX

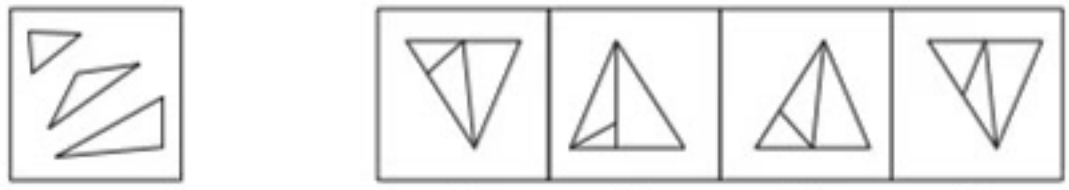
Directions (Q. Nos. 41-45) *A question figure is given on the left side and four answer figures, marked* 1, 2, 3, 4 *are given on the right side. Select the answer figure which can be formed from the cut-out pieces given in the question figure and write your answer only in english numbers* (*i.e.* 1, 2, 3, 4) *in the box against the number corresponding to the question.*

41. **Question Figure** **Answer Figures**



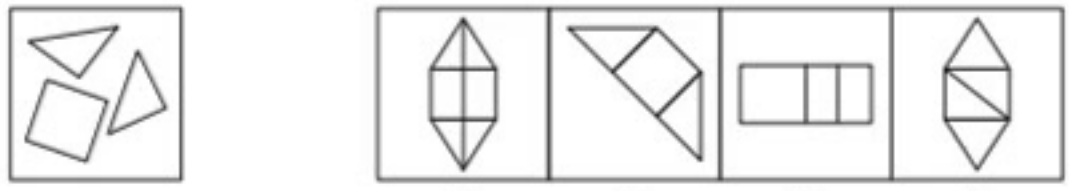
(1) (2) (3) (4)

42.



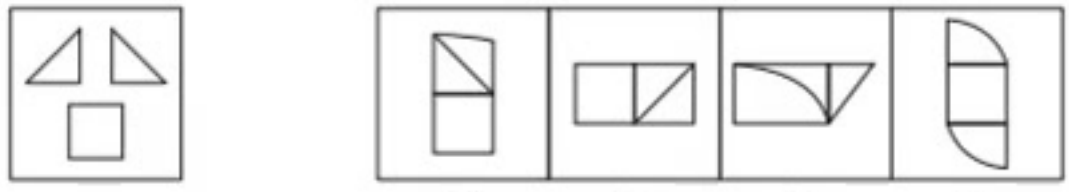
(1) (2) (3) (4)

43.



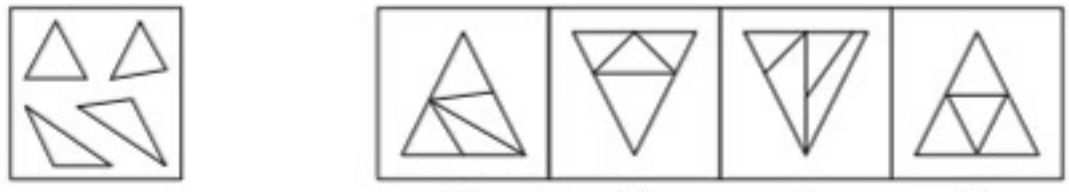
(1) (2) (3) (4)

44.



(1) (2) (3) (4)

45.

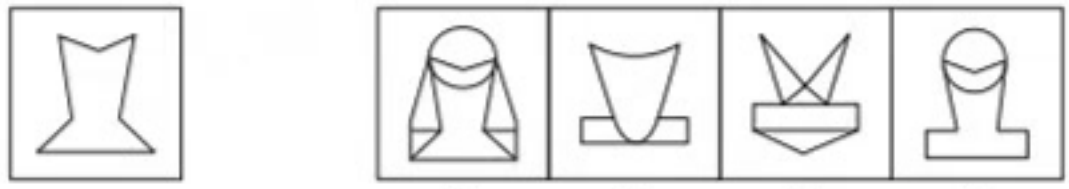


(1) (2) (3) (4)

Part X

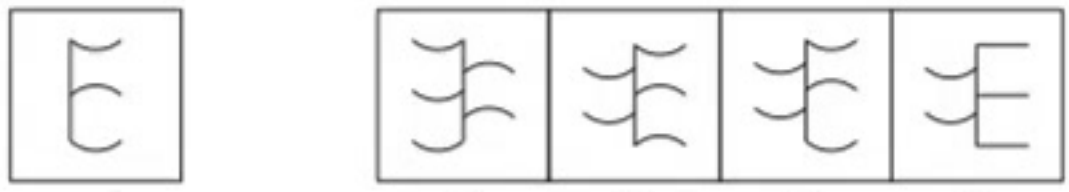
Directions (Q. Nos. 46-50) *A question figure is given on the left side and four answer figures, marked* 1, 2, 3, 4 *are given on the right side. Select the answer figures which the question figure is hidden/embedded and write your answer only in english numbers* (*i.e.* 1, 2, 3, 4) *in the box against the number corresponding to the question.*

46. **Question Figure** **Answer Figures**



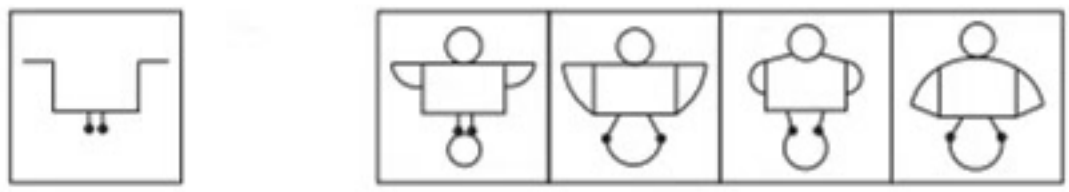
(1) (2) (3) (4)

47.



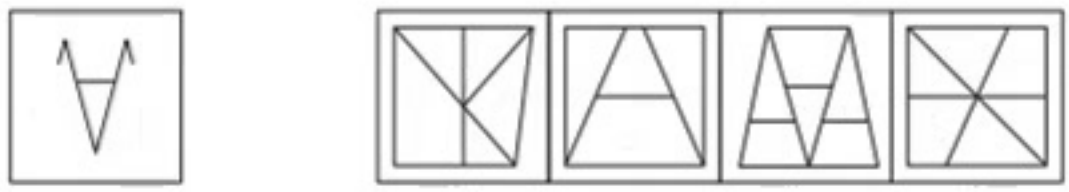
(1) (2) (3) (4)

48.



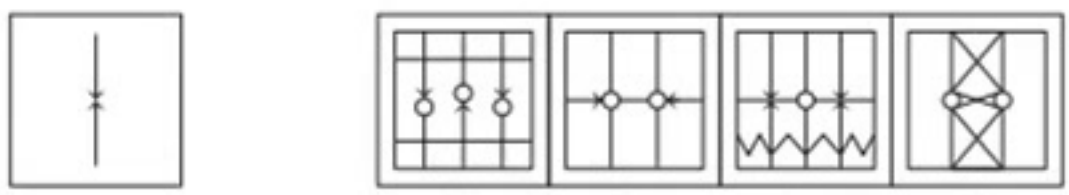
(1) (2) (3) (4)

49.



(1) (2) (3) (4)

50.



(1) (2) (3) (4)

SECTION II : Arithmetic Test

Directions (Q. Nos. 51-75) *For every question four probable answers bearing numbers* 1, 2, 3 *and* 4 *are given. Only one out of these is correct. You have to give the correct answer and write the number in the box against the number corresponding to the questions in the answer sheet.*

51. If $23200 \div 145 = 160$, then $232 \div 1.45$ is equal to

(1) 160 (2) 16
(3) 1.60 (4) 0.16

52. 84% is equal to

(1) $\frac{42}{100}$ (2) $\frac{42}{50}$
(c) $\frac{84}{225}$ (d) 8.4

53. A man buys a TV at ₹ 18200. He spends ₹ 1800 on repairing of TV. If he want ₹ 3000 as profit. What is the selling price of TV?
(1) ₹ 20430 (2) ₹ 21200
(3) ₹ 23000 (4) ₹ 25200

54. In what time ₹ 3500 will become ₹ 4130 when annual rate of interest is 6%.
(1) 4 yr (2) 3 yr (3) 6 yr (4) 5 yr

55. What is quotient when 76076 is divided by 13?
(1) 5652 (2) 5852 (3) 5762 (4) 5662

56. A common multiple of both 9 and 7 is *A*. This number is in between 1200 and 1300. What is number *A*?
(1) 1197 (2) 1260 (3) 1206 (4) 1266

57. 9, 13, 17, 21, 25, ?
What is the next term in the given series?
(1) 26 (2) 27 (3) 29 (4) 33

58. In which of the following numbers only one prime number lie.
(1) 40 and 50 (2) 60 and 70
(3) 80 and 90 (4) 90 and 100

59. Find the sum of 7.7+ 7.77+ 7.777+ 7.777.
(1) 28. 2828 (2) 28. 2847
(3) 30.0247 (4) 31.0247

60. A rectangular plot has sides 100 m × 80 m. Find the length of wire to surround it three times.
(1) 180 m (2) 1080 m (3) 360 m (4) 720 m

61. A person covered $47\frac{1}{2}$ km in one day. If the covered $29\frac{1}{3}$km by scooter, $8\frac{5}{6}$,km by bicycle and rest of the distance on foot. Find the distance covered on foot?
(1) $8\frac{1}{3}$ (2) $10\frac{1}{3}$ (3) $9\frac{1}{3}$ (4) $12\frac{2}{3}$

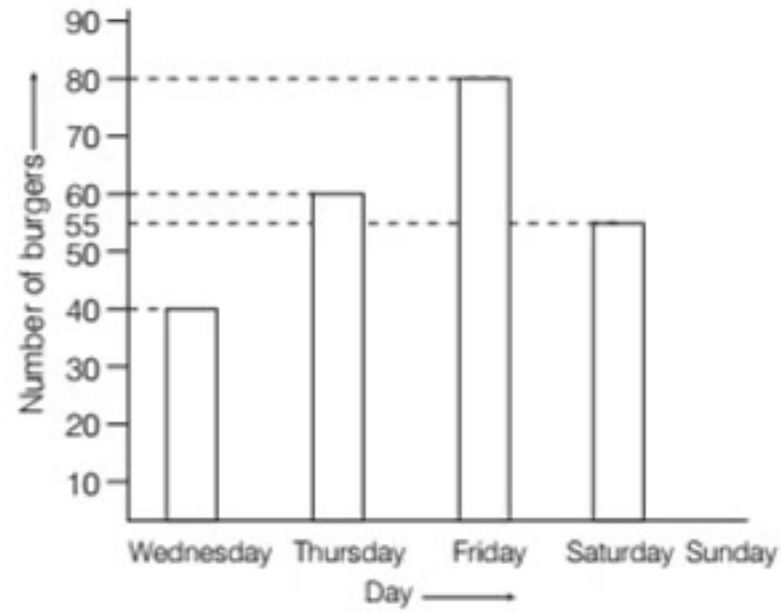
62. 12 Men or 15 women can do a piece of work in 21 days. Find the number of days required to complete the same work by 6 men and 10 women.
(1) 15 (2) 18 (3) 21 (4) 24

63. A fish tank length, breadth and height is 40cm , 60cm and 50cm respectively. It contains 50 liter of water, How much water is needed to fill it completely.
(1) 50 L (2) 60 L (3) 70 L (4) 120 L

64. A store sells a packet of 5 apples in ₹25 and a single apple in ₹ 6, if a lady purchase 27 apples. How much money will she pay?
(1) ₹ 128 (2) ₹ 130 (3) ₹ 137 (4) ₹ 150

65. Kaku got 7 marks less than Bakshi while Raman got 3 marks more than Kaku. If the total marks obtained by all three is 76. Find the marks obtained by Raman.
(1) 22 (2) 25 (3) 29 (4) 31

66. The following bar diagram shows the sale (number of burgers)of a burger saler during 5 days.



If total sale of burger was 320. Then number of burger sold on Sunday?
(1) 85 (2) 80 (3) 75 (4) 90

67. Four pieces of 75 cm were cut from a piece of 14m 25cm of fabric. Find the length of remaining fabric.
(1) 13 m 50 cm (2) 11 m 25 cm
(3) 10 m 50 cm (4) 10m 25 cm

68. Pictograms shows the number of plants sold through a nursery from Monday to friday

Days	Sold Plants
Monday	🌱 🌱
Tuesday	🌱 🌱 🌱 🌱
Wednesday	🌱 🌱 🌱 🌱 🌱
Thursday	🌱 🌱 🌱
Friday	🌱 🌱 🌱 🌱 🌱

🌱 = 20 plants

Find the number of plants sold from Monday fo Friday.
(1) 19 (2) 190 (3) 250 (4) 380

69. Find the differences between 5 digits greater and 5 digits smaller number with different digits.
(1) 41976 (2) 88531
(3) 98531 (4) 108999

70. Using the different digits, find the smallest number of 4 digits in which 9 is in tens place.
(1) 1290 (2) 1092
(3) 2091 (4) 2190

71. Which is the smallest 5 digit number formed by digits 5,1,6 when two digits can be used twice?
(1) 11565 (2) 51156
(3) 11556 (4) 11655

72. The HCF of two numbers 14 and 28 is 14. Find the LCM.
(1) 28 (2) 196 (3) 298 (4) 98

73. What is the four digit smallest number which is completely divided by 2,3,8,10?
(1) 1020 (2) 1060
(3) 1080 (4) 1120

74. The product of two numbers is 18.75. If one number is thrice of another. Find the larger number.
(1) 2.5 (2) 9.5 (3) 4.5 (4) 7.5

75. Find the value of $3 \times 0.3 \times 0.03 \times 0 \times 30$.
(1) 81 (2) 8.1 (3) 0.81 (4) 0

SECTION III : Language Test (English)

Directions (Q. Nos. 76-100) *Read the following passages carefully and answer the questions by choosing the options that you consider the most appropriate.*

Passage I

Our voyage was very prosperous, but I shall not trouble the reader with a journal of it. The captain called in at one or two ports and sent in his long-boat for provisions and fresh water, but I never went out of the ship still we came into the Downs, which was on the 3rd day of June, 1706, about nine months after my escape. I offered to leave my goods in security for payment of my freight, but the captain protested he would not receive one farthing. We took kind leave of each other, and I made him promise that he would come to see me at my house in Redriff. I hired a house and a guide for five shillings which I borrowed from the captain.

76. When the writer uses the word 'prosperous' to describe the voyage, he means that
(1) it made him rich (2) it made him healthy
(3) it was very pleasant (4) it was uneventful

77. On the voyage, the author
(1) left the ship at intervals
(2) was not able to leave the ship because it did not stop
(3) never left the ship at all
(4) never left the ship till they came into the Downs

78. In the context of the passage, the word 'provisions' means
(1) mainly food (2) mainly security
(3) money (4) mainly ammunition

79. For the payment of the author's freight, the captain
(1) kept his goods as security
(2) refused to accept any money
(3) protested against being paid only a farthing
(4) accepted a sum of money

80. From the passage, it is clear that the captain's attitude to the author was
(1) one of hostility
(2) one of indifference
(3) one of extreme friendliness and kindness
(4) one of disgust and irritation

Passage II

A story tells that two friends were walking through the desert. During some point of the journey they had an argument, and one friend slapped the other one in the face. The one who got slapped was hurt, but without saying anything, wrote in the sand: "TODAY MY BEST FRIEND SLAPPED ME IN THE FACE." They kept on walking until they found an oasis, where they decided to take a bath. The one who had been slapped got stuck in the mire and started drowning, but the friend saved him. After the friend recovered from the near drowning, he wrote on a stone: "TODAY MY BEST FRIEND SAVED MY LIFE." The friend who had slapped and saved his best friend asked him, "After I hurt you, you wrote in the sand, and now, you write on a stone. Why?"

The other friend replied: "When someone hurts us, we should write it down in sand where winds of forgiveness can erase it away. But, when someone does something good for us, we must **engrave** it in stone where no wind can ever erase it."

81. Why did the friend who got hurt write on the sand?
(1) Because he was very kind-hearted
(2) Because he was too weak to take revenge
(3) Because he knew that his feeling of hurt was temporary
(4) Because he loved his friend too much

82. What is an oasis?
(1) An oasis is a tall tree found in a desert.
(2) An oasis is a water body found in a desert.
(3) An oasis is a creature like centipede.
(4) An oasis is grassland.

83. What did one of the friends do after recovering from the near drowning?
(1) He rebuked his friend.
(2) He avenged by slapping his friend in his face.
(3) He wrote something on sand in his praise.
(4) He wrote something about his friend to express his gratitude.

84. What does writing on the stone suggest?
(1) Writing something on stone means expressing one's love for another.
(2) Writing on stone means writing something with an intention to make it last forever.
(3) Writing something on stone means expressing one's extreme anger.
(4) Writing something on stone means writing something with a view to preaching one and all.

85. What is the synonym of the word 'engrave' as used in the passage?
(1) dislodge (2) neglect
(3) aid (4) inscribe

Passage III

I woke up one August morning in a warm sweat. I ran to the refrigerator to get a cold drink, but the refrigerator was broken and all the drinks were as hot as me. I walked over to my electric fan, but it wasn't working either. I then turned on the television and finally realized that the electricity in my house was out. Later that day, I went to the pool to cool off. I dived right in! I swam eight laps before I got tired. My friend Lucy then bought me an ice-cream cone. I got a vanilla ice-cream cone with rainbow sprinkles. Even though it was really hot, I did have a lot of fun.

86. What did the narrator want from the refrigerator?
(1) a ham sandwich (2) a fan
(3) a drink (4) an apple

87. Why does the electric fan not work?
(1) it was broken
(2) it needed batteries
(3) the power was out
(4) it wasn't oiled

88. How many laps did it take for the narrator to tire of the pool?
(1) two (2) four (3) six (4) eight

89. Who bought the narrator an ice-cream cone?
(1) Lucy (2) Sam (3) Peter (4) Prince

90. What was the flavour of the ice-cream?
(1) rainbow (2) vanilla
(3) chocolate (4) strawberry

Passage IV

Once upon a time I went for a week's holiday in the Continent with an Indian friend. We both enjoyed ourselves and were sorry when the week was over, but on parting our behaviour was absolutely different. He was plunged in despair. He felt that because the holiday was over all happiness was over until the world ended. He could not express his sorrow too much, but in me the Englishman came out strong. I could not see what there was to make a fuss about. It was not as if we were parting forever or dying. 'Buck up', I said, 'do buck up'. He refused to buck up, and I left him plunged in gloom.

91. What is the Continent in the context of the passage?
(1) An island (2) The countryside
(3) African safari (4) Europe

92. What does the author mean by 'buck up'?
(1) Buckle yourself up
(2) Stand up
(3) Cheer up
(4) Shut up

93. Why was the Indian friend plunged in despair?
(1) He was hopeless
(2) He experienced racial discrimination
(3) He would never be so happy again
(4) He had spend lot of money

94. What does 'but in me the Englishman came out strong' imply?
(1) He was strong Englishman
(2) He had the typical English character
(3) The Englishman went out of him
(4) He started following Indian traditions

95. What is the author's intension in the passage?
(1) To contrast the Indian character with the English character
(2) To show that an Indian is sorrowful
(3) To ridicule the Indian traditions
(4) To praise the Englishman

Passage V

One day a wolf found a sheepskin. He covered himself with the sheepskin and got into a flock of sheep grazing in a field. He thought, "The shepherd will shut the sheep in the pen after sunset. At night I will run away with a fat sheep and eat it."

All went well till the shepherd shut the sheep in the pen and left. The wolf waited patiently for the night to advance and grow darker. But then an unexpected thing happened. One of the servants of the shepherd entered the pen. His master had sent him to bring a fat sheep for supper. As luck would have it, the servant picked up the wolf dressed in the sheepskin. That night the shepherd and his guests had wolf for supper.

96. Why did the wolf cover himself with the sheepskin and get into a flock of sheep?
(1) He wanted to look like a beautiful sheep.
(2) He wanted to eat a sheep.
(3) He wanted to enter into the pen.
(4) He wanted to make friends with the sheep.

97. How did the wolf meet his end?
(1) All the sheep attacked the wolf and killed him.
(2) The shepherd recognised the wolf in sheep's clothing and killed him.
(3) The shepherd's servant picked up the wolf dressed in the sheepskin for supper.
(4) The wolf died of a serious disease.

98. What is the moral of the passage?
(1) An evil design has an evil end.
(2) Pen is mightier than the sword.
(3) Might is right
(4) Die in harness

99. Why did the servant pick the wolf for supper? Select the most appropriate answer.
1. Because he wanted to have the tasty meat of wolf.
2. Because the wolf was in sheep's clothing.
3. Because the servant thought the wolf to be a fat sheep.
(1) Only 1 (2) Only 2 (3) Only 3 (4) Only 1 and 2

100. What is the antonym of the word 'shut' as used in the passage?
(1) kill (2) close (3) imprison (4) free

Answers

1	(2)	**2**	(1)	**3**	(4)	**4**	(2)	**5**	(2)	**6**	(3)	**7**	(2)	**8**	(3)	**9**	(4)	**10**	(1)
11	(3)	**12**	(1)	**13**	(4)	**14**	(4)	**15**	(4)	**16**	(2)	**17**	(2)	**18**	(4)	**19**	(3)	**20**	(2)
21	(4)	**22**	(3)	**23**	(2)	**24**	(2)	**25**	(3)	**26**	(3)	**27**	(3)	**28**	(2)	**29**	(1)	**30**	(2)
31	(4)	**32**	(2)	**33**	(2)	**34**	(3)	**35**	(4)	**36**	(3)	**37**	(4)	**38**	(1)	**39**	(3)	**40**	(2)
41	(1)	**42**	(4)	**43**	(2)	**44**	(2)	**45**	(1)	**46**	(1)	**47**	(3)	**48**	(1)	**49**	(3)	**50**	(3)
51	(2)	**52**	(2)	**53**	(3)	**54**	(2)	**55**	(2)	**56**	(2)	**57**	(3)	**58**	(4)	**59**	(4)	**60**	(2)
61	(3)	**62**	(2)	**63**	(3)	**64**	(3)	**65**	(2)	**66**	(1)	**67**	(2)	**68**	(4)	**69**	(2)	**70**	(2)
71	(3)	**72**	(1)	**73**	(3)	**74**	(4)	**75**	(4)	**76**	(3)	**77**	(4)	**78**	(1)	**79**	(2)	**80**	(3)
81	(3)	**82**	(2)	**83**	(4)	**84**	(2)	**85**	(4)	**86**	(3)	**87**	(3)	**88**	(4)	**89**	(1)	**90**	(2)
91	(4)	**92**	(3)	**93**	(1)	**94**	(2)	**95**	(1)	**96**	(2)	**97**	(3)	**98**	(1)	**99**	(3)	**100**	(4)

Hints and Solutions

1. Figure number (2) is different from other in given four figures.

2. Figure number (1) is different from given figures.

3. Figure number (4) is different from given figures.

4. Figure number (2) is different from given figures.

5. Figure number (2) is different from given figures.

6. Answer figure (3) is same as given question figures.

7. Answer figure (2) is same as given question figures.

8. Answer figures (3) is same as given question figures.

9. Answer figure (4) is same as given question figures.

10. Answer figure (1) is same as given question figures.

11. Answer figure (3) will be complete the pattern of given question figure.

(3)

12. Answer figure (1) will be complete the pattern of given question figure.

(1)

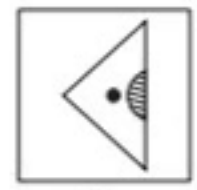
13. Answer figure (4) will be complete the pattern to given question figure.

(4)

14. Answer figure (4) will be complete the pattern of given question figure.

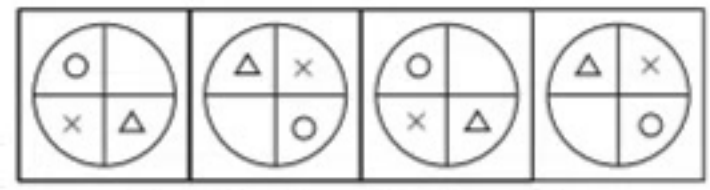
(4)

15. Answer figure (4) will be complete the pattern of given question figure.



(4)

16. The following pattern of series is.

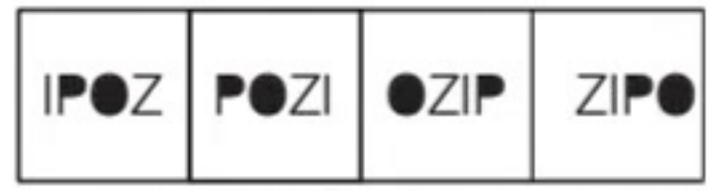


Answer figure (2) will complete the series.

17. The following pattern of series is

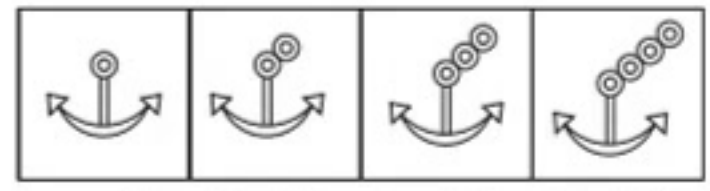
Answer figure (2) will be come in the place of blank in given series.

18. The following pattern of the series is



Answer figure (4) will come in the place to blank in given question figure.

19. The following pattern of the series is

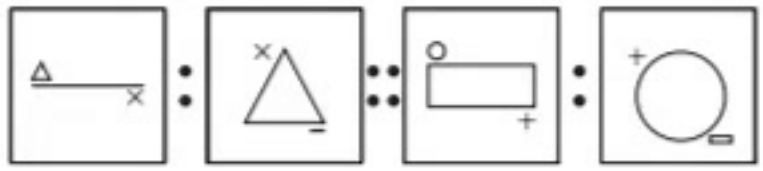


Answer figure (3) will be come in the place of blank in the given question figure.

20. One line in added vertically in each step. So, Answer figure (2) will come in the blank space.

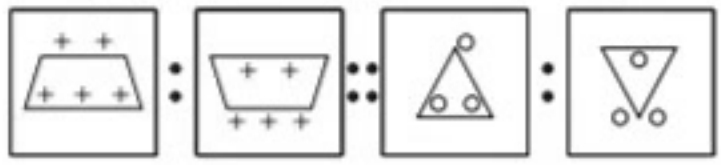
21. In the given first two question figures, Ist figure gets enlarged. Second figure go to bottom and IIIrd figure go on Top.

Similarly, figure (4) follows the correct pattern

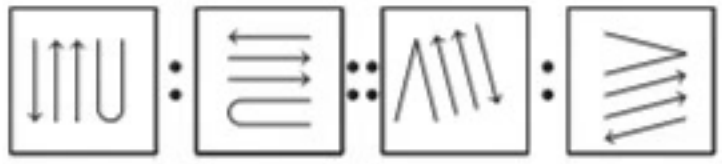


22. In the given question, outer figure (*i.e.* '+') come inside and inner figure goes outside. Also, the trapezium gets inverted.

Similarly, figure number (3) follows the correct pattern.

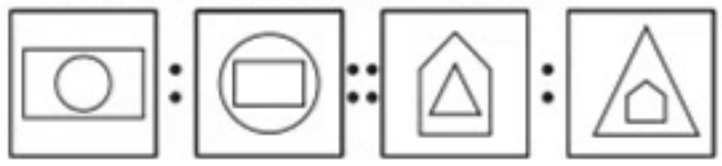


23. Here, figure rotates 90° clock wise.



24. The overlapping lines join to form a closed figure and the vertices get shaded..

25. Both the figures interchange their position.



26. Answer figure (3) is the missing part of the given question figure.

27. Answer figure (3) is the missing part of the given question figure.

28. Answer figure (2) is the missing part of the given question figure which will complete the figure.

29. Answer figure (1) is the missing part of the given question figure.

30. Answer figure (2) is the missing part of the given question figure.

31. Answer figure (4) is the correct mirror image of the given question figure.

32. Answer figure (2) is the correct mirror image of the given question figure.

33. Answer figure (2) is the correct mirror image of the given question figure.

34. Answer figure (3) is the correct mirror image of the given question figure.

35. Answer figure (4) is the correct mirror image of the given question figure.

36. When we open the question figure, it appears as answers figure (3).

37. When we open the given question figure, it appears as answer figure (4).

38. When we open the given question figure, it appears as answer figure (1).

39. When we open the given question figure, it appears as answer figure (3).

40. When we open the given question figure, it appears as answer figure (2).

41. After combining all parts the of given question figure answer figure(1) will be formed.

42. After combining all parts the of given question figure answer figure(4) will be formed.

43. After combining all parts the of given question figure answer figure(2) will be formed.

44. After combining all parts the of given question figure answer figure(2) will be formed.

45. After combining all parts the of given question figure answer figure(1) will be formed.

46. The given question figure is hidden/embedded in answer figure(1).

47. The given question figure is hidden/embedded in answer figure (3).

48. The given question figure is hidden /embedded in answer figure (1).

49. The given question figure is hidden/embedded in answer figure (3).

50. The given question figure is hidden/embedded in answer figure (3).

51. $23200 \div 145 = 160$ [given]

$\therefore 232 \div 1.45 = \frac{2320}{145} = 16$

52. $84\% = \frac{84}{100} = \frac{42}{50}$

53. Total cost price of TV = ₹ (18200 + 1800) = ₹ 20000

Profit = ₹ 3000 [given]

We know that,

Selling price = Cost price + Profit

= 20000 + 3000 = ₹ 23000

54. Simple interest = 4130 − 3500 = 630

We know that, $SI = \frac{P \times R \times T}{100}$

where, P = Principal, R = Rate, T = Time

$630 = \frac{3500 \times 6 \times T}{100}$

$T = \frac{630}{35 \times 6} = \frac{630}{210} = 3\,Yr$

55. $13\overline{)76076}$ | 5852 quotient

65
110
104
67
65
26
26
0 Remainder.

56. A common multiple of 9 and 7 both is A. Then number will completely divide both 9 and 7. We observed that only two number 1197 and 1260 is completely divide by 9 and 7. But only number 1260 is in between 1200 and 1300.

Thus, the number A is 1260.

57. The series follows the pattern as

$$9 + 4 = 13$$
$$13 + 4 = 17$$
$$17 + 4 = 21$$
$$21 + 4 = 25$$
$$25 + 4 = \boxed{29}$$

Therefore, 29 is the next term in the given series.

58. Between 90 and 100 only one prime number '97' exist.

59.
7.7000
7.7700
7.7770
+7.7777
31.0247

60. Given,

length of rectangular plot = 100m

Breadth of rectangular of plot = 80 m

As we know that perimeter of plot

= 2 (length + Breadth)

Perimeter = 2(100+80)

= 2 × 180 = 360 m

length of wire to surround it three times

= 3 × 360 = 1080 m

61. Total distance $= 47\frac{1}{2}\text{km} = \frac{95}{2}\text{km}$

Distance covered by scooter $= 29\frac{1}{3}\text{km} = \frac{88}{3}\text{km}$

Distance covered by bicycle $= 8\frac{5}{6} = \frac{53}{6}\text{km}$

Now, distance covered on foot $= \frac{95}{2} - \frac{88}{3} - \frac{53}{6}$

$$\frac{95}{2} - \frac{88}{3} - \frac{53}{6} = \frac{285 - 176 - 53}{6} = \frac{56}{6}$$

$$= \frac{28}{3}\text{km} = 9\frac{1}{3}\text{km}$$

62. 12 men = 15 women

$$1 \text{ man} = \frac{15}{12} \text{ women}$$

$$1 \text{ man} = \frac{5}{4} \text{ women}$$

∴ 6 men + 10 women

$$= \left(6 \times \frac{5}{4} + 10\right) = \left(\frac{15}{2} + 10\right) = \frac{35}{2} \text{ women}$$

$$\therefore \quad M_1 = 15, D_1 = 21, M_2 = \frac{35}{2}, D_2 = ?$$

$$W_1 = W_2 = 1$$

Therefore by using formula

$$M_1D_1W_2 = M_2D_2W_1$$

$$15 \times 21 \times 1 = \frac{35}{2} \times D_2 \times 1$$

$$D_2 = \frac{15 \times 21 \times 2}{35} = 18 \text{ days}$$

63. Amount of water stored in the tank = Volume of the tank

∴ Volume of tank = length × breadth × Height

$$\therefore \quad V = 40 \times 60 \times 50$$

$$V = 120000 \text{ cm}^3$$

As 1000 cm^3 1 litre

$$\therefore \quad V = 120\text{L}$$

As tank already stored 50 liters of water.

∴ Amount of water to fill the tank completely

$$= 120 - 50 = 70 \text{ L}$$

64. Price of packet of 5 apples is ₹ 25.

Price of a single apple = ₹ 6

Now, 27 apples = 5×5 packet + 2 apple

$$= 5 \times 25 + 2 \times 6 = 125 + 12 = ₹\ 137$$

∴ Price of 27 apples = ₹ 137

65. ∴ Let marks obtained by Kaku = x

Marks obtained by Raman = $x + 3$

Marks obtained by Bakshi = $x + 7$

According to the question

$$x + x + 3 + x + 7 = 76$$

$$3x + 10 = 76 \Rightarrow 3x = 66 = 22$$

∴ Marks obtains by Raman = $x + 3 = 22 + 3 = 25$

66. Total sale of Burger = 320

Burger sold on Wednesday = 40

Burger sold on Thursday = 60

Burger sold on Friday = 80

Burger sold on Saturday = 55

Now, burger sold on Sunday = Total sale − Sale on (Wed + Thu + Fri + Sat)

$$= 320 - (40 + 60 + 80 + 55)$$

$$= 320 - 235 = 85$$

67. Total length of fabric = 14m 25cm

$= 1400 + 25 = 1425$cm

Length of 4 pieces of 75cm = $75 \times 4 = 300$cm

Remaining length = 1425 cm − 300cm

= 1125cm = 11m 25cm

68. Number of plant sold from Monday to friday

$= 20 \times (2 + 4 + 5 + 3 + 5)$

$= 20 \times 19$

$= 380$

69. 5 digit largest number = 98765

5 digit smaller number = 10234

Required difference = 98765 − 10234 = 88531

70. The smallest number of four digits by using different digit = 1092

71. The 5 digit smallest number using digit 5,1, 6 by using two digits twice = 11556

72. We know that,

Product of two numbers = HCF×LCM

$14 \times 28 = 14 \times \text{LCM}$

$\text{LCM} = \frac{14 \times 28}{14} = 28$

73. LCM of 2,3,8,10

2	2	3	8	10
3	1	3	4	5
4	1	1	4	5
5	1	1	1	5
	1	1	1	1

$= 2 \times 3 \times 4 \times 5 = 120$

∴ The four digit smallest number is multiple of 120

$= 120 \times 9 = 1080$

74. Let smaller number = x

Larger number = $3x$

According to the question

$x \times 3x = 18.75$

$3x^2 = 18.75$

$x^2 = 6.25$

$x = \sqrt{6.25} = 2.5$

∴ Larger number $= 3x = 3 \times 2.5 = 7.5$

75. Any number multiplied by zero we get zero as resultant.

∴ $3 \times 0.3 \times 0.03 \times 0 \times 30 = 0$

76. When the writer uses the word 'prosperous' to describe the voyage, he means that it was very pleasant.

77. On the voyage, the author never left the ship till they came into the Downs.

78. Here the word 'provisions' means 'food'.

79. The captain of the ship refused to accept any money for the payment of the author's freight.

80. It can be inferred from the passage that the captain's attitude to the author was one of extreme friendliness and kindness.

81. The friend who got hurt wrote on the sand because he knew that his feeling of hurt was temporary.

82. An oasis is a water body found in a desert.

83. On of the friends wrote "TODAY MY BEST FRIEND SAVED MY LIFE" on a stone about his friend to express his gratitude after recovering from the near drowning.

84. Writing on stone means writing something with an intention to make it last forever.

85. Both 'engrave' and 'inscribe' mean cut or carve (a text or design) on the surface of a hard object. Hence, they are synonyms.

86. The narrator wanted a cold drink from the refrigerator.

87. The electric fan was not working because the power was out.

88. The narrator swam eight laps of the pool before he got tired.

89. The narrator's friend Lucy bought him an ice-cream cone.

90. It was a vanilla ice-cream with rainbow sprinkles.

91. Europe is the continent in the context of the passage.

92. The author means 'cheer up' by 'buck up'.

93. The Indian friend was plunged in despair because he was hopeless.

94. The clause 'but in me the Englishman came out strong' implies that he had the typical English character.

95. The author's intension in the passage is to contrast the Indian character with the English character.

96. The wolf covered himself with the sheepskin and get into a flock of sheep because he wanted to eat a sheep.

97. The wolf met his end as the shepherd's servant picked up the wolf dressed in the sheepskin for supper.

98. 'An evil design has an evil end' is the moral of the passage.

99. The servant picked the wolf for supper because he thought the wolf to be a fat sheep.

100. According to the passage, the word 'shut' means 'keep in a place by closing something such as a door' hence 'free' is the appropriate antonym of it.

Jawahar Navodaya Vidyalaya

Class 6

Entrance Exam

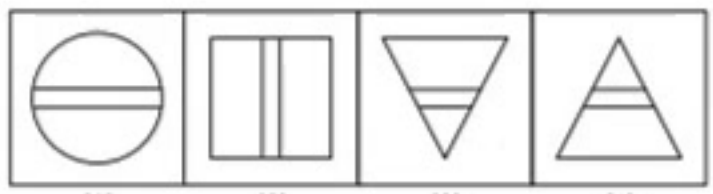
Model Solved Paper 2017

Section I Mental Ability Test

Part I

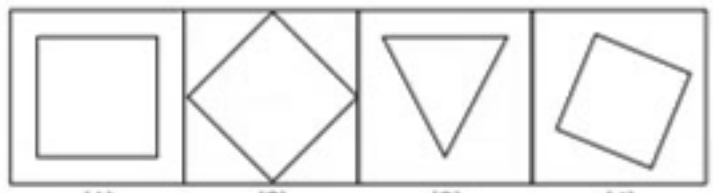
Directions (Q. Nos. 1-5) *In the following questions, four figures* (1), (2), (3) *and* (4) *have been given below. Of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different and indicate the correct letter below it.*

1.



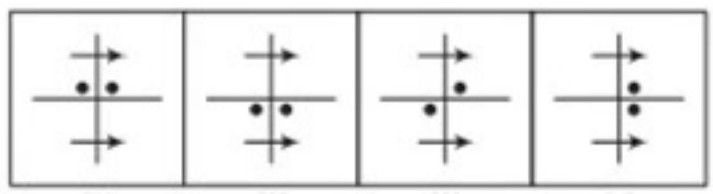
(1) (2) (3) (4)

2.



(1) (2) (3) (4)

3.



(1) (2) (3) (4)

4.

(1) (2) (3) (4)

5.

(1) (2) (3) (4)

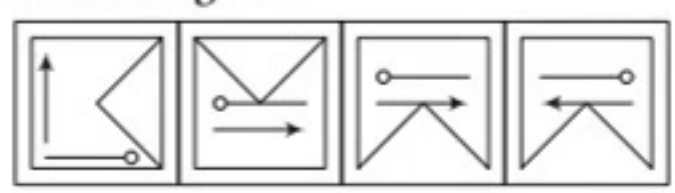
Part II

Directions (Q. Nos. 6-10) *In the following questions, a problem figure is given on the left hand side and four answer figures* (1), (2) (3) *and* (4) *are given on the right hand side. Select the answer figure which is exactly the same as the problem figure and indicate the letter below the correct answer figure.*

Problem Figure

6.

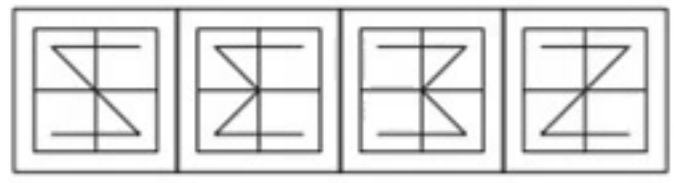
Answer Figures



(1) (2) (3) (4)

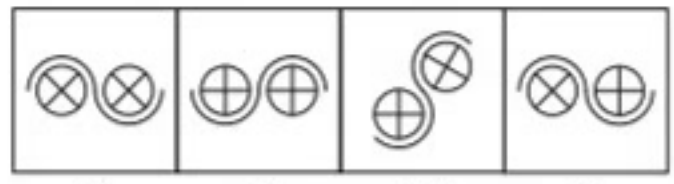
Problem Figure **Answer Figures**

7.



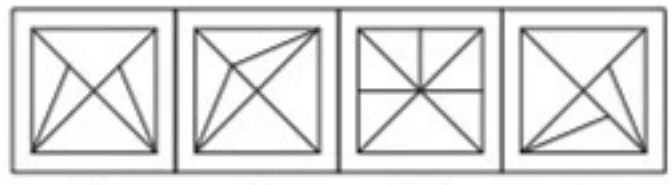
(1) (2) (3) (4)

8.



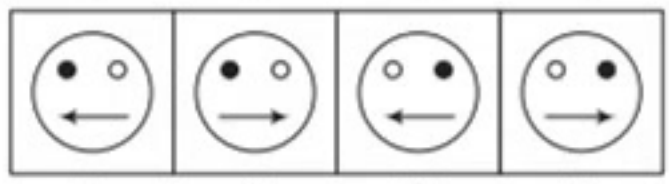
(1) (2) (3) (4)

9.



(1) (2) (3) (4)

10.



(1) (2) (3) (4)

Part III

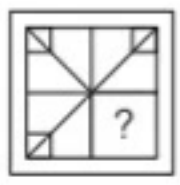
Directions (Q. Nos. 11-15) *In the following questions, there is a problem figure on the left hand side, a part of which is missing. Observe the answer figures* (1), (2), (3) *and* (4) *on the right hand side and find out the answer figure which without changing the direction, fits in the missing part of the problem figure in order to complete the pattern in the problem figure.*

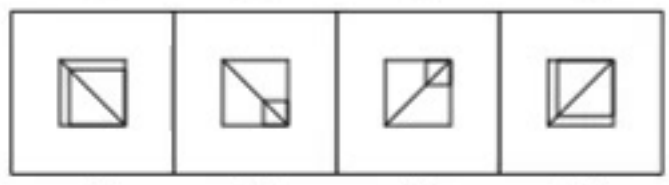
Problem Figure **Answer Figures**

11.

(1) (2) (3) (4)

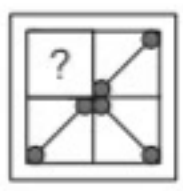
12.

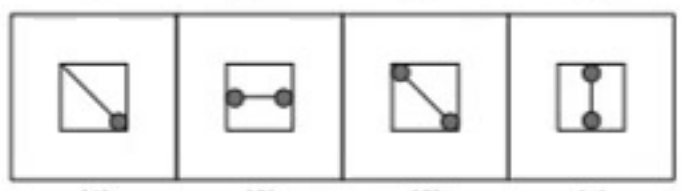




(1) (2) (3) (4)

13.

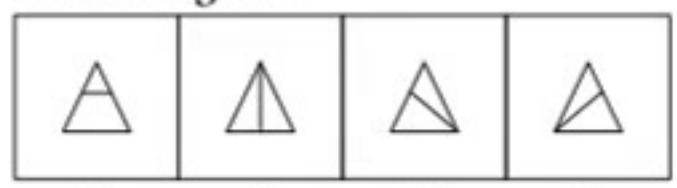




(1) (2) (3) (4)

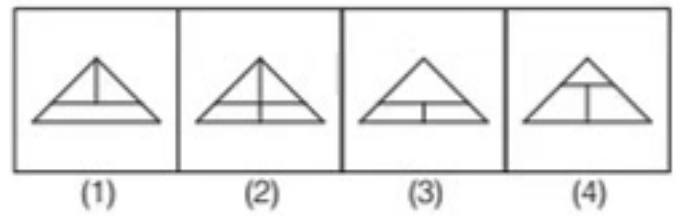
Problem Figure **Answer Figures**

14.



(1) (2) (3) (4)

15.



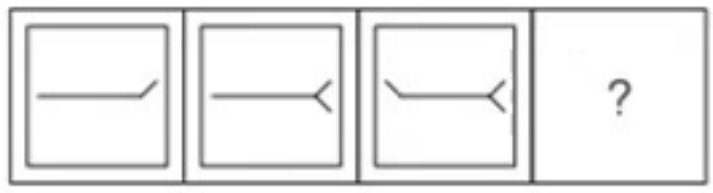
(1) (2) (3) (4)

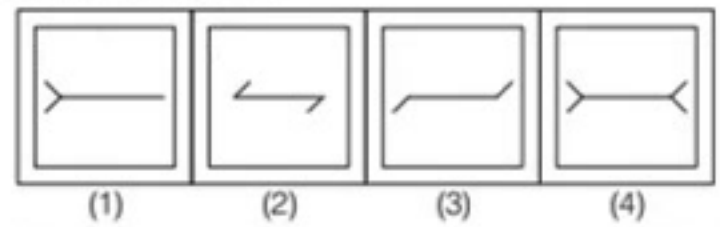
Part IV

Directions (Q. Nos. 16-20) *In the following questions, there are three problem figures and the space for the fourth figure. The problem figures are in a series. Find out one figure from among the answer figures which occupies the blank space for the fourth figure and which completes the series.*

Problem Figures **Answer Figures**

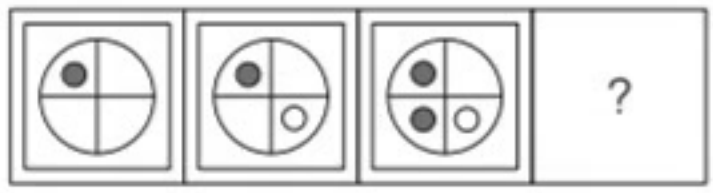
16.

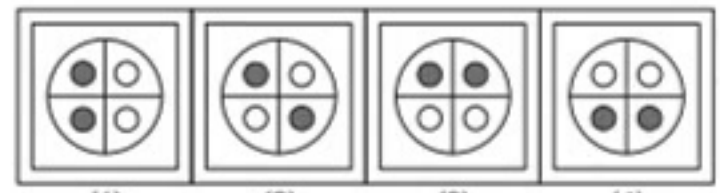




(1) (2) (3) (4)

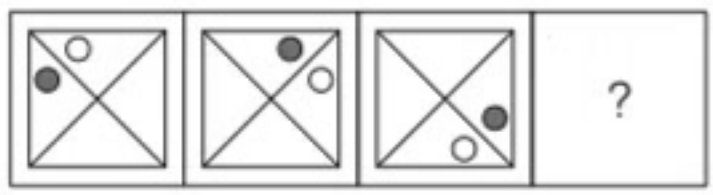
17.

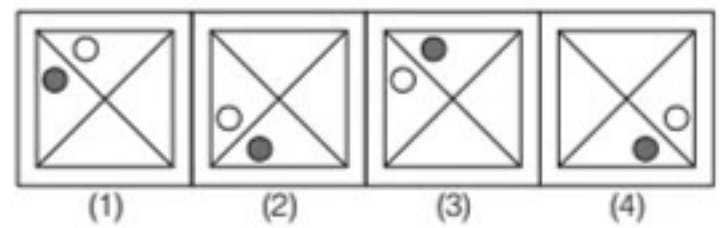




(1) (2) (3) (4)

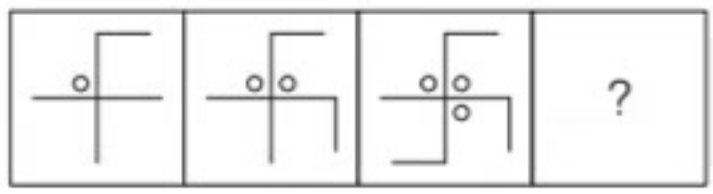
18.

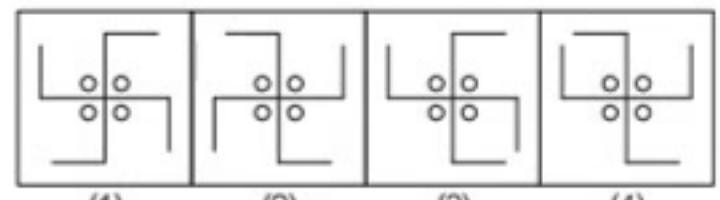




(1) (2) (3) (4)

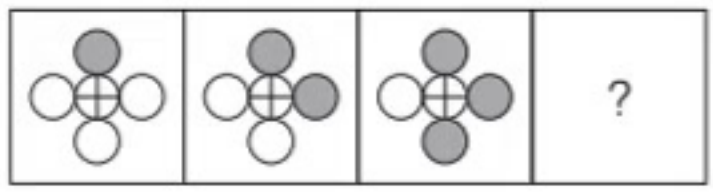
19.

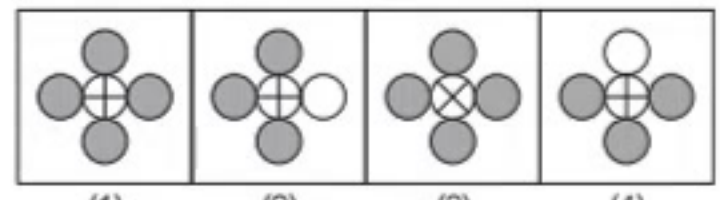




(1) (2) (3) (4)

20.





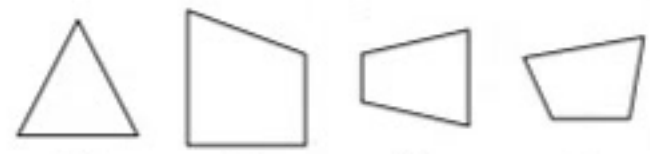
(1) (2) (3) (4)

Part V

Directions (Q. Nos. 21-25) *In the following questions, one part of a square is given on the left hand side and the other one is among the four figures* (1), (2), (3) *and* (4) *given on the right hand side. Find the figure on the right hand side that completes the square.*

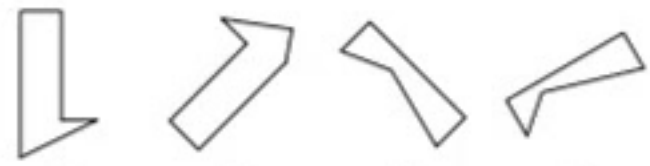
Problem Figure **Answer Figures**

21.



(1) (2) (3) (4)

22.



(1) (2) (3) (4)

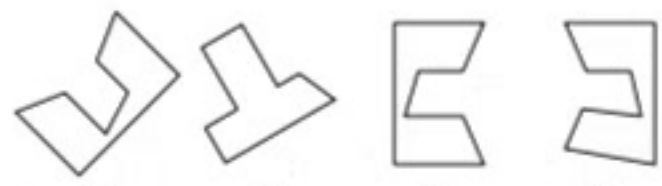
23.

(1) (2) (3) (4)

24.

(1) (2) (3) (4)

25.



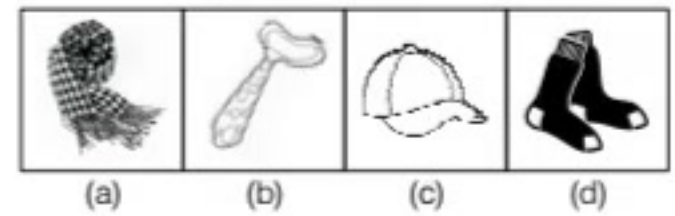
(1) (2) (3) (4)

Part VI

Directions (Q. Nos. 26-30) *In the following questions, three problem figures are given. There is some relationship between the first and second figures. Same relationship should exist between the third and fourth figures. Fourth space is blank. Select the figures from the answer figure.*

Problem Figures **Answer Figures**

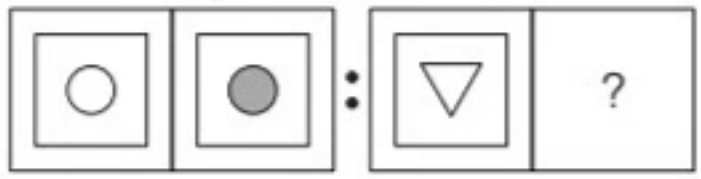
26.

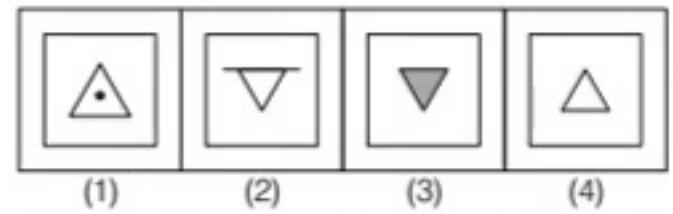


(a) (b) (c) (d)

Problem Figures **Answer Figures**

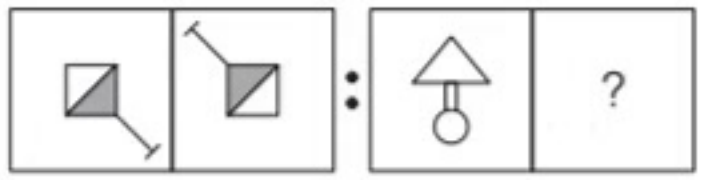
27.





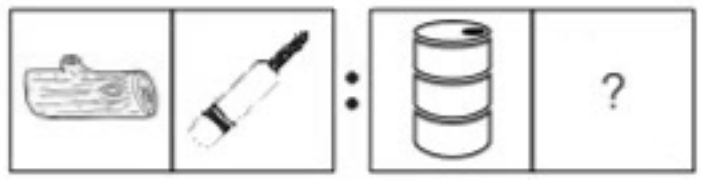
(1) (2) (3) (4)

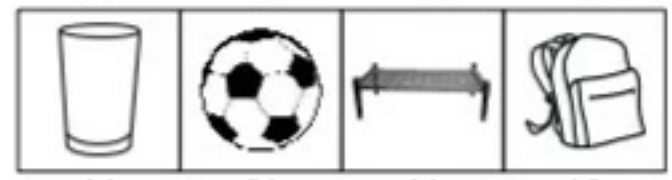
28.



(1) (2) (3) (4)

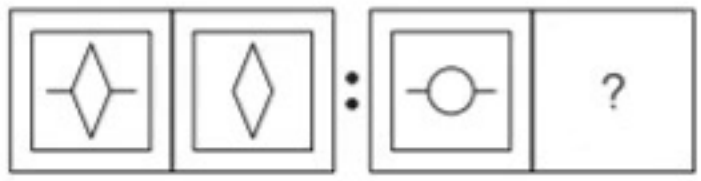
29.

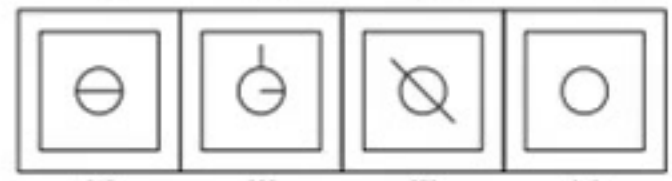




(a) (b) (c) (d)

30.





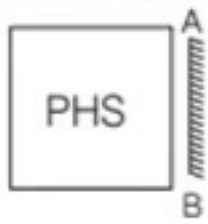
(1) (2) (3) (4)

Part VII

Directions (Q. Nos. 31-35) *In the given questions, there is a problem figure and four answer figures* (1), (2), (3) *and* (4). *Find out the correct figure when a mirror is held on* AB *line.*

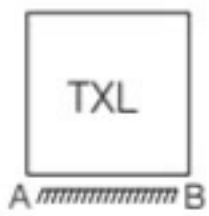
Problem Figure **Answer Figures**

31.



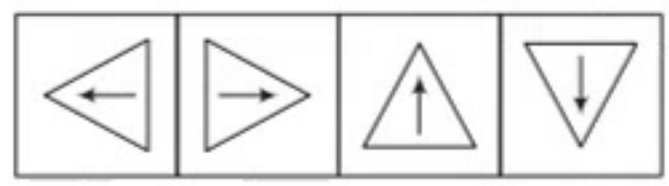
(1) (2) (3) (4)

32.



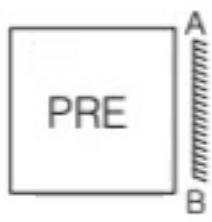
(1) (2) (3) (4)

33.



(1) (2) (3) (4)

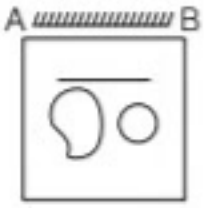
34.

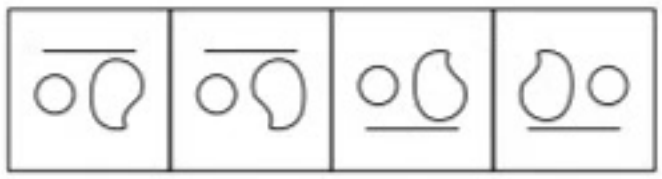


(1) (2) (3) (4)

Problem Figure **Answer Figures**

35. A B





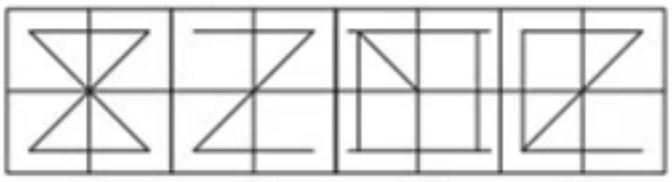
(1) (2) (3) (4)

Part VIII

Directions (Q. Nos. 36-40) *In the given questions, there is a problem figure and four answer figures* (1), (2), (3) *and* (4). *Select the one in which the problem figure is hidden?*

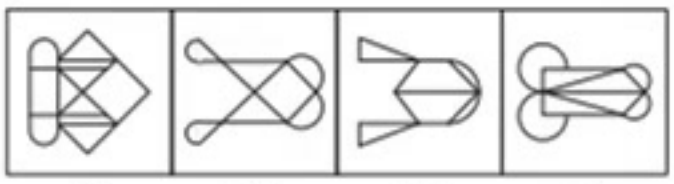
Problem Figure **Answer Figures**

36.



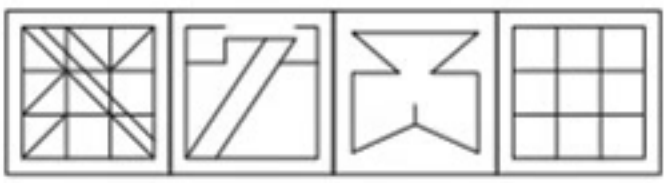
(1) (2) (3) (4)

37.



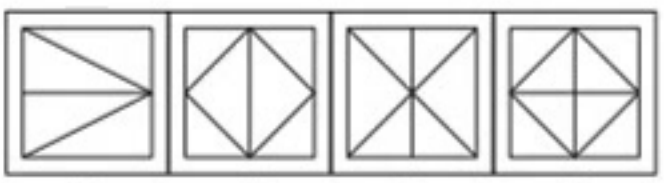
(1) (2) (3) (4)

38.



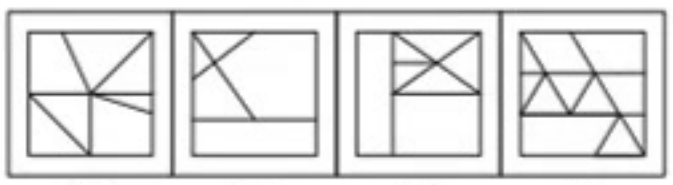
(1) (2) (3) (4)

39.



(1) (2) (3) (4)

40.



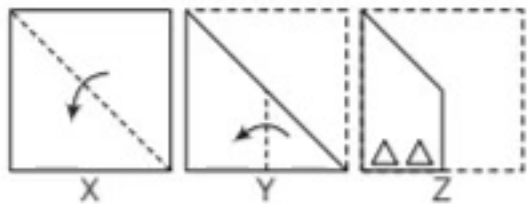
(1) (2) (3) (4)

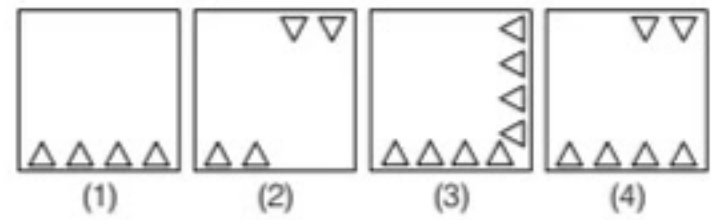
Part IX

Directions (Q. Nos. 41-45) *In each the following questions, a set of figures have been given showing a sequence in which paper is folded and finally cut from a particular or section. Below these figures a set of answer figures* (1), (2), (3) *and* (4) *showing the design which the paper actually acquires when it is unfolded. Choose the correct answer figures.*

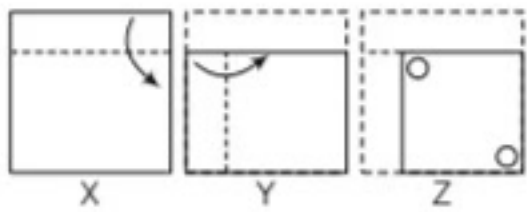
Problem Figures **Answer Figures**

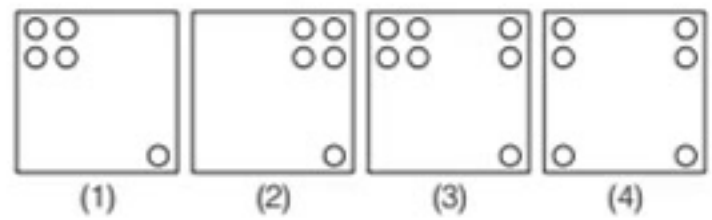
41.



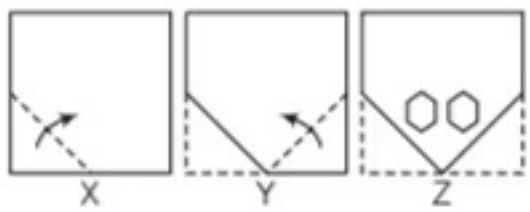


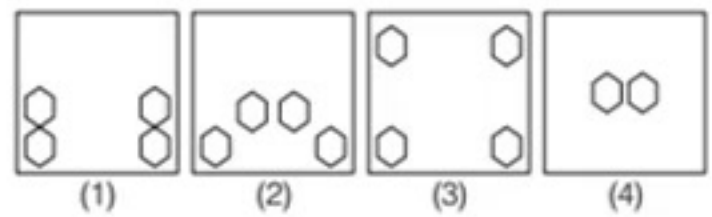
42.



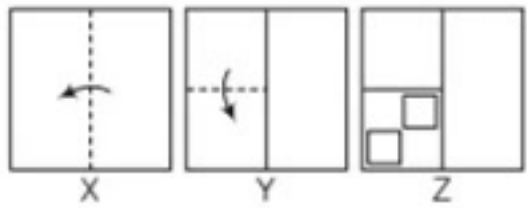


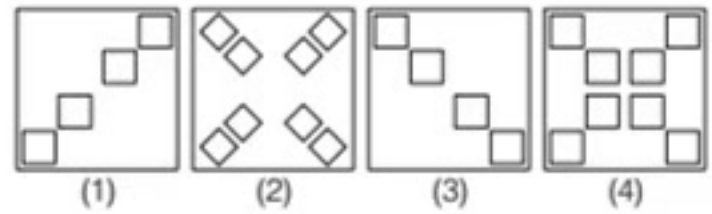
43.



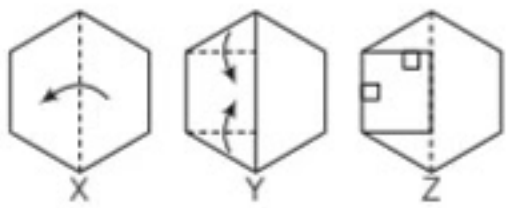


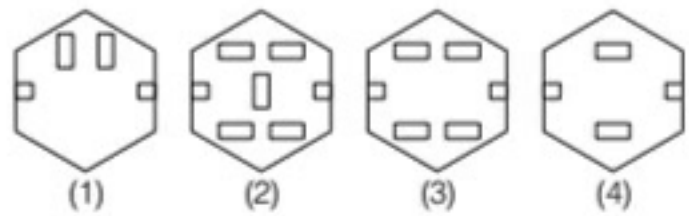
44.





45.



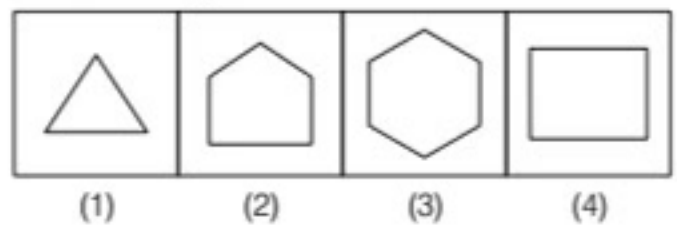


Part X

Directions (Q. Nos. 46-50) *In the given questions, there is a problem figures, observe the answer figures* (1), (2), (3) *and* (4) *and find out the answer figure which can be formed from the cut pieces of problem figures?*

Problem Figure **Answer Figures**

46.

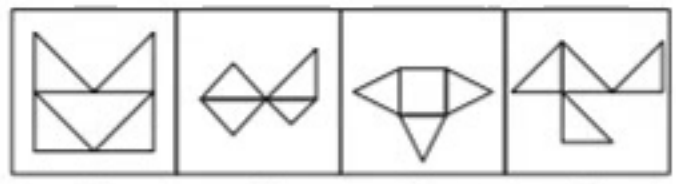


Problem Figure **Answer Figures**

47.

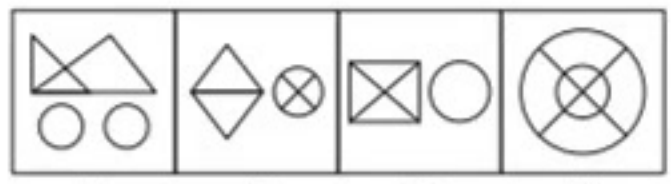
(1) (2) (3) (4)

48.



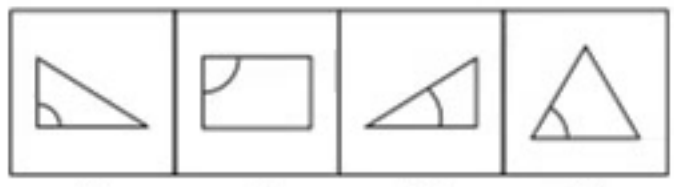
(1) (2) (3) (4)

49.



(1) (2) (3) (4)

50.



(1) (2) (3) (4)

Section II Arithmetic Test

51. Read the given information carefully and answer the question.

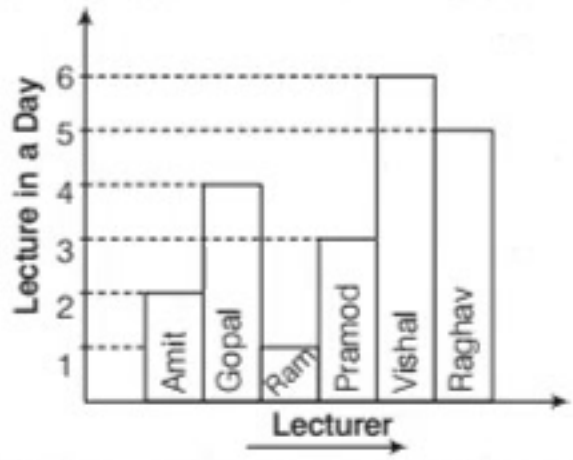
Months	Sold Bananas
March	
April	
May	
June	
July	

[Here, ▩ = 5 dozen]

What is the number of sold bananas during the given months?

(1) 1180 (2) 1380
(3) 1250 (4) 1450

52. Study the graph and answer the question.



What is the difference between the lecture taken by Amit and Raghav to the Gopal and Pramod during a week?

(1) 42 (2) 7 (3) 35 (4) 0

53. The area of square, whose perimeter is 48 m is
(1) 48 m^2 (2) 144 m^2 (3) 1152 m^2 (4) 2304 m^2

54. The average of 20 values is 18. If 3 is subtracted from each of the values, then the new average will be
(1) 21 (2) 15 (3) 16 (4) 17

55. Two numbers are in the ratio 2 : 3. If 9 is added to each, they will be in the ratio 3 : 4, the numbers are
(1) 12, 28 (2) 18, 27 (3) 8, 12 (4) 10, 15

56. What is the volume of a box whose each edge measures 3 m in length?
(1) 54 cu m (2) 27 cu m (3) 18 cu m (4) 9 cu m

57. A bus starts at 9 : 10 am from Delhi and reaches Chandigarh at 4 : 20 pm. The total time in this journey is
(1) 7 h 10 min (2) rightly 7 h
(3) 6 h 30 min (4) 7 h 20 min

58. A student scored 18 marks out of 25 marks in the first test of Math. In the second test he scored 22 marks in the second test exceeds his first test by
(1) 4% (2) 8% (3) 16% (4) 80%

59. By selling a dozen pencil at the cost of ₹ 30, the shopkeeper gains ₹ 10. His percentage of profit was
(1) 20 (2) 35 (3) 50 (4) 66

60. A drum is $\frac{2}{3}$ full, if 50 L more required to fill it up, how much is the capacity of the drum?
(1) 150 L (2) 120 L (3) 100 L (4) 90 L

61. A train is running at a uniform speed of 75 km/h. How much time does it take to cover a distance of 350 km?
(1) 4 h (2) 5 h
(3) 4 h 30 min (4) 4 h 40 min

62. A person borrowed a sum of ₹ 20000 for 2 yr on simple interest. He had to repay ₹ 24800 including interest after 2 yr. The rate of interest per annum was
(1) 48% (2) 24% (3) 12% (4) 6%

63. $\frac{1}{3}$ of a certain journey is covered at the rate of 25 km/h, $\frac{1}{4}$ at the rate of 30 km/h and the rest of 50 km/h. What is the average speed for the whole journey?
(1) 30 km/h (2) 33 km/h (3) $33\frac{1}{3}$ km/h (4) 32 km/h

64. Simplify

$$\frac{\frac{7}{3} \times \frac{2}{3} \div \frac{3}{5}}{2 + 1\frac{2}{3}}$$

(1) 99/70 (2) 70/99
(3) 33/30 (4) 70/27

65. After allowing a discount of 18%, a washing machine is available for ₹ 13489. What is the marked price of the washing machine?
(1) ₹ 16540 (2) ₹ 15450
(3) ₹ 16450 (4) ₹ 15540

66. 90% of 300 + 30% of 90 is equal to
(1) 287 (2) 297
(3) 237 (4) 277

67. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is
(1) 1197 (2) 2394
(3) 4932 (4) 2384

68. A school collected ₹ 2304 as fees from its students. If each student paid as many as there were students in the school, how many students were there in the school?
(1) 240 (2) 460
(3) 480 (4) 440

69. Next term of 258, 130, 66, 34, 18, ... is
(1) 12 (2) 10
(3) 8 (4) 13

70. The product of two decimals is 20.7326. If one decimal is 4.13, what is the other decimal?
(1) 5.12 (2) 4.82
(3) 5.23 (4) 5.02

71. In an annual examination, Hardik got 500 marks out of 725. What is his approximate per cent in the examination?
(1) 88 (2) 79
(3) 54 (4) 70

72. Find the average of the following set of scores 567, 434, 323, 290, 401
(1) 398 (2) 412
(3) 407 (4) 403

73. *A*, *B* and *C* divide an amount of ₹ 9861 amongst themselves in the ratio of 3 : 11 : 5, respectively. What is the *B*'s share in the amount?
(1) ₹ 4671 (2) ₹ 5709
(3) ₹ 6228 (4) ₹ 7266

74. There are 3450 employees in an organisation. Out of which 42% got promoted. How many such employees are there who got promoted?
(1) 1449 (2) 1518
(3) 1587 (4) 1656

75. The mean of 20 observations was found to be 65 but later on it was found that 69 was misread as 96. Find the correct mean.
(1) 63.65 (2) 12.37
(3) 69.50 (4) 65.95

Section III Language Test (English)

Directions (Q. Nos. 76-100) *There are five passages in this section. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each questions four probable answer bearing* (1), (2), (3) *and* (4) *are given. Only one out of these is correct. You have to choose the correct answer.*

Passage 1

Among the major tasks before us, none is of greater importance for our strength and stability than the task of building up the unity and solidarity of our people. Our country often stood like a solid rock in the face of common danger and there is a deep underlying unity which runs like a golden thread through all our seeming diversity. There have been occasions when unfortunate and disturbing divisions, some of them accompanied by violence, have appeared in our society.

Political democracy and the way it has functioned in our country is surely a great achievement. Here again we owe an immeasurable debt to Shri J L Nehruji for his deep attachment to democracy as a form of government and as a way of life. There is something in our older cultural heritage too. I have particularly in view that enduring strength in Indian life which can best be described as respect for human personality and the spirit of tolerance. I have no doubt in my mind that it is only by methods of persuasion and mutual accommodation and by a constant search for areas of agreement as the basis for action, that democracy and work. It is in this spirit that I shall devote myself to the duties and responsibilities of the office I have been called upon to fill.

76. The writer thinks that
(1) we have never faced dangers
(2) in our country there is unity underlying diversity
(3) our society is tribal in organisation
(4) stability of the nation depends upon many factors

77. The author believes that democracy can work
(1) if leaders are honest
(2) if people participate
(3) if method of persuasion and mutual adjustment are employed
(4) if people have faith in democracy

78. What is the permanent trend in Indian life?
(1) Respect for human personality
(2) Love for animals
(3) Worship of nature
(4) Hero-worshipping

79. Shri Nehru was deeply attached to
(1) democracy as a way of life
(2) democracy of the Western
(3) democracy which emerges from our culture
(4) the Indian way of living

80. The writer wants to work for
(1) just economic forces (2) just social order
(3) democratic forces (4) None of these

Passage 2

Desert is a place where there is sand all-around. It is a hot and dry place. There is very little rain in deserts. So, very few trees grow there. The only plants that grow in the deserts are cactus, date palms and thorny bushes which do not need much water to grow.

The Sahara is the biggest desert in the world. It stretches across the whole of North Africa. The Arabian desert is also a very large desert. In India too, there is a desert called Thar desert in Rajasthan. Life in a desert is tough. The days are very hot and nights are cool.

81. The biggest desert in the world is in
(1) India (2) Africa
(3) Arabia (4) America

82. In desert regions
(1) there is no rainfall (2) it rains heavily
(3) there is enough rain (4) there is a little rain

83. The climate in a desert is
(1) pleasant (2) difficult
(3) comfortable (4) cold

84. Date palms grow in
(1) plains
(2) hilly regions
(3) deserts
(4) snowy regions

85. Very few trees grow in deserts because
(1) most trees need water to grow
(2) there is sand all-around
(3) nights are very cold
(4) there is no one to take care of trees

Passage 3

About three hundred and fifty years age there lived in India an Emperor called Shah Jahan. He had a beautiful and intelligent wife, whom he loved very much. Her name was Mumtaz Mahal; its shortened form, Taj Mahal, means 'pride of the palace'. In the year 1630 this beloved wife of the emperor died. The emperor decided, out of love for his wife, to build her the most beautiful tomb that had ever been seen. Shah Jahan gathered the best artists and architects from India, Turkey, Persia and Arabia to design the building. It took more than 20000 men working over a period of 18 years to build the Taj Mahal, perhaps the most beautiful building in India.

86. Which of the following is the work of an 'architect'?
(1) To advise the king
(2) To build a palace
(3) To design a building
(4) To supervise cooking of meals

87. People consider Taj Mahal as
(1) a large river
(2) the most beautiful building in India
(3) a very tall building
(4) a memory of an emperor

88. Which one of the statements agrees with the paragraph?
(1) Shah Jahan wanted to build a palace for himself
(2) Artists and Architects from India asked Shah Jahan to give them work
(3) 'Pride of the palace' means 'Shah Jahan'
(4) Shah Jahan decided to build a beautiful tomb for his beloved wife

89. Which one of the following pairs is not associated with buildings?
(1) Painters and carpenters
(2) Teachers and doctors
(3) Architects and engineers
(4) Masons and plumbers

90. Taj Mahal was built
(1) out of love for Mumtaz Mahal
(2) because Mumtaz Mahal was intelligent
(3) to let the world know that Mumtaz Mahal was beautiful
(4) to protect Mumtaz Mahal from his enemies

Passage 4

Since, the most ancient times, India has been not only periodically invaded by greedy hordes but also visited by tradesman and travellers, scholars and sight-seers. Some of them have written books. The books of these writers become all the more important because there were not too many of them and they have served as rich sources for the historian. It is especially in this context that observations provided by the great Chinese writer Hiuen Tsang become very relevant.

Already in the 7th century, Buddhism was a powerful cultural force among the educated classes of China. It was common for Chinese pilgrims to come to India, the native land of the Buddha, to pay their respects to the founder of their religion. Perhaps the most famous of them all was this gentle observer who had studied and travelled extensively in China before entering the Indian sub-continent. Being both scholar and sophisticated, he was not given to easy praise. Within India itself he traversed deserts and climbed mountains, stayed in villages and lived in capitals, practised in monasteries and studied in universities and spent time in some royal courts as well.

91. Why are the writings of Hiuen Tsang considered as relevant?
(1) He had spent sometime in some royal courts
(2) He visited India as a trader and sight-seer
(3) He had travelled to many Asian countries
(4) He was a gentle observer

92. Chinese pilgrims commonly come to visit
(1) mountains
(2) villages
(3) deserts
(4) the native land of Buddha

93. What probably prompted Hiuen Tsang to travel to India?
(1) To study influence of Buddhism on Hindu religion
(2) To spread his religion in India
(3) To undertake pilgrimage and enhance knowledge
(4) To study the powerful cultural force in India

94. In the most ancient times, India was visited by except
(1) scholars (2) tradesman
(3) farmers (4) sight-seers

95. Hiuen Tsang did all of the following travel in India except
(1) travelled in deserts
(2) lived in villages
(3) followed the schedule in Monasteries
(4) taught in the university

Passage 5

Man-made satellites play a very important role in the modern man's world today. It helps in the study of space which has fascinated and inspired people for centuries and also helps us to find out more about the Earth and our Solar system. Advances in satellite technology have diversified to such an extent that it has improved our quality of life. Satellites help us communicate with people anywhere in the world, forecast weather, look at climate change and monitor disaster. Almost everyone today use satellite technology. Paying by credit card, or using an ATM machine-all involve satellite technology. Thus satellites have become an integral part of present-day man.

96. Satellites help in the study of
(1) animals (2) space
(3) plastics (4) bacteria

97. The word 'fascinated' used in the paragraph means
(1) pleased (2) interested
(3) affected (4) enthused

98. Which of the following sequences is correct as mentioned in the paragraph?
(1) Technology—Monitor—Study
(2) Monitor—Study—Technology
(3) Study—Monitor—Technology
(4) Technology—Study—Monitor

99. The phrase 'present-day man' means
(1) man who is present (2) man present everyday
(3) man of everyday (4) man of today

100. Satellite technology cannot be used for
(1) speaking to a friend in America
(2) washing and drying clothes
(3) taking out money from a bank
(4) warning against a storm

Answers

1. (2)	**2.** (3)	**3.** (4)	**4.** (4)	**5.** (3)	**6.** (3)	**7.** (2)	**8.** (4)	**9.** (1)	**10.** (2)
11. (4)	**12.** (2)	**13.** (3)	**14.** (3)	**15.** (1)	**16.** (4)	**17.** (1)	**18.** (2)	**19.** (1)	**20.** (1)
21. (2)	**22.** (4)	**23.** (2)	**24.** (2)	**25.** (3)	**26.** (4)	**27.** (3)	**28.** (1)	**29.** (3)	**30.** (4)
31. (4)	**32.** (3)	**33.** (4)	**34.** (1)	**35.** (4)	**36.** (1)	**37.** (3)	**38.** (1)	**39.** (3)	**40.** (1)
41. (3)	**42.** (1)	**43.** (2)	**44.** (4)	**45.** (1)	**46.** (3)	**47.** (1)	**48.** (1)	**49.** (2)	**50.** (4)
51. (2)	**52.** (4)	**53.** (2)	**54.** (2)	**55.** (2)	**56.** (2)	**57.** (1)	**58.** (4)	**59.** (3)	**60.** (1)
61. (4)	**62.** (3)	**63.** (3)	**64.** (2)	**65.** (3)	**66.** (2)	**67.** (2)	**68.** (3)	**69.** (2)	**70.** (4)
71. (4)	**72.** (4)	**73.** (2)	**74.** (1)	**75.** (1)	**76.** (2)	**77.** (3)	**78.** (1)	**79.** (1)	**80.** (2)
81. (2)	**82.** (4)	**83.** (2)	**84.** (3)	**85.** (1)	**86.** (3)	**87.** (2)	**88.** (4)	**89.** (2)	**90.** (1)
91. (4)	**92.** (4)	**93.** (3)	**94.** (3)	**95.** (4)	**96.** (2)	**97.** (2)	**98.** (3)	**99.** (4)	**100.** (2)

Hints and Solutions

1. All figures in serial numbers (1), (3) and (4) have two parallel lines drawn horizontally but in figure (2) the parallel lines are drawn vertically, therefore figure (2) is different from other remaining figures.
2. In the given figures all figures are quadrilaterals but figure (3) is a triangle. Therefore, figure (3) is different from other figures.
3. Considering the positions of two black small circles figure (4) is different from other figures.
4. All figures, have straight lines but figure (4) has a curved line which is different than the other figure.
5. A small circle has been drawn inside the figures in serial number (1), (2) and (4). But in figure (3) a small triangle has been drawn inside the figure (3).
6. Answer figure (3) resembles completely with the given problem figure.
7. In the problem figure the square has been divided into four equal parts by joining the mid points of the opposite sides. A 'W' type figure has been drawn at the centre of the square. Answer figure (2) resembles with the problem figure.
8. In problem figure signs of multiplication and addition are drawn under curved loop. Answer figure (4) resembles with the problem figure.
9. In the problem figure two diagonals of a square have been drawn intersecting each other. Mid point of the portion of the diagonals lying between the point of intersection and the upper are joined with two lines with the opposite vertices. The pattern in answer figure (1) resembles with the problem figure.
10. In the problem figure a blackened circle is followed by an empty circle. An arrow has been drawn horizontally pointing towards empty circle. The same figure pattern has been repeated in answer figure (2).
11. In the given pattern of the problem figure the missing part of this figure can be filled by answer figure (4) without changing the direction.
12. Shift answer figure (2) and put it on the missing part of the problem figure, it will complete the problem figure.
13. In the given positions of blackened circle and empty circle. In answer figure (3) will complete the given problem figure.
14. In the given problem figure answer figure (3) will complete the missing part of the problem figure.
15. Shift answer figure (1) on the missing part of the problem figure, if will complete the problem figure.
16. In problem figures one small lines are increasing in each problem figure. Therefore, answer figure (4) will occupy in the blank space.
17. Answer figure (1) will occupy the blank space.
18. In problem figures circles are moving in clockwise direction. Therefore, answer figure (2) will occupy the blank space.
19. In problem figures one small line and a small circle is increasing by one in subsequent figures. Therefore, answer figure (1) will occupy the blank space.
20. In problem figures the number of black shaded circles are increasing by (1) starting from zero. Therefore, answer figure (1) will occupy the blank space.
21. The square of the problem figure can be completed by turning the answer figure (2).
22. Answer figure (4) will be the correct figure which complete the square of the problem figure.
23. For completing the square of the problem figure, answer figure (2) should be turned and placed on the square.
24. For completing the problem figures, turn answer figure (2) and put it on the problem figure, we get the complete square of the problem figure.
25. Answer figure (3) will complete the square of the problem figure by shifting and turning.
26. As, men wear kurta, in the same way women wear saree.
27. As in problem figure (1) to (2), innermost design getting shade, in the same way changes occur in problem figure (3) to produce answer figure (3).
28. As in problem figure (1) to (2), whole figure rotate in either direction, in the same way changes occurs in problem figure (3) to produce answer figure (1).
29. As in problem figure (1) to (2), there is an increase of one design, in the same way changes occur in problem figure (3) to produce the answer figure (3).
30. As in problem figure (1) to (2), the two smaller lines adjoining main figure is disappeared, in the same way changes occur in problem figure (3), to produce the answer figure (4).

51. Number of sold bananas in March
$= 6 \times 12 \times 5 = 360$ bananas
Number of sold bananas in April
$= 3 \times 12 \times 5 = 180$ bananas
Number of sold bananas in May
$= 5 \times 12 \times 5 = 300$ bananas
Number of sold bananas in June
$= 2 \times 12 \times 5 = 120$ bananas
Number of sold bananas in July
$= 7 \times 12 \times 5 = 420$ bananas
Hence, number of sold bananas
$= 360 + 180 + 300 + 120 + 420$
$= 1380$ bananas

52. Lectures taken by Amit in a day = 2
Lectures taken by Raghav in a day = 5
Total number of lectures by Amit and Raghav
$= 2 + 5 = 7$
Total number of lectures in a week $= 7 \times 6 = 42$
Lectures taken by Gopal in a day = 4
Lectures taken by Pramod in a day = 3
Total number of lectures by Gopal and Pramod
$= 4 + 3 = 7$
Total number of lectures by Gopal and Pramod in a week $= 7 \times 6 = 42$
$\therefore$ Required difference $= 42 - 42 = 0$

53. Side of the square $= \frac{\text{Perimeter}}{4} = \frac{48}{4} = 12$ m
Area of the square = Side × Side
$= 12 \times 12 = 144\ m^2$

54. Previous total $= 20 \times 18 = 360$
New case $= 360 - 3 \times 20 = 360 - 60 = 300$
$\therefore$ New average $= \frac{300}{20} = 15$

55. Let numbers be $2x$ and $3x$
Then, $\frac{2x+9}{3x+9} = \frac{3}{4}$
$\Rightarrow \quad 4(2x + 9) = 3(3x + 9)$
$\Rightarrow \quad 8x + 36 = 9x + 27$
$\Rightarrow \quad 9x - 8x = 36 - 27 \Rightarrow x = 9$
$\therefore$ Numbers are $2 \times 9 = 18$
and $3 \times 9 = 27$

56. Volume of the box $= 3 \times 3 \times 3 = 27$ cu m

57. Time of start from Delhi = 9 : 10 am
Reaching time at Chandigarh = 4 : 20 pm
Time from 9 : 10 to 12 : 00 = 2 h 50 min
From 12 : 00 to 4 : 20 = 4 h 20 min
Total time taken = 7 h 10 min

58. Marks in Ist test = 18
Marks in IInd test = 22
Marks in (I + II) test = 18 + 22 = 40
Max. Marks = 25 + 25 = 50
$\because$ Marks in 50 = 40
$\therefore$ Marks in Percentage $= 40 \times 2 = 80\%$

59. Cost price = 30 − 10 = ₹ 20
$$\text{Percentage profit} = \frac{\text{Profit} \times 100}{\text{Cost price}}$$
$$= \frac{10 \times 100}{20} = 50\%$$

60. $\because$ Empty part of the drum $= 1 - \frac{2}{3} = \frac{1}{3}$
If $\frac{1}{3}$ part requires = 50 L
Then, 1 part requires $= 50 \div \frac{1}{3} = 50 \times 3 = 150$ L

61. Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{350}{75} = \frac{14}{3}$ h $= 4\frac{2}{3}$ h = 4 h 40 min

62. $\because$ Amount = ₹ 24800
Principal = ₹ 20000
$\therefore$ SI = Amount − Principal = 24800 − 20000
= ₹ 4800
$$\text{Rate of interest} = \frac{SI \times 100}{P \times T}$$
$$= \frac{4800 \times 100}{20000 \times 2} = 12\%$$

63. Let the total journey be x km.
Then, $\frac{x}{3}$ is covered at 25 km/h, $\frac{x}{4}$ is at 30 km/h
$$\text{Rest of the distance} = x - \frac{x}{3} - \frac{x}{4}$$
$$= \frac{12x - 4x - 3x}{12} = \frac{5x}{12}$$
at the speed of 50 km/h
$\therefore$ Total time of journey
$$= \frac{x}{75} + \frac{x}{120} + \frac{5x}{12 \times 50}$$
$$= \frac{18x}{600} = \frac{3x}{100} \text{ h}$$
$$\text{Average speed} = \frac{x}{\frac{3x}{100}} = \frac{100}{3} = 33\frac{1}{3} \text{ km/h}$$

64. $$\frac{\frac{7}{3} \times \frac{2}{3} \div \frac{3}{5}}{2 + 1\frac{2}{3}} = \frac{\frac{7}{3} \times \frac{2}{3} \times \frac{5}{3}}{2 + \frac{5}{3}} = \frac{\frac{70}{27}}{\frac{11}{3}}$$
$$= \frac{70 \times 3}{27 \times 11} = \frac{70}{99}$$

65. Selling price of washing machine = ₹ 13489

Discount allowed = 18%

Let marked price of washing machine be ₹ x.

$\therefore \quad x - \frac{18x}{100} = 13489$

$\Rightarrow \quad \frac{82x}{100} = 13489$

$\Rightarrow \quad x = \frac{13489 \times 100}{82}$

$\therefore \quad$ = ₹ 16450

66. 90% of 300 + 30% of 90

$= \frac{90 \times 300}{100} + \frac{30 \times 90}{100}$

$= 90 \times 3 + 3 \times 9$

$= 270 + 27 = 297$

67. Other number $= \frac{\text{HCF} \times \text{LCM}}{\text{First number}}$

$= \frac{38 \times 98154}{1558} = 2394$

68. Total money collected = ₹ 2304 = 230400 paise

As number of students = Money paid by students

$\therefore$ Number of students in school $= \sqrt{230400} = 480$

69. 258 → 130 → 66 → 34 → 18 → $\boxed{10}$

÷2+1 ÷2+1 ÷2+1 ÷2+1 ÷2+1

70. Suppose second decimal = x

Then, $x \times 4.13 = 20.7326$

$\Rightarrow \quad x = \frac{20.7326}{4.13} = 5.02$

71. Required percentage $= \frac{500}{725} \times 100 = 68.9 = 70$

72. Average $= \frac{567 + 434 + 323 + 290 + 401}{5}$

$= \frac{2015}{5} = 403$

73. B's share in the amount $= \frac{9861 \times 11}{19}$ = ₹ 5709

74. $3450 \times \frac{42}{100} = \frac{144900}{100} = 1449$ got promotion

75. $\frac{x}{20} = 65 \Rightarrow x = 1300$

According to the question, 96 − 69 = 27

$\therefore \quad$ New $x = 1300 - 27 = 1273$

$\Rightarrow \quad \frac{1273}{20} = 63.65$

JAWAHAR
NAVODAYA
VIDYALAYA

MENTAL ABILITY TEST

CHAPTER

01

ODD-MAN OUT

Odd man out is the process of putting things or objects into a group and then finding the different object or thing that does not belong to the group. In this chapter, we deal with questions which have a set of four figures, out of which except one, are alike or have some common features/characteristics. You have to select that exclusively different figure from the given set.

In this chapter the changes in figure are based on the following types

- Based on formation
- Based on relation of two elements
- Based on method of writing
- Based on number of side
- Based on different elements
- Based on real images
- Based on position
- Based on rotation

Based on Formation

In this type, out of the four figures three figures are formed in a same manner while fourth figure is different. Candidates are required to find out odd figure.

Example **1.**

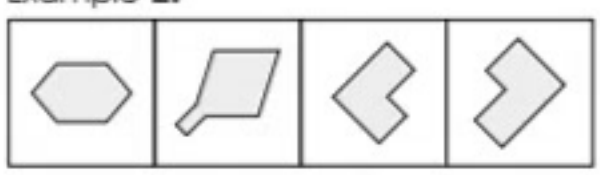
(1) (2) (3) (4)

Sol. **(3)** Except figure (3), all other figures are formed by straight lines while figure (3) is formed by curved line.

Based on Number of Side

In this type, three designs have equal number of sides while fourth contains different number of sides.

Example **2.**



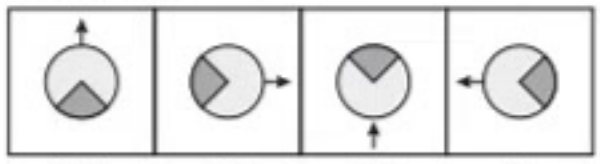
(1) (2) (3) (4)

Sol. **(2)** Except figure (2), all other figures have 6 straight lines while figure (2) has seven straight lines.

Based on Position

In this type, out of the four figures elements in three figures are in same position while in one figure elements are in differents position.

Example **3.**



(1) (2) (3) (4)

Sol. **(3)** Except figure (3), in all other figures the shaded portion and arrow are pointing in same direction while in figure (3) the shaded portion and arrow are pointing in opposite direction.

Based on Relation of Two Elements

In this type, all the four figures contain two elements. Elements in each figure are released to one another in a certain way. In different figure elements are differently related to one another.

Example **4.**

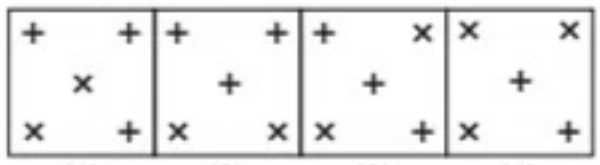
(1) (2) (3) (4)

Sol. **(1)** Except figure (1), in all other figures, inner design has one less number of sides than outer design while in figure (1) inner design has three less number of sides than outer design.

Based on Different Elements

In this type, three figures have same elements while fourth has different. Candidates are required to choose the figure which has different elements.

Example **5.**



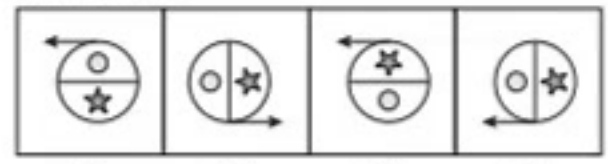
(1) (2) (3) (4)

Sol. **(4)** Except figure (4), all others figures have three '+' and two '×' designs while figure (4) has two '+' and three '×' designs.

Based on Rotation

In this type, out of the four figures three figures have same rotational direction i.e. either clockwise or anti-clockwise while fourth rotates in different direction. Candidates are required to find out the odd figure.

Example **6.**



(1) (2) (3) (4)

Sol. **(4)** Except figure (4), all other figures are moving in anti-clockwise direction while figure (4) is moving in clockwise direction.

Based on Method of Writing

In this type, three letters are formed by similar elements while the fourth one is formed by different elements.

Example **7.**

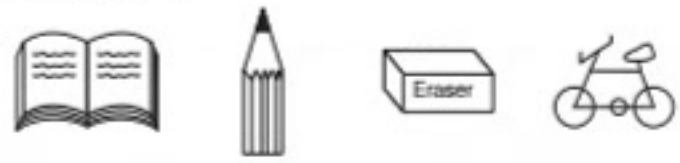
(1) (2) (3) (4)

Sol. **(2)** Except figure (2), all other letters are made up of three straight lines while the letter in figure (2) is made up of two straight lines.

Based on Real Images

In this type, four diagrams of real images are given which show some real meaning. In these figures three represent similar meaning while the meaning of one figure is different from others. The candidates are required to choose the different image.

Example **8.**



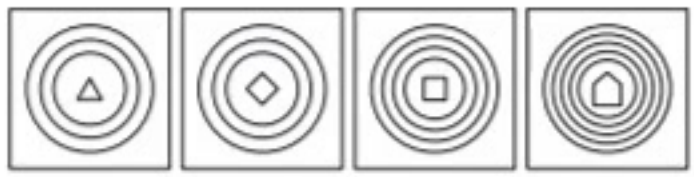
(1) (2) (3) (4)

Sol. **(4)** Except cycle all others are stationary items.

Entrance Corner

Directions (Q. Nos. 1-46) *In the following questions, there are four figures. Three of them have common relation or characteristics and belong to one class. Select the figure which different and does not have any relation with the other figures in the group.*

1.



(1) (2) (3) (4)

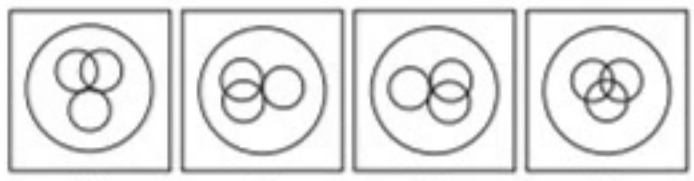
[JNV 2019]

2.

(1) (2) (3) (4)

[JNV 2019]

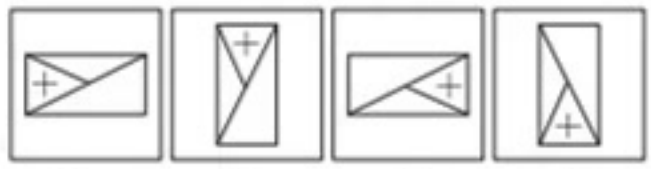
3.



(1) (2) (3) (4)

[JNV 2019]

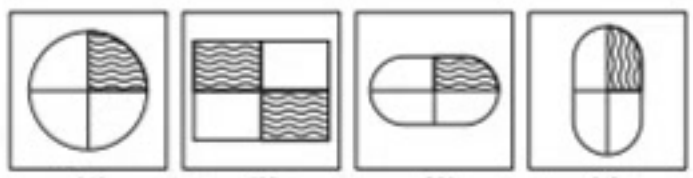
4.



(1) (2) (3) (4)

[JNV 2019]

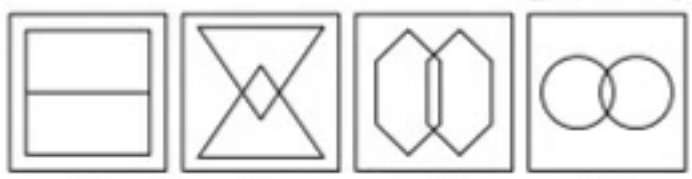
5.



(1) (2) (3) (4)

[JNV 2018]

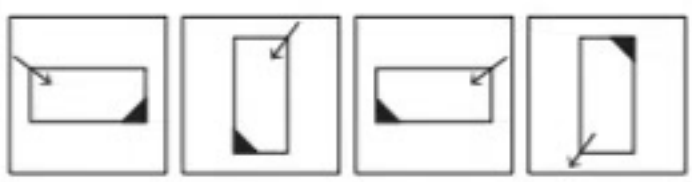
6.



(1) (2) (3) (4)

[JNV 2018]

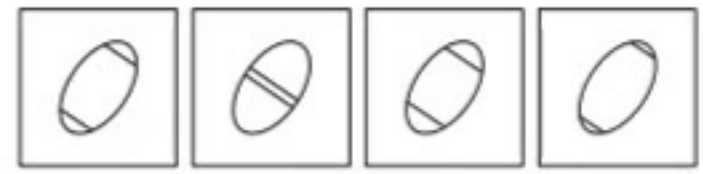
7.



(1) (2) (3) (4)

[JNV 2018]

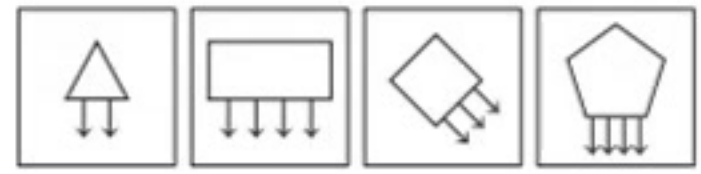
8.



(1) (2) (3) (4)

[JNV 2018]

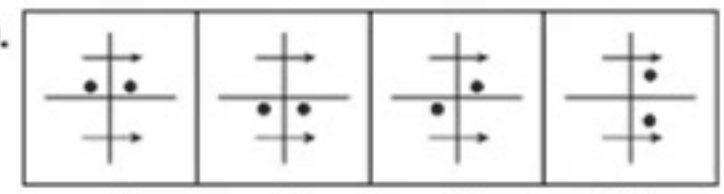
9.



(1) (2) (3) (4)

[JNV 2018]

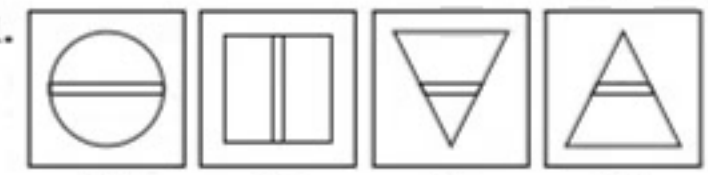
10.



(1) (2) (3) (4)

[JNV 2005]

11.



(1) (2) (3) (4)

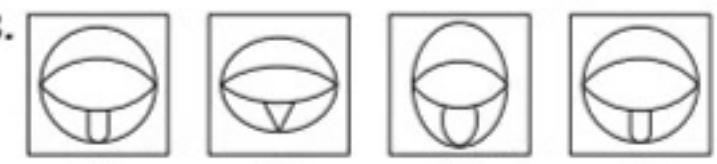
[JNV 2017, 1995]

12.

(1) (2) (3) (4)

[JNV 2017]

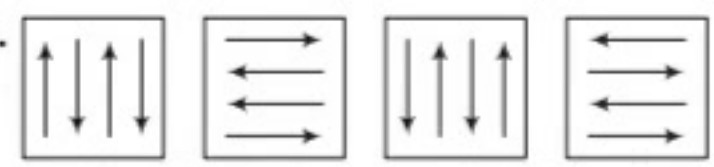
13.



(1) (2) (3) (4)

[JNV 2016]

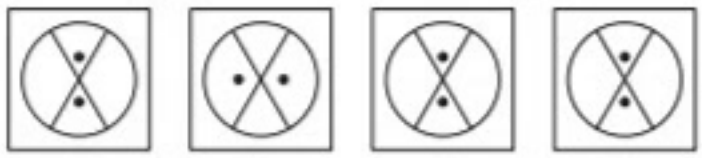
14.



(1) (2) (3) (4)

[JNV 2016]

15.



(1) (2) (3) (4)

[JNV 2016]

16.

(1) (2) (3) (4)

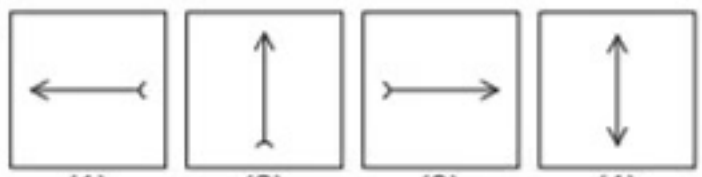
[JNV 2015]

17.

(1) (2) (3) (4)

[JNV 2015]

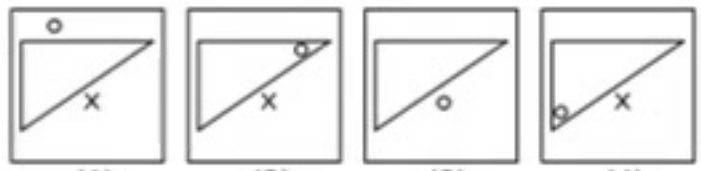
18.



(1) (2) (3) (4)

[JNV 2015]

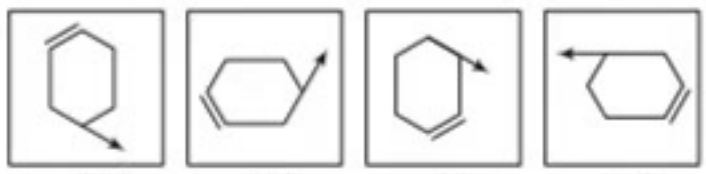
19.



(1) (2) (3) (4)

[JNV 2014]

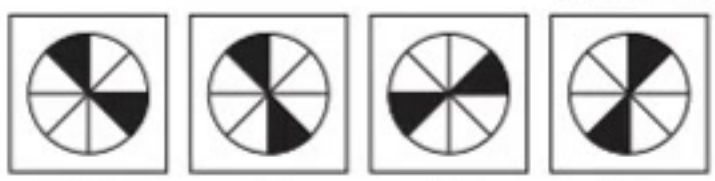
20.



(1) (2) (3) (4)

[JNV 2014]

21.



(1) (2) (3) (4)

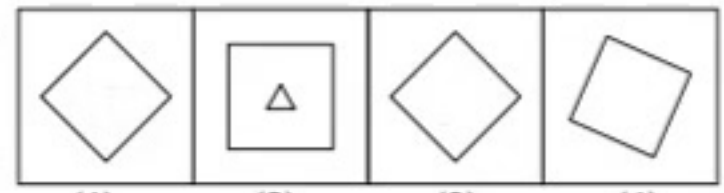
[JNV 2013]

22.

(1) (2) (3) (4)

[JNV 2013]

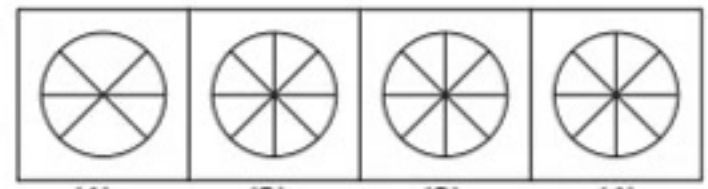
23.



(1) (2) (3) (4)

[JNV 2012]

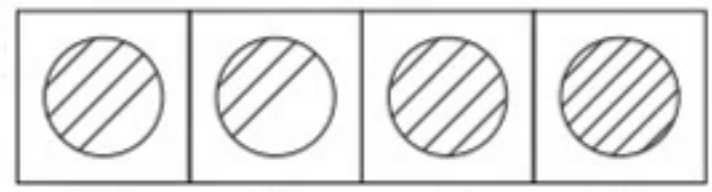
24.



(1) (2) (3) (4)

[JNV 2012]

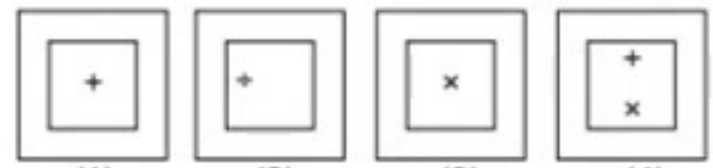
25.



(1) (2) (3) (4)

[JNV 2011]

26.



(1) (2) (3) (4)

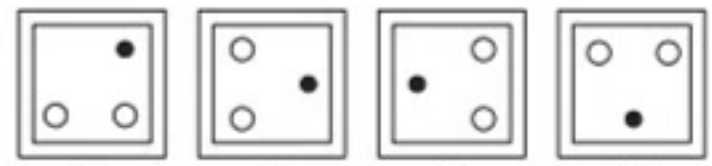
[JNV 2011]

27.

(1) (2) (3) (4)

[JNV 2010]

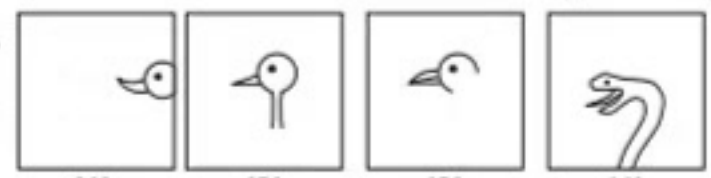
28.



(1) (2) (3) (4)

[JNV 2010]

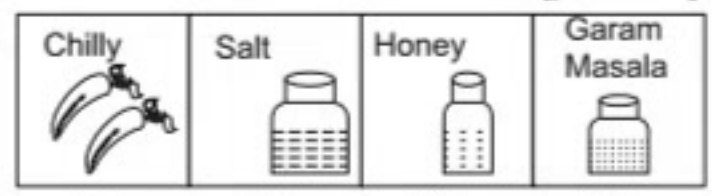
29.



(1) (2) (3) (4)

[JNV 2009]

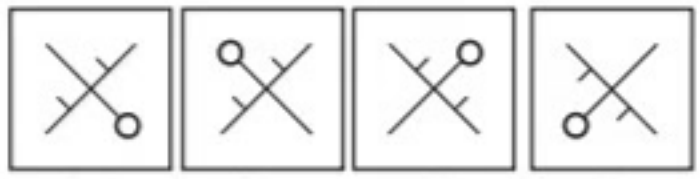
30.



(1) (2) (3) (4)

[JNV 2009]

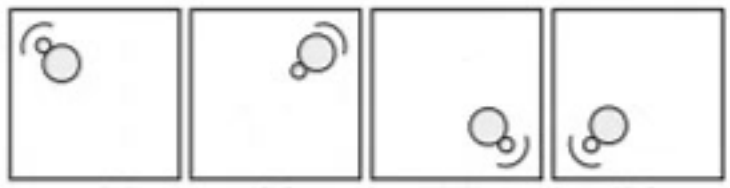
31.



(1) (2) (3) (4)

[JNV 2008]

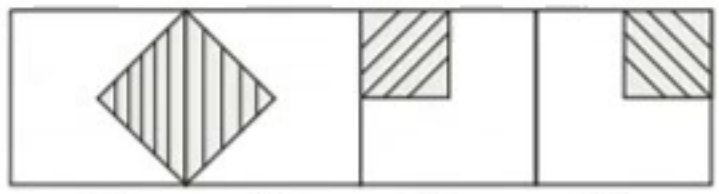
32.



(1) (2) (3) (4)

[JNV 2008]

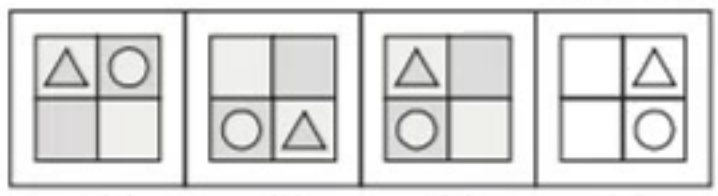
33.



(1) (2) (3) (4)

[JNV 2007]

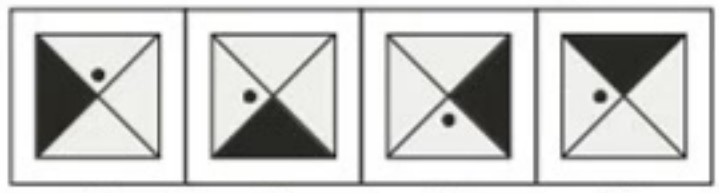
34.



(1) (2) (3) (4)

[JNV 2007]

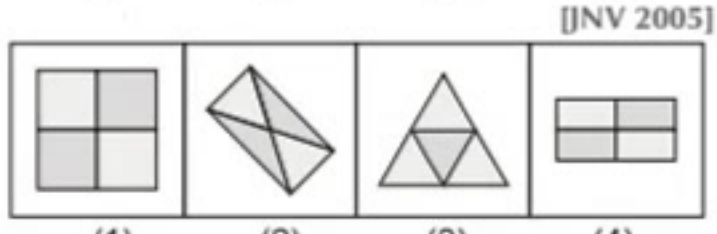
35.



(1) (2) (3) (4)

[JNV 2005]

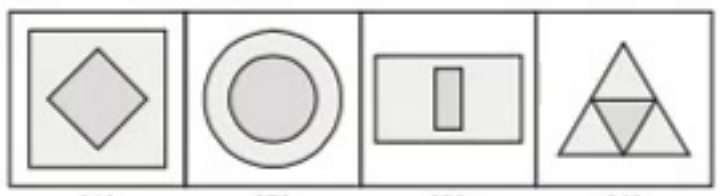
36.



(1) (2) (3) (4)

[JNV 2004]

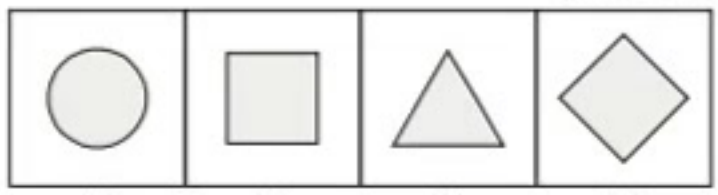
37.



(1) (2) (3) (4)

[JNV 2004]

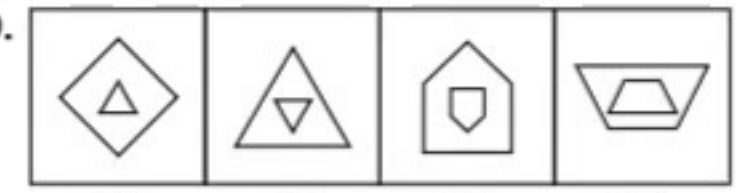
38.



(1) (2) (3) (4)

[JNV 2003]

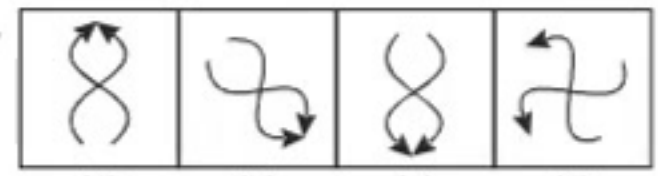
39.



(1) (2) (3) (4)

[JNV 2003]

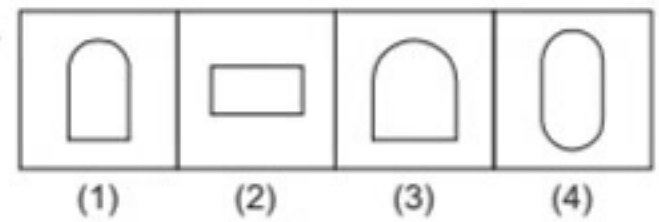
40.



(1) (2) (3) (4)

[JNV 2002]

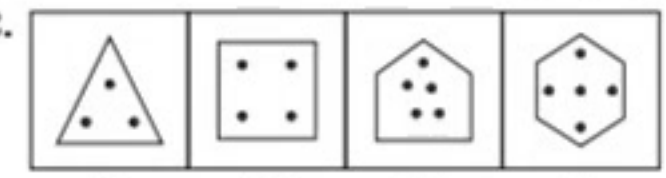
41.



(1) (2) (3) (4)

[JNV 2002]

42.



(1) (2) (3) (4)

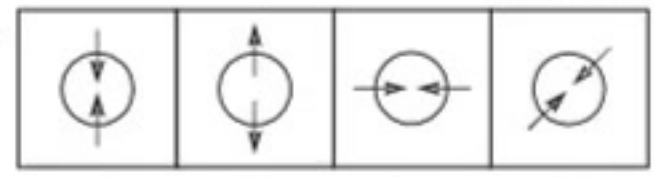
[JNV 2000]

43.

(1) (2) (3) (4)

[JNV 2000]

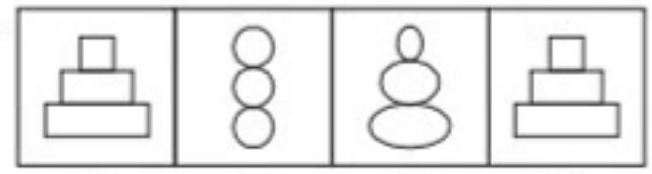
44.



(1) (2) (3) (4)

[JNV 1999]

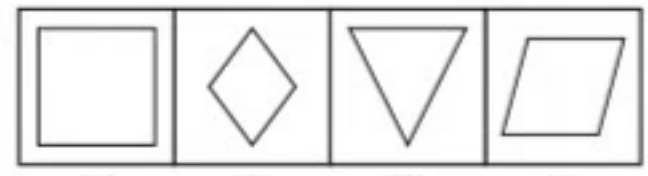
45.



(1) (2) (3) (4)

[JNV 1999]

46.



(1) (2) (3) (4)

[JNV 1998]

Answers

1 *(2)*	**2** *(3)*	**3** *(4)*	**4** *(2)*	**5** *(2)*	**6** *(1)*	**7** *(4)*	**8** *(2)*	**9** *(2)*	**10** *(3)*
11 *(2)*	**12** *(4)*	**13** *(2)*	**14** *(2)*	**15** *(2)*	**16** *(4)*	**17** *(4)*	**18** *(4)*	**19** *(3)*	**20** *(3)*
21 *(1)*	**22** *(4)*	**23** *(2)*	**24** *(1)*	**25** *(1)*	**26** *(4)*	**27** *(2)*	**28** *(1)*	**29** *(4)*	**30** *(3)*
31 *(1)*	**32** *(2)*	**33** *(2)*	**34** *(3)*	**35** *(4)*	**36** *(3)*	**37** *(2)*	**38** *(1)*	**39** *(2)*	**40** *(4)*
41 *(2)*	**42** *(4)*	**43** *(3)*	**44** *(2)*	**45** *(2)*	**46** *(3)*				

Hints and Solutions

1. Except figure (2), in all other figures the innermost geometrical figure is made up of similar number straight lines as there are circles.

Hence, figure (2) is different.

2. Except figure (3), all other figures consist of three letters R, U and N. But in figure (3), letter 'K' is used in place of 'R'.

Hence, figure (3) is different.

3. Except figure (4), all other figures have only two intersecting circles. But in figure (4) all the three circles are intersecting each other.

Hence, figure (4) is different.

4. Except figure (2), all other figures are same when rotated.

5. Except figure (2), in all other figures, only one part of the figure is shaded while in figure (2) two parts are shaded.

6. Except figure (1), in all other figures, two similar figures are intersecting each other.

7. Except figure (4), in all other figures the arrow is pointing towards the shaded portion of rectangle. But in figure (4) it is pointing in opposite direction.

8. Except figure (2), in all other figures the two lines are at the corner of the oval while in figure (2) both the lines are as the centre of the oval.

9. Except figure (2), all other figures have one less number of arrows as the number of lines in shape.

10. Considering the position of two black small circles figure (3) is different from other figures.

11. All figures in serial numbers (1), (3) and (4) have two parallel lines drawn horizontally but in figure (2) the parallel lines are drawn vertically, therefore figure (2) is different from other remaining figures.

12. Except figure (4), all other figures are made up of straight lines but figure (4) is made up of curved line.

13. Except figure (2), all other figures are made up of curved lines but in figure (2) there are two straight lines.

14. Except figure (2), in all other figures position of arrows changed alternatively.

15. Except figure (2), all other figures are same.

16. Except figure (4), all other figures have curved line outside the circle in same manner.

17. Except figure (4), all other figures have curved line which cuts the circle in same manner.

18. Except figure (4), all other figures are same when rotated.

19. Except figure (3), all figures contain two small figures namely circle (O) and cross (×).

20. Except figure (3), all other figure are rotating in anticlockwise direction, while figure (3) is rotating in clockwise direction.

21. Except figure (1), in all others the shaded parts are opposite to each other.

22. Except figure (4), all others are worn on upper part of the body.

23. Except (2), all other figures have single design.

24. Except (1), all others have four diameters.

25. Except figure (1), in all others, the number of lines in circles is odd.

26. Except figure (4) all other figures have single mathematical design.

27. Except figure (2), all others made up of straight lines.

28. Except figure (1), all other figures are same when rotated.

29. Except figure (4), all others are related with bird.

30. Except Honey, all others are different spices.

31. Except figure (1), all other figures are same when rotated.

32. Except figure (2), in all other figures the curved line is near to the smaller circle but in figure (2), it is near to the larger circle.

33. Except figure (2), in all other figures there are five number of lines inside the main figure. But in figure (2), it is four.

34. Except figure (3), in all other figures the circle is ahead of triangle when we move in clockwise direction.

35. Except figure (4), all other figures are same when rotated.

36. Except figure (3), in all other figures there are two lines which divides the main figure in four parts.

37. Except figure (2), all other figures have two similar shapes made up of straight lines. While figure (2) is made up of curved line.

38. Except figure (1), all other figures are made up of straight lines while figure (1) is made up of curved line.

39. Except figure (1), all other figures have same inner and outer designs, but in opposite directions.

40. Except figure (4), all other figures are same when rotated.

41. Except figure (2), all other figures have a circular side.

42. Except figure (4), all other figures have same number of dots inside the figure as there are number of lines in the figure.

43. Except figure (3), all other figures have same inner and outer designs.

44. Except figure (2), in all other figures both the arrows are pointing to the centre of the circle.

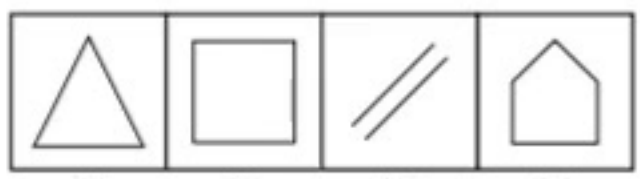
45. Except figure (2), in all other figures the size of all the three shapes are different. But in figure (2) all the three circles are of same size.

46. In the given figures, all figures are quadrilaterals but figure (3) is a triangle. Therefore, figure (3) is different from other figures.

Practice Exercise

Directions (Q. Nos. 1-46) *In the following questions, there are four figures. Three of them have common relation or characteristics and belong to one class. Select the figure which different and does not have any relation with the other figures in the group.*

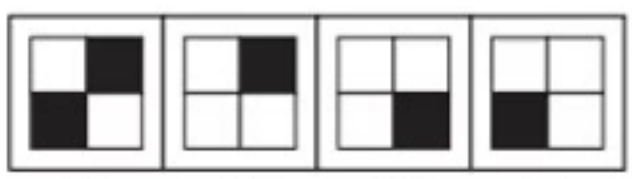
1.



(1) (2) (3) (4)

[JNV 1997]

2.



(1) (2) (3) (4)

[JNV 1996]

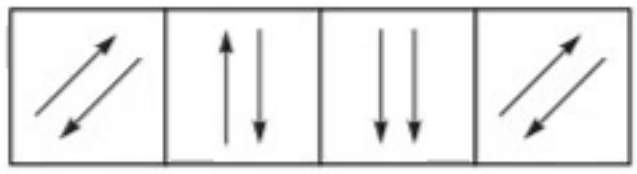
3.

SUN	NUS	SNO	UNS
(1)	(2)	(3)	(4)

4.

C	F	K	M
(1)	(2)	(3)	(4)

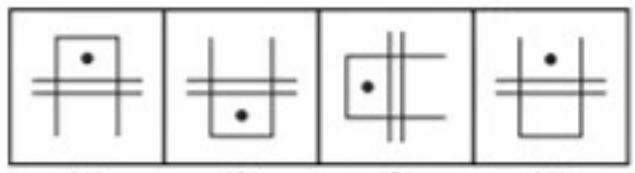
5.



(1) (2) (3) (4)

[JNV 1996]

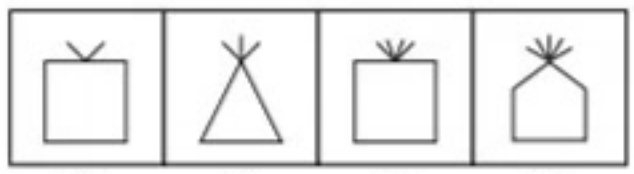
6.



(1) (2) (3) (4)

[JNV 1995]

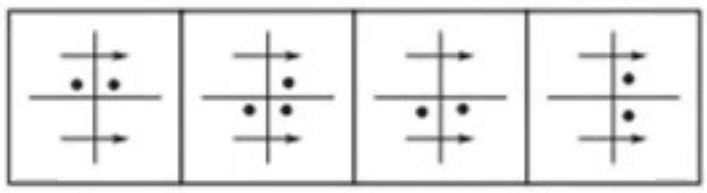
7.



(1) (2) (3) (4)

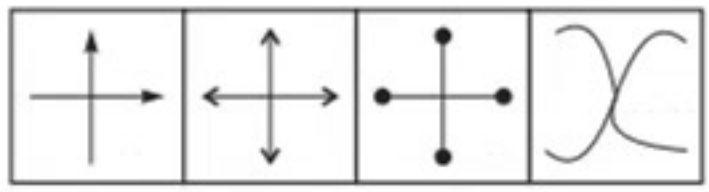
[JNV 1995]

8.



(1) (2) (3) (4)

9.



(1) (2) (3) (4)

10.

(1) (2) (3) (4)

11.

(1) (2) (3) (4)

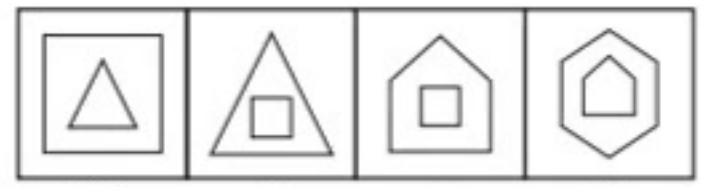
[JNV 1994]

12.

A	U	E	I
(1)	(2)	(3)	(4)

[JNV 1994]

13.



(1) (2) (3) (4)

[JNV 1993]

14.

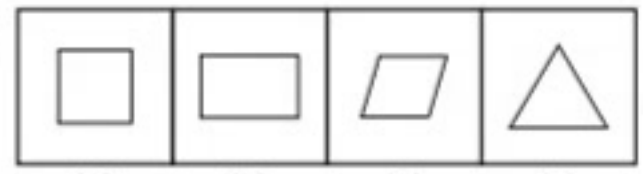
TREE	EERT	ERTE	ERTT
(1)	(2)	(3)	(4)

15.

(1) (2) (3) (4)

[JNV 1993]

16.

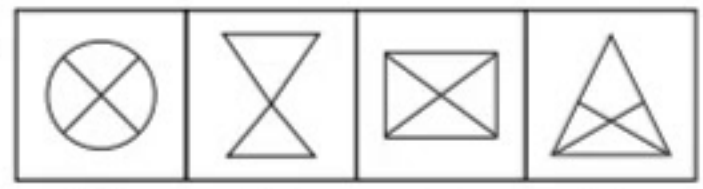


(1) (2) (3) (4)

17.

(1) (2) (3) (4)

18.

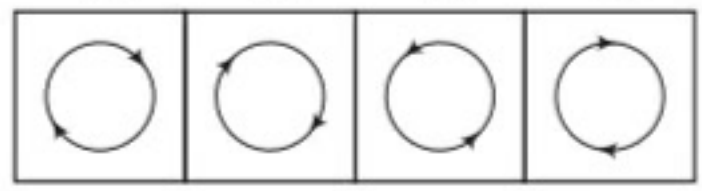


(1) (2) (3) (4)

19.

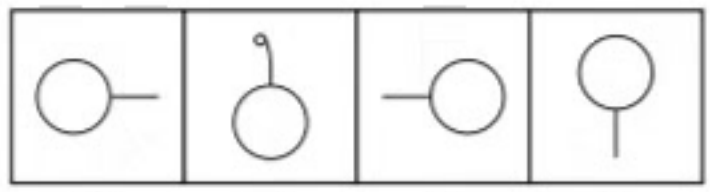
(1) (2) (3) (4)

20.



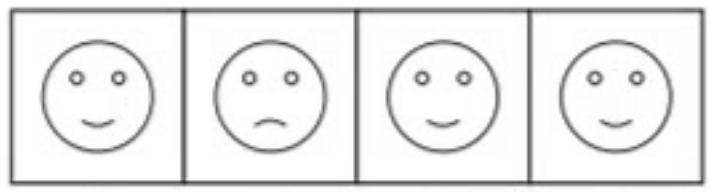
(1) (2) (3) (4)

21.



(1) (2) (3) (4)

22.



(1) (2) (3) (4)

23.

H	F	K	D

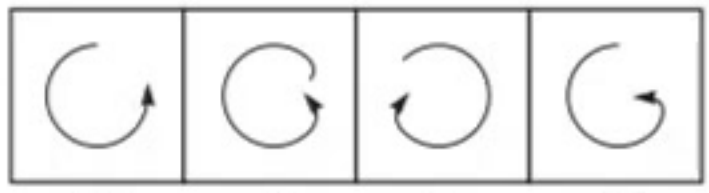
(1) (2) (3) (4)

24.

A	B	C	D

(1) (2) (3) (4)

25.



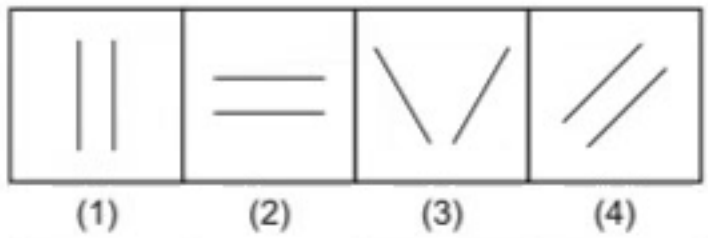
(1) (2) (3) (4)

26.

A	E	I	J

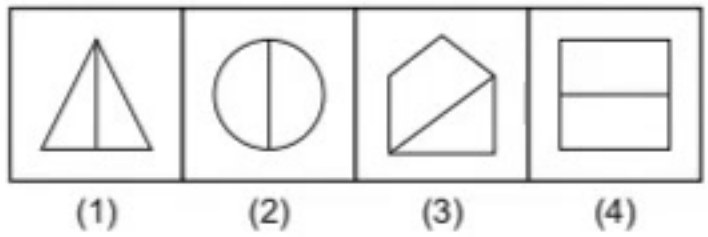
(1) (2) (3) (4)

27.



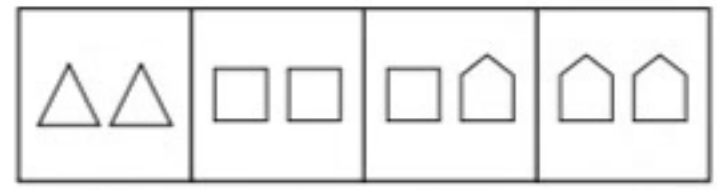
(1) (2) (3) (4)

28.



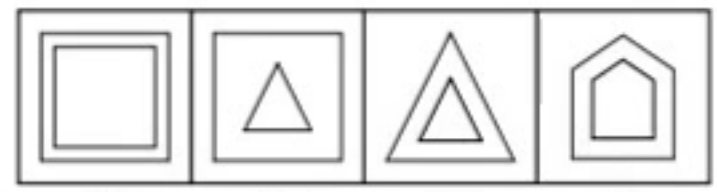
(1) (2) (3) (4)

29.



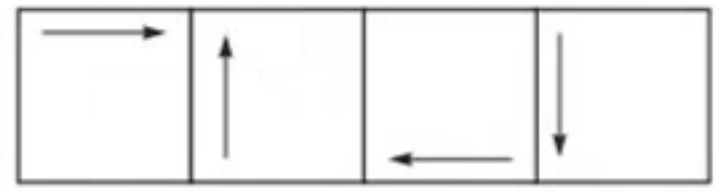
(1) (2) (3) (4)

30.



(1) (2) (3) (4)

31.



(1) (2) (3) (4)

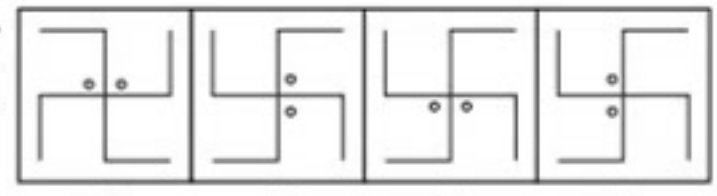
32.

(1) (2) (3) (4)

33.

(1) (2) (3) (4)

34.

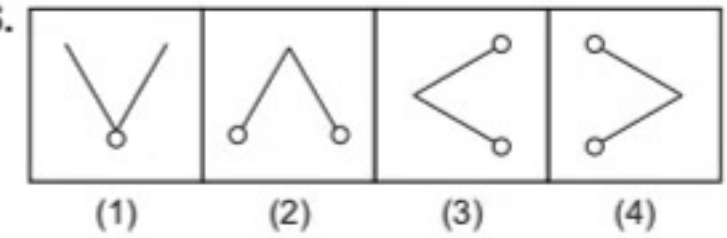


(1) (2) (3) (4)

35.

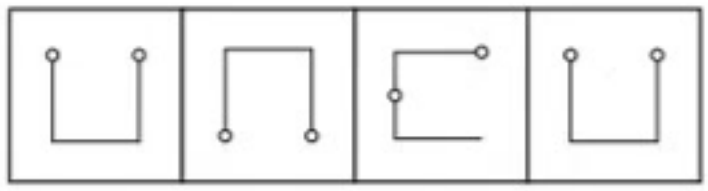
(1) (2) (3) (4)

36.



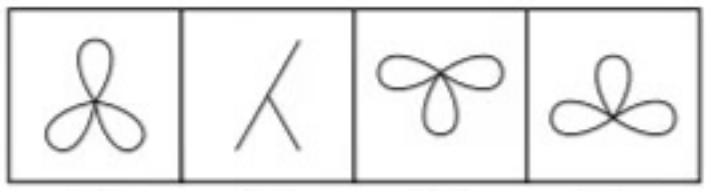
(1) (2) (3) (4)

37.



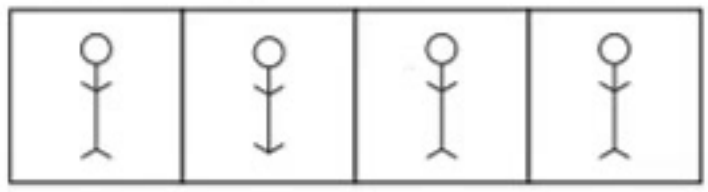
(1) (2) (3) (4)

38.



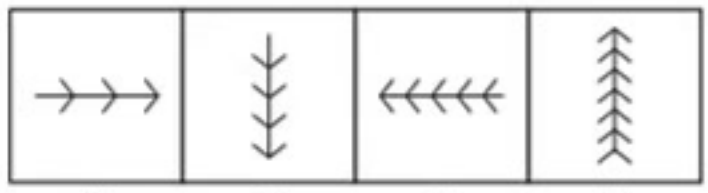
(1) (2) (3) (4)

39.



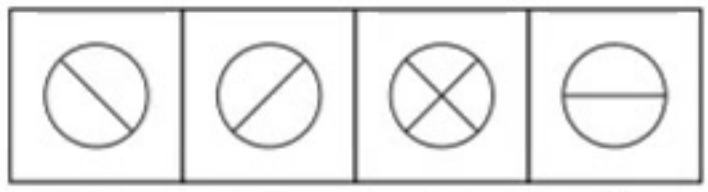
(1) (2) (3) (4)

40.



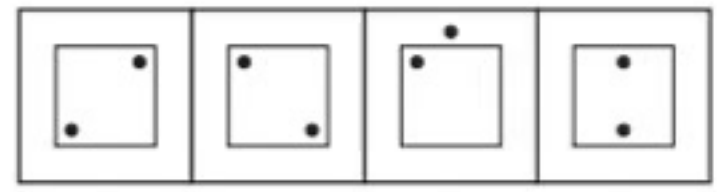
(1) (2) (3) (4)

41.



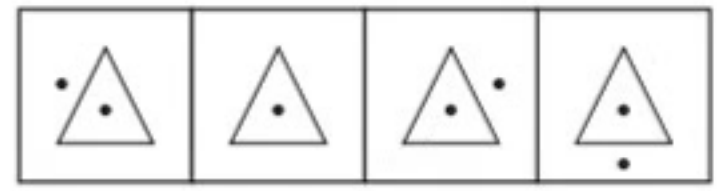
(1) (2) (3) (4)

42.



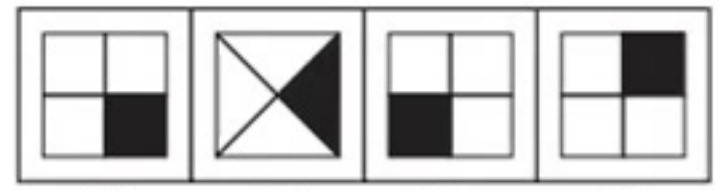
(1) (2) (3) (4)

43.



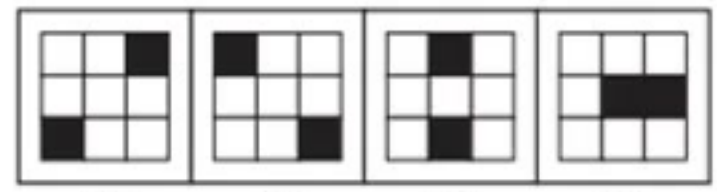
(1) (2) (3) (4)

44.



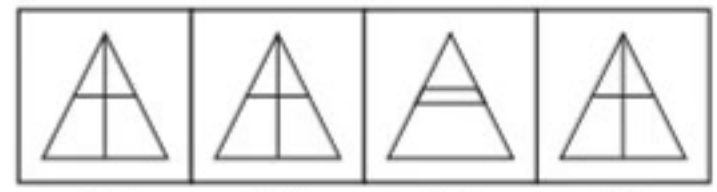
(1) (2) (3) (4)

45.



(1) (2) (3) (4)

46.



(1) (2) (3) (4)

Answers

1 *(3)*	**2** *(1)*	**3** *(3)*	**4** *(4)*	**5** *(3)*	**6** *(4)*	**7** *(1)*	**8** *(2)*	**9** *(4)*	**10** *(3)*
11 *(3)*	**12** *(2)*	**13** *(2)*	**14** *(4)*	**15** *(4)*	**16** *(4)*	**17** *(3)*	**18** *(2)*	**19** *(2)*	**20** *(3)*
21 *(2)*	**22** *(2)*	**23** *(4)*	**24** *(1)*	**25** *(3)*	**26** *(4)*	**27** *(3)*	**28** *(3)*	**29** *(3)*	**30** *(2)*
31 *(4)*	**32** *(2)*	**33** *(3)*	**34** *(1)*	**35** *(4)*	**36** *(1)*	**37** *(3)*	**38** *(2)*	**39** *(2)*	**40** *(2)*
41 *(3)*	**42** *(3)*	**43** *(2)*	**44** *(2)*	**45** *(4)*	**46** *(3)*				

Hints and Solutions

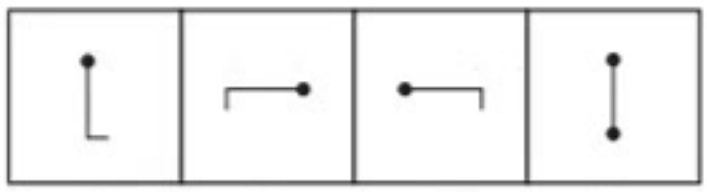
1. Except figure (3), all other figures are closed figures.
2. Except figure (1), all other figures have only one shaded portion.
3. Except figure (3), all other figures contain letters S, U and N, while figure (3) has letter 'O' in place of 'U'.
4. Except figure (4), letters in all other figures are made up of three straight lines while letter in figure (4) is made up of four straight lines.
5. Except figure (3), in all other figures both the arrows are in opposite direction.
6. Except figure (4), all other figures are same when rotated.

7. Except figure (1), in all other figures the number small lines at the top of the figure is same as the number straight lines in the main figure.
8. Only figure (2) has three small black dots.
9. All figures have straight lines but figure (4) has curved lines which is different than the other figures.
10. A small circle has been drawn inside the figures in serial numbers (1), (2) and (4). But in figure (3) a small triangle has been drawn inside the figure (3).
11. Except figure (3), in all other figures the direction of both the shapes are different.
12. Except U, all others are made up straight lines. But 'U' is made up of curved line.
13. Except figure (2), in all other figures the number of lines in inner figure is one less than the number of lines in outer figure.
14. Except figure (4), all other figures contain letters T, R, E and E, while figure (4) has one extra 'T' in place of 'E'.
15. Only in figure (4) two lines divide the main figure in four equal parts.
16. Except figure (4), all other figures are made up of four lines.
17. Figure (3) has one closed loop while others do not have such loop
18. Figure (2) is divided into two parts while others are being divided into four parts.
19. Except figure (2), in all others, the number of circles are even.
20. Direction of arrows in all figures except figure (3), is in clockwise direction.
21. Except figure (2), all other figures are same when rotated.
22. Except figure (2), all other figures have same smiling face.
23. Except figure (4), all other figures are made up of straight lines only.
24. Except figure (1), all other figures have curved lines.
25. Except figures (3), all others are rotating in anti-clockwise direction.
26. Only letter 'J' has one curved line.
27. Except figure (3), all other figures have parallel lines.
28. Except figure (3), all other figures are divided into two equal parts.
29. Except figure (3), in all others, both designs are same.
30. Except figure (3), in all others, both designs are same.
31. Except figure (4), in all others, the arrow is moving in clockwise direction.
32. Except figure (2), all other figures are same when rotated.
33. Except figure (3), In all other, only one side is shaded.
34. Except figure (1), all other figures are same when rotated.
35. Except figure (4), in all other figures the lower part of the triangle is shaded.
36. Except figure (1), in all others, the design has two circles.
37. Except figure (3), in all others, the circles are at the end of the design.
38. Except figure (2), all other figures have designs like petals.
39. Except figure (2), all others are same in structures.
40. Except figure (2), in all others, the number of head of the arrow is odd.
41. Except figure (3), circle in all other figures are divided into two equal parts.
42. Except figure (3), in all other figures both the circle are inside the square.
43. Except figure (2), in all other figures there is two black dots.
44. Except figure (2), all other figures are same when rotated.
45. Except figure (4), in all other figures both the shaded squares are not adjacent to each other.
46. Except figure (3), all other figures are same.

Self Practice

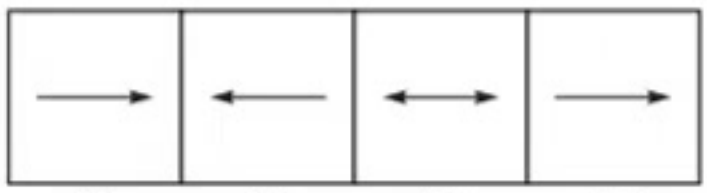
Directions (Q. Nos. 1–28) *In the following questions, there are four figures. Three of them have common relation or characteristics and belong to one class. Select the figure which different and does not have any relation with the other figures in the group.*

1.



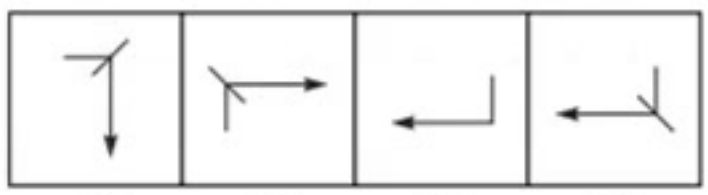
(1) (2) (3) (4)

2.



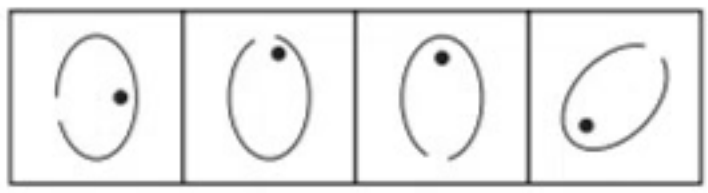
(1) (2) (3) (4)

3.



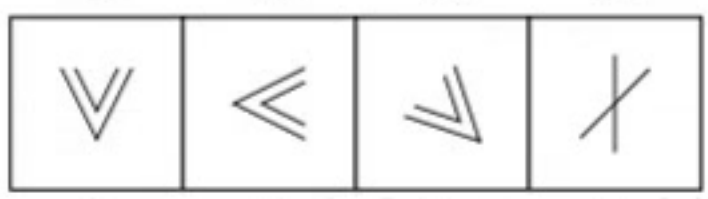
(1) (2) (3) (4)

4.



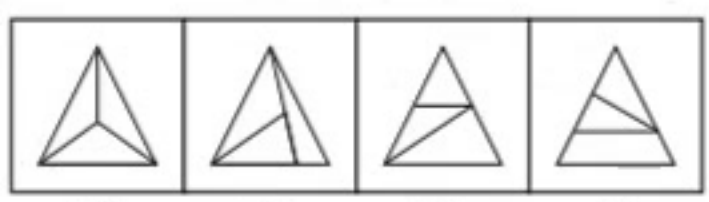
(1) (2) (3) (4)

5.



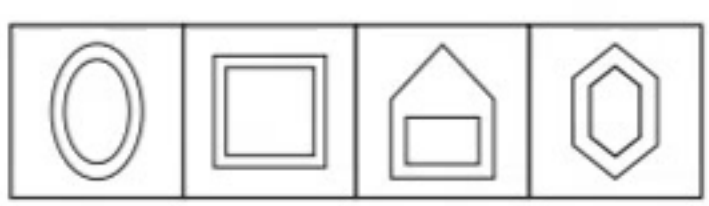
(1) (2) (3) (4)

6.



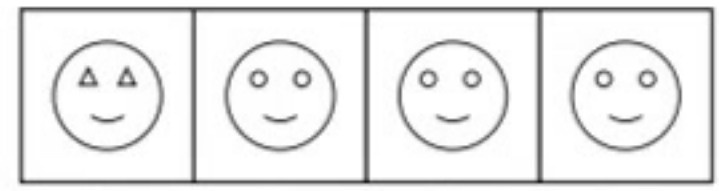
(1) (2) (3) (4)

7.



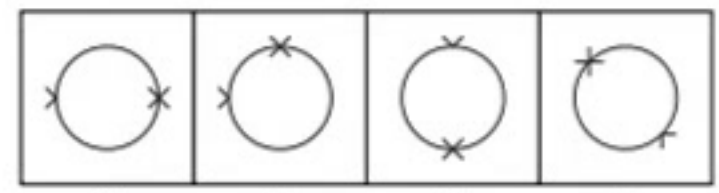
(1) (2) (3) (4)

8.



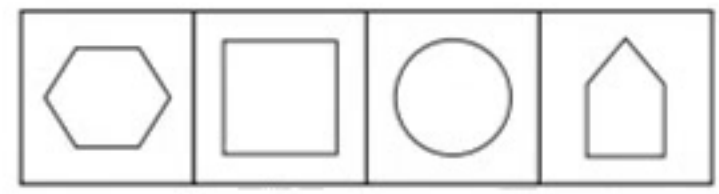
(1) (2) (3) (4)

9.



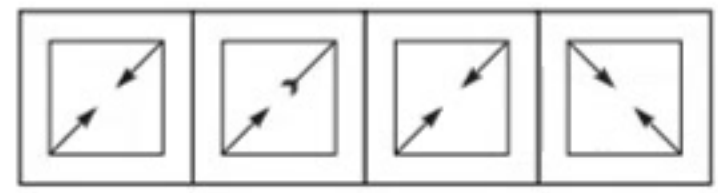
(1) (2) (3) (4)

10.



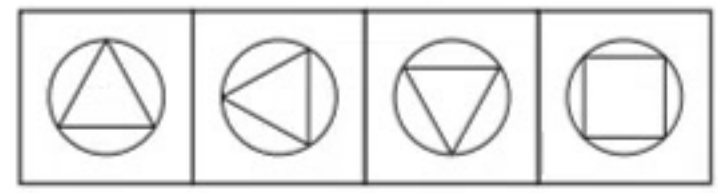
(1) (2) (3) (4)

11.



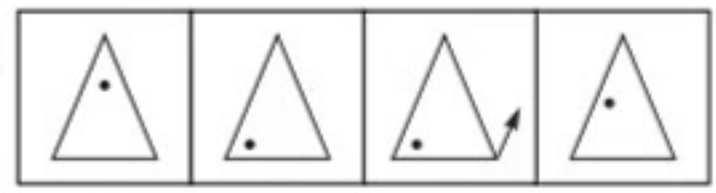
(1) (2) (3) (4)

12.



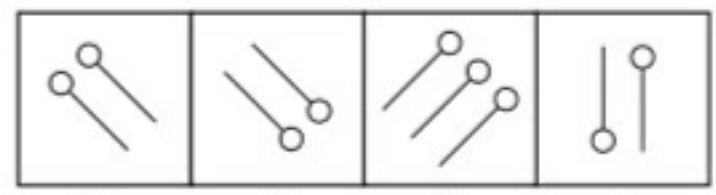
(1) (2) (3) (4)

13.



(1) (2) (3) (4)

14.



(1) (2) (3) (4)

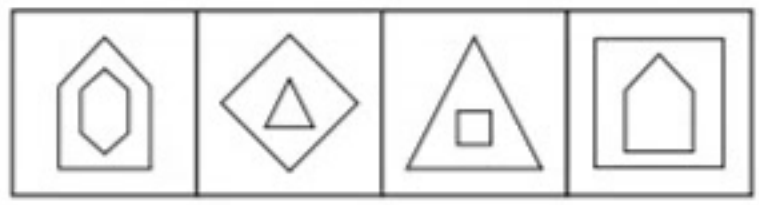
15.

(1) (2) (3) (4)

16.

(1) (2) (3) (4)

17.



(1) (2) (3) (4)

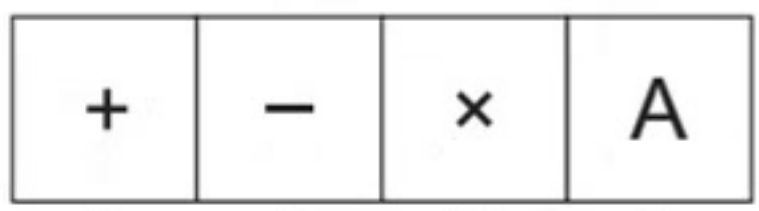
18.

(1) (2) (3) (4)

19.

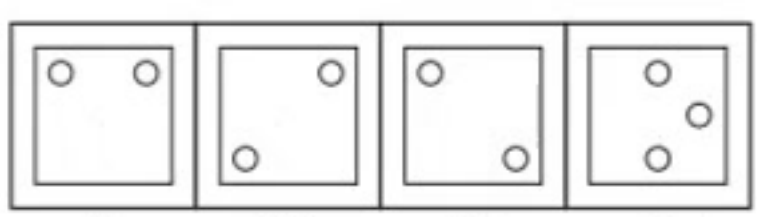
(1) (2) (3) (4)

20.



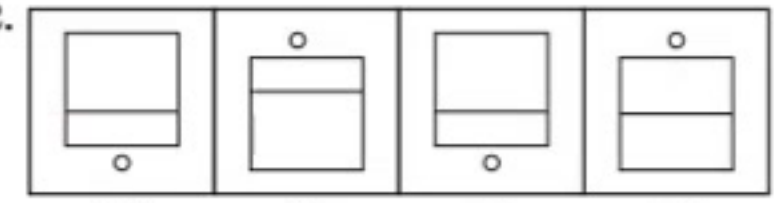
(1) (2) (3) (4)

21.



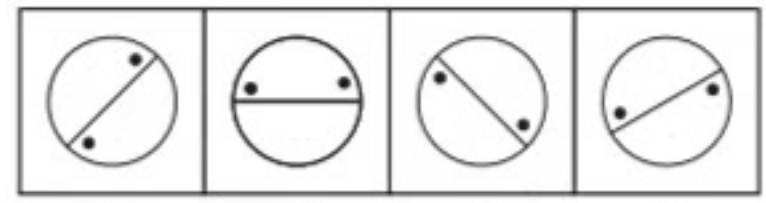
(1) (2) (3) (4)

22.



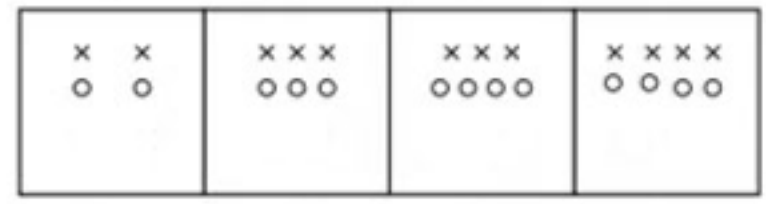
(1) (2) (3) (4)

23.



(1) (2) (3) (4)

24.

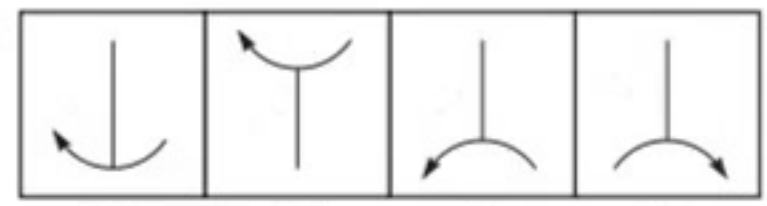


(1) (2) (3) (4)

25.

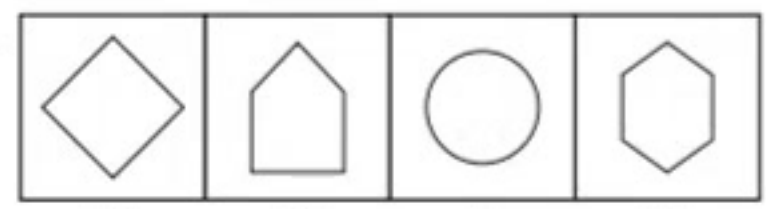
(1) (2) (3) (4)

26.



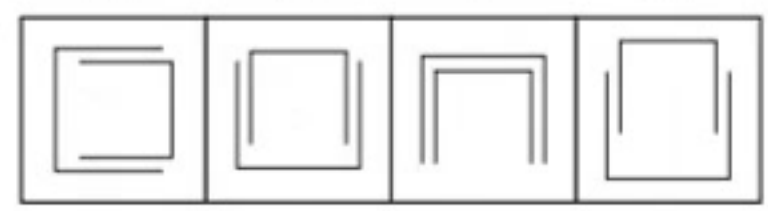
(1) (2) (3) (4)

27.



(1) (2) (3) (4)

28.



(1) (2) (3) (4)

Answers

1 *(4)*	**2** *(3)*	**3** *(3)*	**4** *(2)*	**5** *(4)*	**6** *(1)*	**7** *(3)*	**8** *(1)*	**9** *(2)*	**10** *(3)*
11 *(2)*	**12** *(4)*	**13** *(3)*	**14** *(4)*	**15** *(2)*	**16** *(1)*	**17** *(2)*	**18** *(3)*	**19** *(3)*	**20** *(4)*
21 *(4)*	**22** *(4)*	**23** *(2)*	**24** *(3)*	**25** *(1)*	**26** *(1)*	**27** *(3)*	**28** *(3)*		

CHAPTER

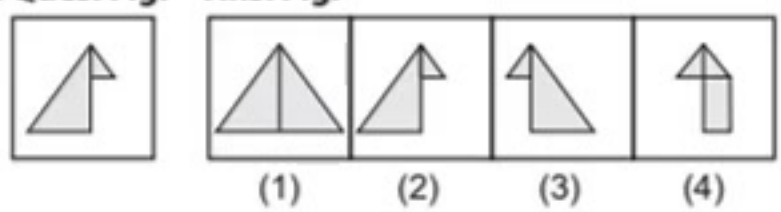
02

FIGURE MATCHING

In this type of questions, a problem figure is given on the left hand side. The candidate is required to find out the one same figure from the four answer figures.

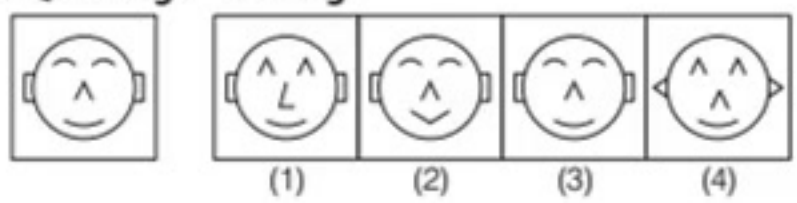
To understand the concept of figure matching, let us look on some of the following examples

Example **1. Ques. Fig.** **Ans. Fig.**



Sol. **(2)** In the given problem figure and answer figures, option (2) is similar figure.

Example **2. Ques. Fig.** **Ans. Fig.**

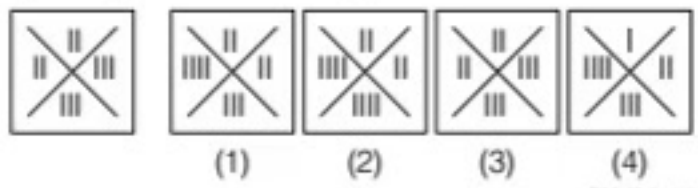


Sol. **(3)** In the given problem figure and answer figures, option (3) is similar figure.

Entrance Corner

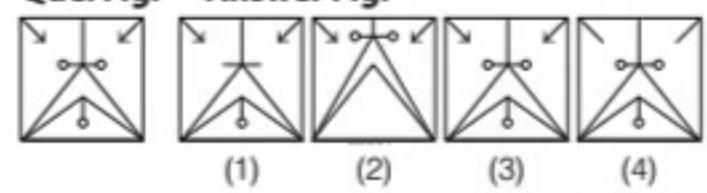
Directions (Q. Nos. 1-50) *In the following questions, a question figure is given on the left hand side and four answer figures marked as* (1), (2), (3) *and* (4) *are also given on the right hand side. Select the answer figure which is exactly the same as the question figure.*

1. Que. Fig. **Answer Fig.**



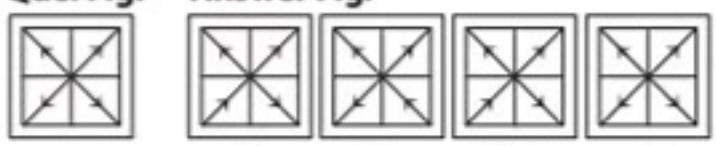
[JNV 2019]

2. Que. Fig. **Answer Fig.**



[JNV 2019]

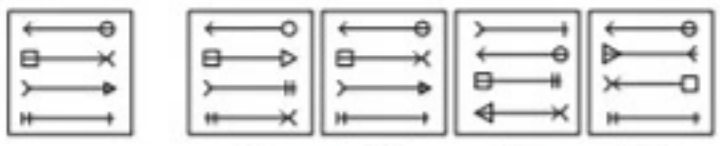
3. Que. Fig. Answer Fig.



(1) (2) (3) (4)

[JNV 2019]

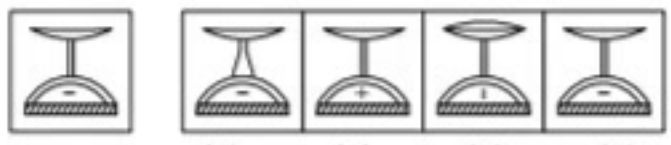
4.



(1) (2) (3) (4)

[JNV 2019]

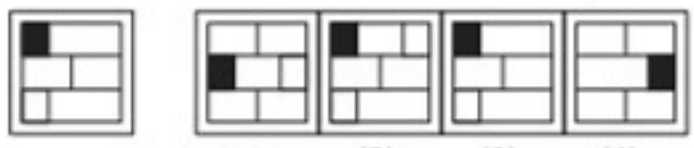
5.



(1) (2) (3) (4)

[JNV 2019]

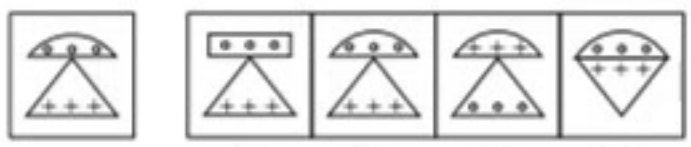
6.



(1) (2) (3) (4)

[JNV 2018]

7.



(1) (2) (3) (4)

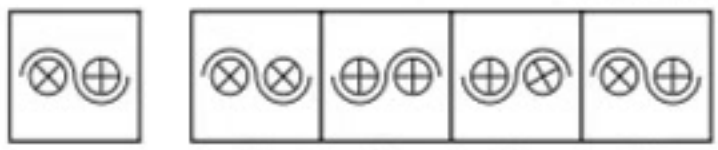
[JNV 2018]

8.

(1) (2) (3) (4)

[JNV 2018]

9.



(1) (2) (3) (4)

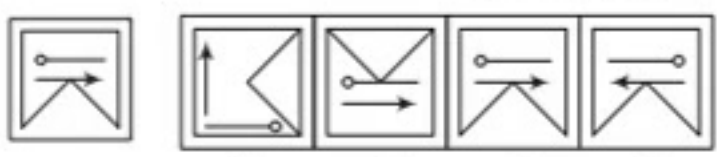
[JNV 2017, 1993]

10.

(1) (2) (3) (4)

[JNV 2017, 1995]

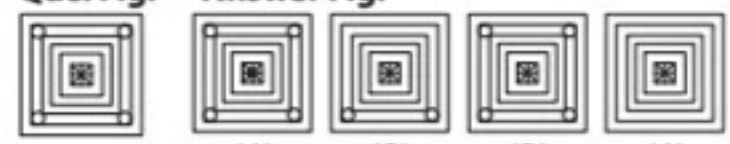
11.



(1) (2) (3) (4)

[JNV 2017]

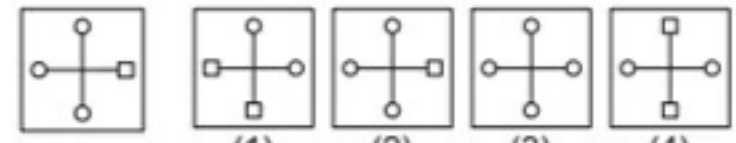
12. Que. Fig. Answer Fig.



(1) (2) (3) (4)

[JNV 2016]

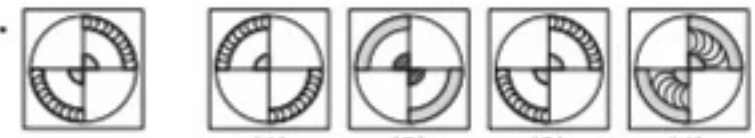
13.



(1) (2) (3) (4)

[JNV 2016]

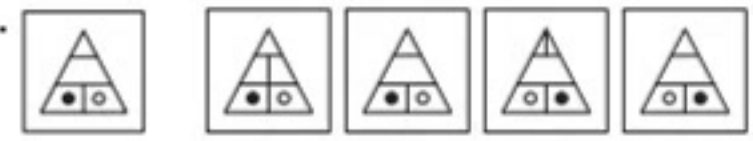
14.



(1) (2) (3) (4)

[JNV 2016]

15.



(1) (2) (3) (4)

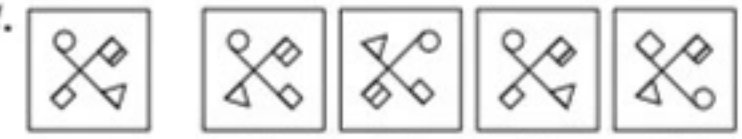
[JNV 2015]

16.

(1) (2) (3) (4)

[JNV 2015]

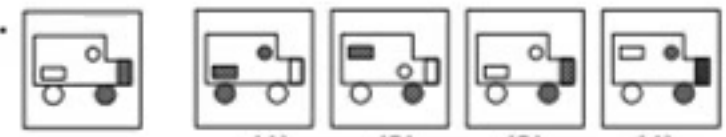
17.



(1) (2) (3) (4)

[JNV 2015]

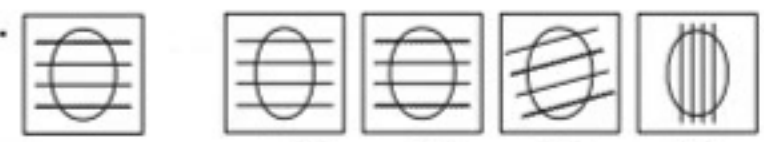
18.



(1) (2) (3) (4)

[JNV 2014]

19.



(1) (2) (3) (4)

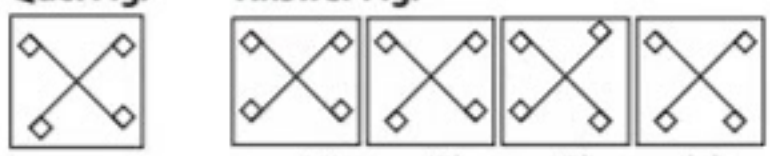
[JNV 2014]

20.

(1) (2) (3) (4)

[JNV 2013]

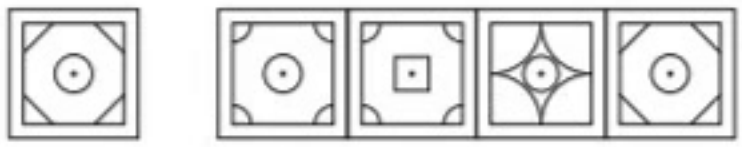
21. **Que. Fig.** **Answer Fig.**



(1) (2) (3) (4)

[JNV 2013]

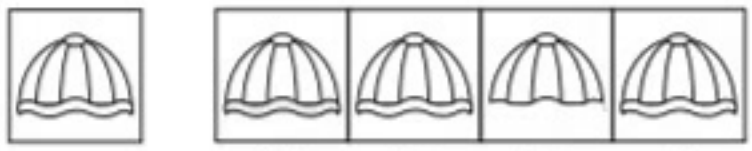
22.



(1) (2) (3) (4)

[JNV 2012]

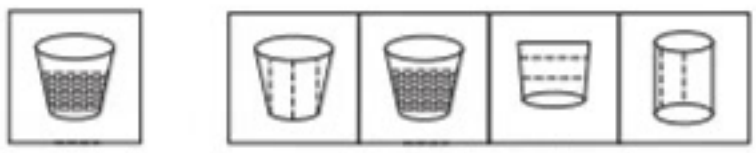
23.



(1) (2) (3) (4)

[JNV 2012]

24.



(1) (2) (3) (4)

[JNV 2012]

25.

(1) (2) (3) (4)

[JNV 2011]

26.

(1) (2) (3) (4)

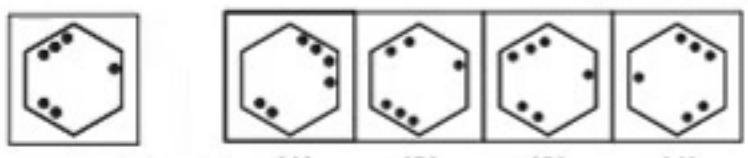
[JNV 2010]

27.

(1) (2) (3) (4)

[JNV 2010]

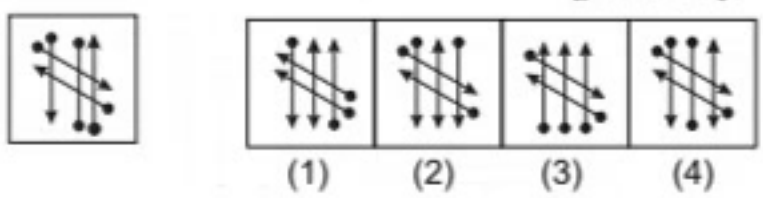
28.



(1) (2) (3) (4)

[JNV 2009]

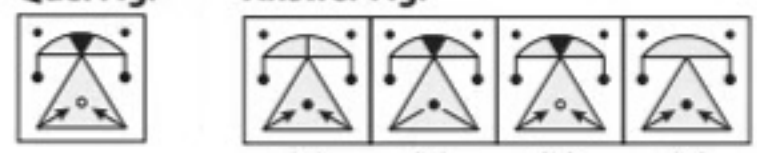
29.



(1) (2) (3) (4)

[JNV 2008]

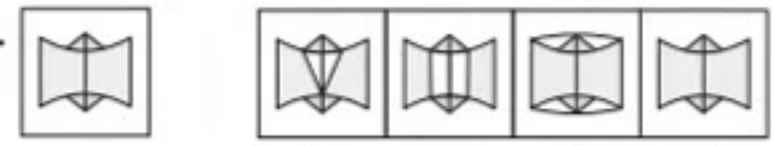
30. **Que. Fig.** **Answer Fig.**



(1) (2) (3) (4)

[JNV 2008]

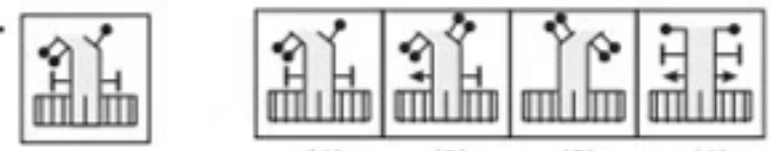
31.



(1) (2) (3) (4)

[JNV 2007]

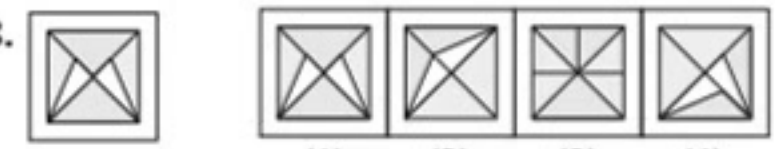
32.



(1) (2) (3) (4)

[JNV 2007]

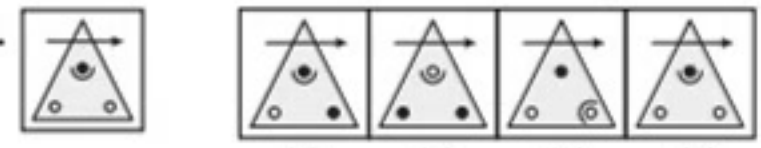
33.



(1) (2) (3) (4)

[JNV 2005]

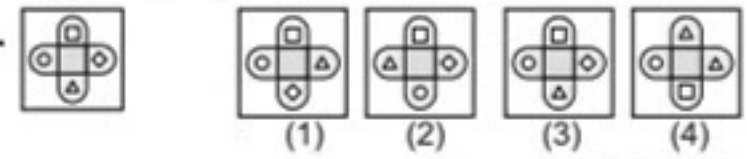
34.



(1) (2) (3) (4)

[JNV 2005]

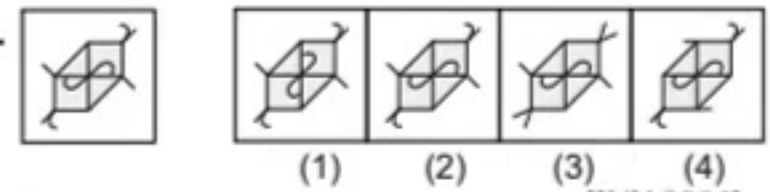
35.



(1) (2) (3) (4)

[JNV 2004]

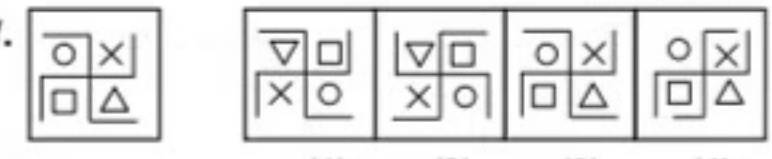
36.



(1) (2) (3) (4)

[JNV 2004]

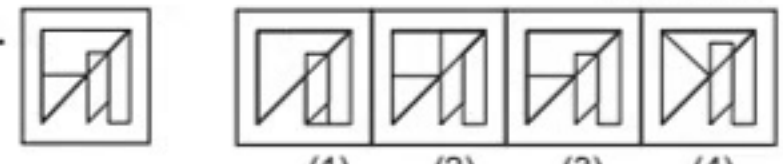
37.



(1) (2) (3) (4)

[JNV 2003]

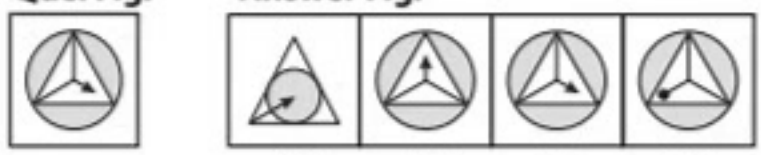
38.



(1) (2) (3) (4)

[JNV 2003]

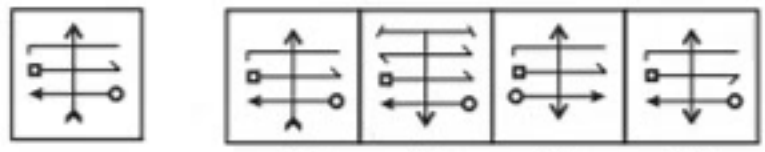
39. **Que. Fig.** **Answer Fig.**



(1) (2) (3) (4)

[JNV 2002]

40.



(1) (2) (3) (4)

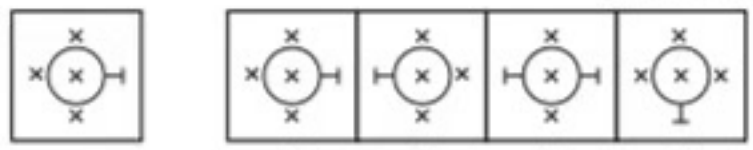
[JNV 2002]

41.

(1) (2) (3) (4)

[JNV 2000]

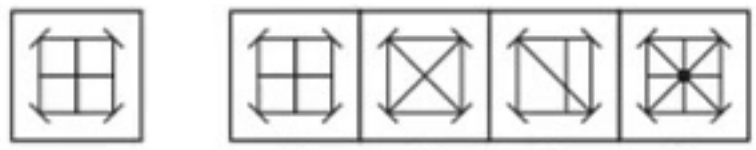
42.



(1) (2) (3) (4)

[JNV 2000]

43.



(1) (2) (3) (4)

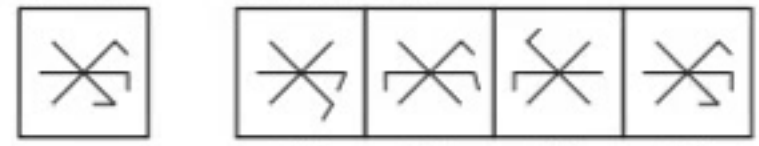
[JNV 1999]

44.

(1) (2) (3) (4)

[JNV 1999]

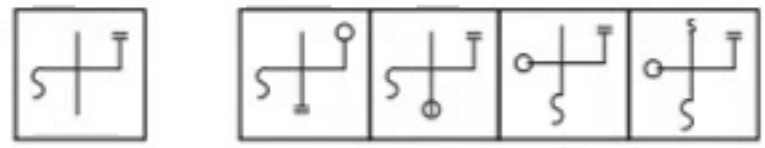
45. **Que. Fig.** **Answer Fig.**



(1) (2) (3) (4)

[JNV 1999]

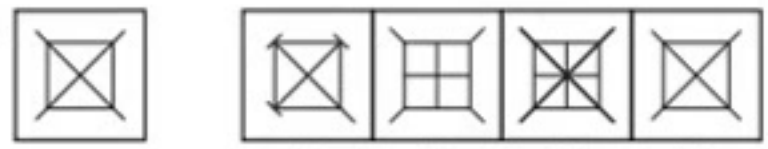
46.



(1) (2) (3) (4)

[JNV 1998]

47.



(1) (2) (3) (4)

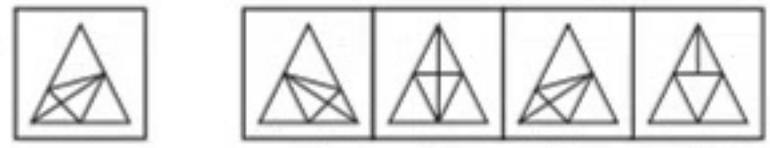
[JNV 1998]

48.

(1) (2) (3) (4)

[JNV 1997]

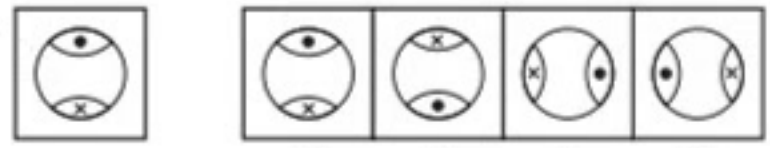
49.



(1) (2) (3) (4)

[JNV 1997]

50.



(1) (2) (3) (4)

[JNV 1996]

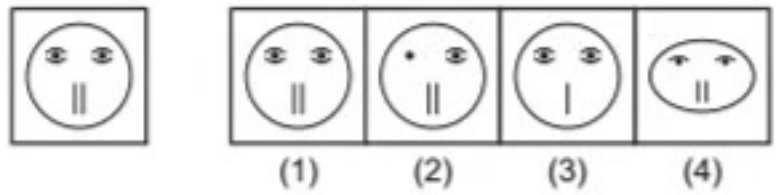
Answers

1 *(3)*	**2** *(3)*	**3** *(4)*	**4** *(2)*	**5** *(4)*	**6** *(3)*	**7** *(2)*	**8** *(1)*	**9** *(4)*	**10** *(2)*
11 *(3)*	**12** *(3)*	**13** *(2)*	**14** *(3)*	**15** *(2)*	**16** *(4)*	**17** *(3)*	**18** *(3)*	**19** *(2)*	**20** *(3)*
21 *(2)*	**22** *(4)*	**23** *(2)*	**24** *(2)*	**25** *(4)*	**26** *(3)*	**27** *(4)*	**28** *(3)*	**29** *(4)*	**30** *(3)*
31 *(4)*	**32** *(1)*	**33** *(1)*	**34** *(4)*	**35** *(3)*	**36** *(2)*	**37** *(3)*	**38** *(3)*	**39** *(3)*	**40** *(1)*
41 *(3)*	**42** *(1)*	**43** *(1)*	**44** *(4)*	**45** *(4)*	**46** *(2)*	**47** *(4)*	**48** *(2)*	**49** *(3)*	**50** *(1)*

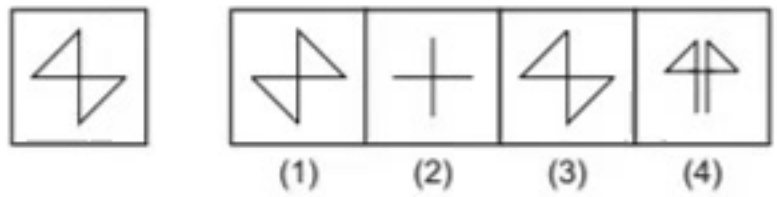
Practice Exercise

Directions (Q. Nos. 1-50) *In the following questions, a question figure has been given to the left side. To the right side are given four answer figures, marked as* (1), (2), (3) *and* (4) *which is exactly similar to the question figure. Find the correct answer figure.*

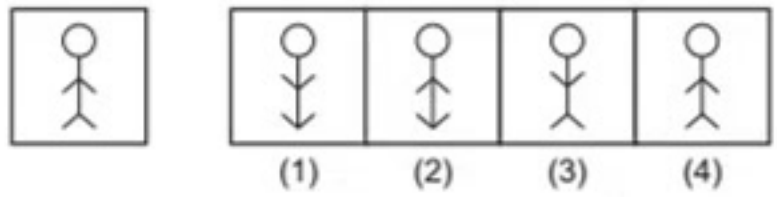
1. **Que. Fig.** **Answer Fig.**



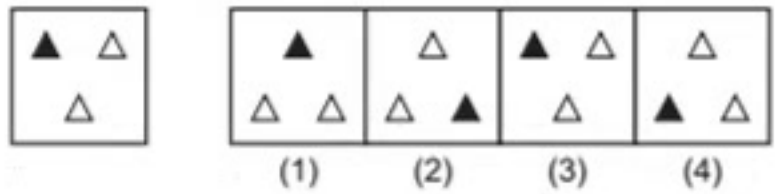
2.



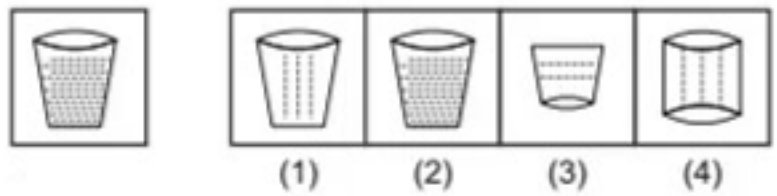
3.



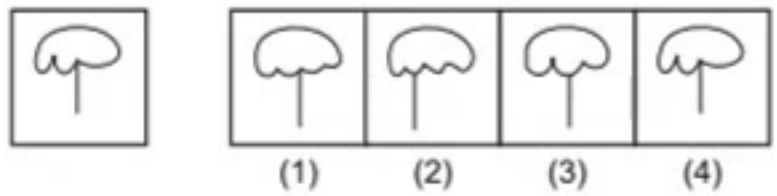
4.



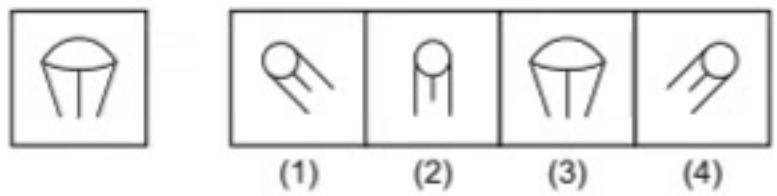
5.



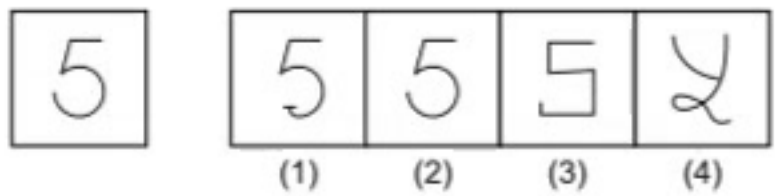
6.



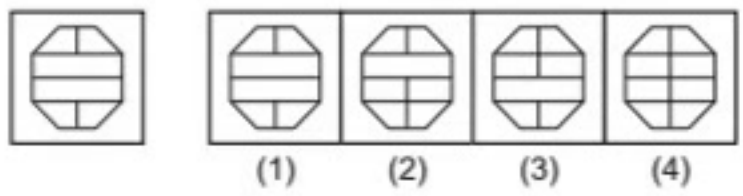
7.



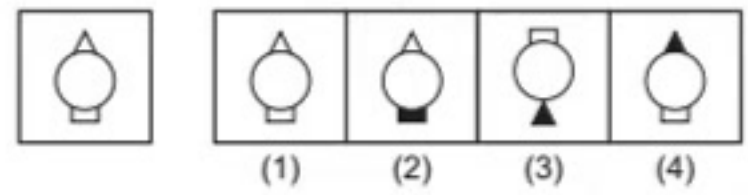
8.



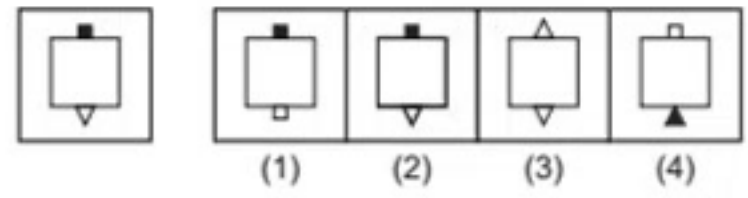
9.



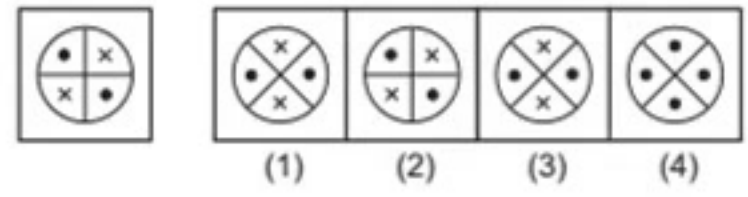
10. **Que. Fig.** **Answer Fig.**



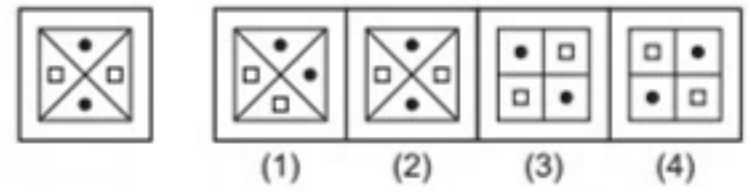
11.



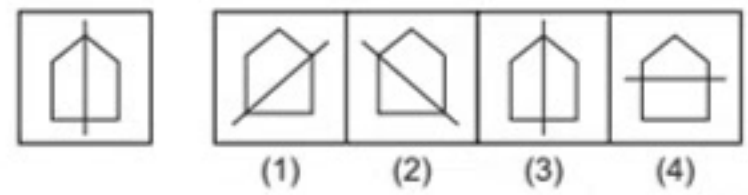
12.



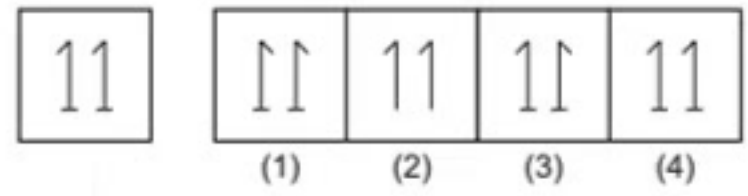
13.



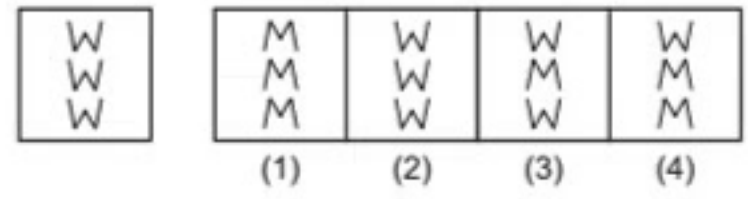
14.



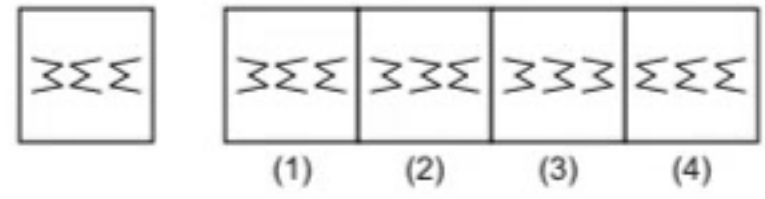
15.



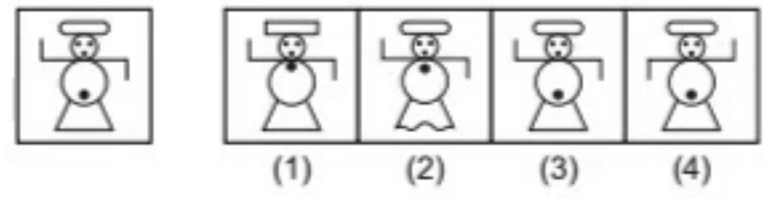
16.



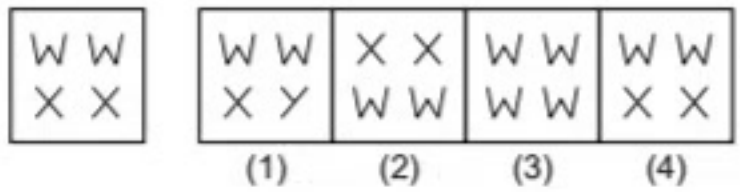
17.



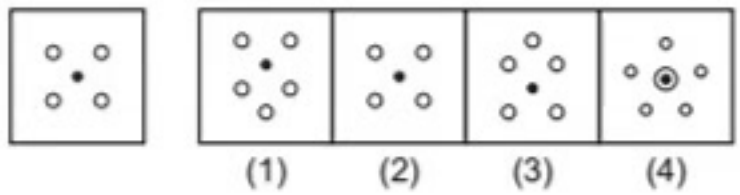
18.



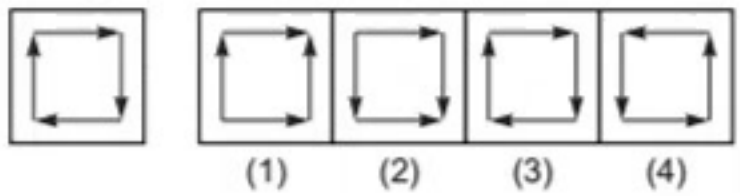
19. **Que. Fig.** **Answer Fig.**



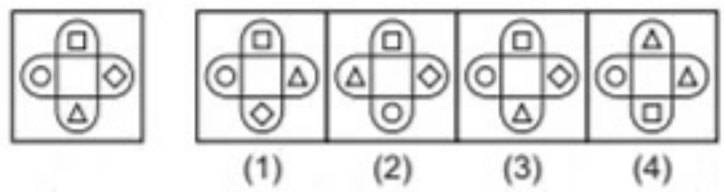
20.



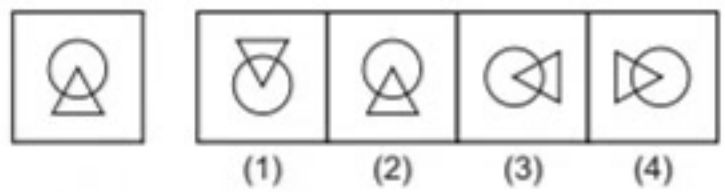
21.



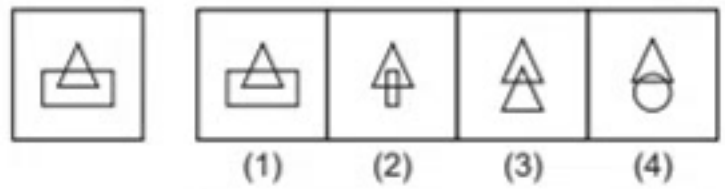
22.



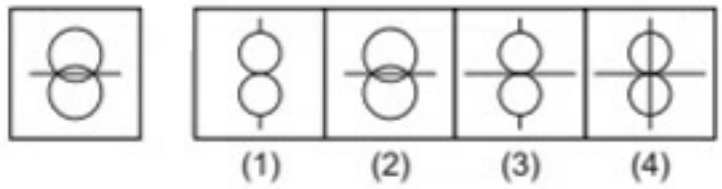
23.



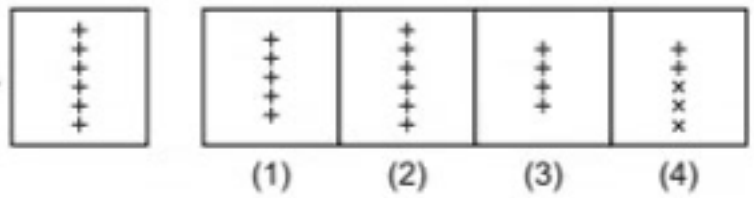
24.



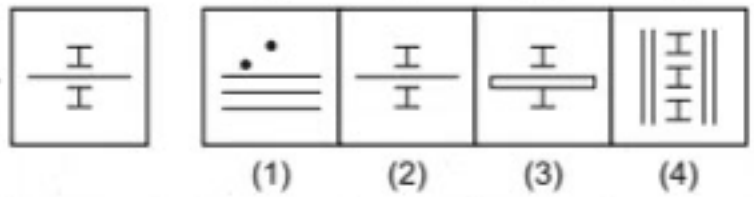
25.



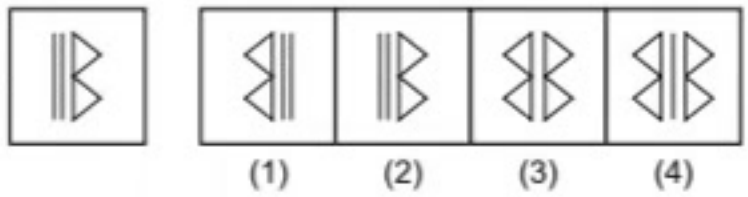
26.



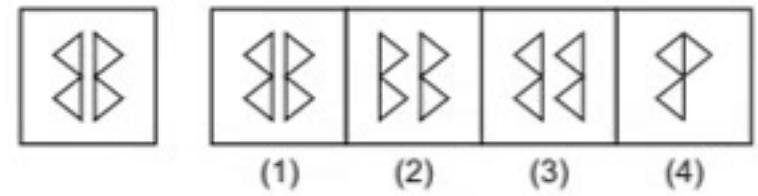
27.



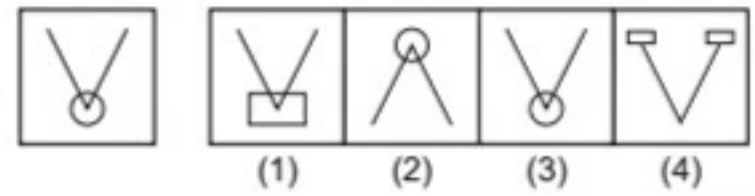
28.



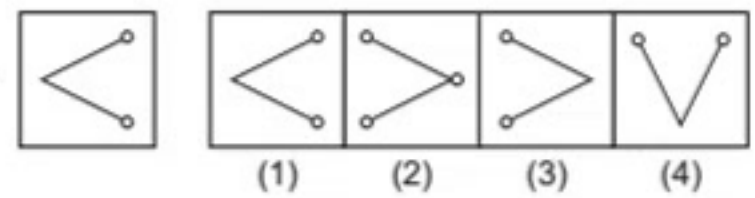
29. **Que. Fig.** **Answer Fig.**



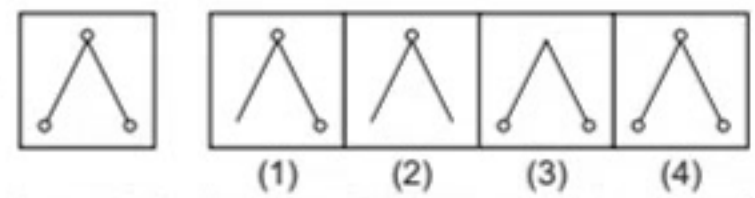
30.



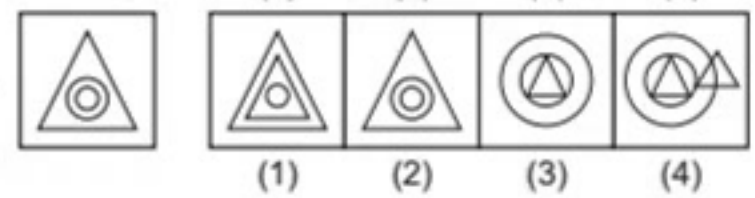
31.



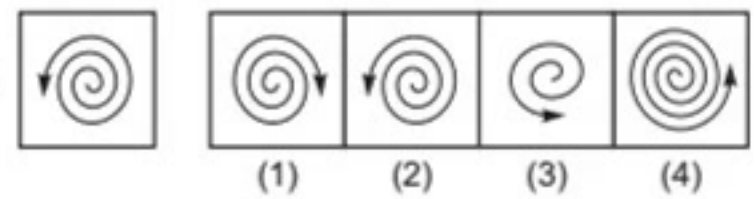
32.



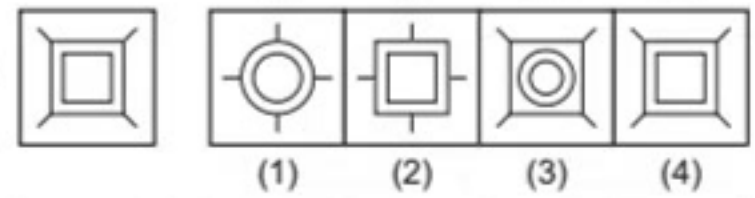
33.



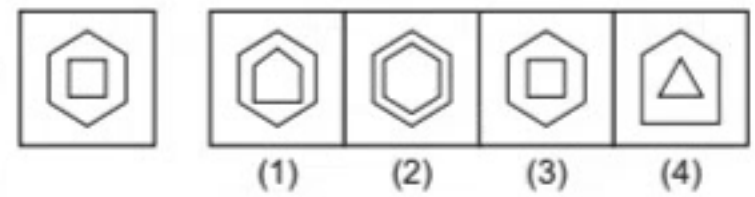
34.



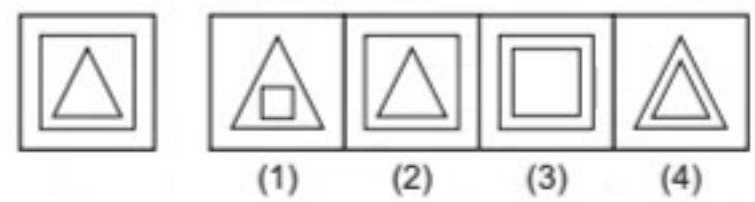
35.



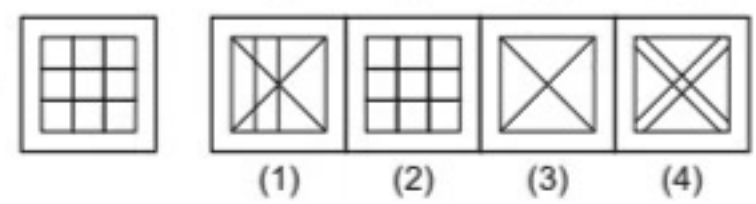
36.



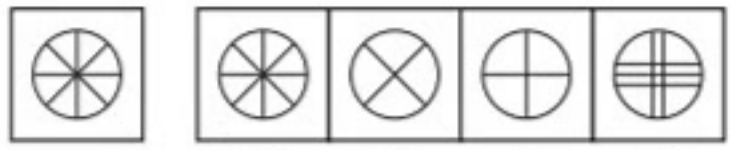
37.



38.

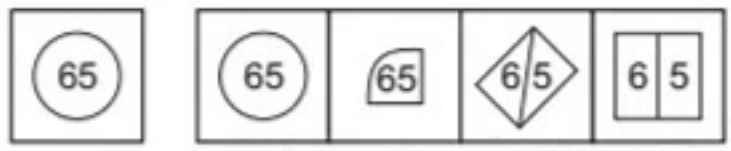


39. **Que. Fig.** **Answer Fig.**



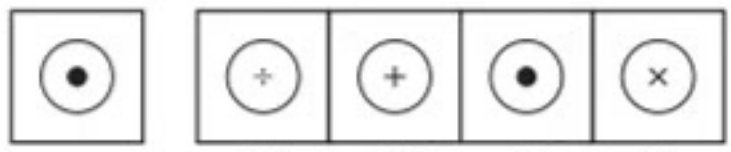
(1) (2) (3) (4)

40.



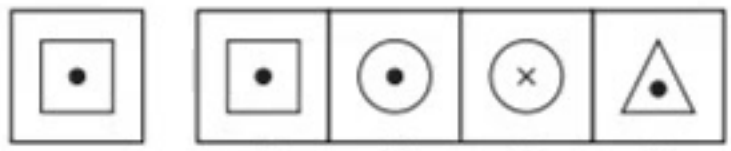
(1) (2) (3) (4)

41.



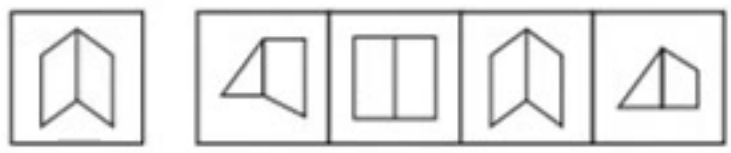
(1) (2) (3) (4)

42.



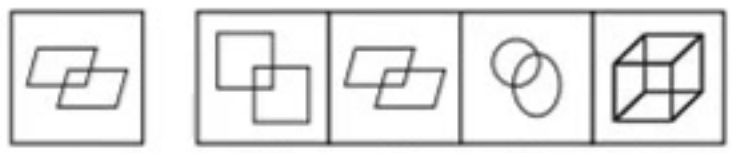
(1) (2) (3) (4)

43.



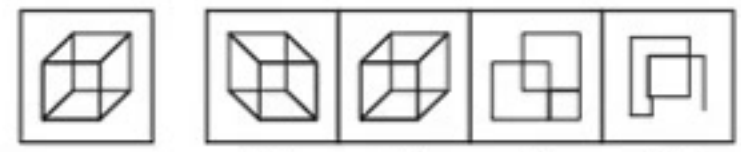
(1) (2) (3) (4)

44.



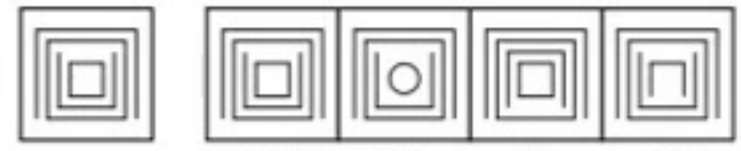
(1) (2) (3) (4)

45. **Que. Fig.** **Answer Fig.**



(1) (2) (3) (4)

46.

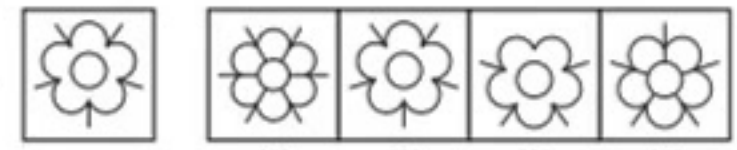


(1) (2) (3) (4)

47.

(1) (2) (3) (4)

48.

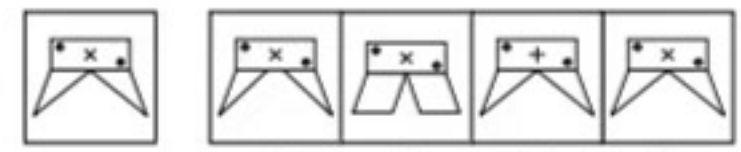


(1) (2) (3) (4)

49.

(1) (2) (3) (4)

50.



(1) (2) (3) (4)

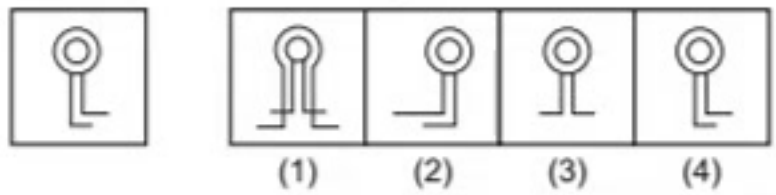
Answers

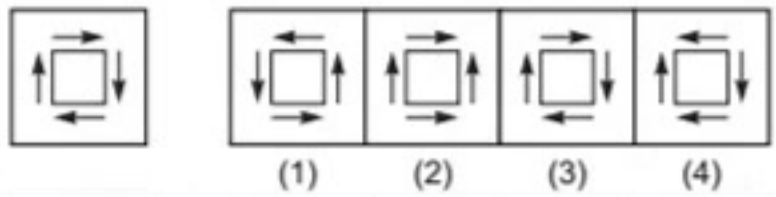
1 *(1)*	**2** *(3)*	**3** *(4)*	**4** *(3)*	**5** *(2)*	**6** *(4)*	**7** *(3)*	**8** *(2)*	**9** *(1)*	**10** *(1)*
11 *(2)*	**12** *(2)*	**13** *(2)*	**14** *(3)*	**15** *(4)*	**16** *(2)*	**17** *(1)*	**18** *(3)*	**19** *(4)*	**20** *(2)*
21 *(3)*	**22** *(3)*	**23** *(2)*	**24** *(1)*	**25** *(2)*	**26** *(2)*	**27** *(2)*	**28** *(2)*	**29** *(1)*	**30** *(3)*
31 *(1)*	**32** *(4)*	**33** *(2)*	**34** *(2)*	**35** *(4)*	**36** *(3)*	**37** *(2)*	**38** *(2)*	**39** *(1)*	**40** *(1)*
41 *(3)*	**42** *(1)*	**43** *(3)*	**44** *(2)*	**45** *(2)*	**46** *(1)*	**47** *(1)*	**48** *(2)*	**49** *(3)*	**50** *(4)*

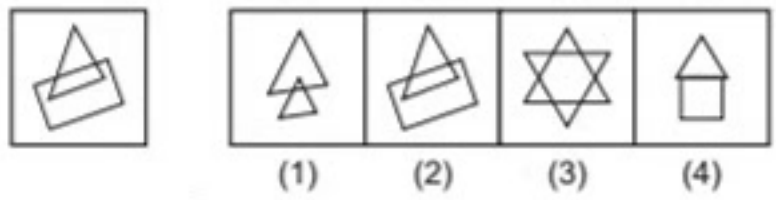
Self Practice

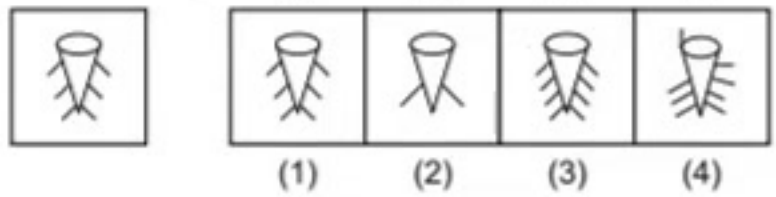
Directions (Q. Nos. 1-38) *In the following questions, a question figure has been given to the left side. To the right side are given four answer figures marked as* (1), (2), (3) *and* (4). *Select the answer figure which is exactly similar to the question figure.*

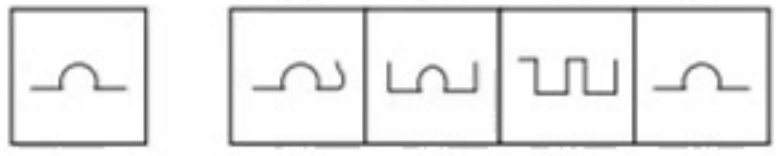
Que. Fig. **Answer Fig.**

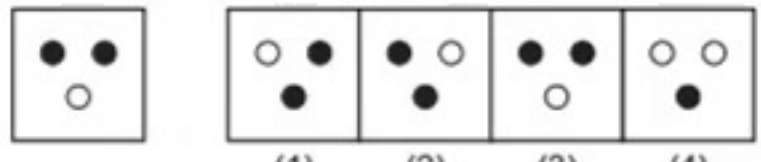
1.

(1) (2) (3) (4)

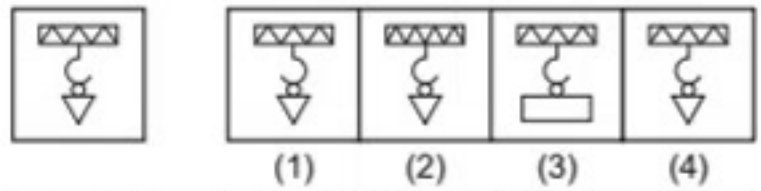
2.

(1) (2) (3) (4)

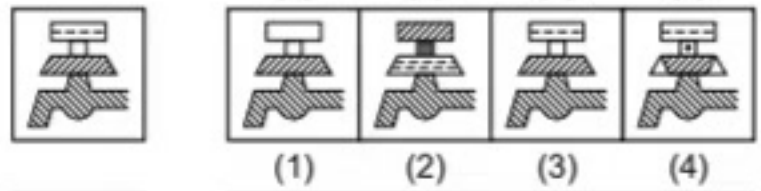
3.

(1) (2) (3) (4)

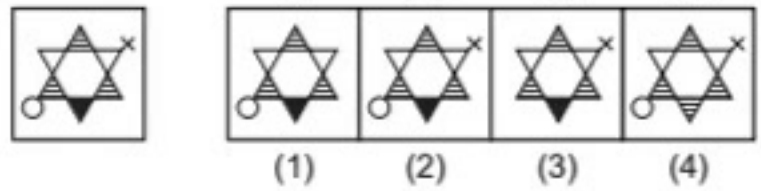
4.

(1) (2) (3) (4)

5.

(1) (2) (3) (4)

6.

(1) (2) (3) (4)

7.

(1) (2) (3) (4)

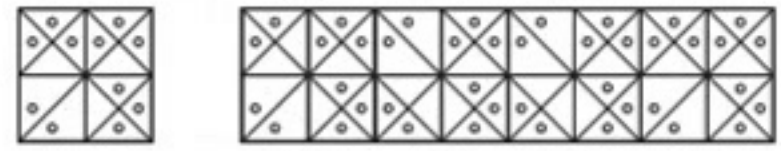
8.

(1) (2) (3) (4)

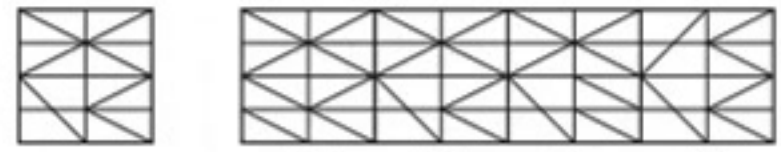
9.

(1) (2) (3) (4)

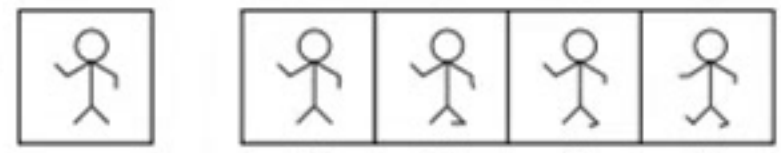
Que. Fig. **Answer Fig.**

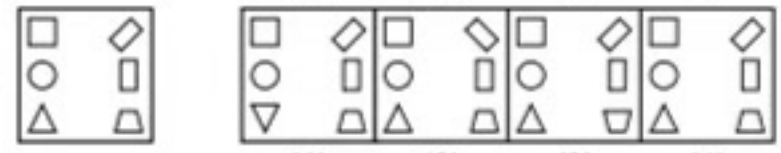
10.

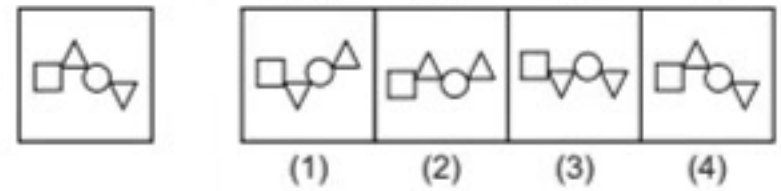
(1) (2) (3) (4)

11.

(1) (2) (3) (4)

12.

(1) (2) (3) (4)

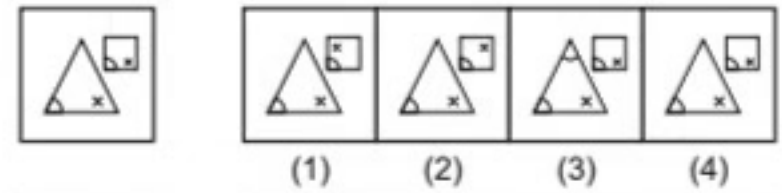
13.

(1) (2) (3) (4)

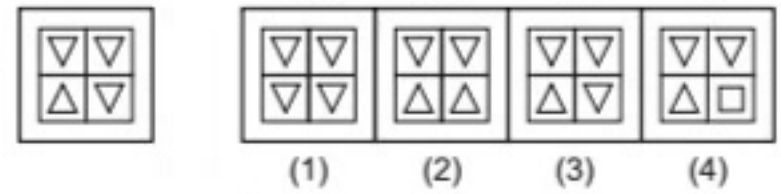
14.

(1) (2) (3) (4)

15.

(1) (2) (3) (4)

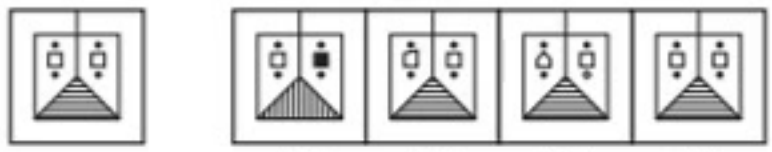
16.

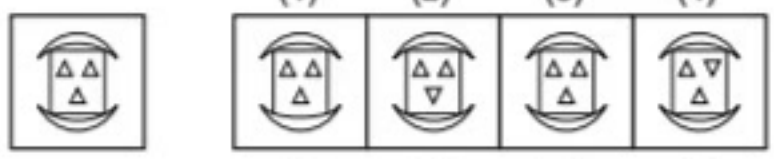
(1) (2) (3) (4)

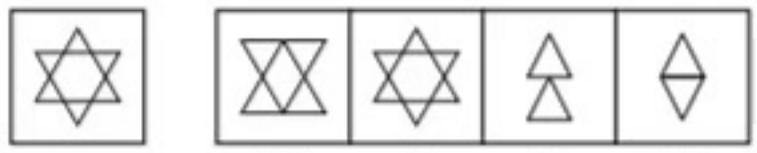
17.

(1) (2) (3) (4)

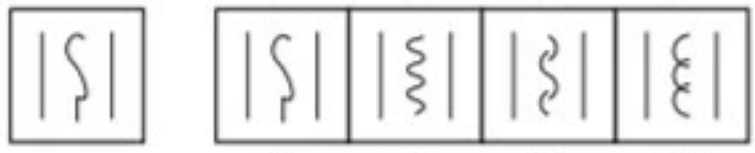
18.

(1) (2) (3) (4)

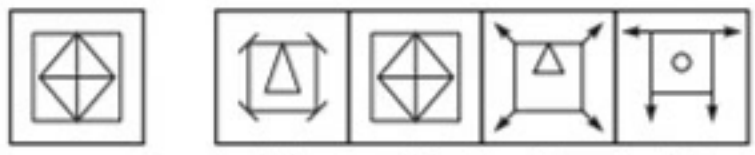
Que. Fig. **Answer Fig.**

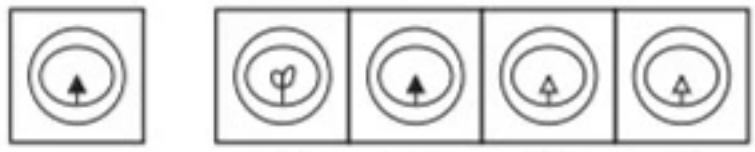
19.

(1) (2) (3) (4)

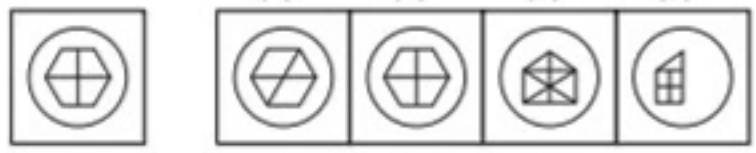
20.

(1) (2) (3) (4)

21.

(1) (2) (3) (4)

22.

(1) (2) (3) (4)

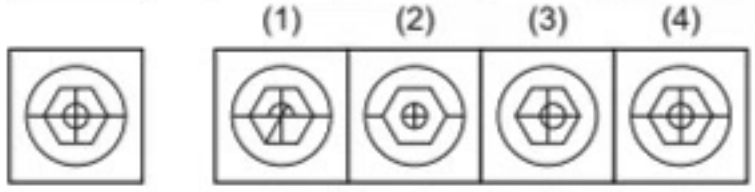
23.

(1) (2) (3) (4)

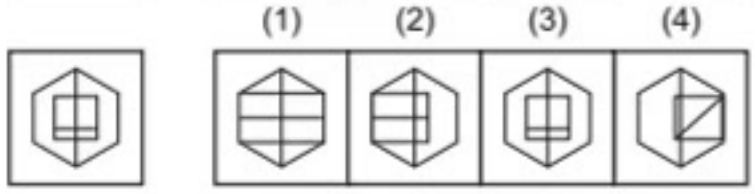
24.

(1) (2) (3) (4)

25.

(1) (2) (3) (4)

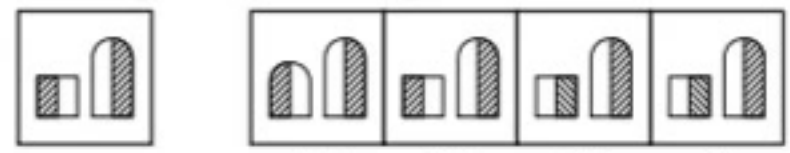
26.

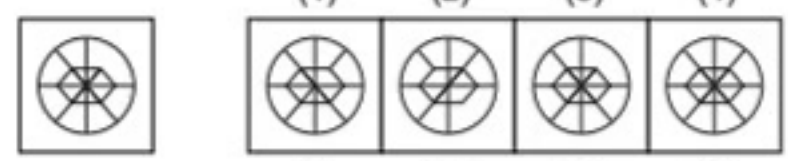
(1) (2) (3) (4)

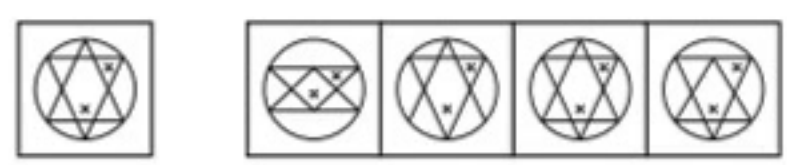
27.

(1) (2) (3) (4)

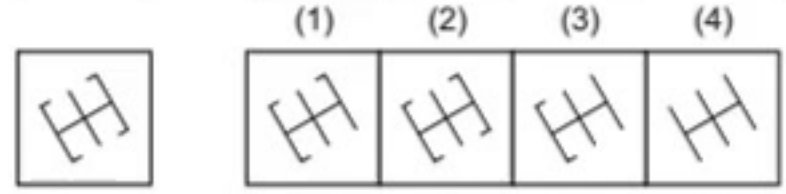
28.

(1) (2) (3) (4)

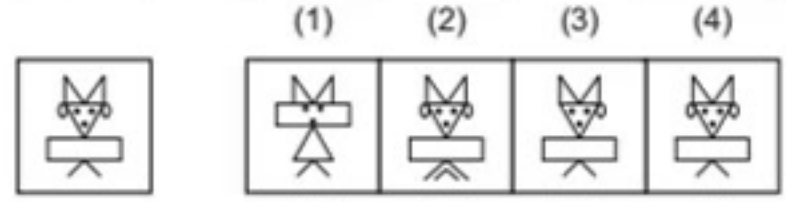
Que. Fig. **Answer Fig.**

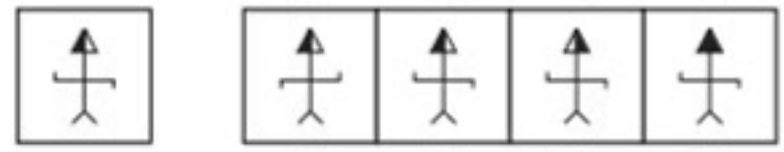
29.

(1) (2) (3) (4)

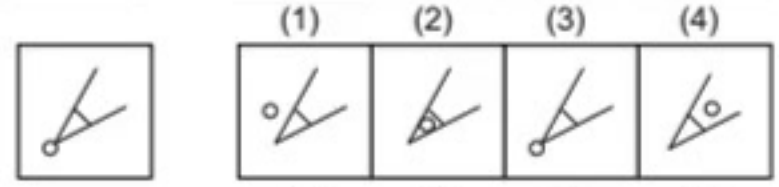
30.

(1) (2) (3) (4)

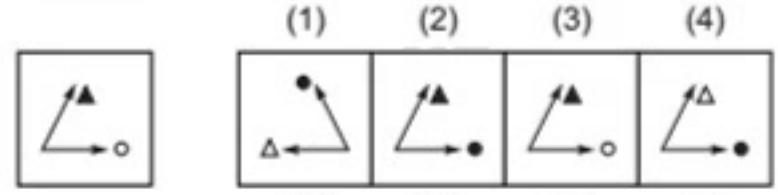
31.

(1) (2) (3) (4)

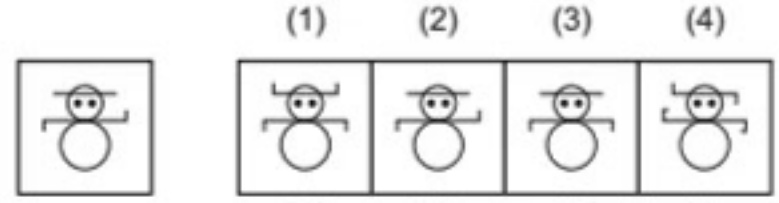
32.

(1) (2) (3) (4)

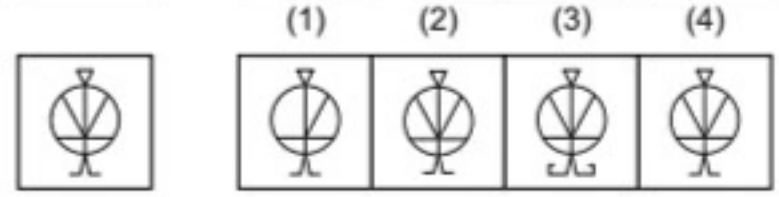
33.

(1) (2) (3) (4)

34.

(1) (2) (3) (4)

35.

(1) (2) (3) (4)

36.

(1) (2) (3) (4)

37.

(1) (2) (3) (4)

38.

(1) (2) (3) (4)

Answers

1 *(4)*	**2** *(3)*	**3** *(2)*	**4** *(1)*	**5** *(4)*	**6** *(3)*	**7** *(4)*	**8** *(3)*	**9** *(2)*	**10** *(1)*
11 *(4)*	**12** *(2)*	**13** *(1)*	**14** *(4)*	**15** *(4)*	**16** *(4)*	**17** *(4)*	**18** *(3)*	**19** *(4)*	**20** *(3)*
21 *(2)*	**22** *(1)*	**23** *(2)*	**24** *(2)*	**25** *(2)*	**26** *(1)*	**27** *(4)*	**28** *(3)*	**29** *(2)*	**30** *(3)*
31 *(3)*	**32** *(2)*	**33** *(4)*	**34** *(2)*	**35** *(3)*	**36** *(3)*	**37** *(2)*	**38** *(4)*		

CHAPTER

03

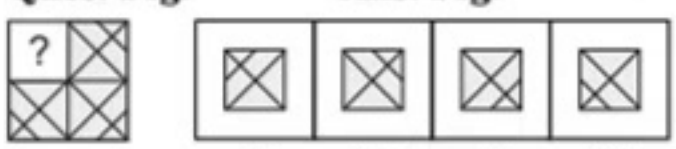
PATTERN COMPLETION

Pattern completion is a process to find out the missing part of an incomplete figure it. In this chapter we deal with questions in which a part, generally 1/4th part of the figure is missing. The student is required to find out the answer figure that completes the given pattern.

While solving the problems the student should follow some points

Example **1.**

Ques. Fig. **Ans. Fig.**



(1) (2) (3) (4)

Sol. **(1)** In the question figure, lower left figure is opposite to upper right figure. So, answer figure (1) is opposite to lower right part figure.

Example **2.**

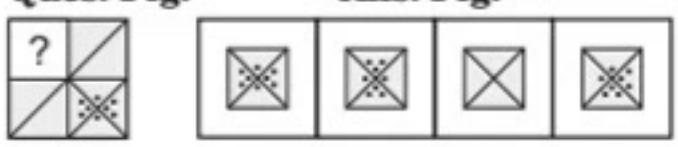
Ques. Fig. **Ans. Fig.**

(1) (2) (3) (4)

Sol. **(3)** In the question figure, upper right figure is opposite to lower left figure. So, answer figure (3) is opposite to upper left part figure.

Example **3.**

Ques. Fig. **Ans. Fig.**

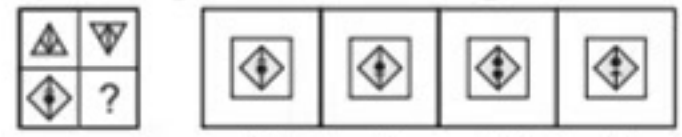


(1) (2) (3) (4)

Sol. **(2)** In the question figure, lower left figure rotates 90° anti-clockwise direction and 8 small dots and one slanting line are included. In the same way lower right figure rotates 90° anti-clockwise direction and 8 small dots and one line is removed. So, answer figure (2) will come in place of the question mark.

Example **4.**

Ques. Fig. **Ans. Fig.**



(1) (2) (3) (4)

Sol. **(2)** According to formula 2, upper left figure rotates 180° clockwise or anti-clockwise to obtain upper right figure in the same way, lower left part figure rotates 180° clockwise or anti-clockwise to obtain lower right figure. So, answer figure 2 will come in place of the question mark.

Example **5.**

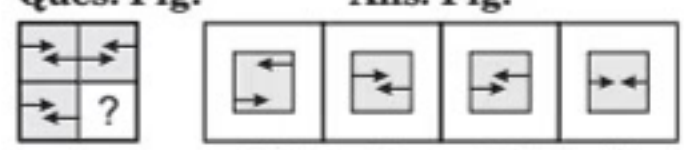
Ques. Fig. **Ans. Fig.**

(1) (2) (3) (4)

Sol. **(3)** Answer figure (3) will complete the problem figure.

Example **6.**

Ques. Fig. **Ans. Fig.**



(1) (2) (3) (4)

Sol. **(3)** The arrows in the column two is the mirror image of the arrows in the column one. So, answer figure (3) will complete the pattern.

Entrance Corner

Directions (Q. Nos. 1-50) *In the following questions a question figure is given to the left. A part of the figure is missing. Answer figures* (1), (2), (3) *and* (4) *are given to the right. Identify the figure out of the answer figures which may fit into the missing part. Do as to complete the pattern.*

Ques. Fig. Ans. Fig.

1.

(1) (2) (3) (4)

[JNV 2019]

2.

(1) (2) (3) (4)

[JNV 2019]

3.

(1) (2) (3) (4)

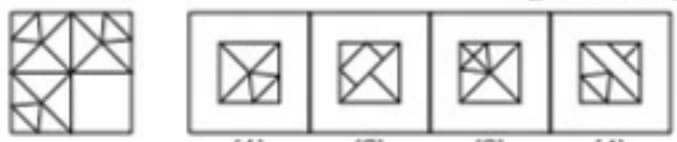
[JNV 2019]

4.

(1) (2) (3) (4)

[JNV 2019]

5.



(1) (2) (3) (4)

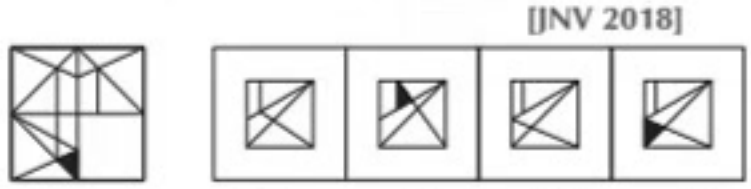
[JNV 2018]

6.

(1) (2) (3) (4)

[JNV 2018]

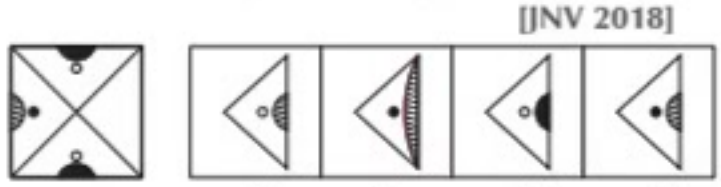
7.



(1) (2) (3) (4)

[JNV 2018]

8.

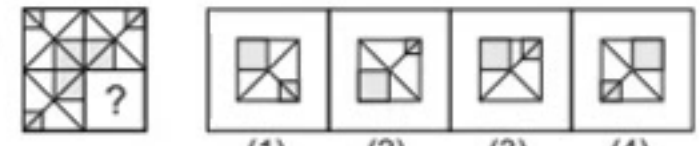


(1) (2) (3) (4)

[JNV 2018]

Ques. Fig. Ans. Fig.

9.



(1) (2) (3) (4)

[JNV 2017, 2002]

10.

(1) (2) (3) (4)

[JNV 2017, 2005]

11.

(1) (2) (3) (4)

[JNV 2017, 1997]

12.

(1) (2) (3) (4)

[JNV 2016]

13.

(1) (2) (3) (4)

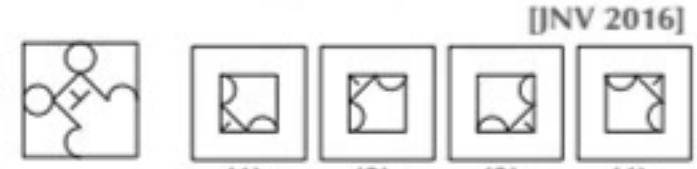
[JNV 2016]

14.

(1) (2) (3) (4)

[JNV 2016]

15.



(1) (2) (3) (4)

[JNV 2015]

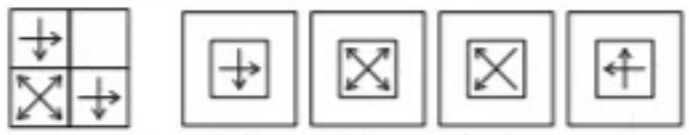
16.

(1) (2) (3) (4)

[JNV 2015]

Ques. Fig. Ans. Fig.

17.



(1) (2) (3) (4)

[JNV 2015]

18.

(1) (2) (3) (4)

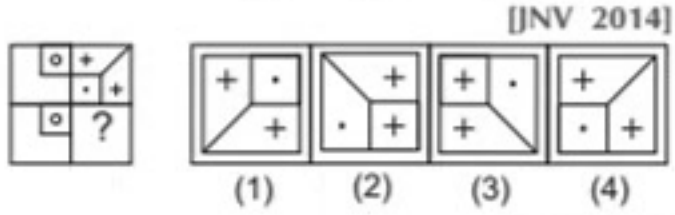
[JNV 2014]

19.

(1) (2) (3) (4)

[JNV 2014]

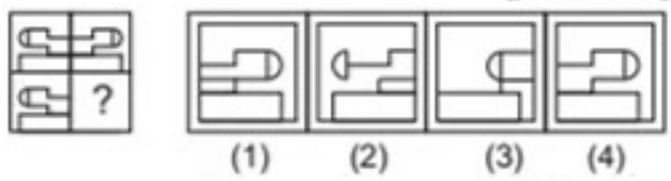
20.



(1) (2) (3) (4)

[JNV 2013]

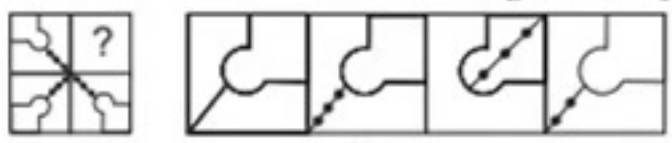
21.



(1) (2) (3) (4)

[JNV 2013]

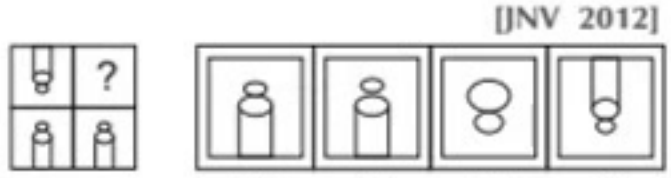
22.



(1) (2) (3) (4)

[JNV 2012]

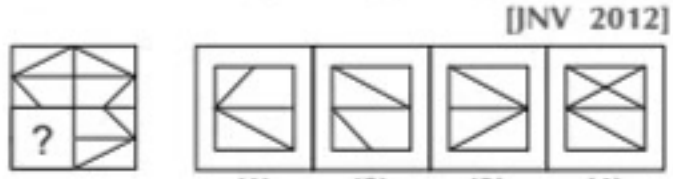
23.



(1) (2) (3) (4)

[JNV 2012]

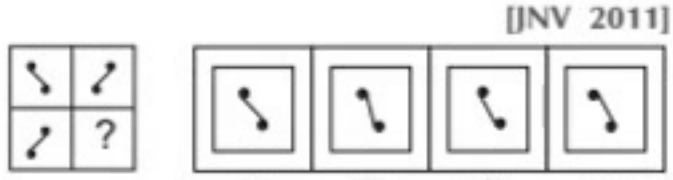
24.



(1) (2) (3) (4)

[JNV 2011]

25.

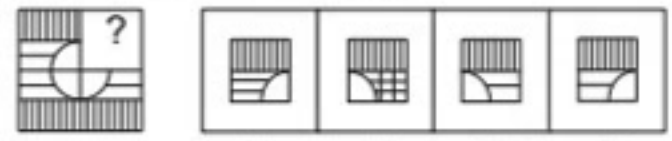


(1) (2) (3) (4)

[JNV 2011]

Ques. Fig. Ans. Fig.

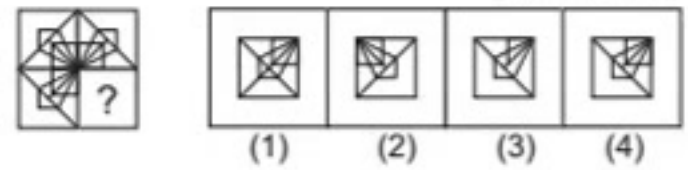
26.



(1) (2) (3) (4)

[JNV 20110]

27.



(1) (2) (3) (4)

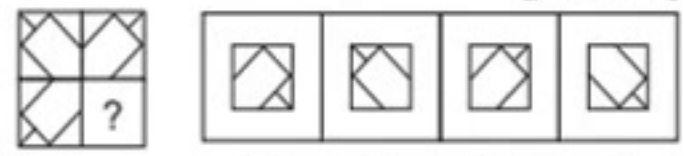
[JNV 2009]

28.

(1) (2) (3) (4)

[JNV 2009]

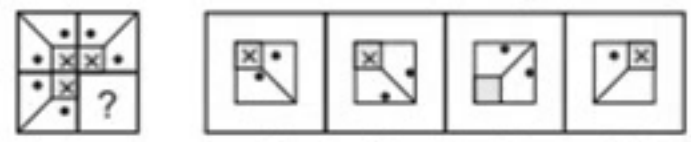
29.



(1) (2) (3) (4)

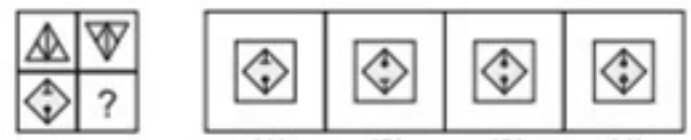
[JNV 2008]

30.



(1) (2) (3) (4)

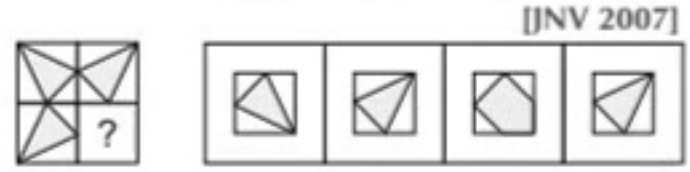
31.



(1) (2) (3) (4)

[JNV 2007]

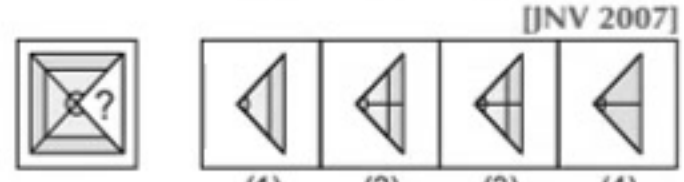
32.



(1) (2) (3) (4)

[JNV 2007]

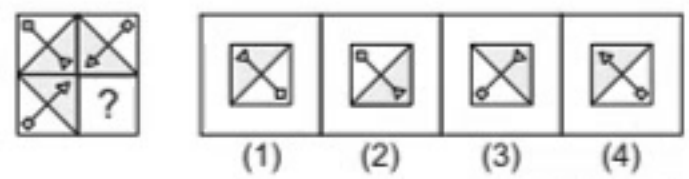
33.



(1) (2) (3) (4)

[JNV 2005]

34.

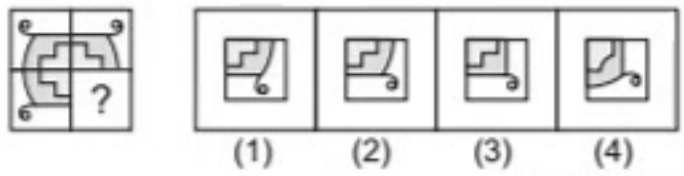


(1) (2) (3) (4)

[JNV 2004]

Ques. Fig. Ans. Fig.

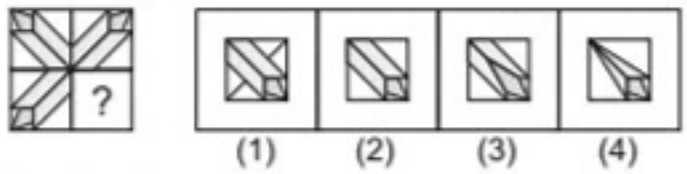
35.



(1) (2) (3) (4)

[JNV 2004]

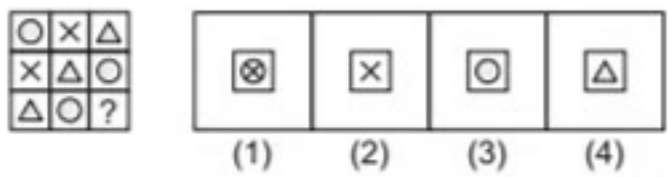
36.



(1) (2) (3) (4)

[JNV 2003]

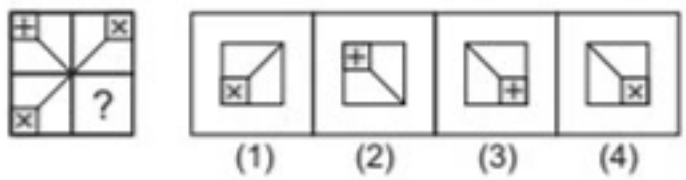
37.



(1) (2) (3) (4)

[JNV 2003]

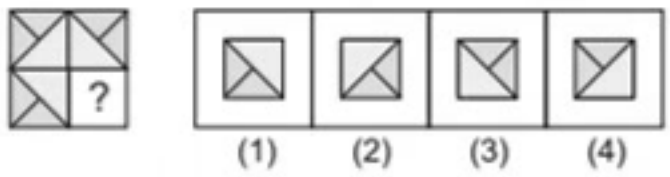
38.



(1) (2) (3) (4)

[JNV 2002]

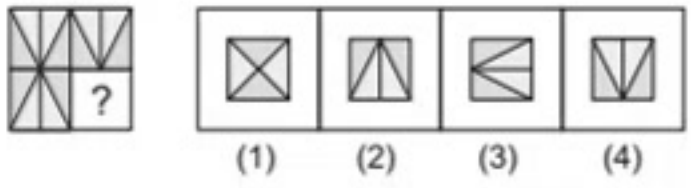
39.



(1) (2) (3) (4)

[JNV 2001]

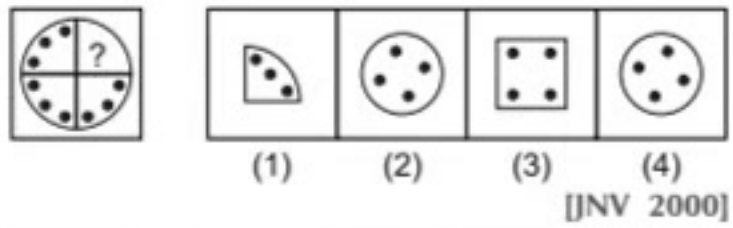
40.



(1) (2) (3) (4)

[JNV 2001]

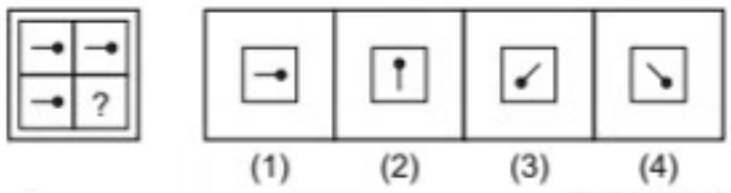
41.



(1) (2) (3) (4)

[JNV 2000]

42.

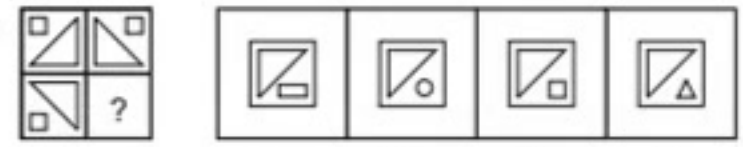


(1) (2) (3) (4)

[JNV 2000]

Ques. Fig. Ans. Fig.

43.



(1) (2) (3) (4)

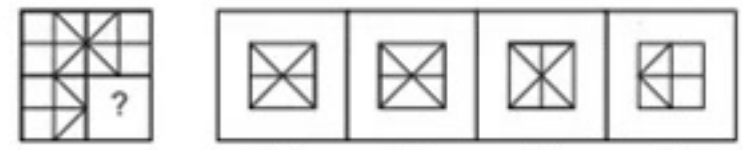
[JNV 1999]

44.

(1) (2) (3) (4)

[JNV 1999]

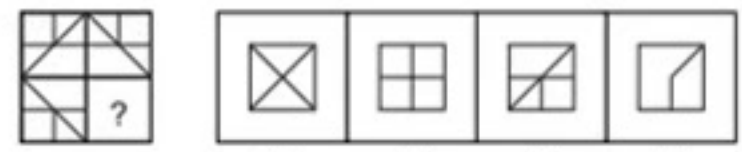
45.



(1) (2) (3) (4)

[JNV 1998]

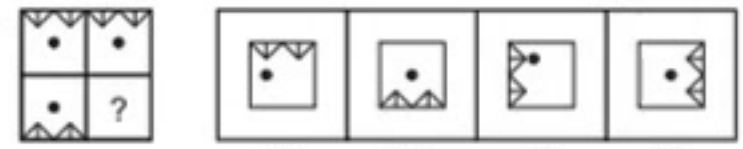
46.



(1) (2) (3) (4)

[JNV 1998]

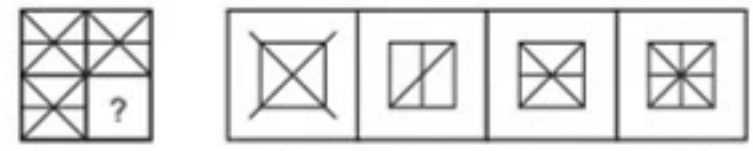
47.



(1) (2) (3) (4)

[JNV 1997]

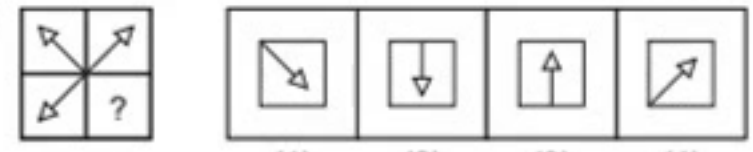
48.



(1) (2) (3) (4)

[JNV 1997]

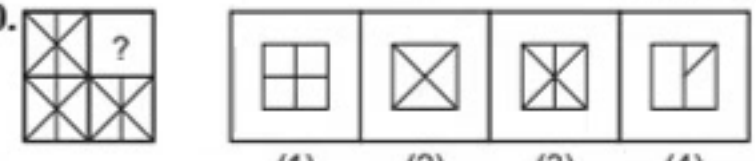
49.



(1) (2) (3) (4)

[JNV 1997]

50.



(1) (2) (3) (4)

[JNV 1997]

Answers

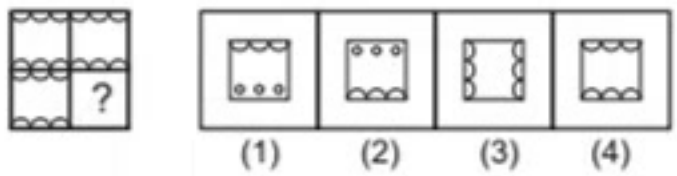
1. *(1)*	**2.** *(3)*	**3.** *(4)*	**4.** *(4)*	**5.** *(1)*	**6.** *(4)*	**7.** *(4)*	**8.** *(4)*	**9.** *(1)*	**10.** *(3)*
11. *(3)*	**12.** *(3)*	**13.** *(3)*	**14.** *(1)*	**15.** *(2)*	**16.** *(1)*	**17.** *(2)*	**18.** *(4)*	**19.** *(3)*	**20.** *(4)*
21. *(4)*	**22.** *(2)*	**23.** *(4)*	**24.** *(1)*	**25.** *(1)*	**26.** *(3)*	**27.** *(2)*	**28.** *(1)*	**29.** *(4)*	**30.** *(1)*
31. *(2)*	**32.** *(1)*	**33.** *(1)*	**34.** *(1)*	**35.** *(2)*	**36.** *(2)*	**37.** *(2)*	**38.** *(3)*	**39.** *(2)*	**40.** *(2)*
41. *(1)*	**42.** *(1)*	**43.** *(3)*	**44.** *(2)*	**45.** *(3)*	**46.** *(3)*	**47.** *(2)*	**48.** *(3)*	**49.** *(1)*	**50.** *(3)*

Practice Exercise

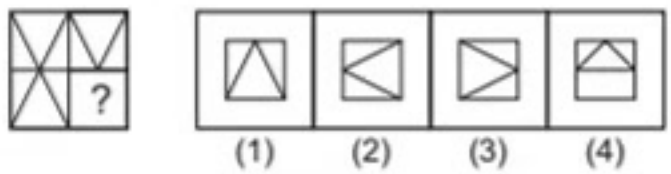
Directions (Q.Nos. 1-24) *In the following questions a question figure is given to the left . A part of the figure is missing. Answer figures* (1), (2), (3) and (4) *are given to the right. Identify the figure out of the answer figures which may fit into the missing part. Do as to complete the pattern.*

Ques. Fig. Ans. Fig.

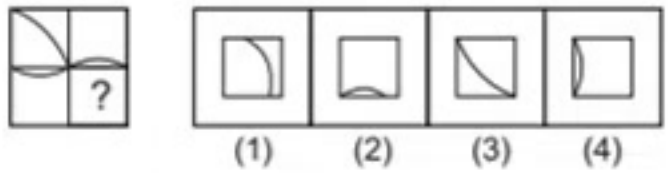
1.



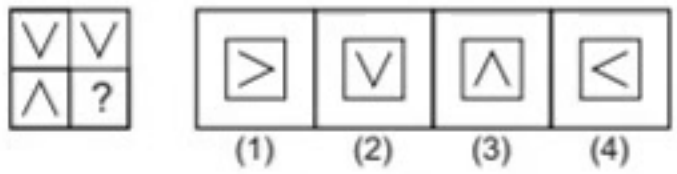
2.



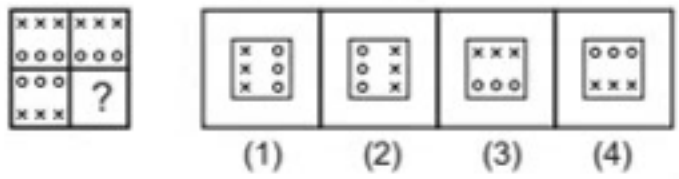
3.



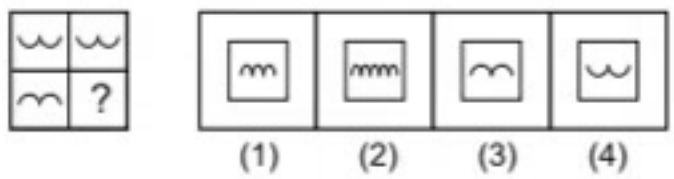
4.



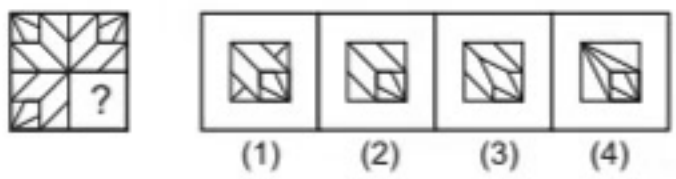
5.



6.

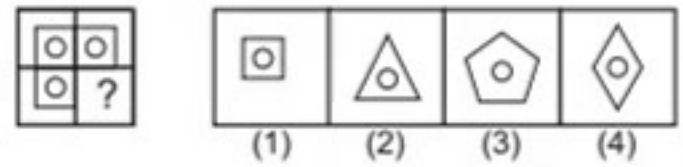


7.

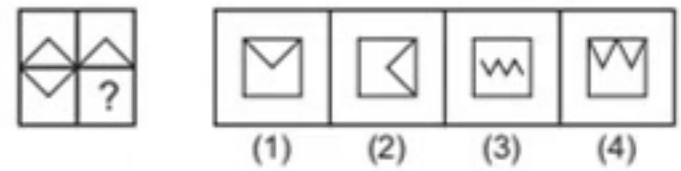


Ques. Fig. Ans. Fig.

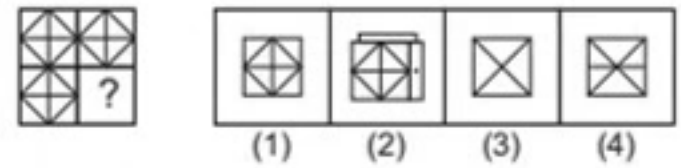
8.



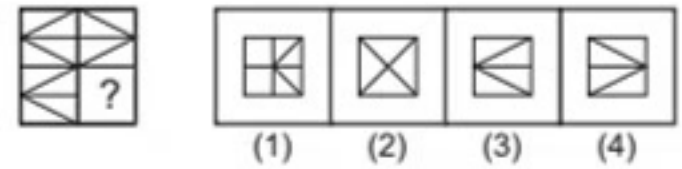
9.



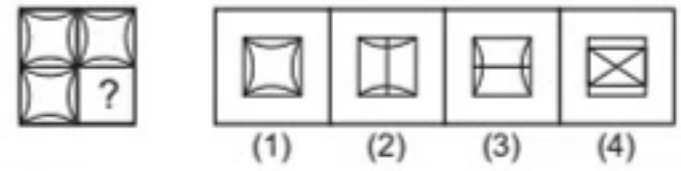
10.



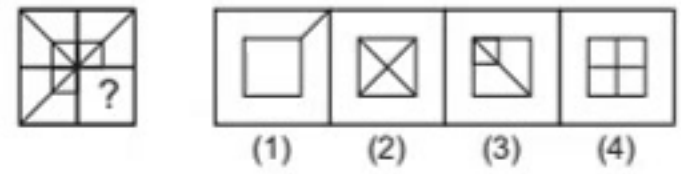
11.



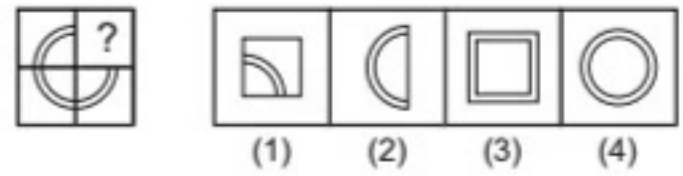
12.



13.

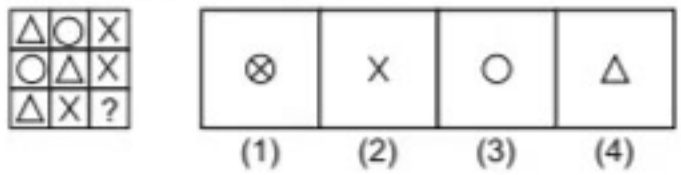


14.

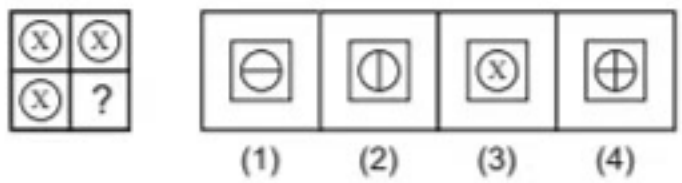


Ques. Fig. Ans. Fig.

15.

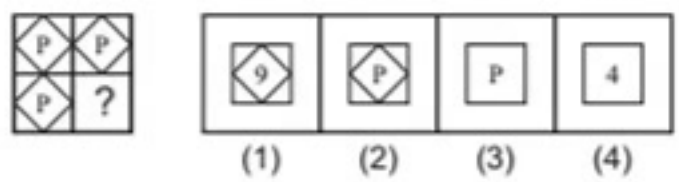


16.

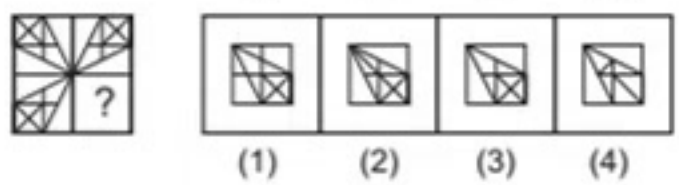


17.

18.

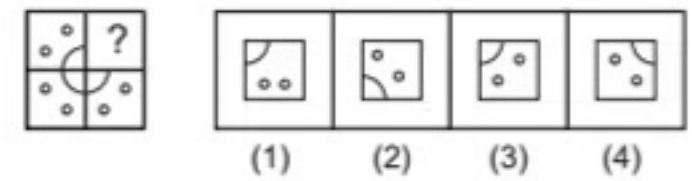


19.

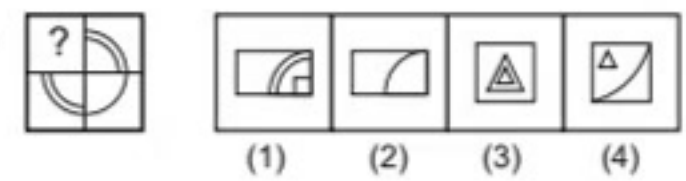


Ques. Fig. Ans. Fig.

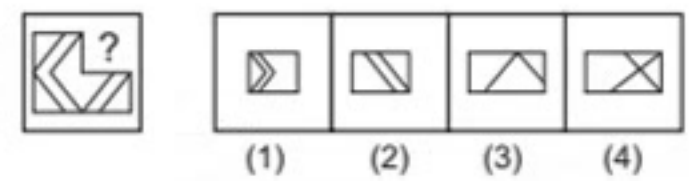
20.



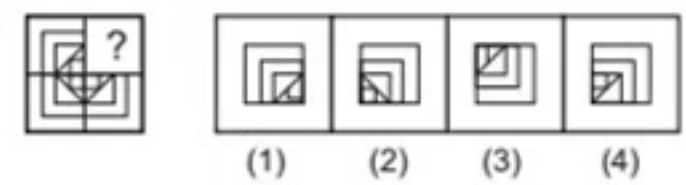
21.



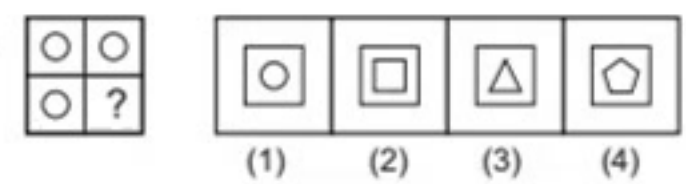
22.



23.



24.



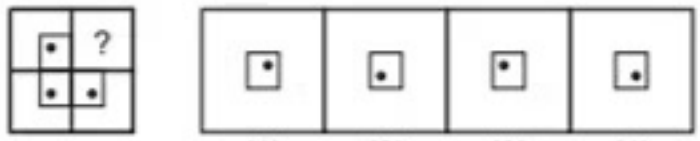
Answers

1 *(4)*	**2** *(1)*	**3** *(3)*	**4** *(3)*	**5** *(4)*	**6** *(3)*	**7** *(2)*	**8** *(1)*	**9** *(1)*	**10** *(1)*
11 *(4)*	**12** *(1)*	**13** *(3)*	**14** *(1)*	**15** *(3)*	**16** *(3)*	**17** *(4)*	**18** *(2)*	**19** *(3)*	**20** *(2)*
21 *(2)*	**22** *(2)*	**23** *(2)*	**24** *(1)*						

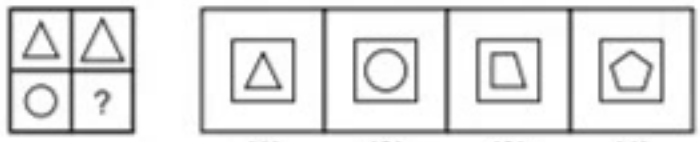
Self Practice

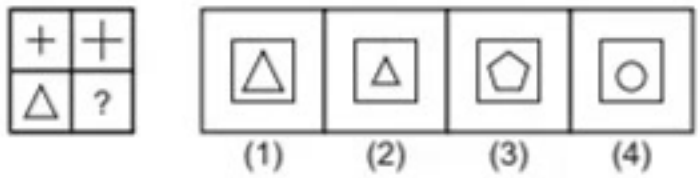
Directions (Q. Nos. 1-30) *In the following questions a question figure is given to the left. A part of the figure is missing. Answer figures* (1), (2), (3) *and* (4) *are given to the right. Identify the figure out of the answer figures which may fit into the missing part. Do as to complete the pattern.*

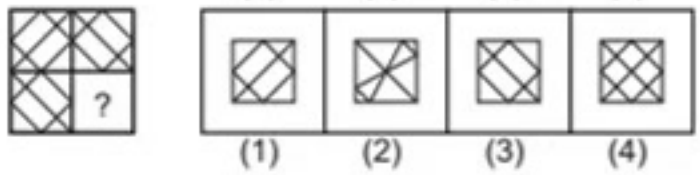
Ques. Fig. Ans. Fig.

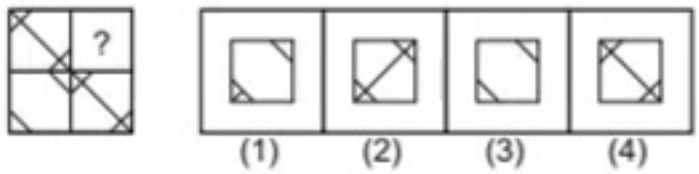
1. 

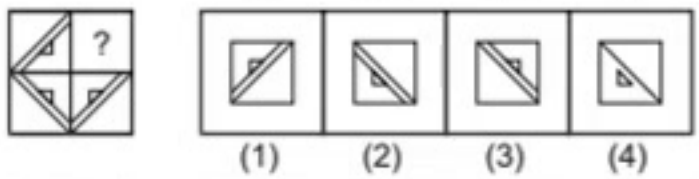
2.

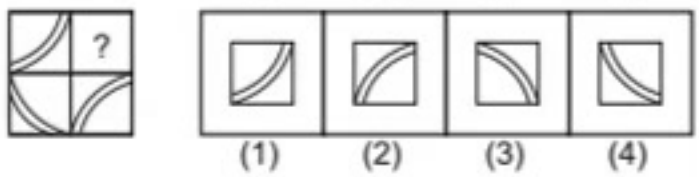
3. 

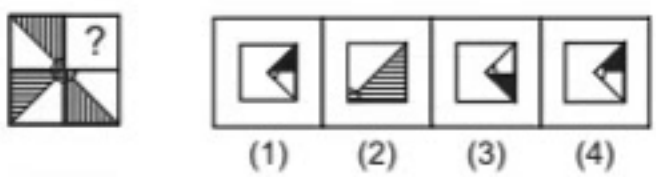
4. 

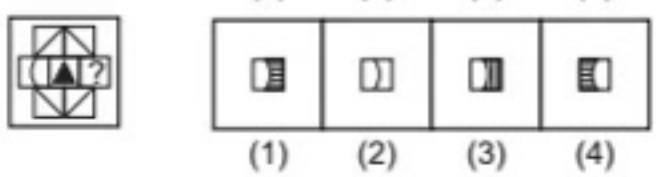
5. 

6. 

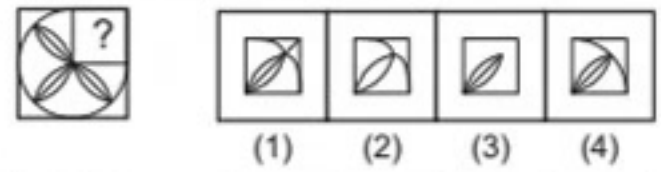
7. 

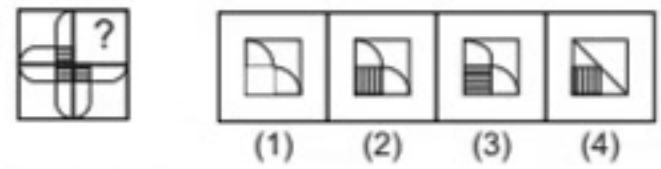
8. 

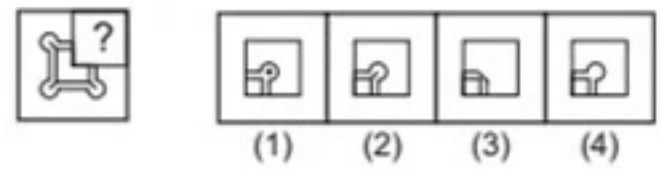
9. 

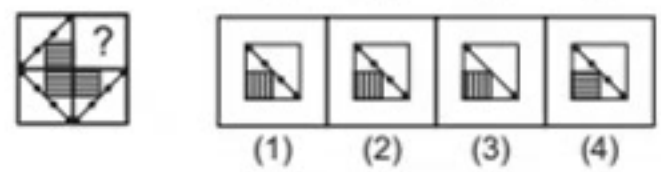
10. 

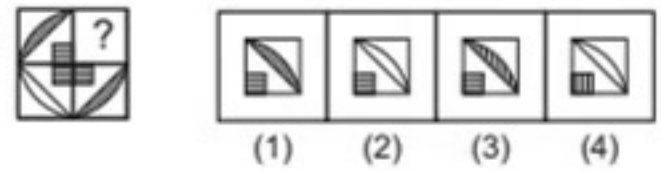
Ques. Fig. Ans. Fig.

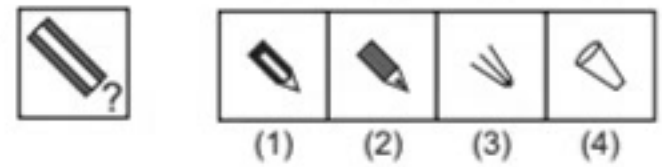
11. 

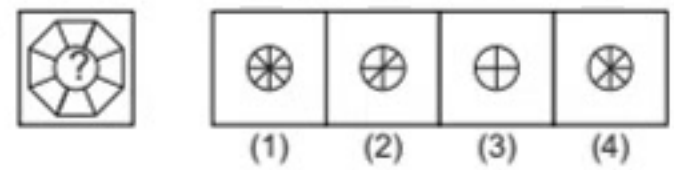
12. 

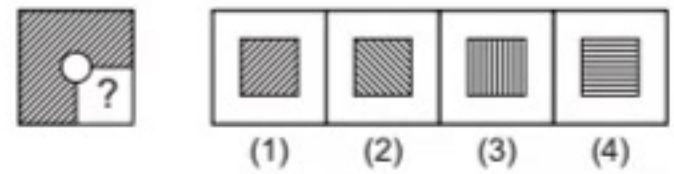
13. 

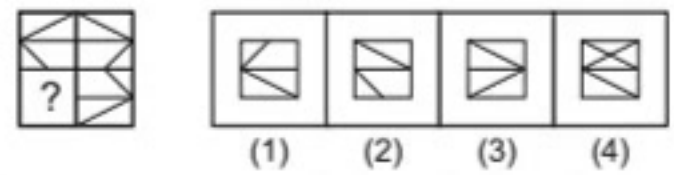
14. 

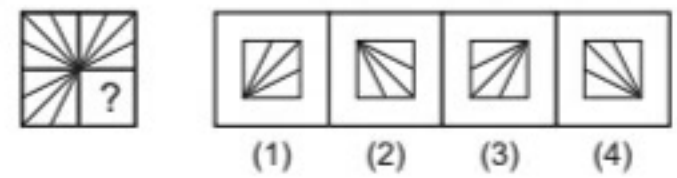
15. 

16. 

17. 

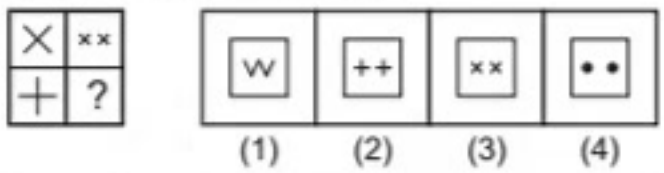
18. 

19. 

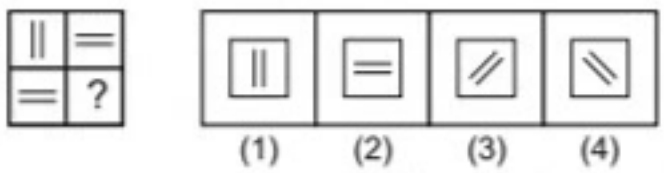
20. 

Ques. Fig. Ans. Fig.

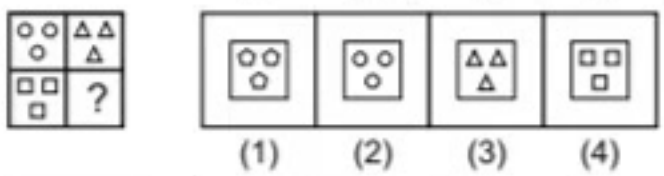
21.



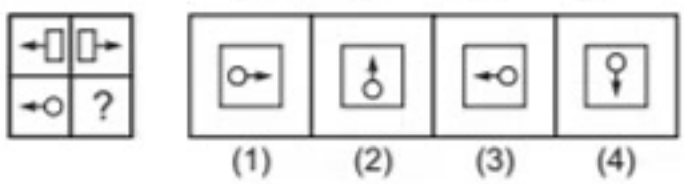
22.



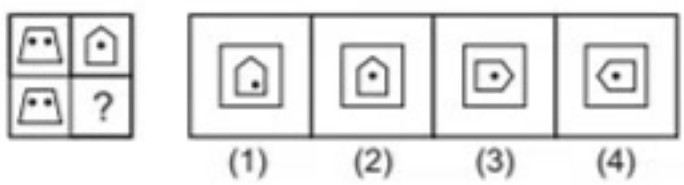
23.



24.

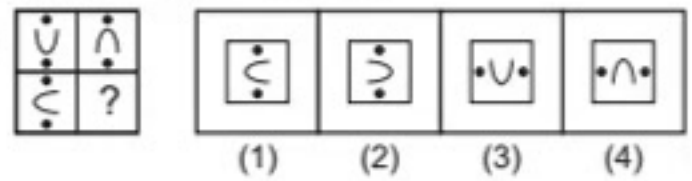


25.

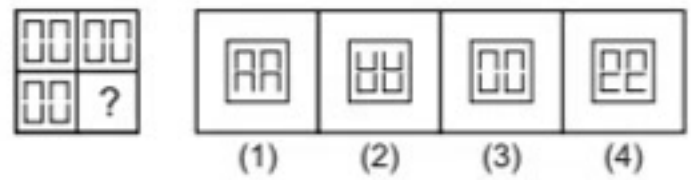


Ques. Fig. Ans. Fig.

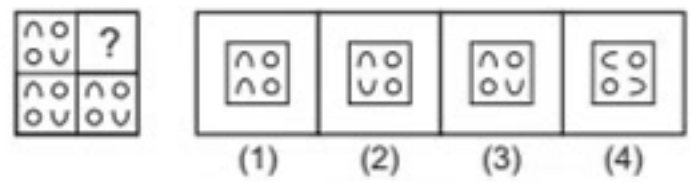
26.



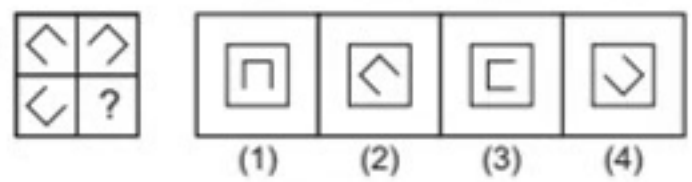
27.



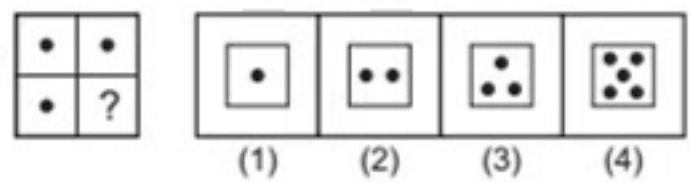
28.



29.



30.



Answers

1. *(1)*	**2.** *(1)*	**3.** *(2)*	**4.** *(1)*	**5.** *(1)*	**6.** *(3)*	**7.** *(2)*	**8.** *(3)*	**9.** *(2)*	**10.** *(2)*
11. *(4)*	**12.** *(3)*	**13.** *(2)*	**14.** *(4)*	**15.** *(2)*	**16.** *(2)*	**17.** *(1)*	**18.** *(1)*	**19.** *(1)*	**20.** *(2)*
21. *(2)*	**22.** *(1)*	**23.** *(1)*	**24.** *(1)*	**25.** *(2)*	**26.** *(2)*	**27.** *(3)*	**28.** *(3)*	**29.** *(4)*	**30.** *(1)*

CHAPTER

04

FIGURE SERIES COMPLETION

In this chapter a series of figures is given as question figures and the candidates are asked to select one of the figure from the set of answer figures which will continue the given sequence.

You are expected to have a clear vision of different movements and additions/deletions of designs and their rotation.

This type of problem on series consists of three figures forming the set of problem figures followed by four other figures forming the set of answer figures. The students are required to select one of the figure from the set of answer figures which will continue the sequence.

While solving the questions, the students should following points.

Rotational Direction

The rotational direction basically states the clockwise and anti-clockwise directions.

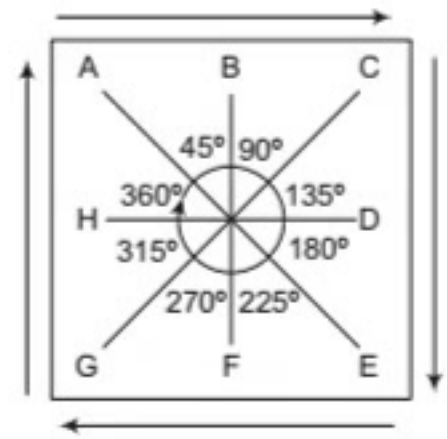
Clockwise movement

Anti-clockwise movement

Directional Movement of Designs

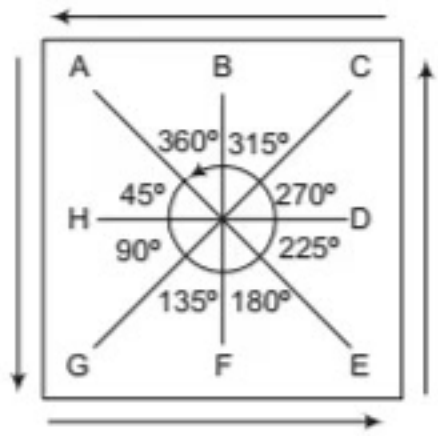
This provides the knowledge of angular movement of designs in clockwise and anti-clockwise directions.

Clockwise Movement



A→ B = 45° ; A→ C = 90°
A→ D = 135° ; A→ E = 180°
A→ F = 225° ; A→ G = 270°
A→ H = 315° ; A→ A = 360°

Anti-clockwise Movement

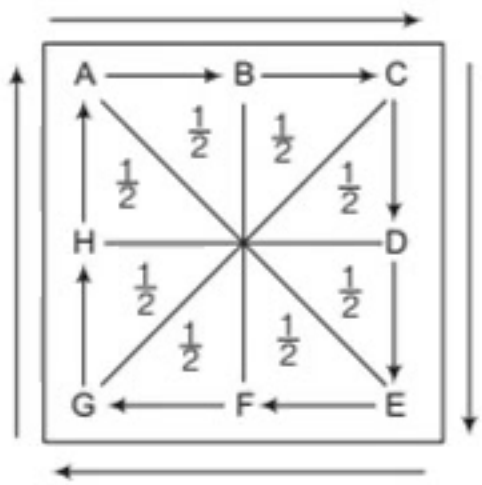


A→ H = 45°
A→ G = 90°
A→ F = 135°
A→ E = 180°
A→ D = 225°
A→ C = 270°
A→ B = 315°
A→ A = 360°

Movement of Designs Through Distance

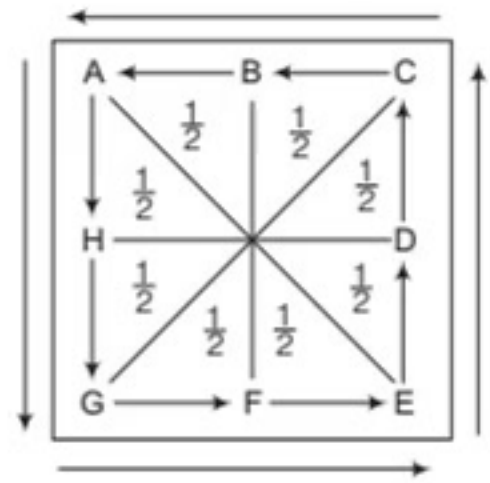
The movement of designs through distance in clockwise and anti-clockwise directions is given below.

Clockwise Movement



A→ B = $\frac{1}{2}$ arm/step;
A→ C = 1 arm/step
A→ D = $1\frac{1}{2}$ arm/step;
A→ E = 2 arm/step
A→ F = $2\frac{1}{2}$ arm/step;
A→ G = 3 arm/step
A → H = $3\frac{1}{2}$ arm/step;
A→ A = 4 arm/step

Anti-clockwise Movement



A→ H = $\frac{1}{2}$ arm/step;
A→ G = 1 arm/step
A→ F = $1\frac{1}{2}$ arm/step;
A→ E = 2 arm/step
A→ D = $2\frac{1}{2}$ arm/step;
A→ C = 3 arm/step
A→ B = $3\frac{1}{2}$ arm/step;
A→ A = 4 arm/step

In this chapter the changes between figures can be based on following

- Based on number of designs
- Based on position of designs
- Based on side of designs
- Based on size and colour of designs

Based on Number of Designs

In this type, the changes occur according to the number of designs. The designs becomes more or less than its previous number of designs.

Example **1. Ques. Figures**

Answer Figures

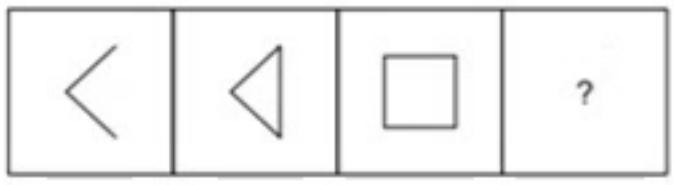
(1) (2) (3) (4)

Sol. **(4)** In each successive figure, one more design is added. Small circle and triangle increases in alternate order. Hence, four triangles will come in fourth figure.

Based on Number of Sides of Designs

In this type, the numbers of sides of design increases or decreases.

Example **2. Ques. Figures**



Answer Figures

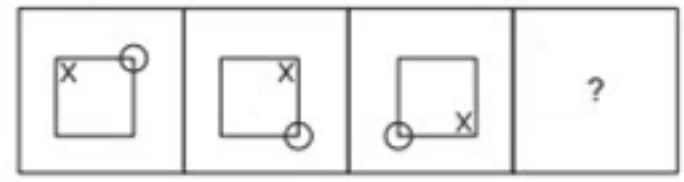
(1) (2) (3) (4)

Sol. **(2)** In each successive figure, one side is increasing. Hence, pentagon will come in fourth figure.

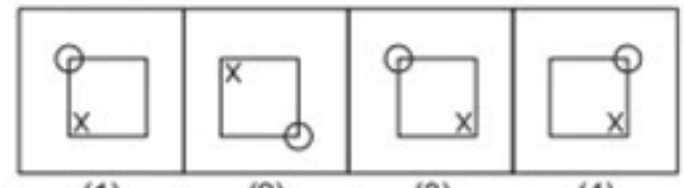
Based on Position of Designs

In this type, designs move from one position to another in a certain fixed pattern.

Example **3. Ques. Figures**



Answer Figures



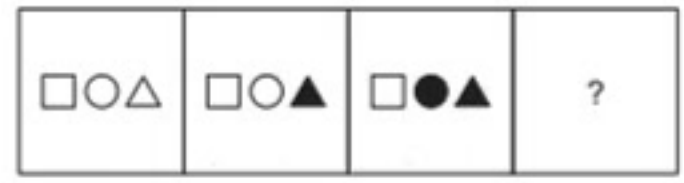
(1) (2) (3) (4)

Sol. **(1)** In each successive figure design (×) and (O) move one step in clockwise direction.

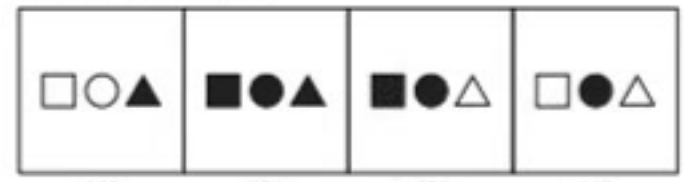
Based on Size and Colour of Designs

In this type, shaded designs become unshaded and *vice-versa*, small designs becomes larger and *vice-versa* and a new design replaces the other design.

Example **4. Ques. Figures**



Answer Figures



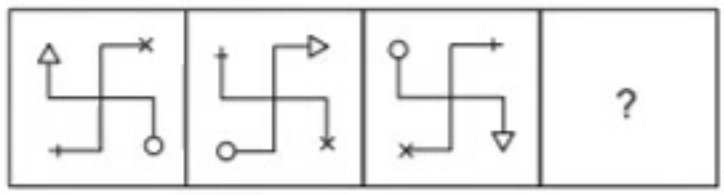
(1) (2) (3) (4)

Sol. **(2)** In each successive figure one more design becomes shaded from the right side.

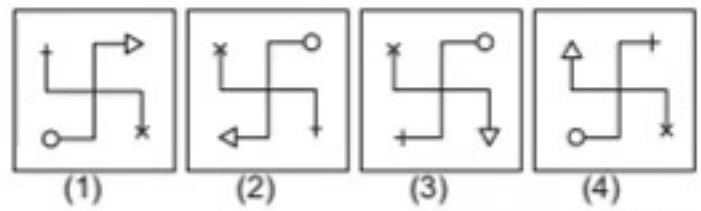
Entrance Corner

Directions (Q. Nos. 1–52) *In the following questions, three question figures are given and the space for the fourth place question mark (?). The question figures are in a series. Choose the figure out of the four answer figures marked as* 1 , 2 , 3 *and* 4 *which may complete the series.*

1. **Question Figures**



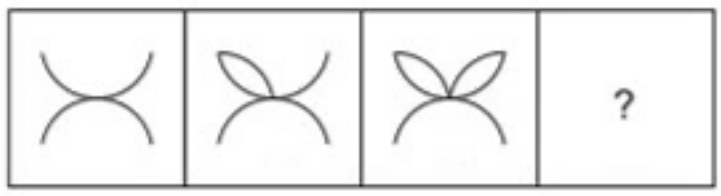
Answer Figures

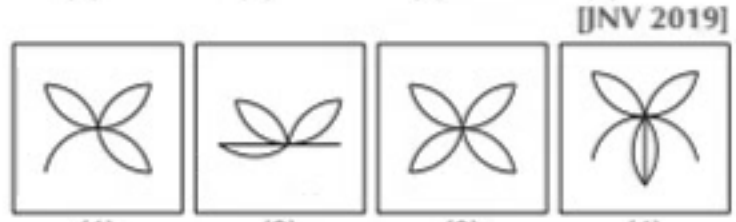


(1) (2) (3) (4)

[JNV 2019]

2.

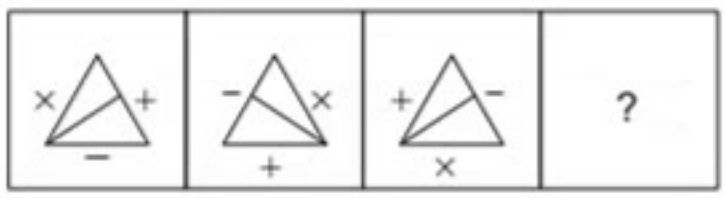


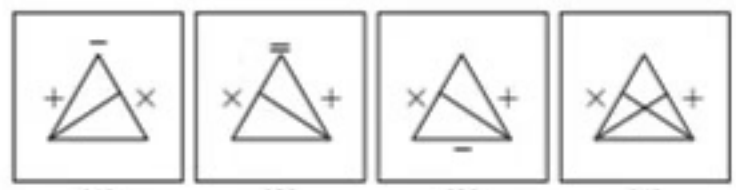


(1) (2) (3) (4)

[JNV 2019]

3.

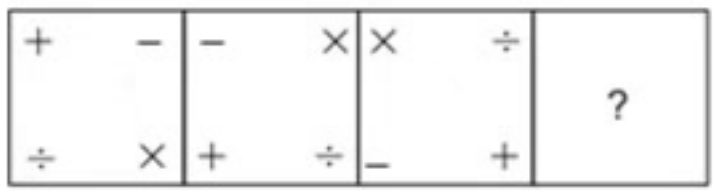


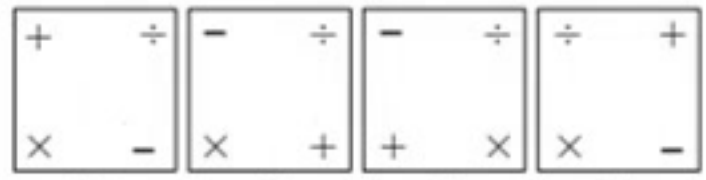


(1) (2) (3) (4)

[JNV 2019]

4.

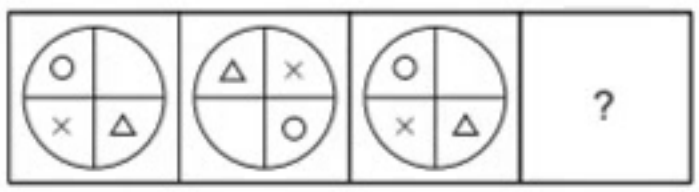


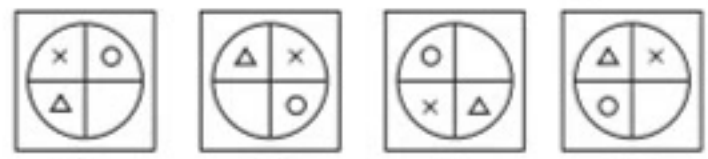


(1) (2) (3) (4)

[JNV 2019]

5.

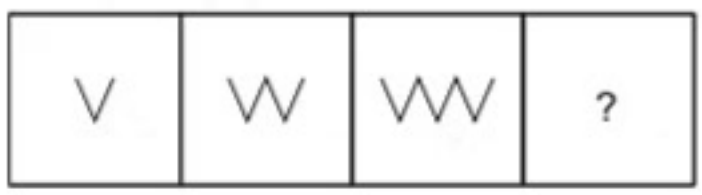


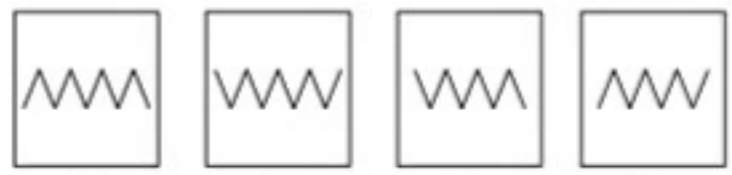


(1) (2) (3) (4)

[JNV 2018]

6.

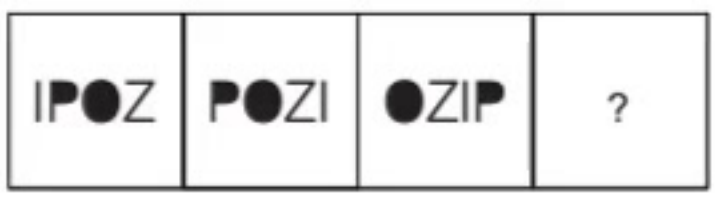




(1) (2) (3) (4)

[JNV 2018]

7.

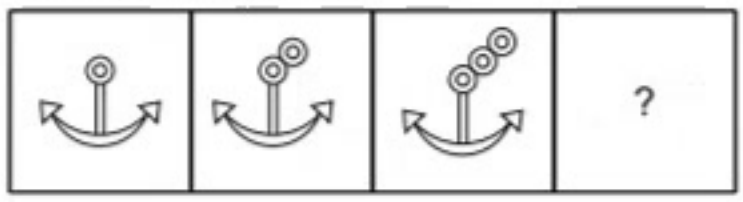


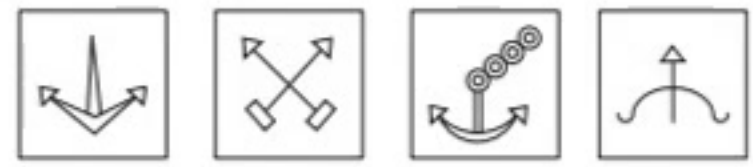
(1) (2) (3) (4)

[JNV 2018]

Question Figures **Answer Figures**

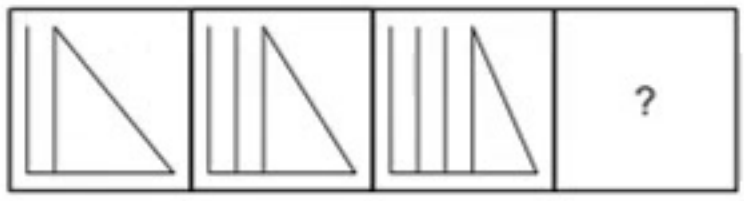
8.





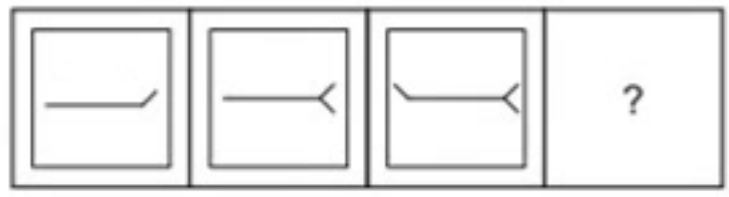
(1) (2) (3) (4)

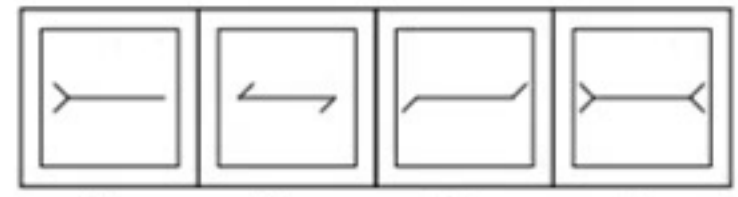
9.



(1) (2) (3) (4)

10.

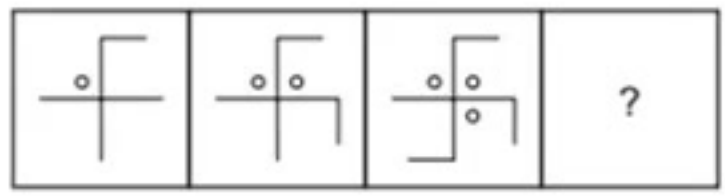


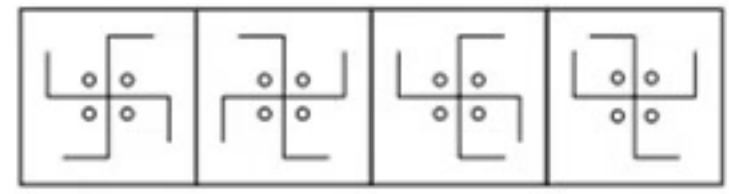


(1) (2) (3) (4)

[JNV 2017, 2005]

11.

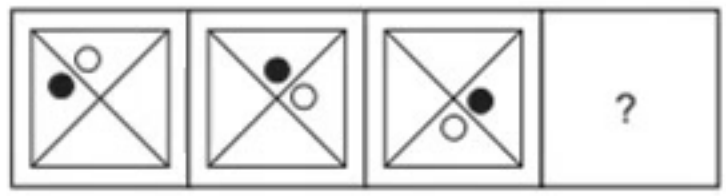


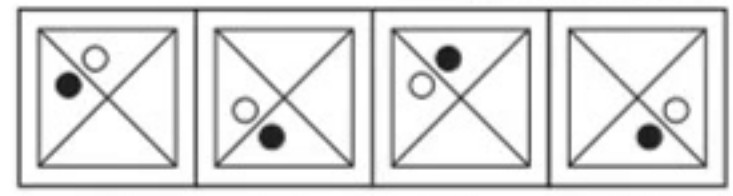


(1) (2) (3) (4)

[JNV 2017, 2005]

12.

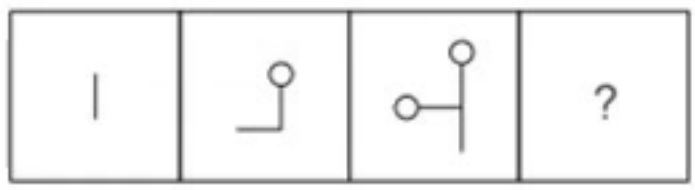


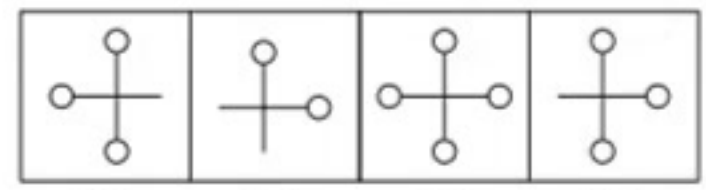


(1) (2) (3) (4)

[JNV 2017, 1997]

13.

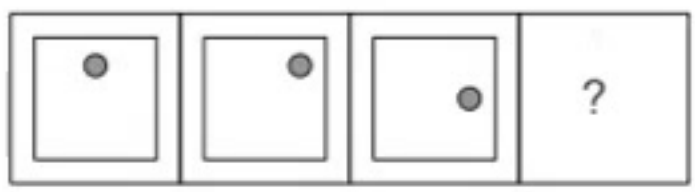


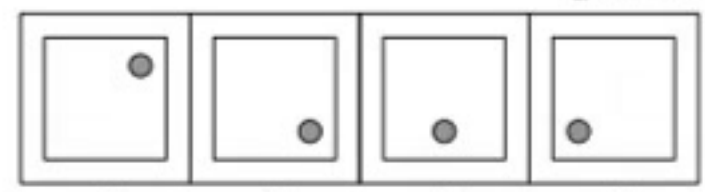


(1) (2) (3) (4)

[JNV 2016]

14.

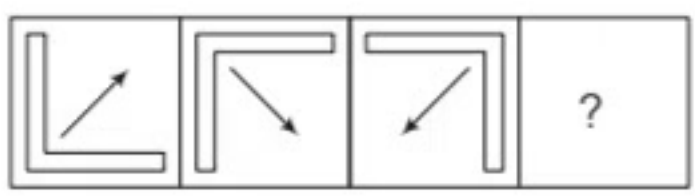


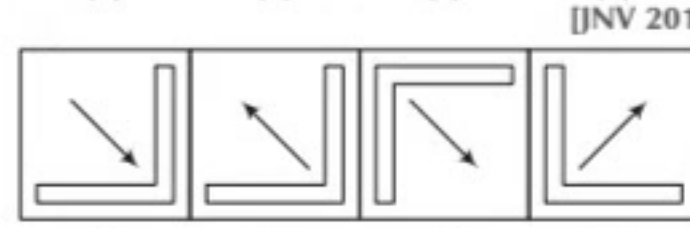


(1) (2) (3) (4)

[JNV 2016]

15.



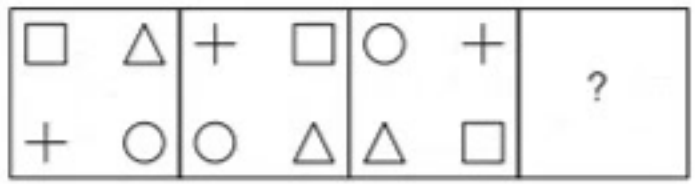


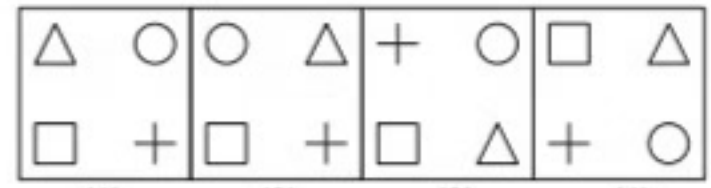
(1) (2) (3) (4)

[JNV 2016]

Question Figures **Answer Figures**

16.

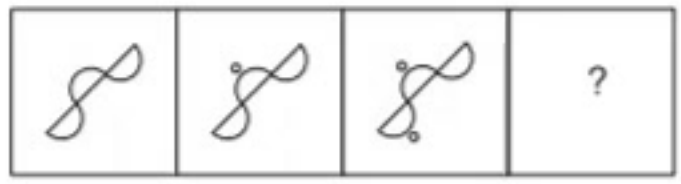


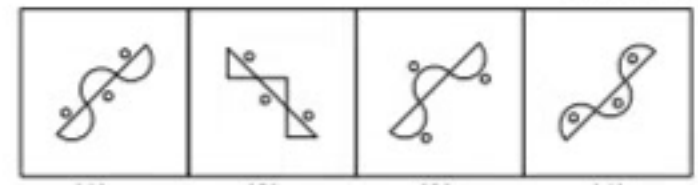


(1) (2) (3) (4)

[JNV 2015]

17.

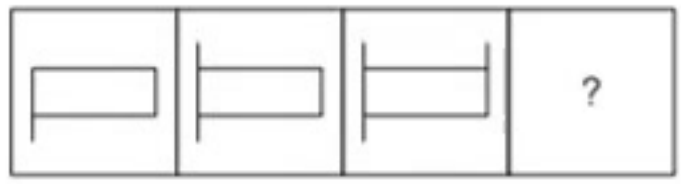




(1) (2) (3) (4)

[JNV 2015]

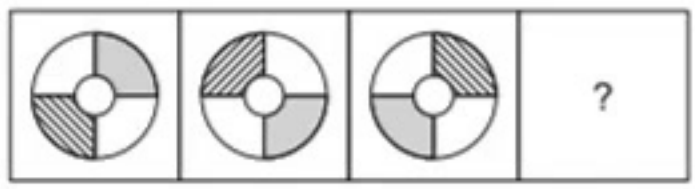
18.

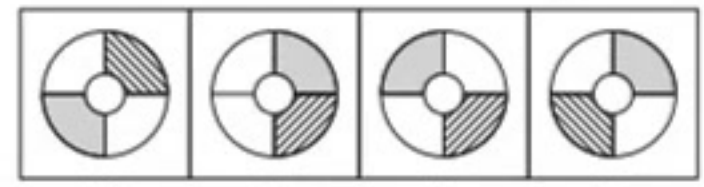


(1) (2) (3) (4)

[JNV 2015]

19.

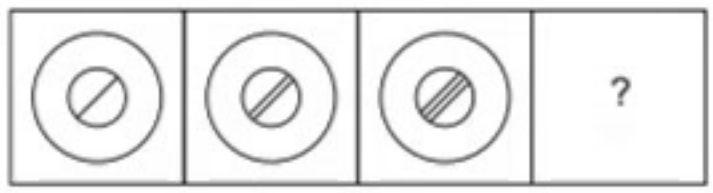


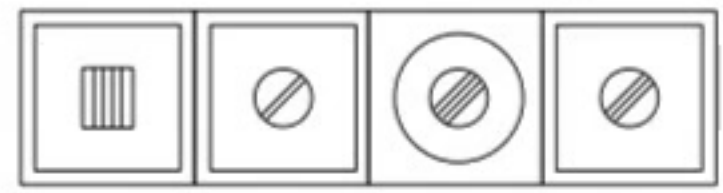


(1) (2) (3) (4)

[JNV 2014]

20.

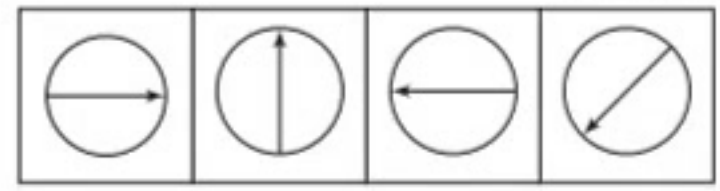




(1) (2) (3) (4)

[JNV 2014]

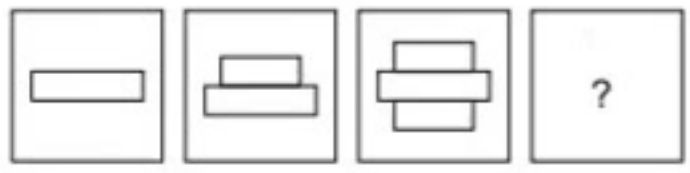
21.

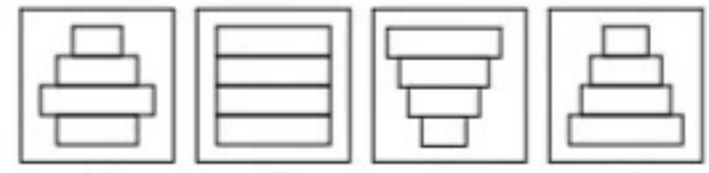


(1) (2) (3) (4)

[JNV 2013]

22.

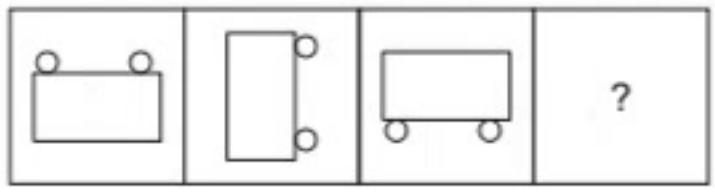


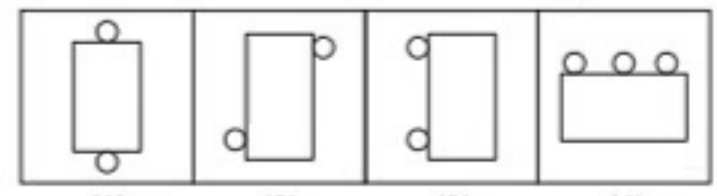


(1) (2) (3) (4)

[JNV 2013]

23.





(1) (2) (3) (4)

[JNV 2012]

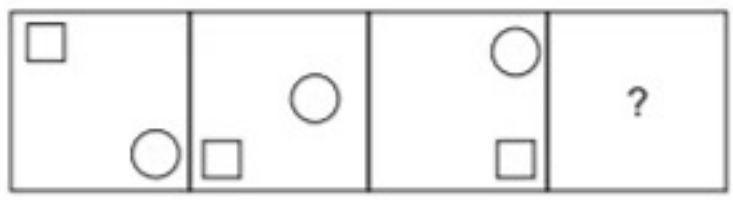
Question Figures **Answer Figures**

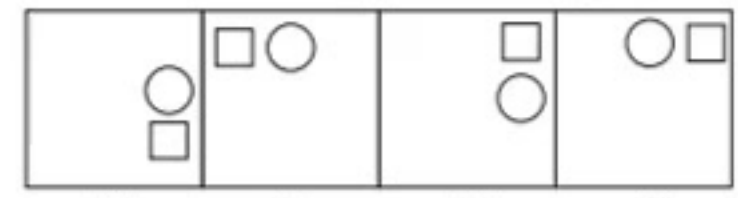
24.

(1) (2) (3) (4)

[JNV 2012]

25.

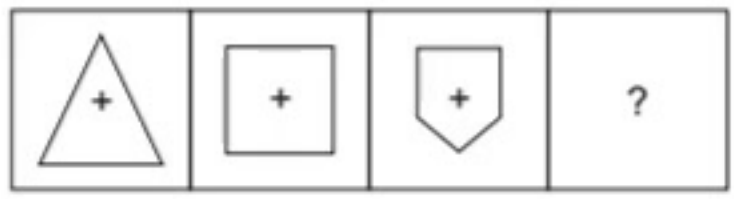


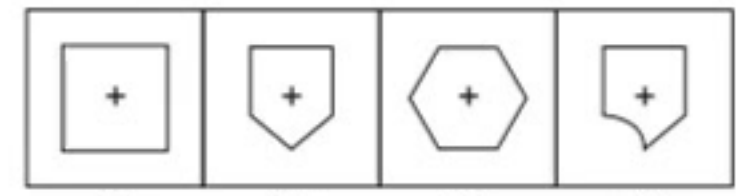


(1) (2) (3) (4)

[JNV 2011]

26.

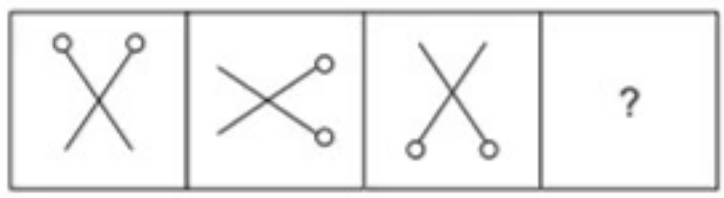


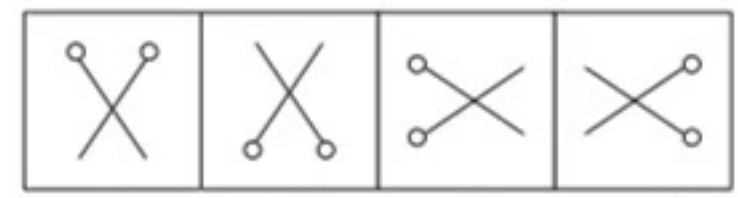


(1) (2) (3) (4)

[JNV 2011]

27.

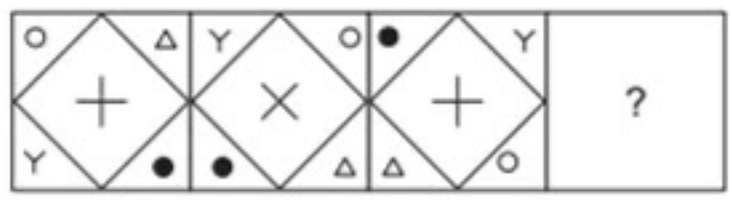


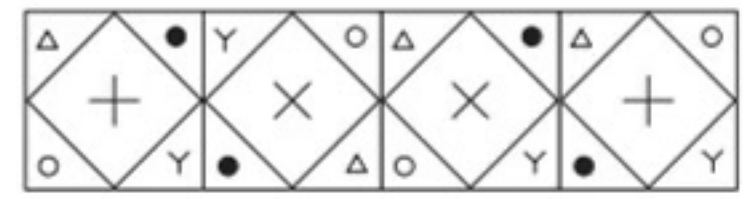


(1) (2) (3) (4)

[JNV 2010]

28.

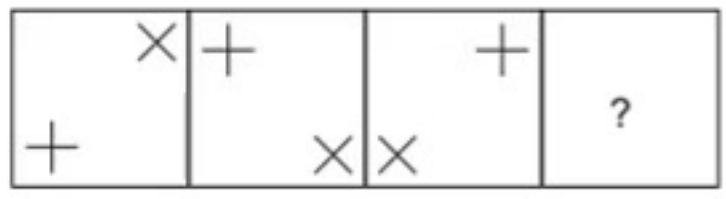


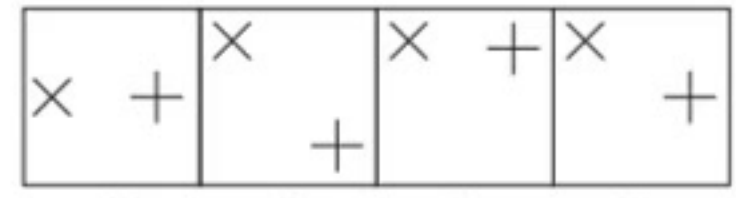


(1) (2) (3) (4)

[JNV 2010]

29.

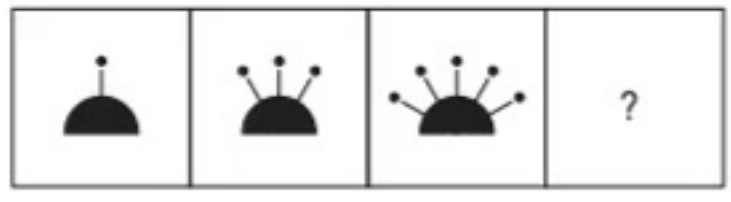


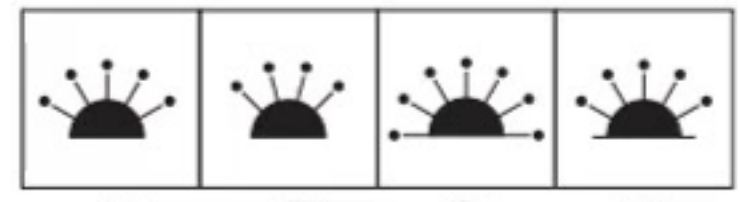


(1) (2) (3) (4)

[JNV 2009]

30.



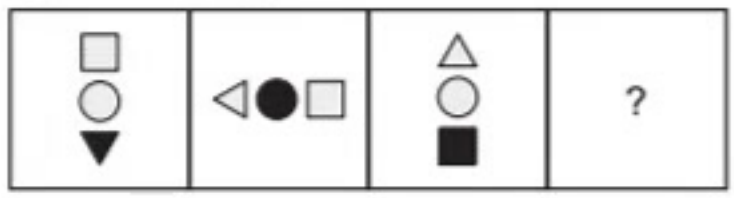


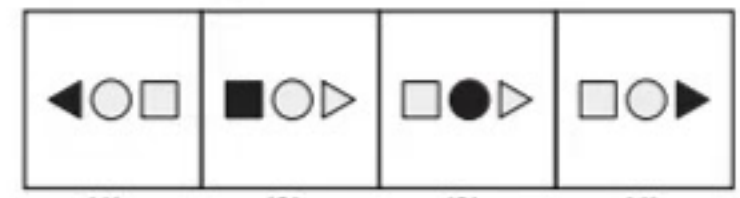
(1) (2) (3) (4)

[JNV 2009]

Question Figures **Answer Figures**

31.

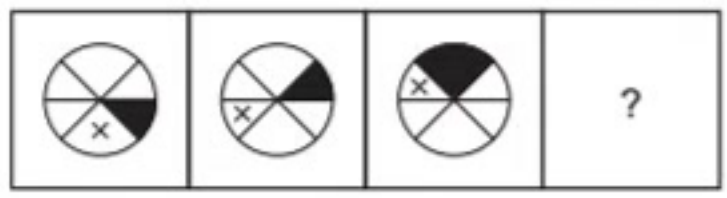


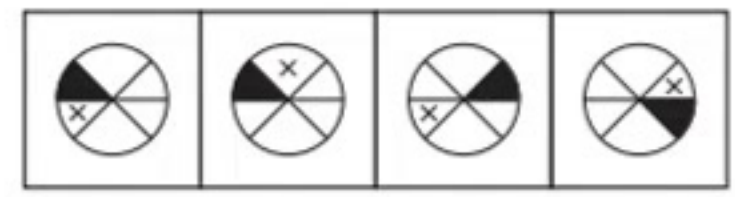


(1) (2) (3) (4)

[JNV 2008]

32.

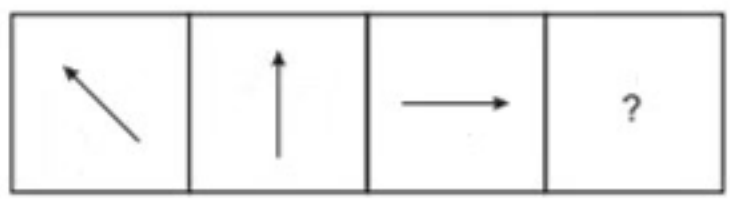


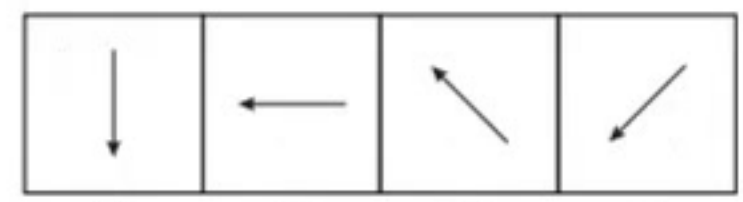


(1) (2) (3) (4)

[JNV 2008]

33.

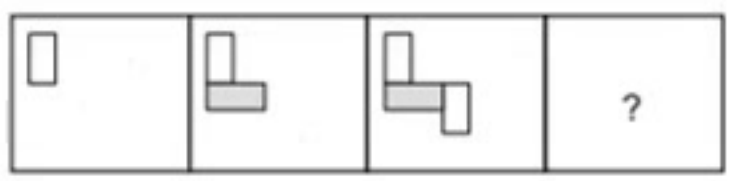


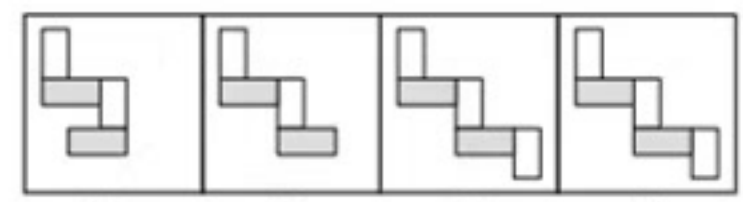


(1) (2) (3) (4)

[JNV 2007]

34.

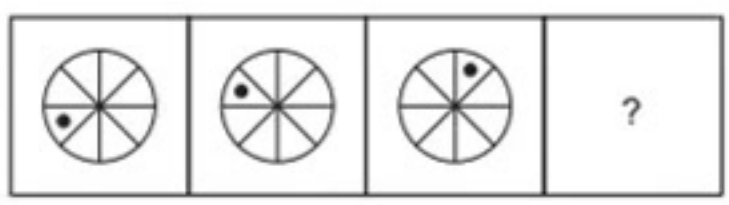


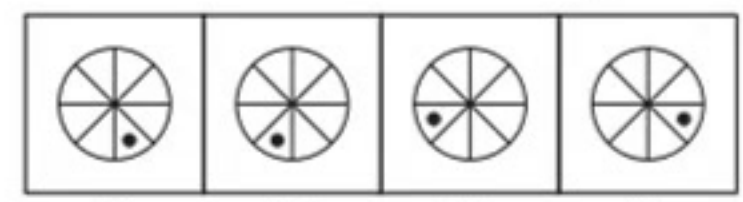


(1) (2) (3) (4)

[JNV 2007]

35.

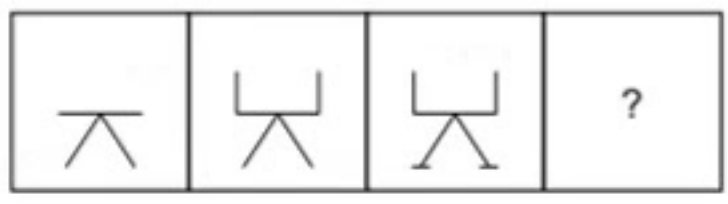


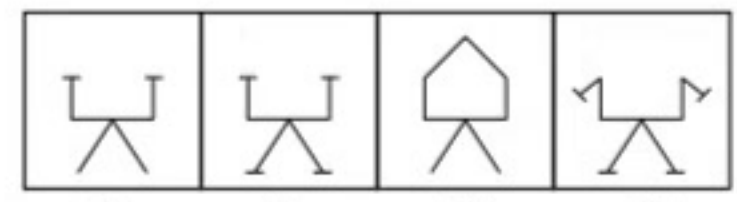


(1) (2) (3) (4)

[JNV 2007]

36.

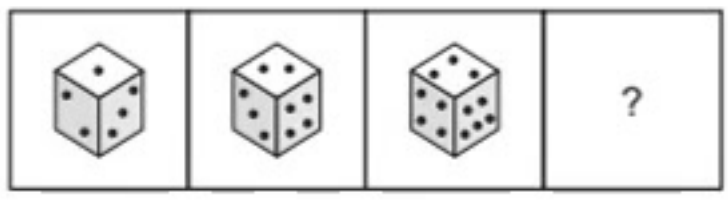


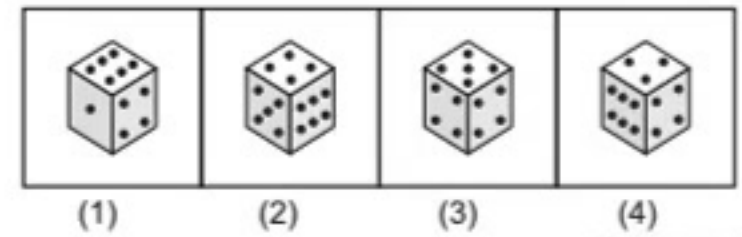


(1) (2) (3) (4)

[JNV 2004]

37.



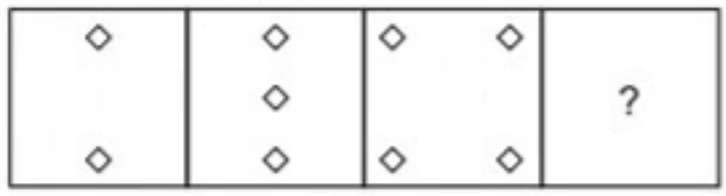


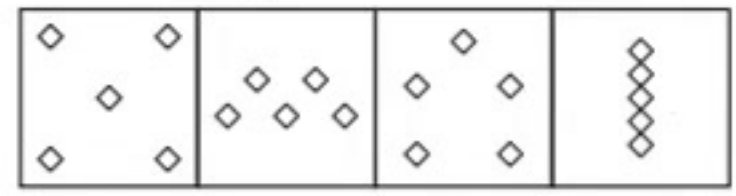
(1) (2) (3) (4)

[JNV 2004]

Question Figures **Answer Figures**

38.

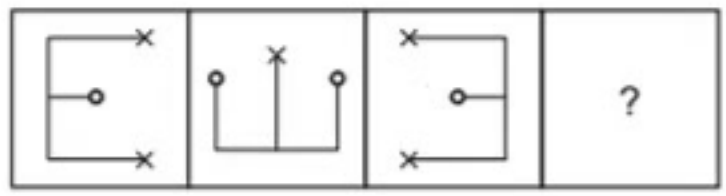


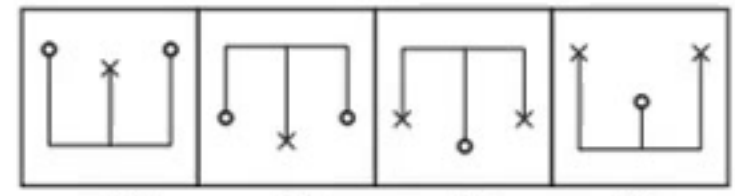


(1) (2) (3) (4)

[JNV 2003]

39.

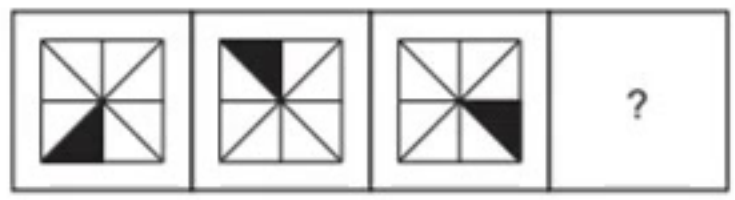


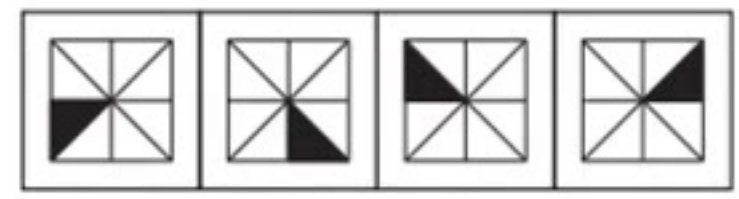


(1) (2) (3) (4)

[JNV 2003]

40.

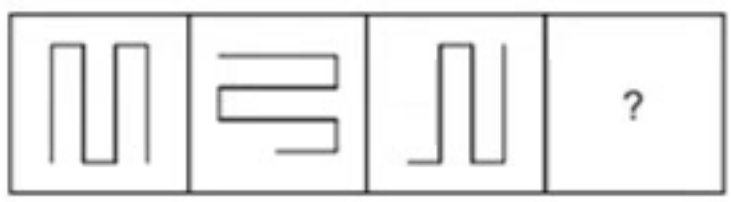




(1) (2) (3) (4)

[JNV 2002]

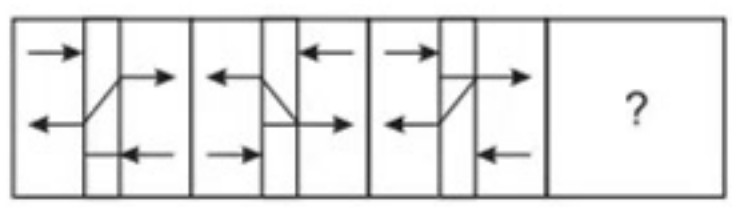
41.

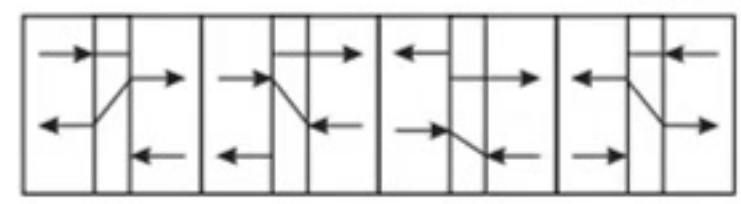


(1) (2) (3) (4)

[JNV 2002]

42.

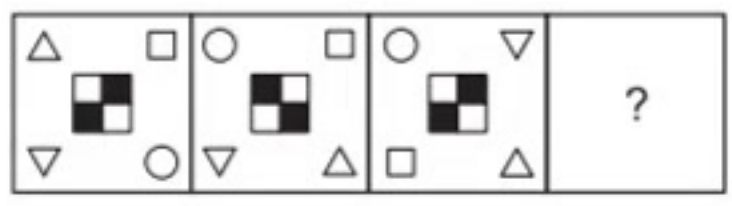


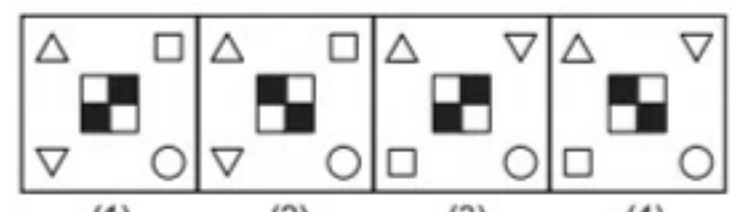


(1) (2) (3) (4)

[JNV 2001]

43.

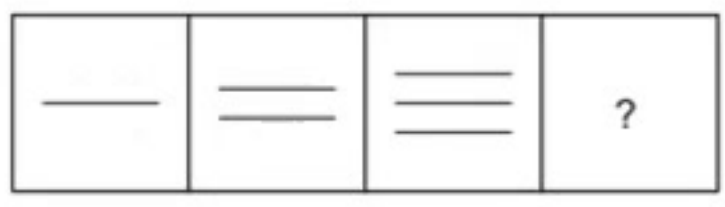


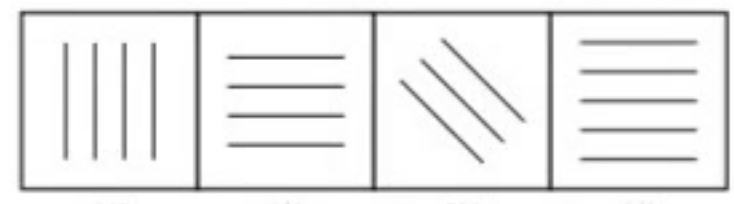


(1) (2) (3) (4)

[JNV 2001]

44.



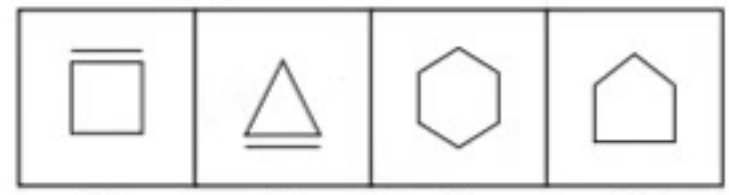


(1) (2) (3) (4)

[JNV 2000]

45. **Question Figures**

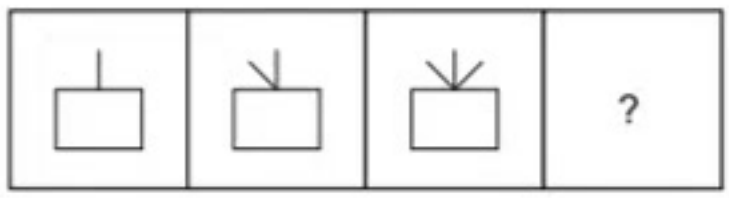
Answer Figures

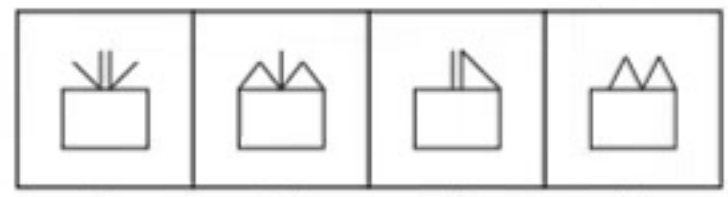


(1) (2) (3) (4)

[JNV 2000]

46.

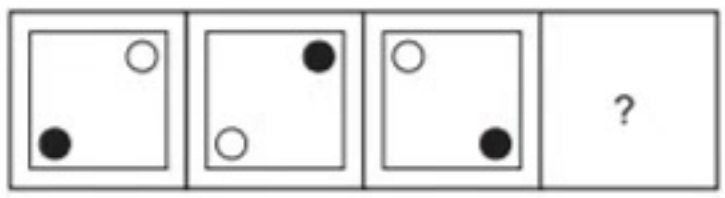


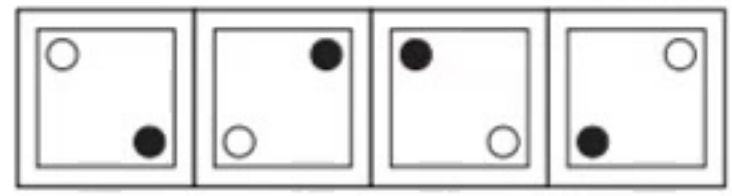


(1) (2) (3) (4)

[JNV 1999]

47.

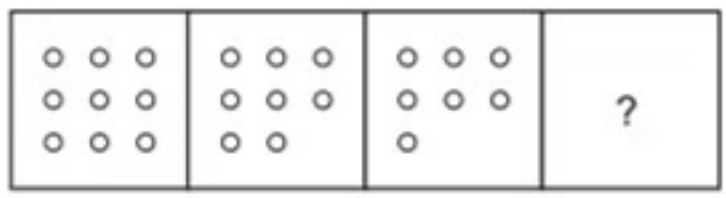


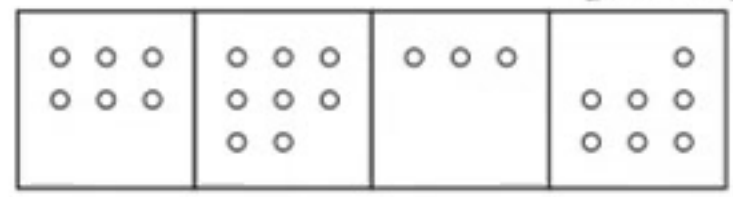


(1) (2) (3) (4)

[JNV 1999]

48.

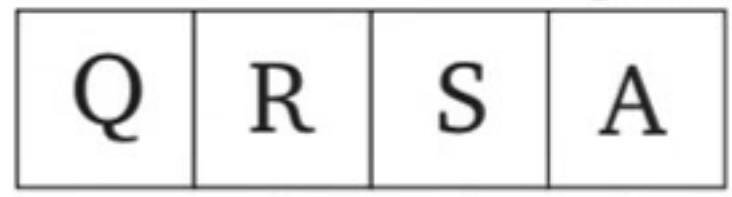




(1) (2) (3) (4)

[JNV 1999]

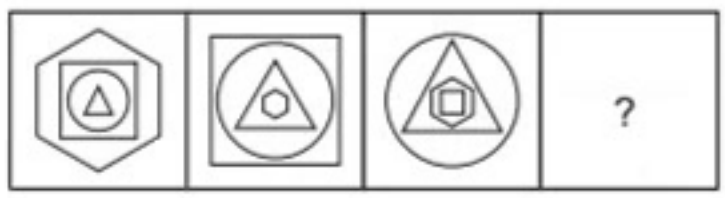
49.

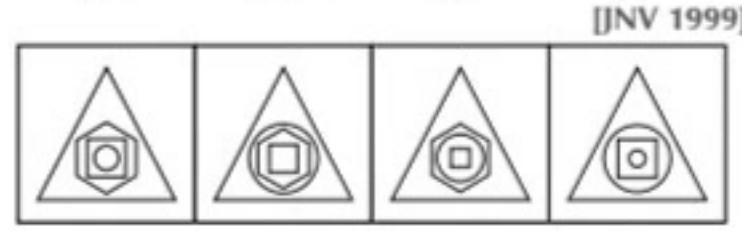


(1) (2) (3) (4)

[JNV 1999]

50.

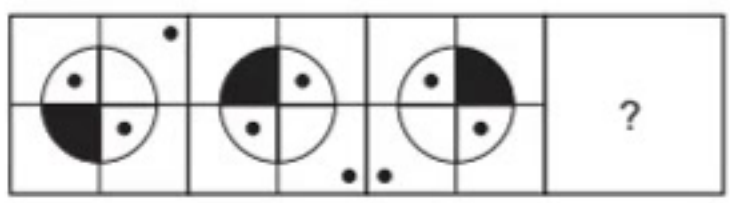


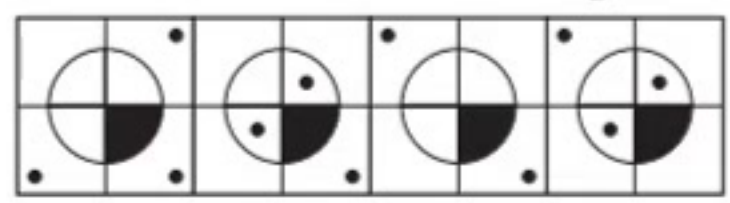


(1) (2) (3) (4)

[JNV 1998]

51.

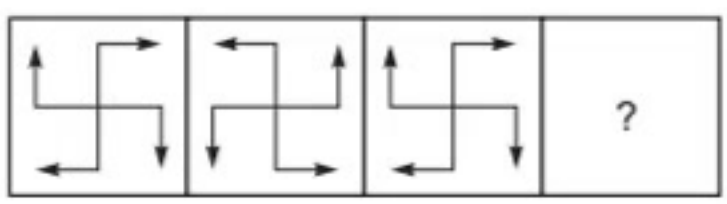


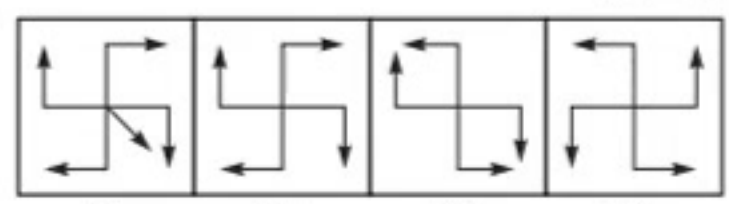


(1) (2) (3) (4)

[JNV 1998]

52.





(1) (2) (3) (4)

[JNV 1998]

Answers

1 (2)	**2** (1)	**3** (3)	**4** (4)	**5** (2)	**6** (2)	**7** (4)	**8** (3)	**9** (2)	**10** (4)
11 (1)	**12** (2)	**13** (1)	**14** (2)	**15** (2)	**16** (1)	**17** (3)	**18** (1)	**19** (3)	**20** (3)
21 (1)	**22** (1)	**23** (3)	**24** (2)	**25** (4)	**26** (3)	**27** (3)	**28** (3)	**29** (2)	**30** (3)
31 (4)	**32** (2)	**33** (4)	**34** (2)	**35** (1)	**36** (2)	**37** (2)	**38** (1)	**39** (2)	**40** (1)
41 (1)	**42** (4)	**43** (2)	**44** (2)	**45** (4)	**46** (1)	**47** (3)	**48** (1)	**49** (2)	**50** (1)
51 (4)	**52** (4)								

Hints and Solutions

1. The elements are moving from one corner to other in clockwise direction in each step. Hence, answer figure (2) will complete the given series.

2. One half-leaf is added in each step in clockwise direction. Hence, answer figure (1) will complete the given series.

3. The symbols are moving from one side of triangle to other in clockwise direction in each step and the line inside the triangle is same in each alternative figure. Hence, answer figure (3) will complete the series.

4. The symbols are changing their position from one corner to other in anti-clockwise direction in each step. Hence, answer figure (4) will complete the given series.

5. First and third figures are same. So, the fourth figure will be same as second figure.

6. In each successive figure, two lines i.e. 'v' are increasing.

7. In each successive figure, the left most letter is shifted to the right most corner.

8. In each successive figure, a symbol '⊙' is increasing.

9. In each successive figure, are vertical line is added to the left most corner and triangle becomes smaller.

10. One small lines is increasing in each successive figure. Therefore, answer figure (4) will the blank space.

11. One small line and a small circle is increasing in subsequent figures. Therefore, answer figure (1) will occupy the blank space.

12. In each successive figure, circles are moving one block in clockwise direction. Therefore, answer figure (2) will occupy the blank space.

13. In each successive figure one line and one small circle is increasing in the design.

14. In each successive figure shaded circle moves half arm in clockwise direction.

15. Each successive figure rotates 90° in clockwise direction to obtain the next figure.

16. In each successive figure designs are moving from one corner to other in clockwise direction.

17. In each successive figure one small circle appears outside the curved line.

18. In each successive figure one small vertical line increases outside the rectangle.

19. In each step, the question figure rotates through 90° clockwise.

20. In each successive figure, a slant line inside the small circle is increasing.

21. In each successive figure, the design rotates 90° in anti-clockwise direction.

22. In each successive figure one upper and lower small rectangle is added.

23. In each step, whole design rotates 90° in clockwise direction.

24. In each step, boy is one step ahead of his previous step.

25. Square is moving 1arm and circle is moving $\frac{1}{2}$ arm in anti-clockwise direction.

26. One line is adding to geometrical design in each step.

27. In each step figure rotates 90°clockwise. So, answer figure (3) is the correct answer.

28. In each successive figure middle element rotates 45° clockwise and four corner elements move one position in clockwise direction.

29. In each step, elements are moving from one corner to other in clockwise direction.

30. In each successive figure, two pins are adding at the top of the semicircular.

31. Figure rotates 90° clockwise and in the first figure triangle (Δ) is black, in second figure circle is black and in third figure square is black therefore in fourth figure triangle is black.

32. Shaded part is moving one step anti-clockwise and cross is moving one step clockwise.

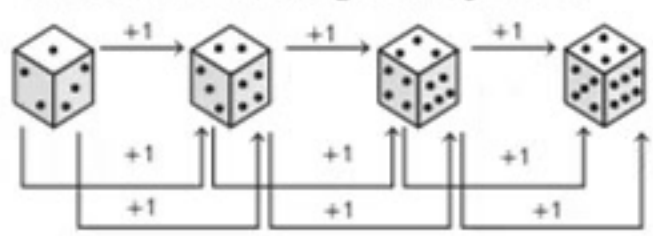
33. Arrow is rotating 45°, 90° and then 135°, in clockwise direction, so answer figure is (4).

34. In each step, shaded and unshaded rectangles are added alternatively in a fixed pattern.

35. Black circle moves 1 section, 2 sections and 3 sections in each step.

36. Two lines are adding subsequently in the design.

37. The dice are following below pattern.



38. In each successive figure, one design is increasing.

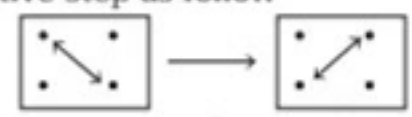
39. The figure is moving 90° in anti-clockwise direction and elements are inter changing their place in each step.

40. The shaded part is moving three blocks ahead in clockwise direction.

41. The design is moving 90° in clockwise direction and right corner's side is half eliminated.

42. The design rotates 180° and the horizontal line comes upwards.

43. The middle design rotates 90° in each step and the elements at corner changes their position in each alternative step as follow



44. In each successive figure, one line is increasing.

45. One line is adding in each subsequent figure.

46. One line is adding at the top of the rectangle subsequently.

47. From first figure to second figure, both the circles change their position, Similarly from third to fourth figure both the circles will change their position.

48. Circles are decreasing by one, subsequently.

49. The series follows below pattern in each step.

$L \xrightarrow{+2} N \xrightarrow{+2} P \xrightarrow{+2} \boxed{R}$

50. The outer most design comes inside in each step.

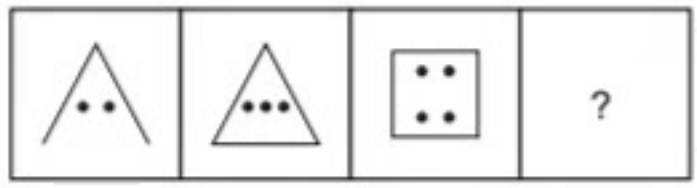
51. The design is moving 90° in clockwise direction.

52. The first figure is same as the third figure Thus, the answer figure will be same as the second figure.

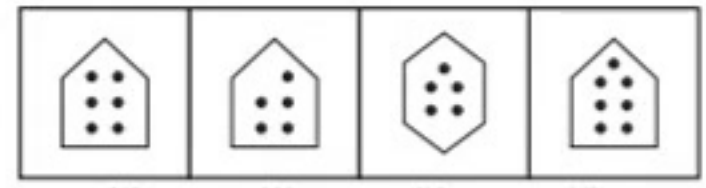
Practice Exercise

Directions (Q. Nos. 1–50) *In the following questions three question figures are given and the space for the fourth place has a question mark (?). The question figures are in a series. Choose the figure out of the four answer figures marked as 1, 2, 3 and 4 which may complete the series.*

1. Question Figures

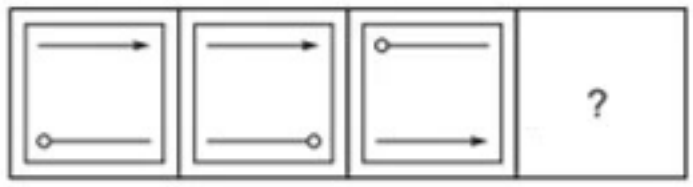


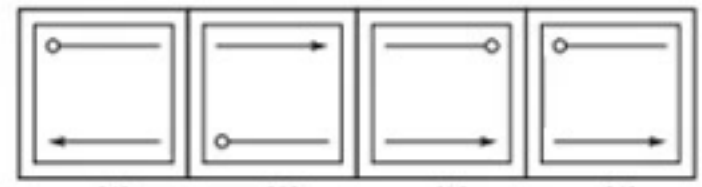
Answer Figures



(1) (2) (3) (4)

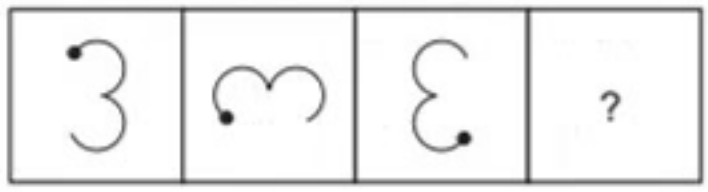
2.

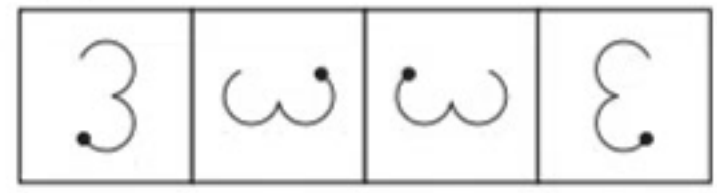




(1) (2) (3) (4)

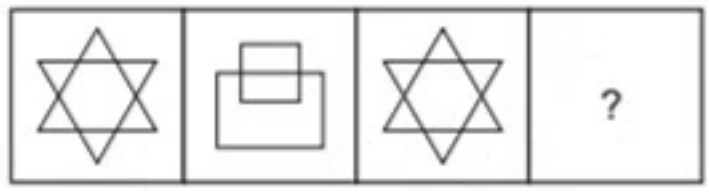
3.





(1) (2) (3) (4)

4.

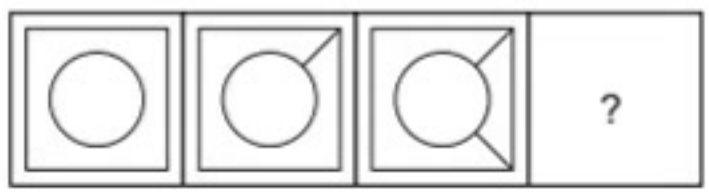


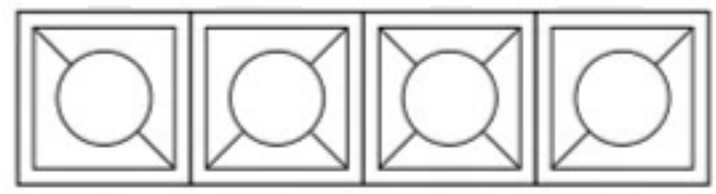
(1) (2) (3) (4)

5.

(1) (2) (3) (4)

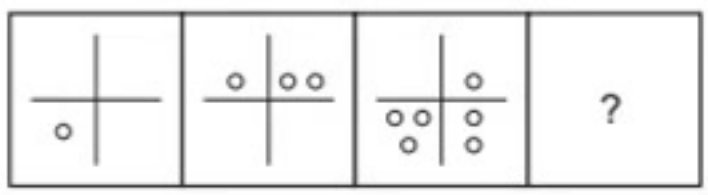
6.

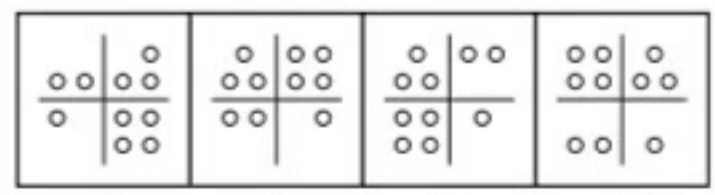




(1) (2) (3) (4)

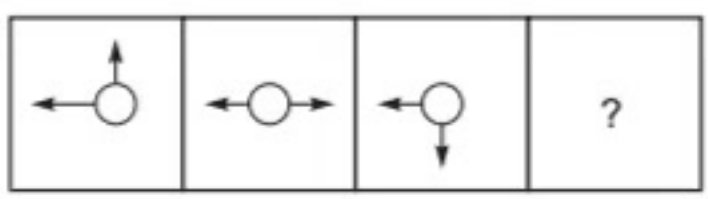
7.

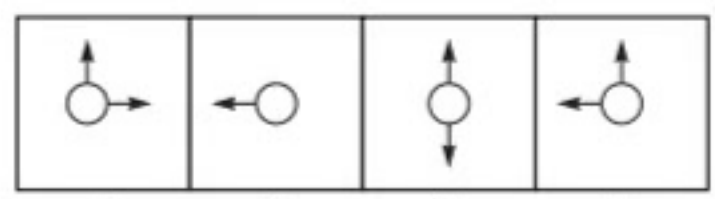




(1) (2) (3) (4)

8.





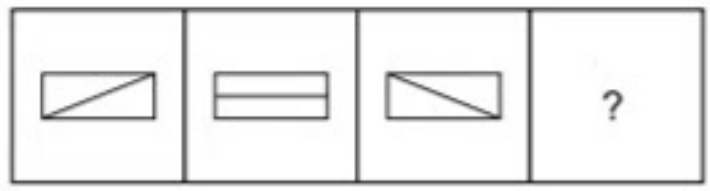
(1) (2) (3) (4)

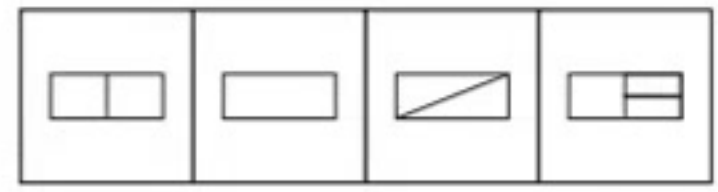
9. Question Figures

Answer Figures

(1) (2) (3) (4)

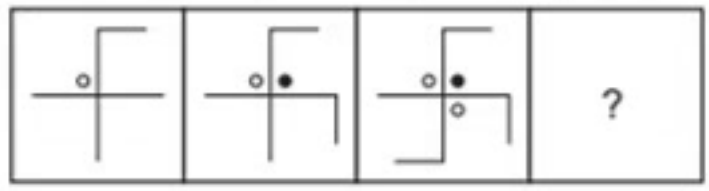
10.

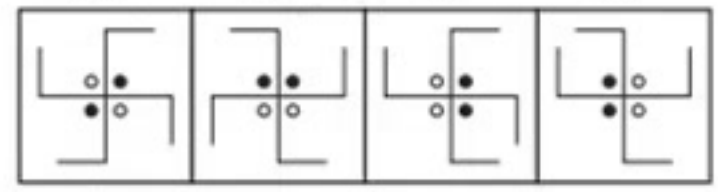




(1) (2) (3) (4)

11.



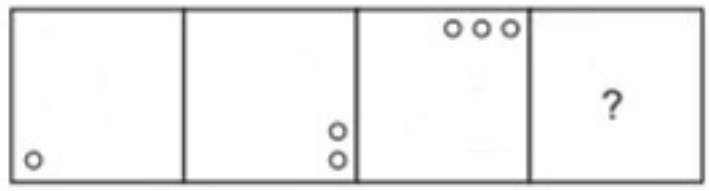


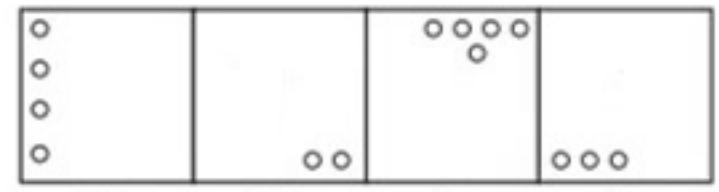
(1) (2) (3) (4)

12.

(1) (2) (3) (4)

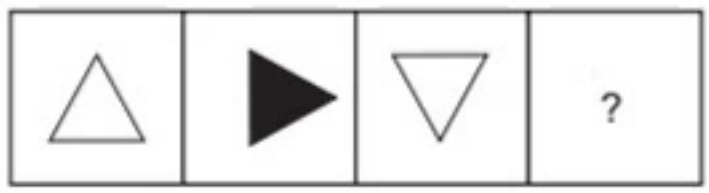
13.

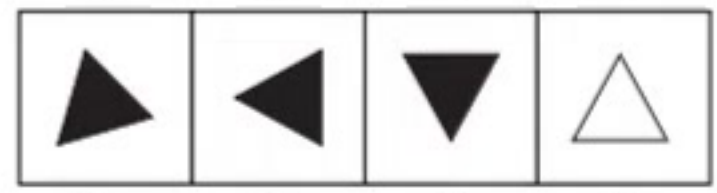




(1) (2) (3) (4)

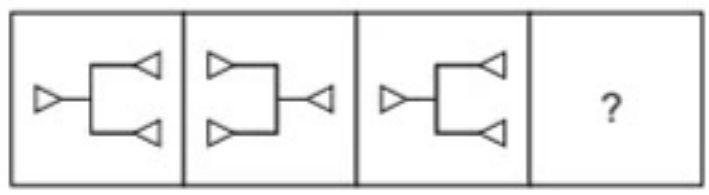
14.

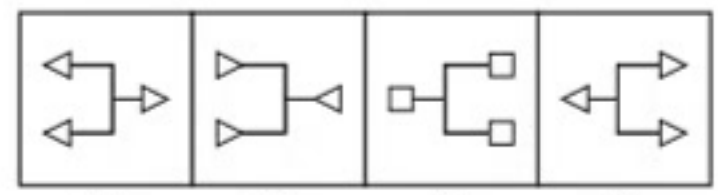




(1) (2) (3) (4)

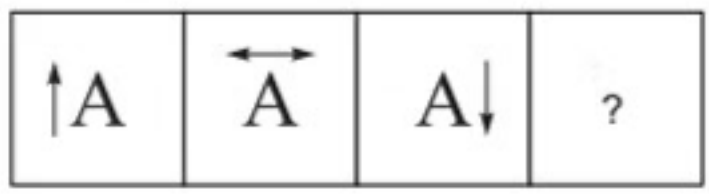
15.





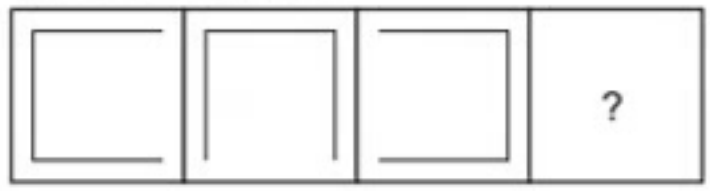
(1) (2) (3) (4)

16.

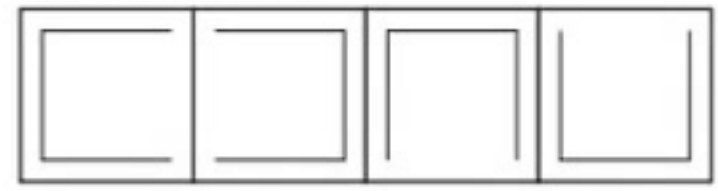


(1) (2) (3) (4)

17. Question Figures

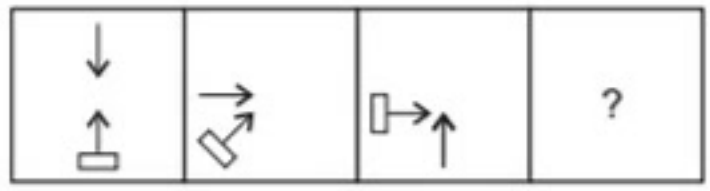


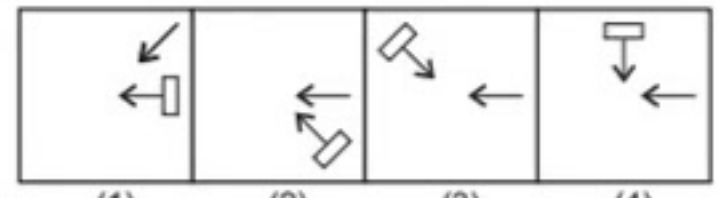
Answer Figures



(1) (2) (3) (4)

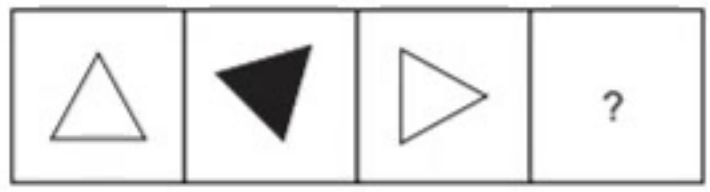
18.





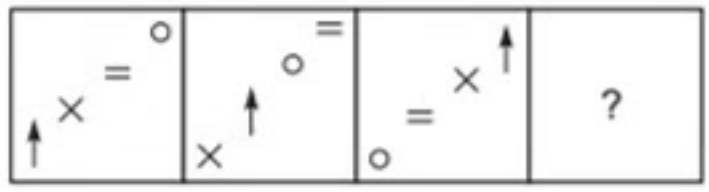
(1) (2) (3) (4)

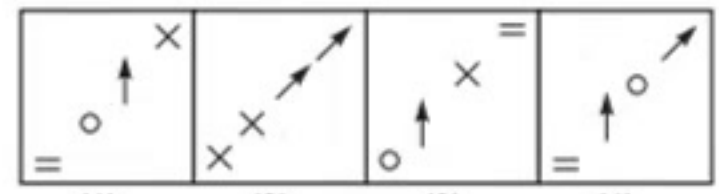
19.



(1) (2) (3) (4)

20.



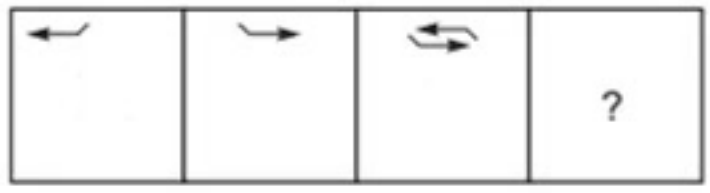


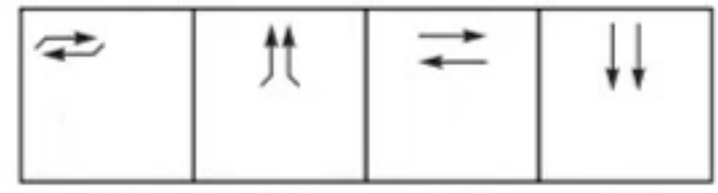
(1) (2) (3) (4)

21.

(1) (2) (3) (4)

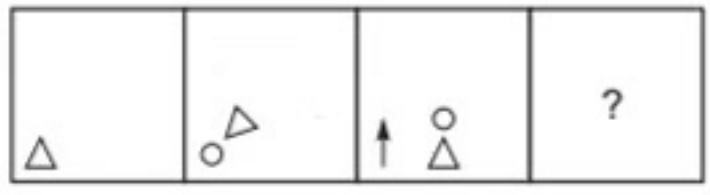
22.

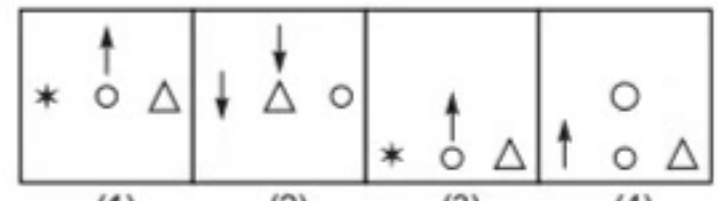




(1) (2) (3) (4)

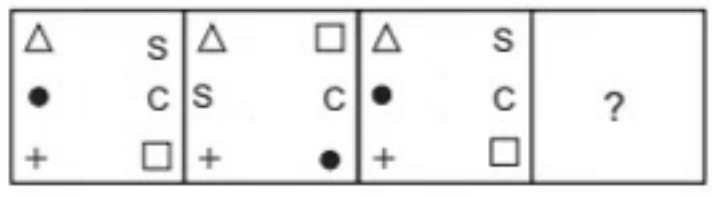
23.

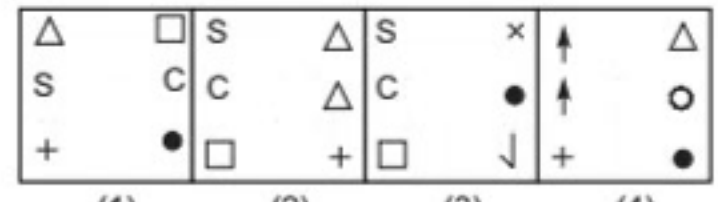




(1) (2) (3) (4)

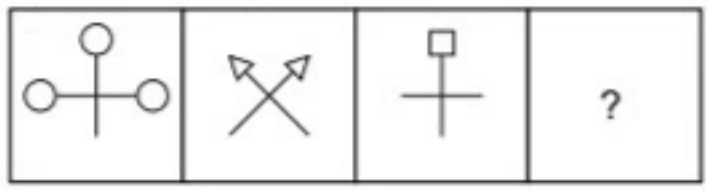
24.



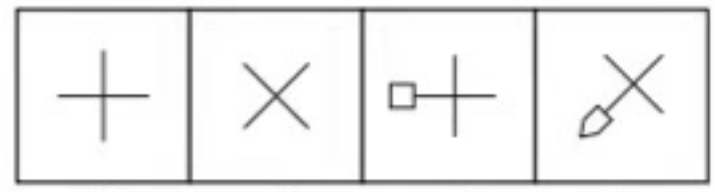


(1) (2) (3) (4)

25. Question Figures

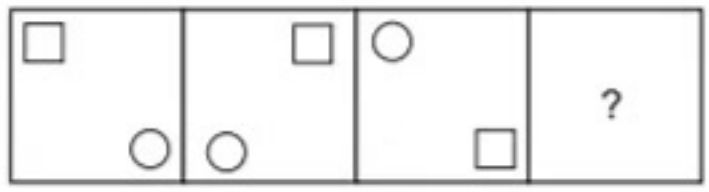


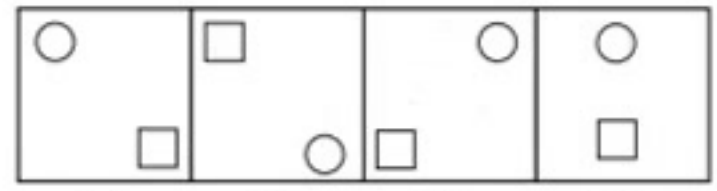
Answer Figures



(1) (2) (3) (4)

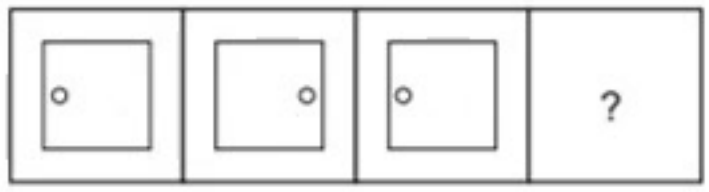
26.

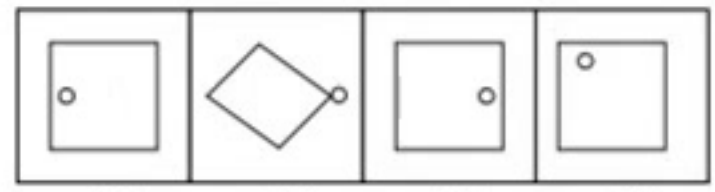




(1) (2) (3) (4)

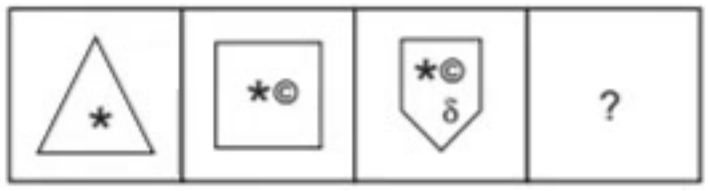
27.

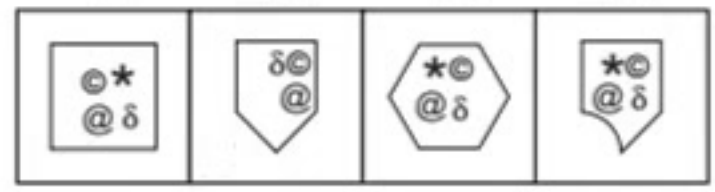




(1) (2) (3) (4)

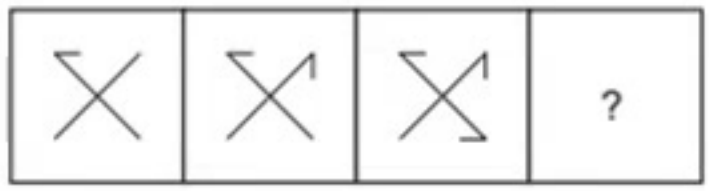
28.

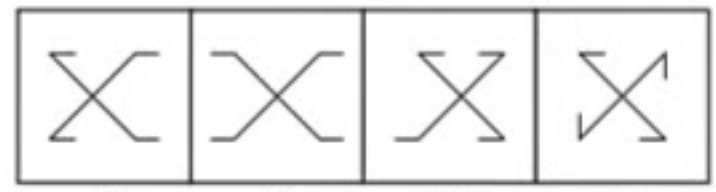




(1) (2) (3) (4)

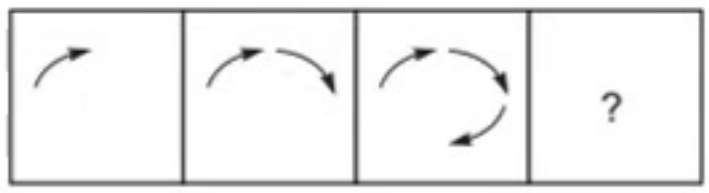
29.

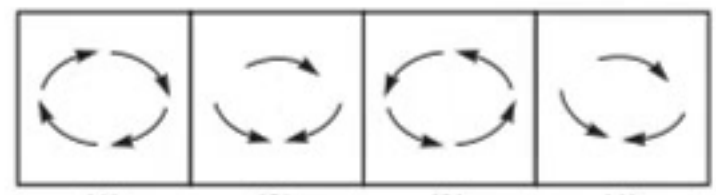




(1) (2) (3) (4)

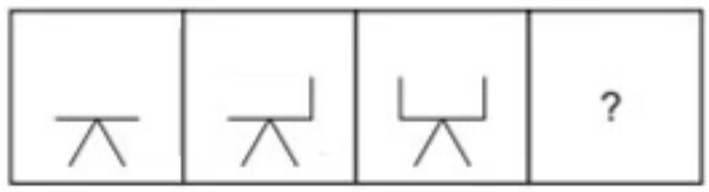
30.

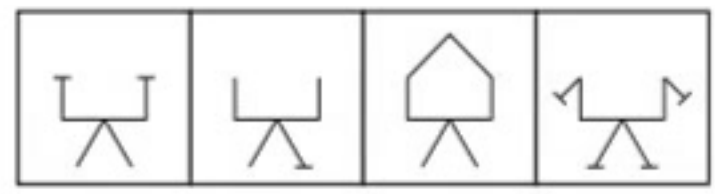




(1) (2) (3) (4)

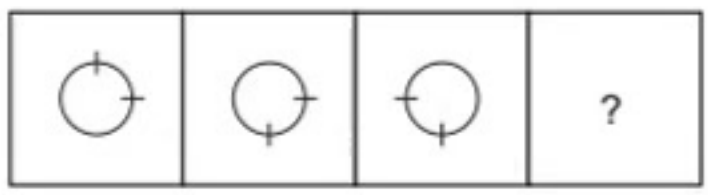
31.

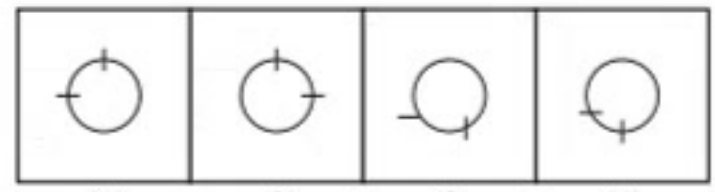




(1) (2) (3) (4)

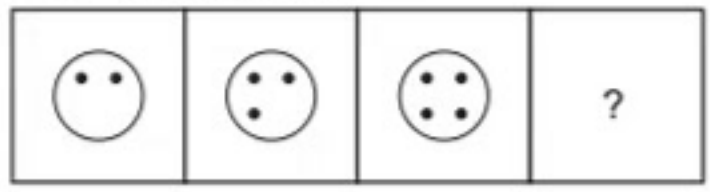
32.



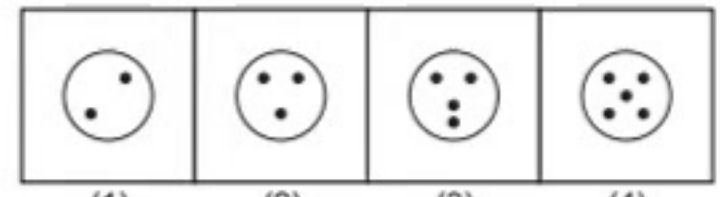


(1) (2) (3) (4)

33. Question Figures

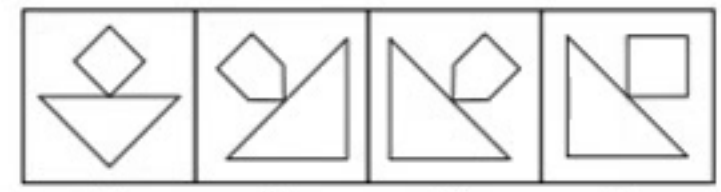


Answer Figures



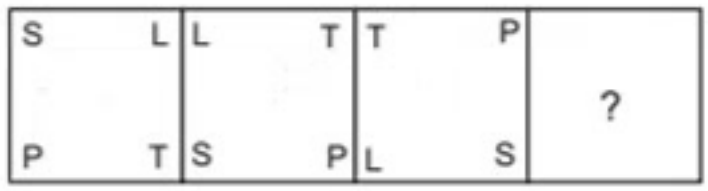
(1) (2) (3) (4)

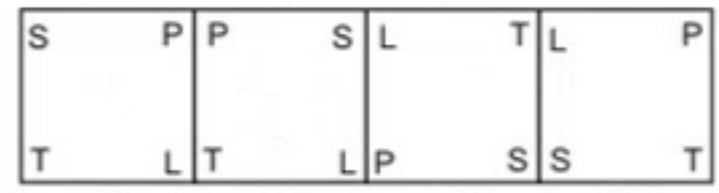
34.



(1) (2) (3) (4)

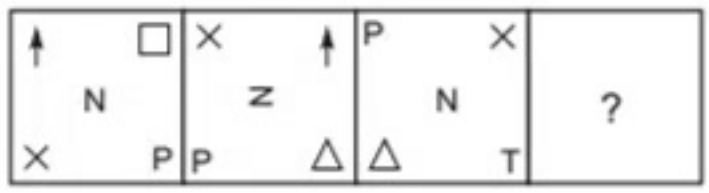
35.

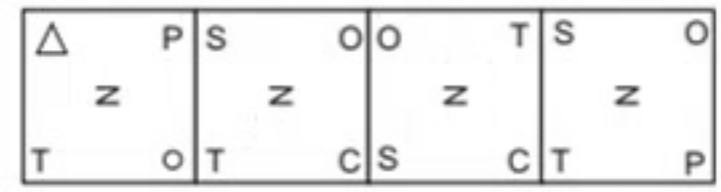




(1) (2) (3) (4)

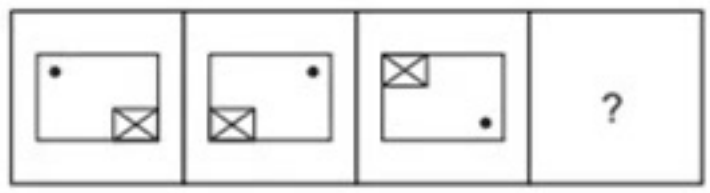
36.

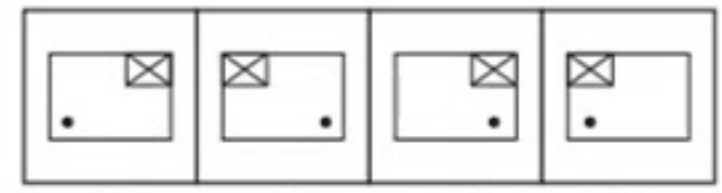




(1) (2) (3) (4)

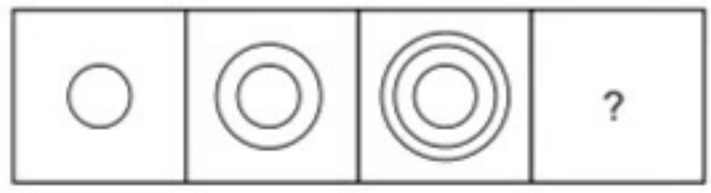
37.

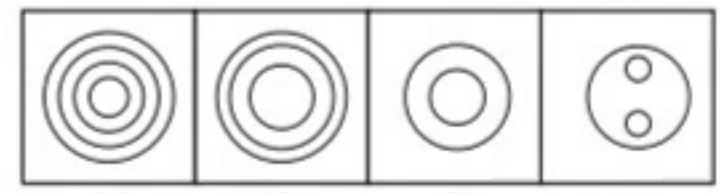




(1) (2) (3) (4)

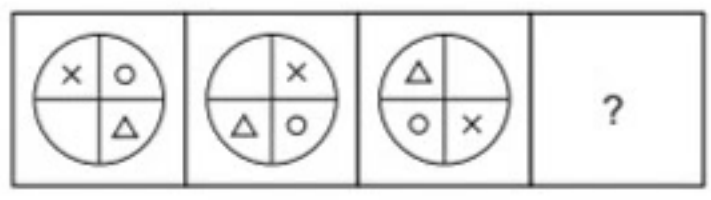
38.

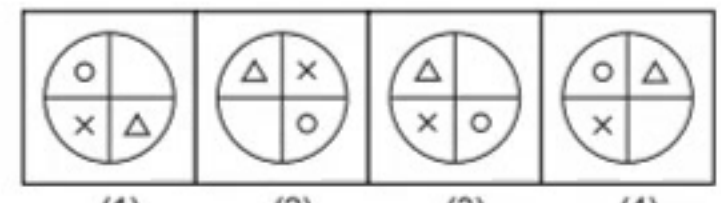




(1) (2) (3) (4)

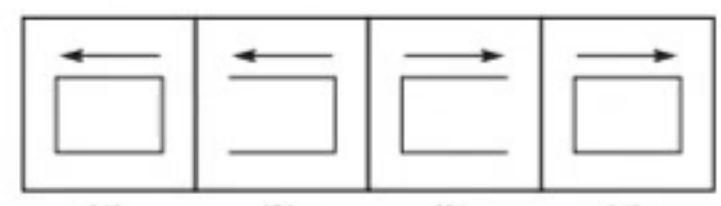
39.





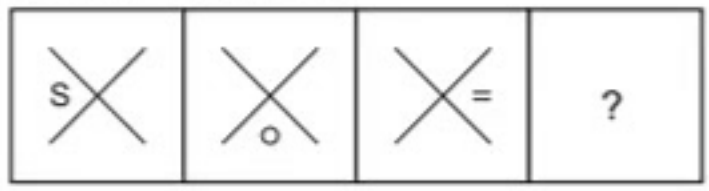
(1) (2) (3) (4)

40.

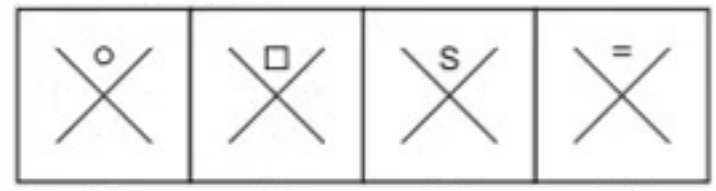


(1) (2) (3) (4)

41. Question Figures

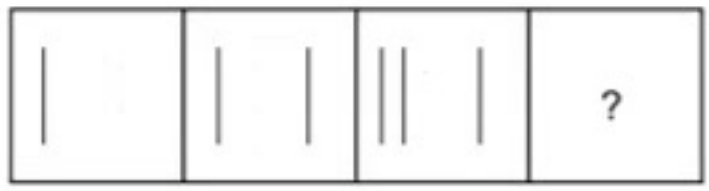


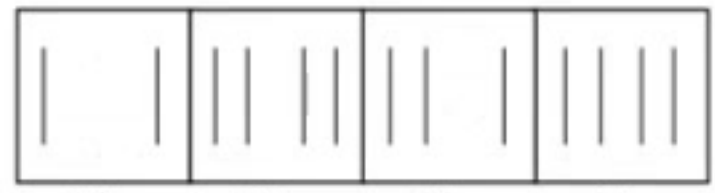
Answer Figures



(1) (2) (3) (4)

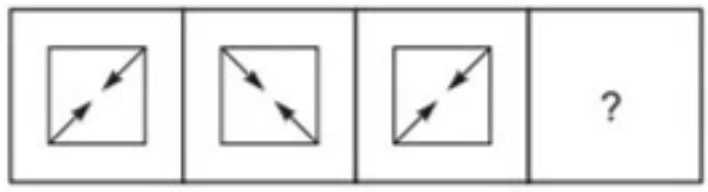
42.

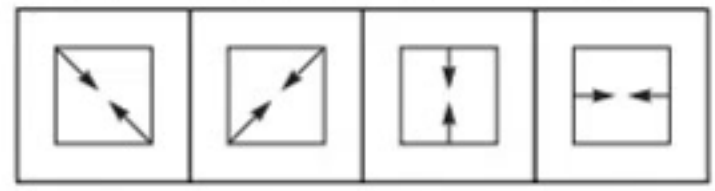




(1) (2) (3) (4)

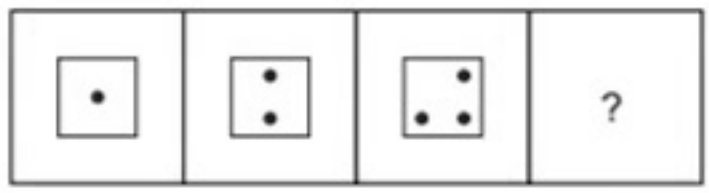
43.

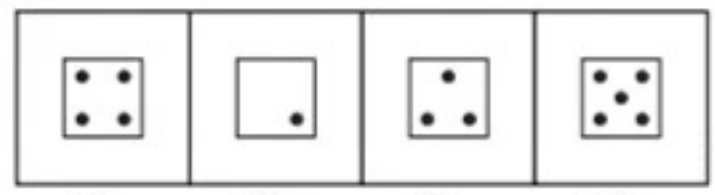




(1) (2) (3) (4)

44.



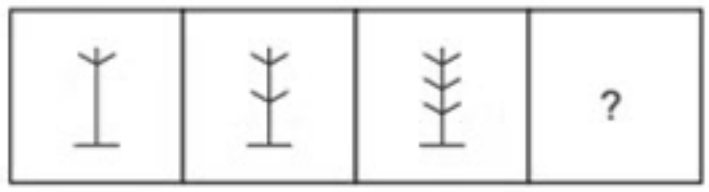


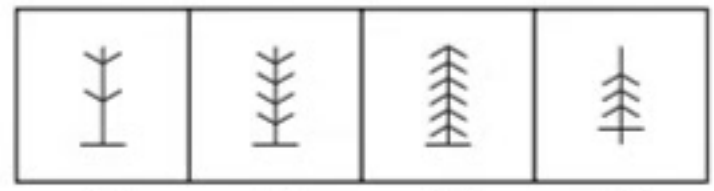
(1) (2) (3) (4)

45.

(1) (2) (3) (4)

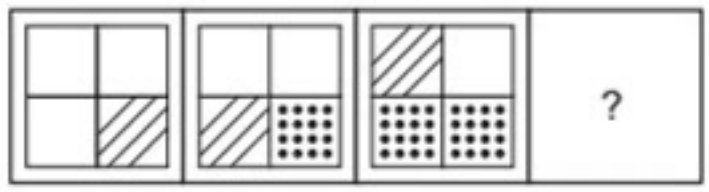
46.

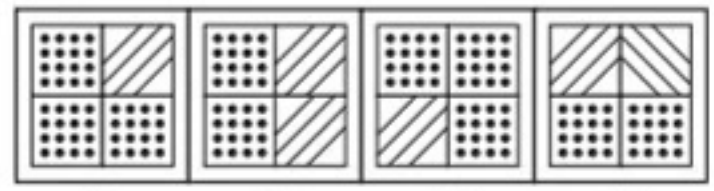




(1) (2) (3) (4)

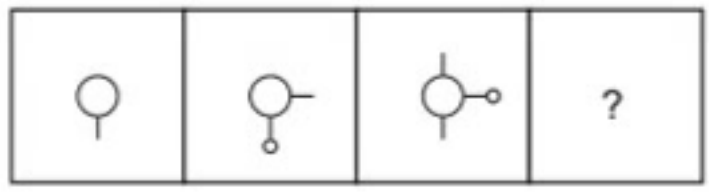
47.

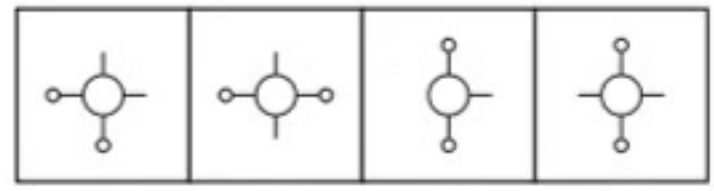




(1) (2) (3) (4)

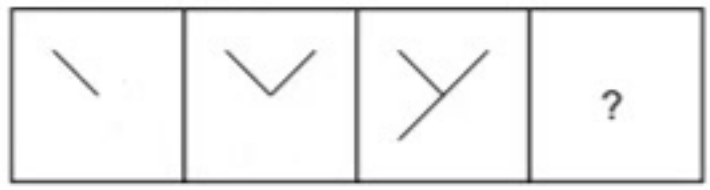
48.



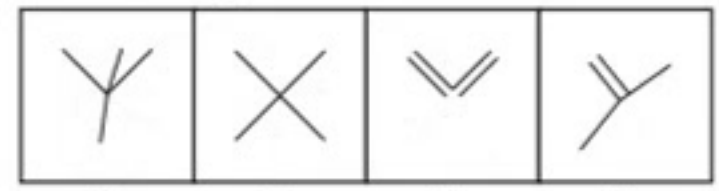


(1) (2) (3) (4)

49. Question Figures

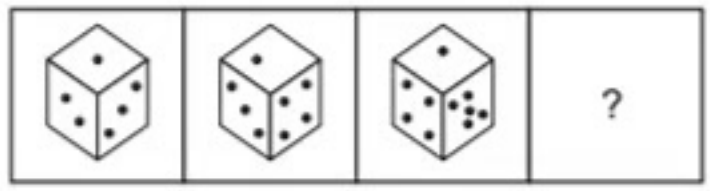


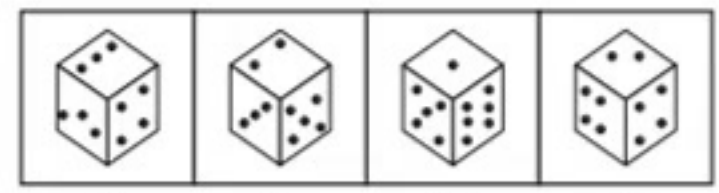
Answer Figures



(1) (2) (3) (4)

50.





(1) (2) (3) (4)

Answers

1 (2)	**2** (1)	**3** (2)	**4** (1)	**5** (2)	**6** (2)	**7** (2)	**8** (2)	**9** (3)	**10** (1)
11 (1)	**12** (2)	**13** (1)	**14** (2)	**15** (2)	**16** (4)	**17** (4)	**18** (3)	**19** (1)	**20** (1)
21 (2)	**22** (1)	**23** (3)	**24** (1)	**25** (2)	**26** (3)	**27** (3)	**28** (3)	**29** (4)	**30** (1)
31 (2)	**32** (1)	**33** (4)	**34** (3)	**35** (2)	**36** (1)	**37** (1)	**38** (1)	**39** (4)	**40** (1)
41 (2)	**42** (2)	**43** (1)	**44** (1)	**45** (2)	**46** (2)	**47** (1)	**48** (4)	**49** (2)	**50** (3)

Hints and Solutions

1. In each successive figure, one dot and one line is increasing.

2. From first to second figure, the pin at the bottom changes its direction. So, the arrow in third figure will change their position in fourth figure.

3. The design is rotating 90° in anti-clockwise direction.

4. Figure 1 is same as figure 3. Thus, the answer figure will be same as the figure 2.

5. The design is moving 90° in clockwise direction.

6. In question figures a pattern is being formed in which no line, one line and two lines are drawn from the vertex (vertices) of the square joining the circle. Therefore, answer figure (2) will occupy the blank space.

7. The circle is moving in clockwise direction and circle is increasing by one in each successive figures.

8. An arrow on the circle is moving 90° in clockwise direction, while the left side arrow is static on its place.

9. One line is adding in the successive design and forming a new figure.

10. The line inside of the rectangle is moving 45° in clockwise direction.

11. In question figures one small line and a small unshaded and shaded circle is increasing alternately. Therefore, answer figure (1) will occupy the blank space.

12. The question figure 1 is same as the question figure 3. Thus, the answer figure will be same as the question figure 2.

13. The circle is increasing by one and moving in anti-clockwise direction in successive figure.

14. The question figure 3 is the reverse of the question figure 1. Thus, the answer figure will be the reverse of the question figure 2.

15. The question figure 1 is same as the question figure 3. Thus, the answer figure will be same as the question figure 2.

16. In the question figures 1 and 3, the arrow is changing its place. So, the arrow is question figure 2 will change its Position in answer figure.

17. Question figures 1, 2 and 3 are being turned in clockwise direction. Therefore, answer figure (4) will occupy the blank space.

18. In the figure, the design ↑ is moving 45° in clockwise direction and ↓ is moving 90° in anti-clockwise direction.

19. The triangle is rotating 45° in clockwise direction with sequence of white to black.

20. From figure 1 to 2 the signs are exchanging its place in the group of two similar pattern will be followed by third figure to get answer figure.

21. The line is increasing by 3 and 4 in the successive figure.

22. In the question figure 1 and 3, the arrow is inverting and turns perpendicularly.

23. All the signs are moving in a proper sequence and a new sign is added at left hand corner each time.

24. The question figure 3 is same as the question figure 1. Thus, the answer figure will be same as the question figure 2.

25. The figure and designs are deleted subsequently.

26. Both designs are moving from one corner to other in clockwise direction.

27. The sign 'O' is shifted to opposite direction.

28. One line is increasing in geometrical figure and one new design comes inside the geometrical figure.

29. One line is adding in clockwise direction in the design.

30. One curved line is adding in clockwise direction.

31. One line is adding subsequently in the design.

32. Cutting lines of the circle are moving 90° in clockwise direction.

33. The number of black dots are increasing by one in each step.

34. The figure is moving 90° in clockwise direction and a line is added.

35. The latters (S, P, T, L) are moving one side in anti-clockwise direction.

36. In each subsequent figure, the central design rotates 90° on its place and the other designs are moving from one corner to other in clockwise direction and a new design comes buttorn right corner.

37. Two designs (•,⊠) are moving from one corner to other in clockwise direction.

38. In each successive figure one circle increases.

39. The designs are moving 90° in clockwise direction.

40. In each successive figure one line is increasing in clockwise direction and the arrow at the top is reserved.

41. Design is moving 90° in anti-clockwise direction and each time a new figure formed.

42. In each step one line is added to the left and right alternatively.

43. The question figure 3 is same as the question figure 1. Thus, the answer figure will be same as the question figure 2.

44. Black dot in the square are increasing by one.

45. Petals are increasing by one in the design.

46. In the design, the lines are increasing by two.

47. The design is moving 90° in clockwise direction and one new design with 16 dots is adding.

48. The design is moving 90° in anti-clockwise direction and a new design is adding one by one.

49. One new line is adding in the design to form the sign '×'.

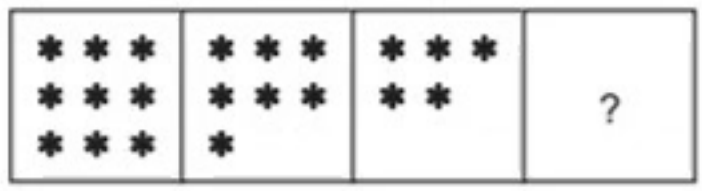
50. The top face of dice remains same while in other two faces one dot is increasing.

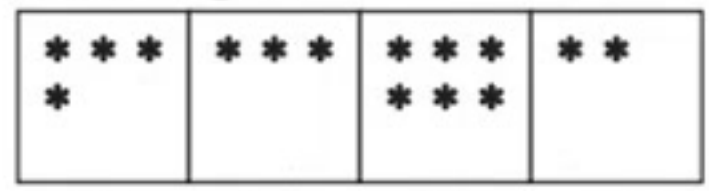
Self Practice

Directions (Q. Nos. 1–24) *In the following questions, question figures are given on the left side. These question figures are in a series. Choose the figure out of the answer figures given on the right side which may complete the series.*

Question Figures | **Answer Figures**

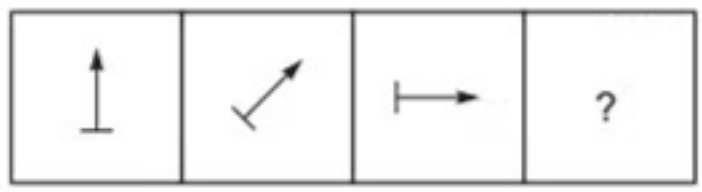
1.

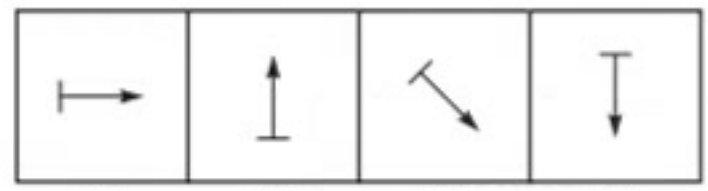




(1) (2) (3) (4)

2.



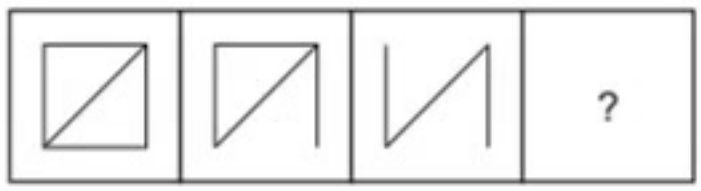


(1) (2) (3) (4)

3.

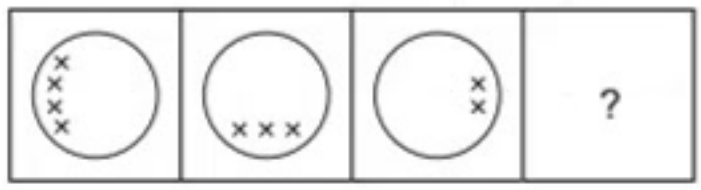
(1) (2) (3) (4)

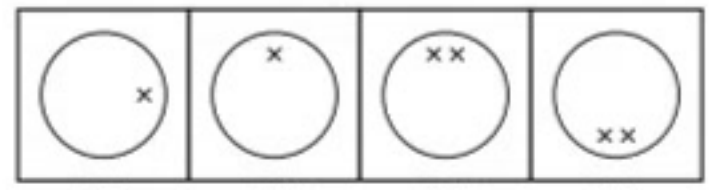
4.



(1) (2) (3) (4)

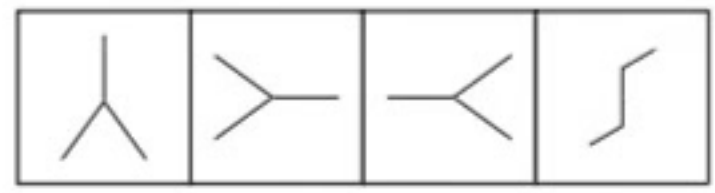
5.





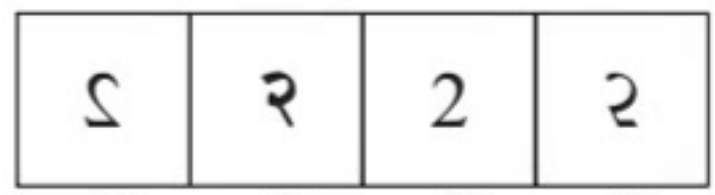
(1) (2) (3) (4)

6.



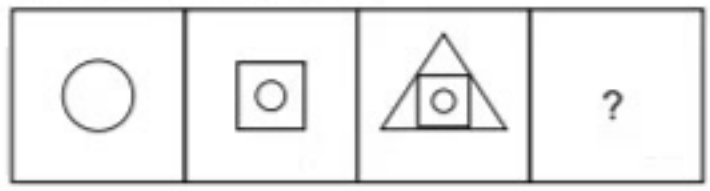
(1) (2) (3) (4)

7.

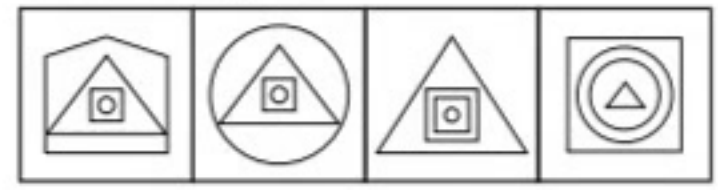


(1) (2) (3) (4)

8. Question Figures

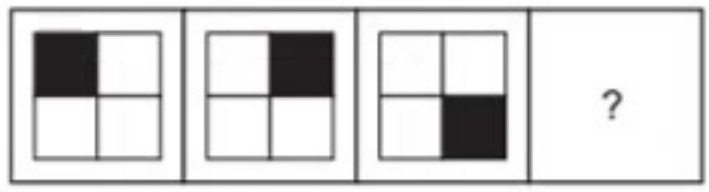


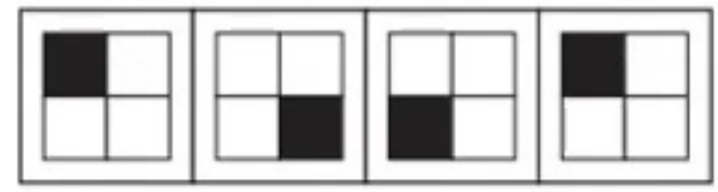
Answer Figures



(1) (2) (3) (4)

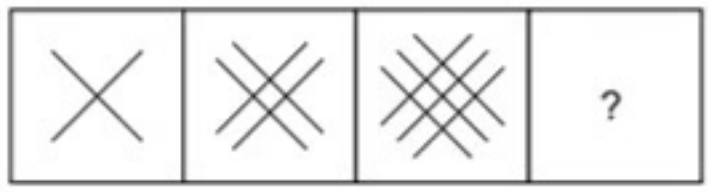
9.

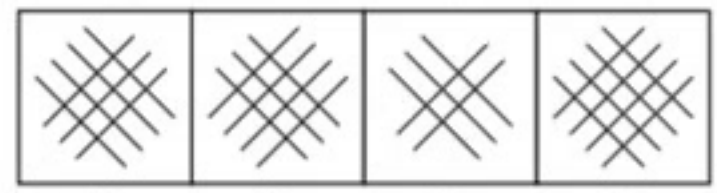




(1) (2) (3) (4)

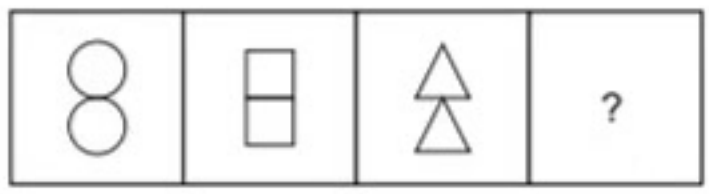
10.





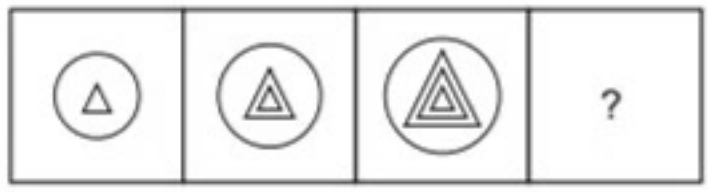
(1) (2) (3) (4)

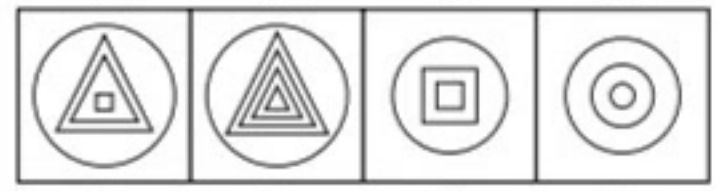
11.



(1) (2) (3) (4)

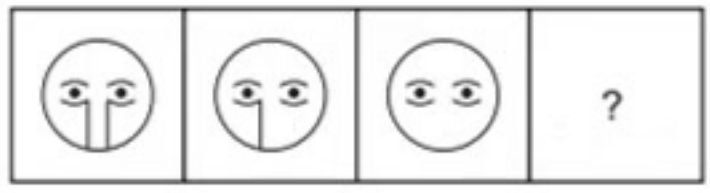
12.

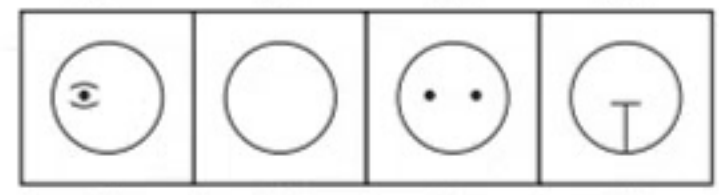




(1) (2) (3) (4)

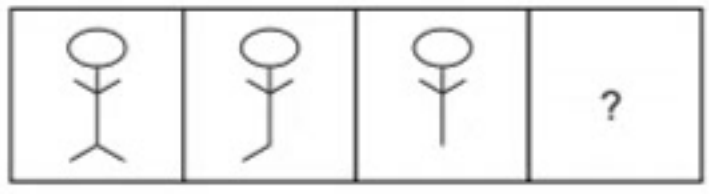
13.

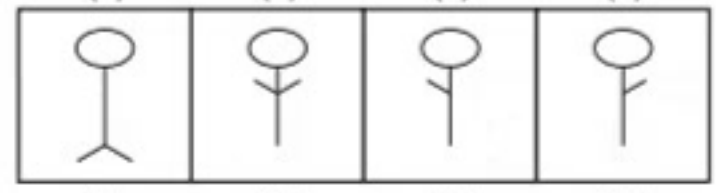




(1) (2) (3) (4)

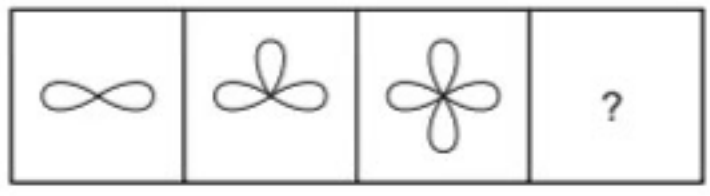
14.

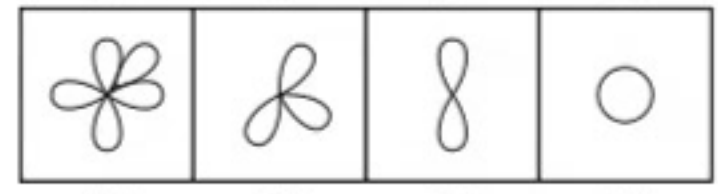




(1) (2) (3) (4)

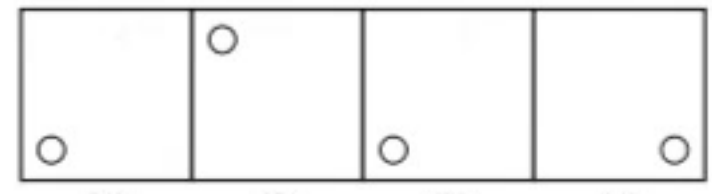
15.





(1) (2) (3) (4)

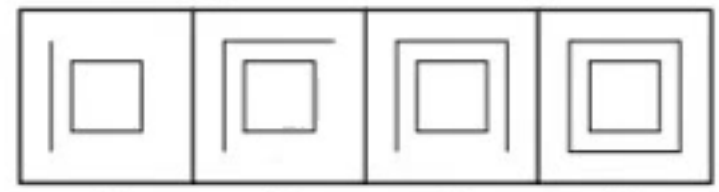
16.



(1) (2) (3) (4)

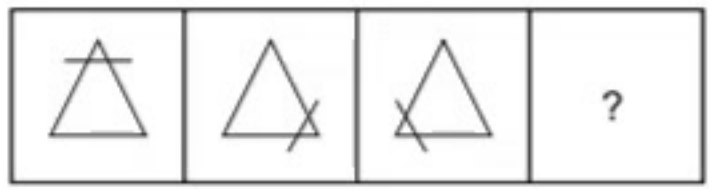
17. Question Figures

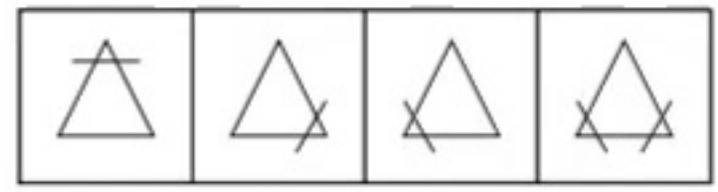
Answer Figures



(1) (2) (3) (4)

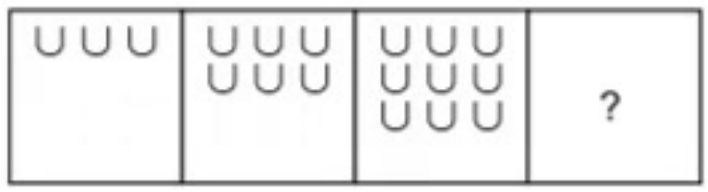
18.





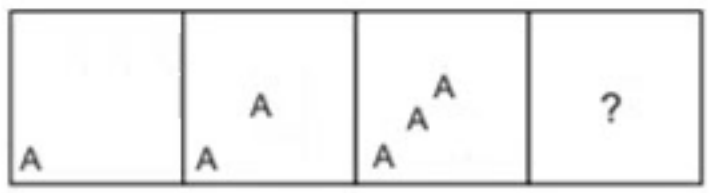
(1) (2) (3) (4)

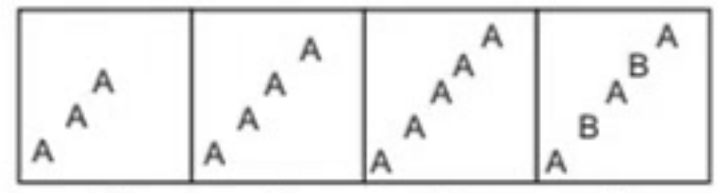
19.



(1) (2) (3) (4)

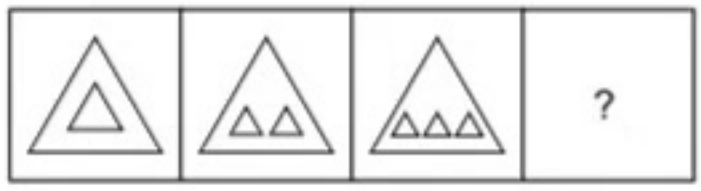
20.

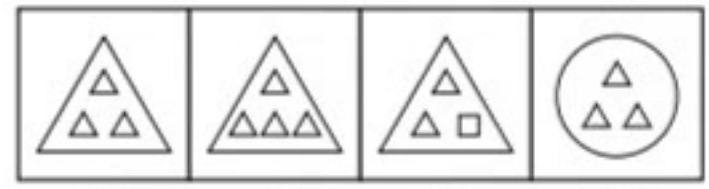




(1) (2) (3) (4)

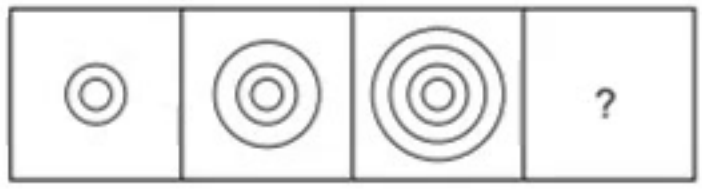
21.

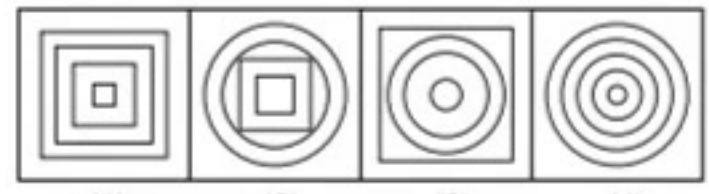




(1) (2) (3) (4)

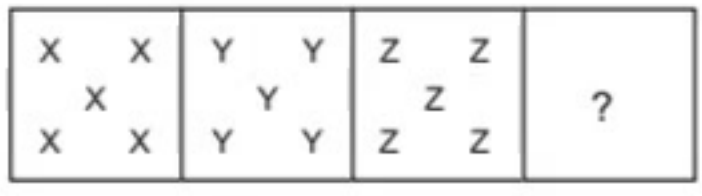
22.

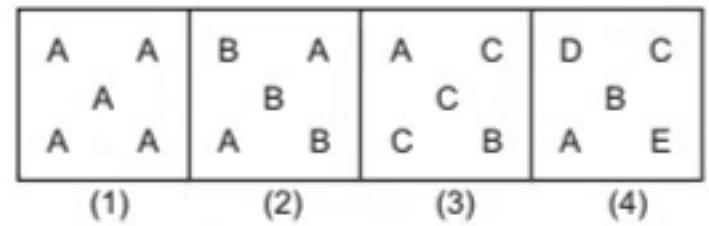




(1) (2) (3) (4)

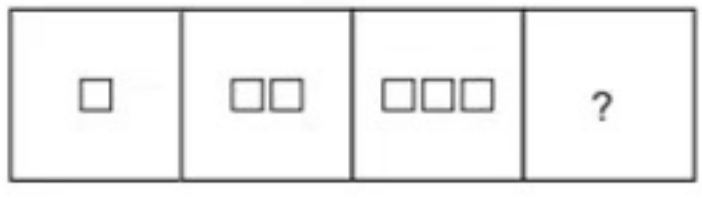
23.

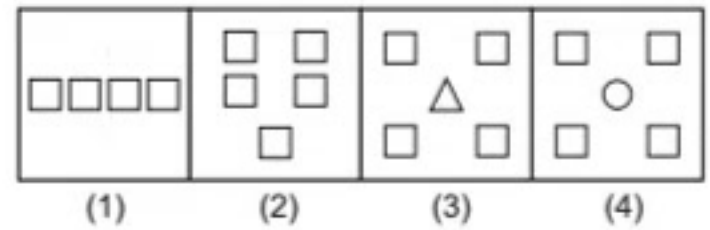




(1) (2) (3) (4)

24.





(1) (2) (3) (4)

Answers

1 (2)	**2** (3)	**3** (1)	**4** (3)	**5** (2)	**6** (1)	**7** (1)	**8** (1)	**9** (3)	**10** (4)
11 (1)	**12** (2)	**13** (1)	**14** (3)	**15** (1)	**16** (4)	**17** (1)	**18** (1)	**19** (4)	**20** (2)
21 (2)	**22** (4)	**23** (1)	**24** (1)						

CHAPTER

05

ANALOGY

Analogy refers to 'correspondence' or similarity. It is also known as relationship test. In this type, the question figure consists of two sets. Each set has two frames separated by the sign of colon (:). The second set is separated by the sign of (::) from first set. The figures in the first set bear a certain relationship with each other. You have to choose, from the set of answer figures one figure bearing the same relationship to the third figure as there is in the first part of two figures.

Students, while solving these questions must kept following points in mind.

- Look carefully the shape of designs.
- Analyse the rotation of designs.
- Look the mirror image of designs.
- Look carefully the side of designs.
- Look carefully the addition/deletion of designs.
- Look the replacement and rearrangement of designs.

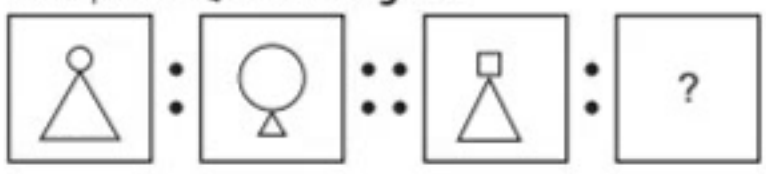
In this chapter, the changes between figures are based on following

- Based on size
- Based on position change
- Based on number of side
- Based on rotation

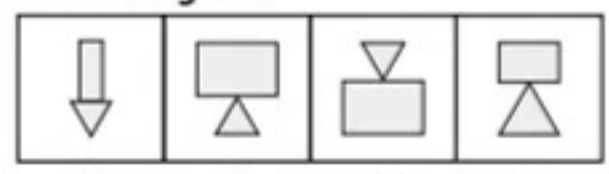
Type I Based on Size

In this type, larger design becomes smaller and smaller design becomes larger.

Example **1. Question Figures**



Answer Figures



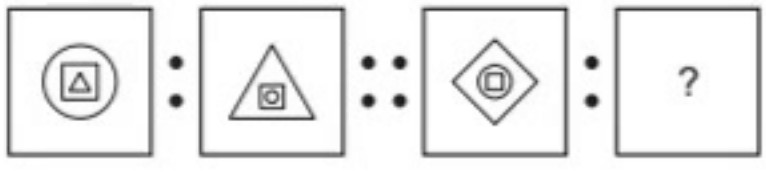
(1) (2) (3) (4)

Sol. (2) From question figure (1) to (2) bottom large design becomes small and upper small design becomes large. Similar rule will follow from the question figure (3) to answer figure (2).

Type II Based on Position Change

In this type, the shapes change their positions with each other.

Example **2. Question Figures**



Answer Figures

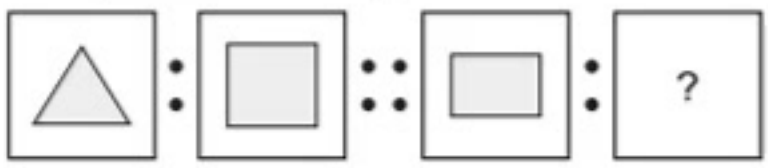
(1) (2) (3) (4)

Sol. (1) From question figure first to second, the innermost shape becomes outermost and the outermost shape becomes innermost. The middle figure has no change. Hence, following the same pattern answer figure (2) will complete the second pair.

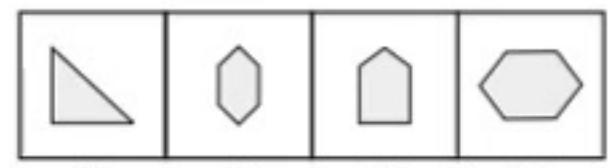
Type III Based on Number of Sides

In this type, the number of sides of geometrical figure increases or decreases.

Example **3. Question Figures**



Answer Figures



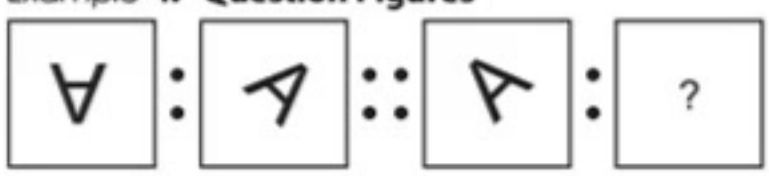
(1) (2) (3) (4)

Sol. **(3)** From question figure (1) to (2), triangle becomes square one i.e. one side increases. Similar, rule will follow from question figure (3) to answer figure (3).

Type IV Based on Rotation

In this type, designs rotate through a certain angle either in clockwise direction or in anti-clockwise direction.

Example **4. Question Figures**



Answer Figures

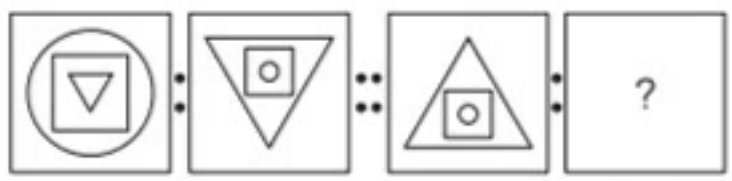
(1) (2) (3) (4)

Sol. **(4)** From question figure (1) to (2), whole design rotates 135° in anti-clockwise direction. Similar rule will follow from question figure (3) to answer figure (4).

Entrance Corner

Directions (Q. Nos. 1-34) *In the following questions, the first two figures in the question figures are related to each other in same way. The same relationship holds between the third figure of the question figure and one of the answer figures* 1, 2, 3 *and* 4. *Identify the figure, which can replace the question mark(?).*

1. Question Figures

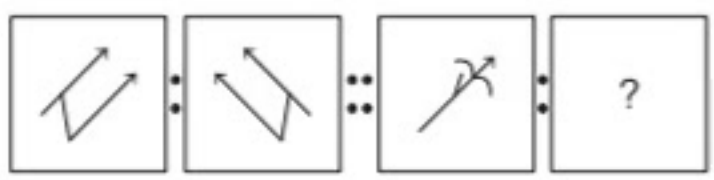


[JNV 2019]

Answer Figures

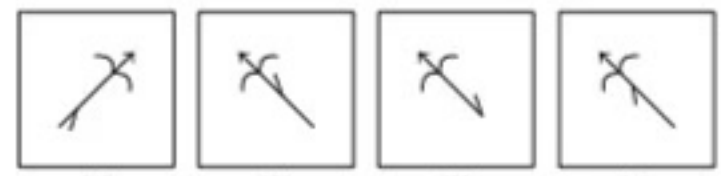
(1) (2) (3) (4)

2. Question Figures



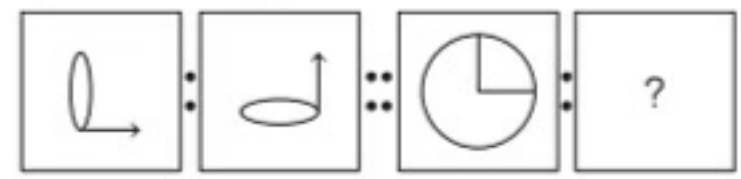
[JNV 2019]

Answer Figures



(1) (2) (3) (4)

3. Question Figures

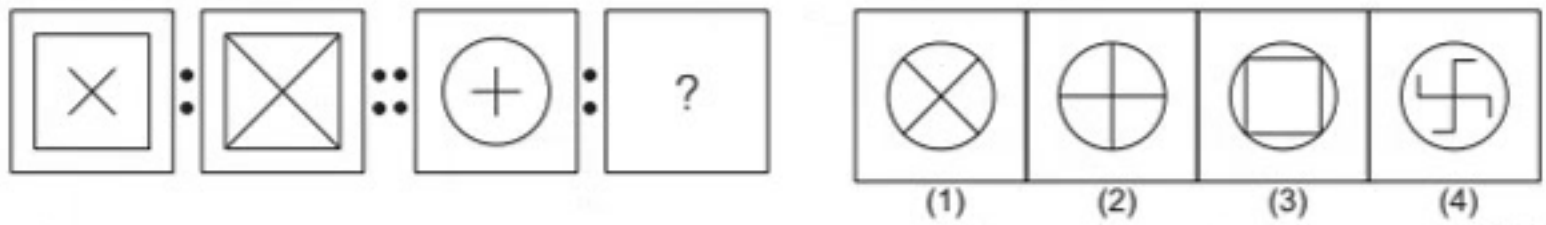


[JNV 2019]

Answer Figures

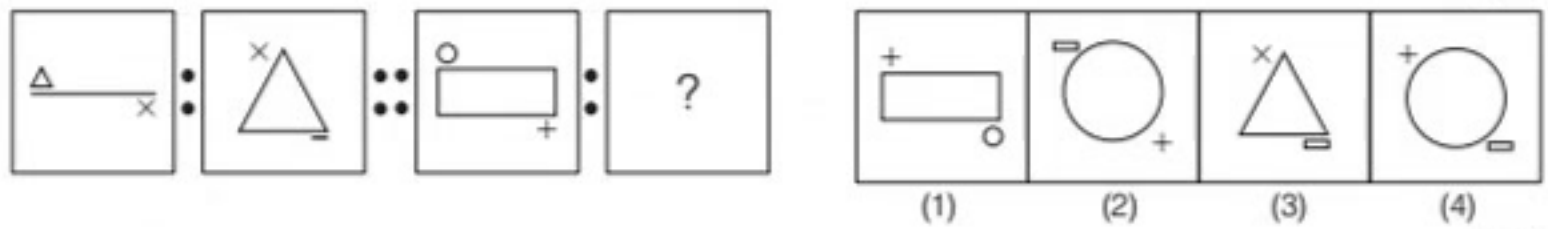
(1) (2) (3) (4)

4. Question Figures **Answer Figures**



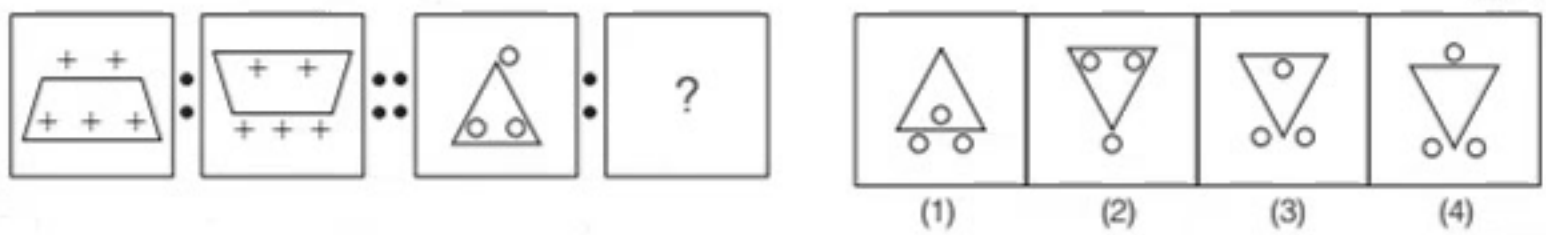
[JNV 2019]

5.



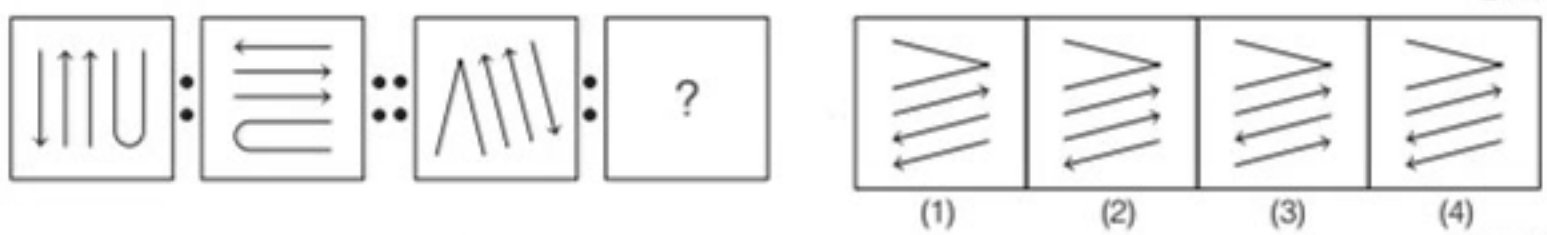
[JNV 2018]

6.



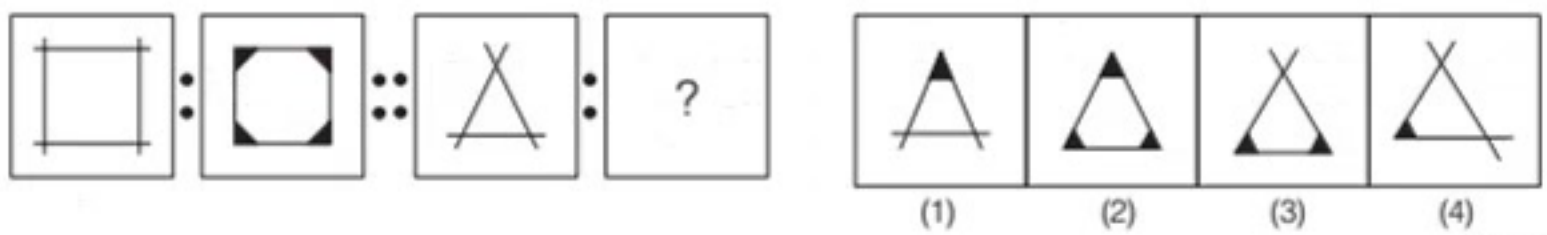
[JNV 2018]

7.



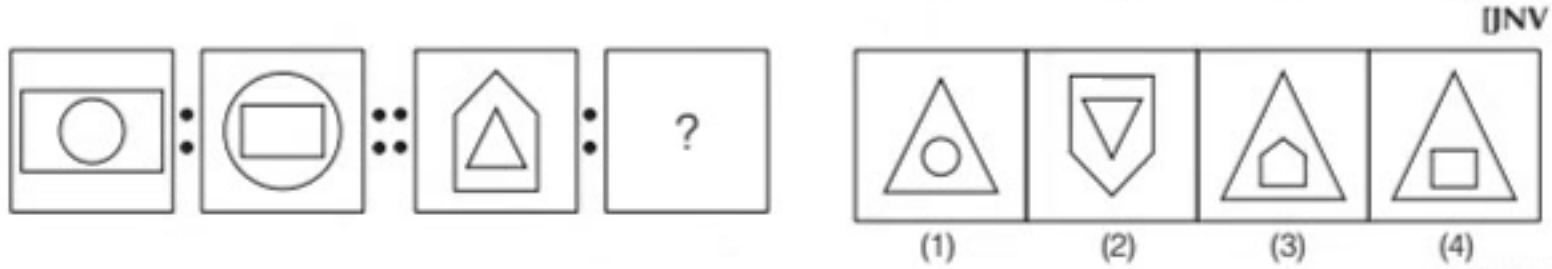
[JNV 2018]

8.



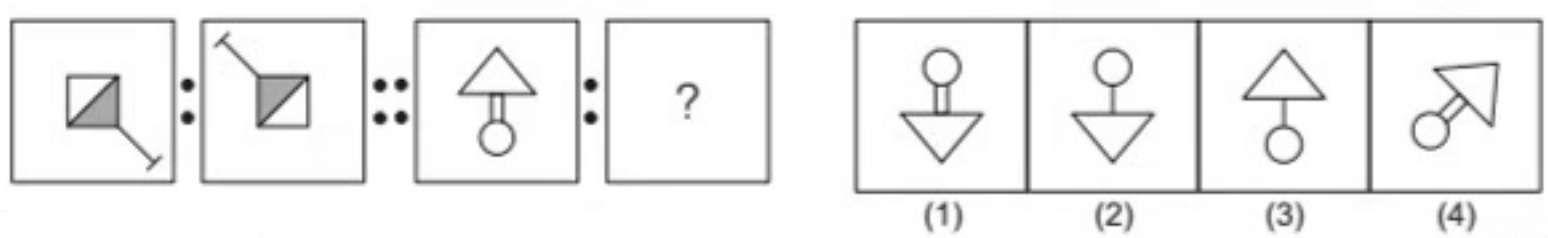
[JNV 2018]

9.



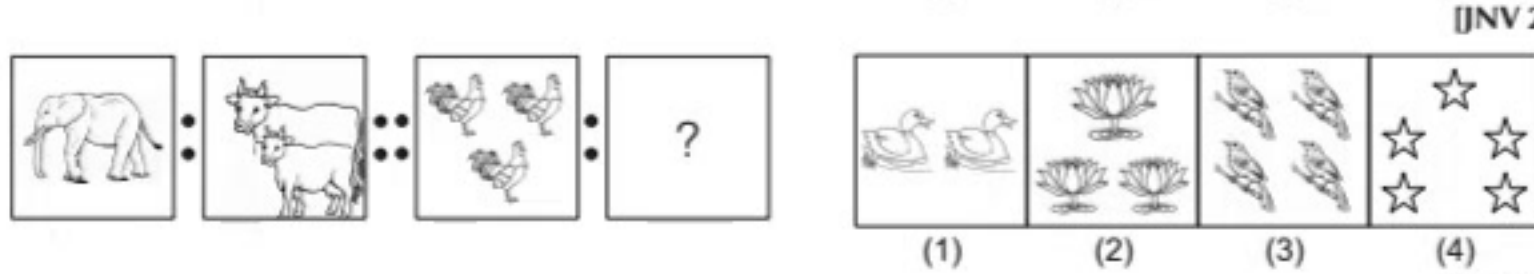
[JNV 2018]

10.



[JNV 2017]

11.



[JNV 2017]

12. **Questions Figures** **Answer Figures**

(1) (2) (3) (4)

[JNV 2017]

13.

(1) (2) (3) (4)

[JNV 2016]

14.

(1) (2) (3) (4)

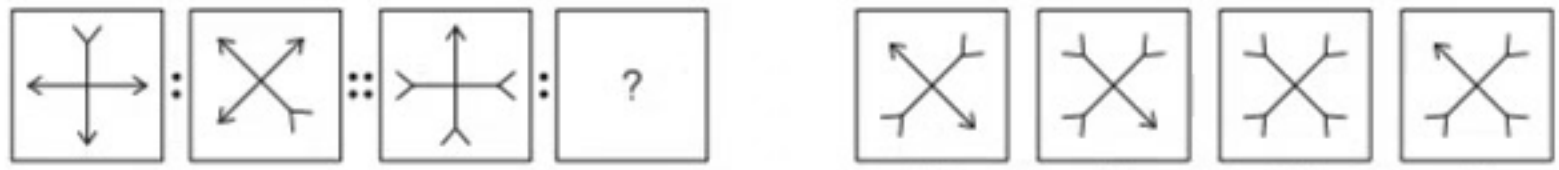
[JNV 2016]

15.

(1) (2) (3) (4)

[JNV 2016]

16.



(1) (2) (3) (4)

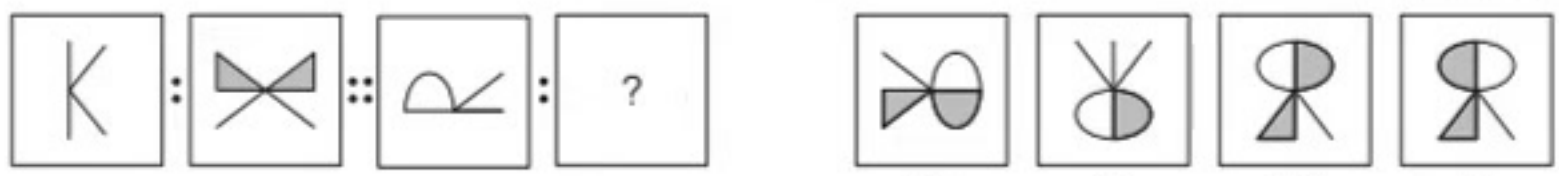
[JNV 2015]

17.

(1) (2) (3) (4)

[JNV 2015]

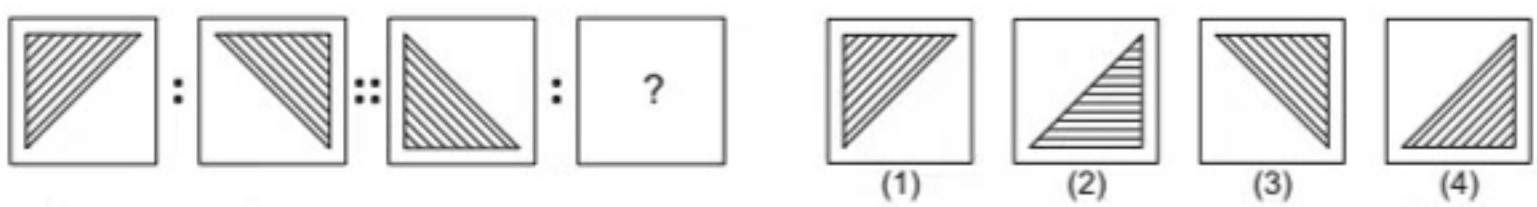
18.



(1) (2) (3) (4)

[JNV 2015]

19.



(1) (2) (3) (4)

[JNV 2014]

13. Problem Figures **Answer Figures**

(1) (2) (3) (4)

[JNV 2016]

14.

(1) (2) (3) (4)

[JNV 2016]

15.

(1) (2) (3) (4)

[JNV 2016]

16.

(1) (2) (3) (4)

[JNV 2015]

17.

(1) (2) (3) (4)

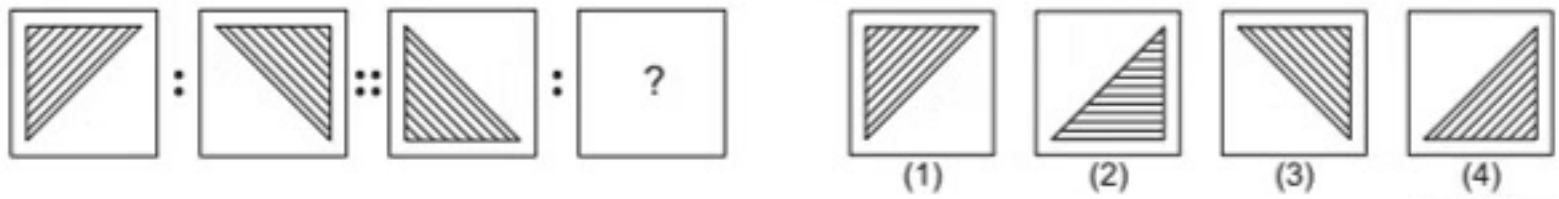
[JNV 2015]

18.

(1) (2) (3) (4)

[JNV 2015]

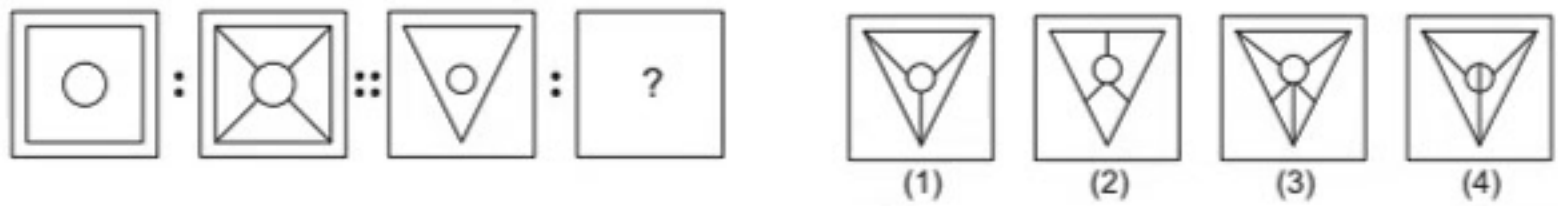
19.



(1) (2) (3) (4)

[JNV 2014]

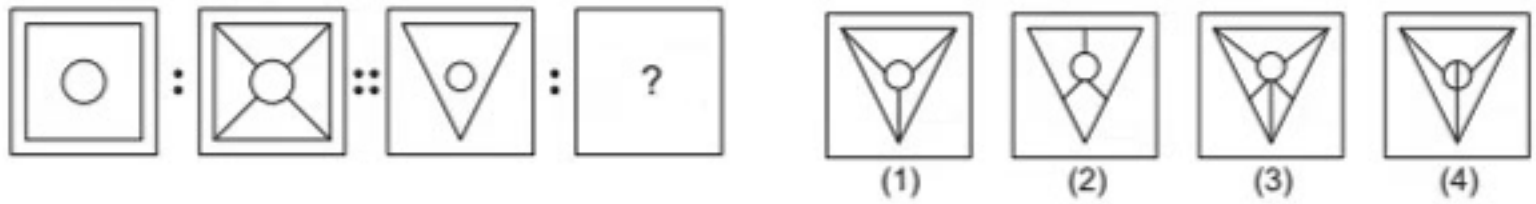
20.



(1) (2) (3) (4)

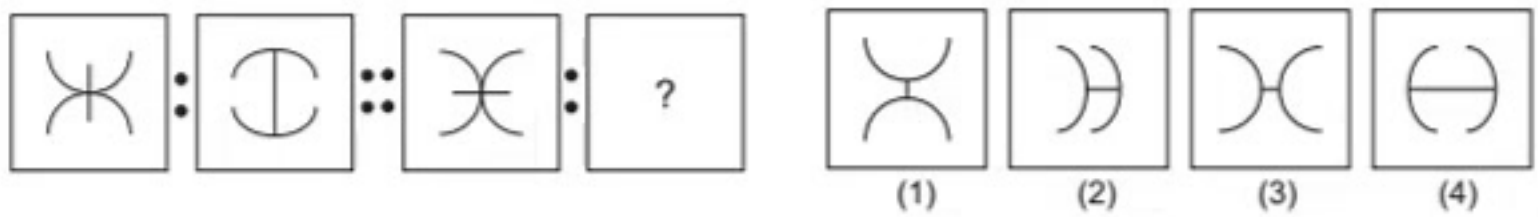
[JNV 2014]

20. Questions Figures **Answer Figures**



[JNV 2014]

21.

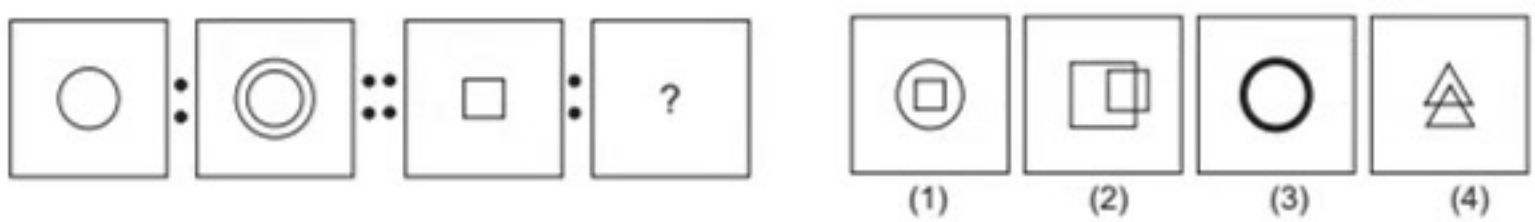


[JNV 2013]

22.

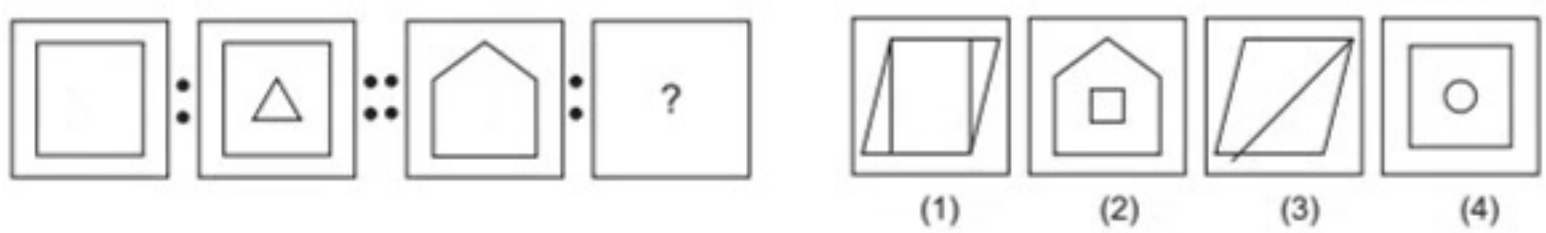
[JNV 2013]

23.



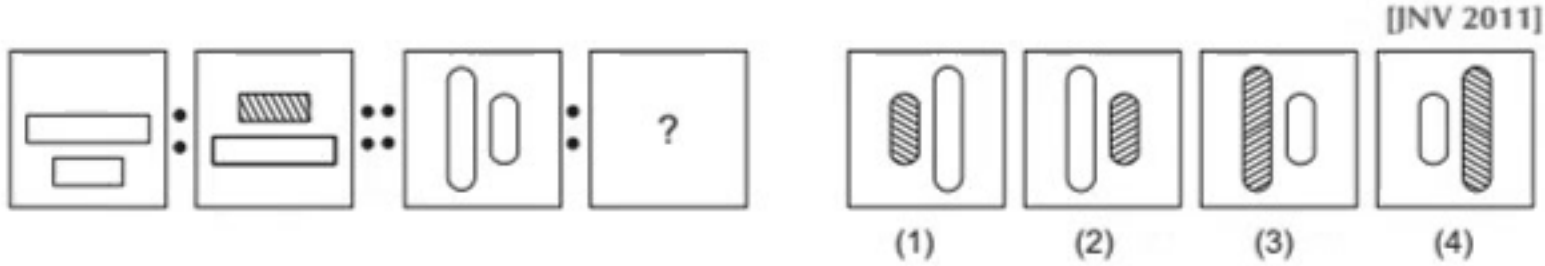
[JNV 2012]

24.



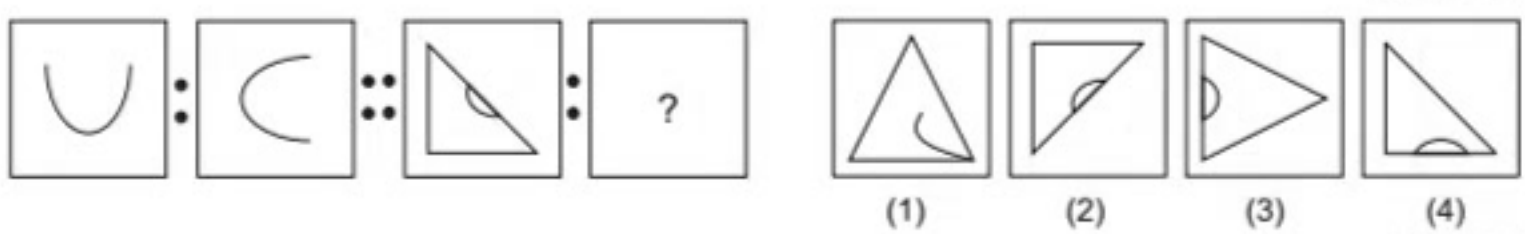
[JNV 2011]

25.



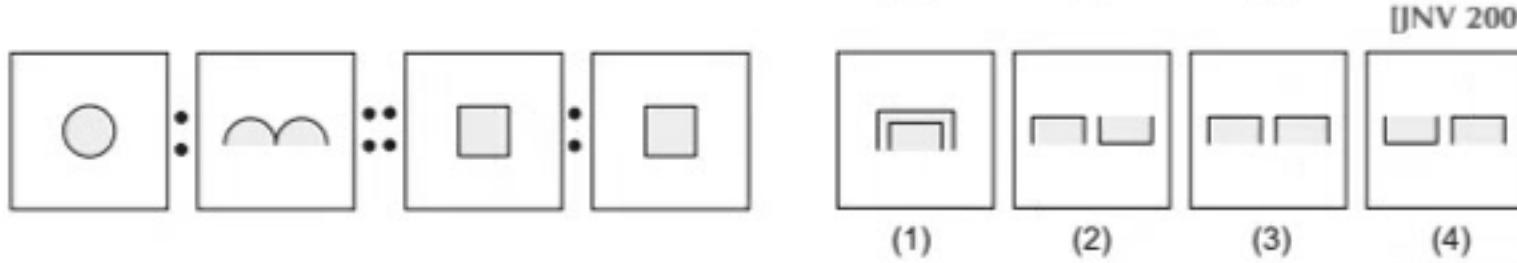
[JNV 2010]

26.



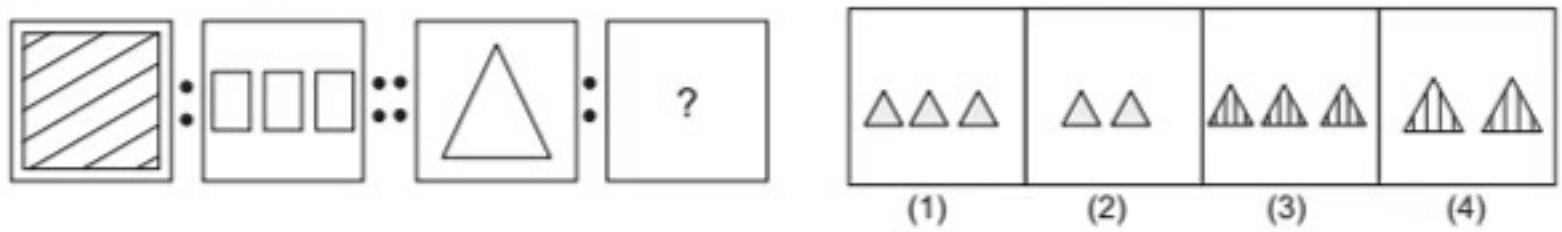
[JNV 2009]

27.



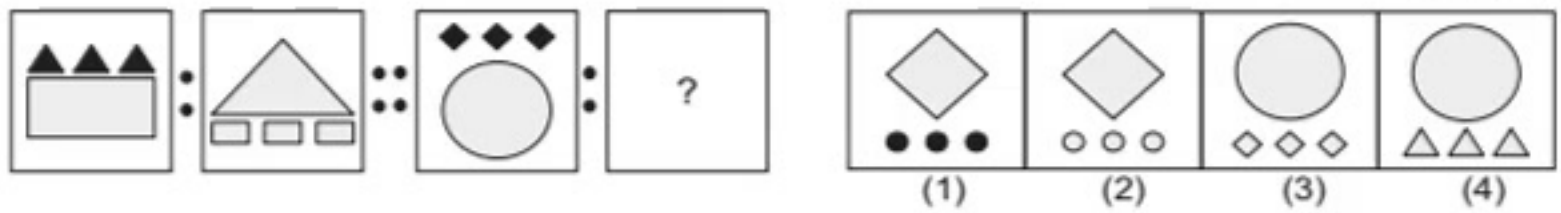
[JNV 2008]

28. Questions Figures **Answer Figures**



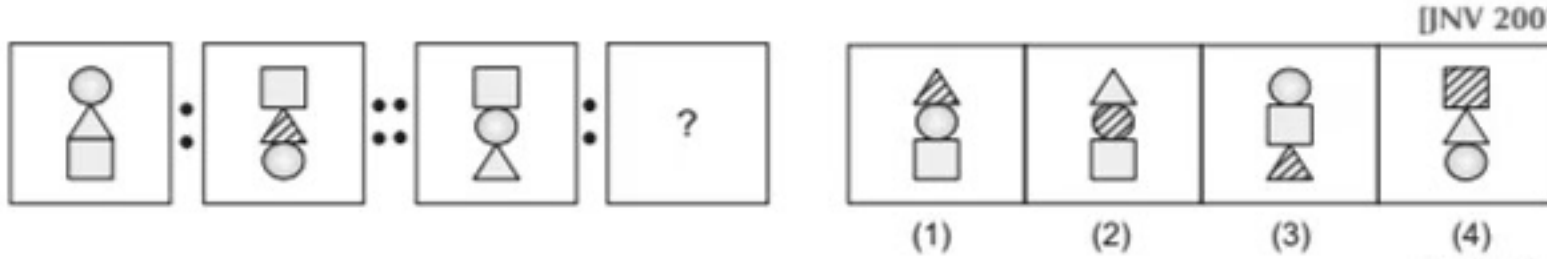
[JNV 2007]

29



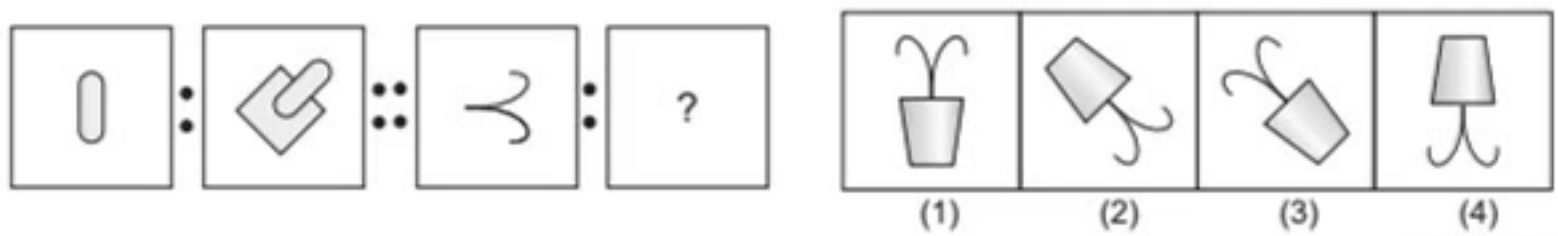
[JNV 2007]

30.



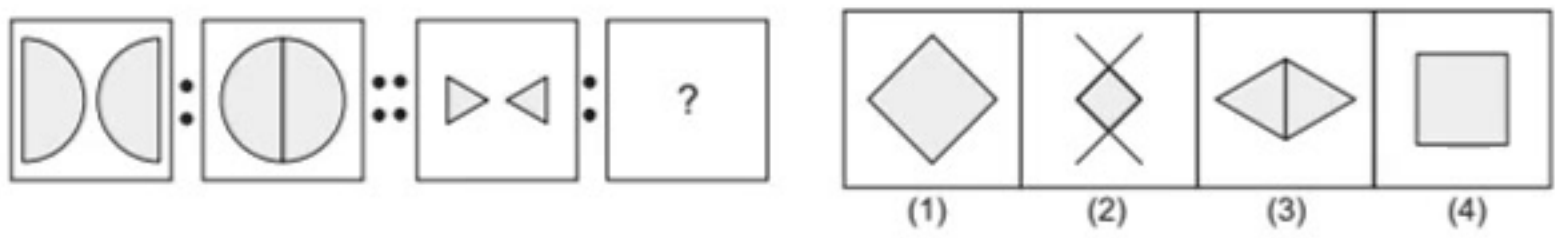
[JNV 2005]

31.



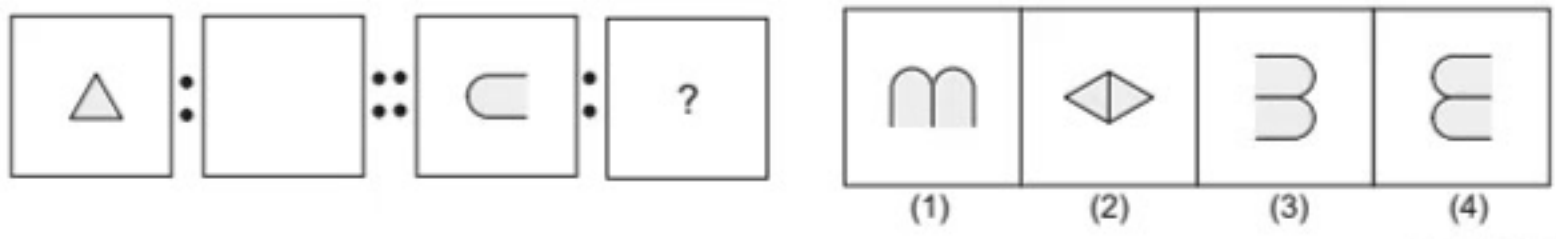
[JNV 2004]

32.



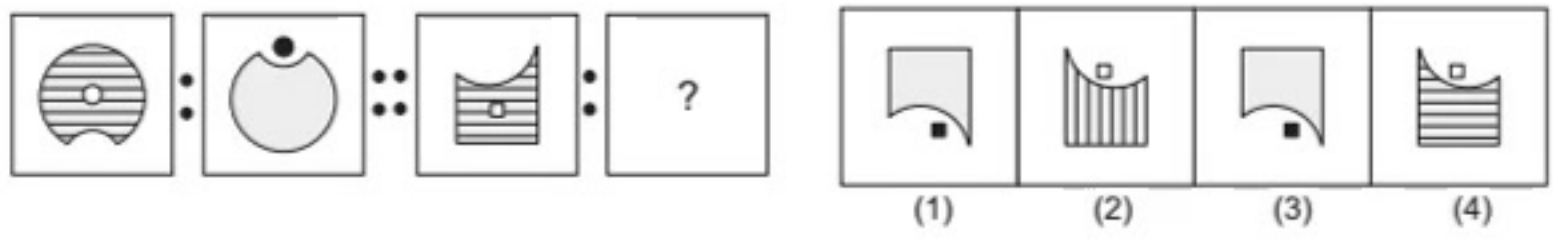
[JNV 2003]

33.



[JNV 2002]

34.



Answers

1 *(3)*	**2** *(2)*	**3** *(4)*	**4** *(2)*	**5** *(4)*	**6** *(3)*	**7** *(2)*	**8** *(2)*	**9** *(3)*	**10** *(1)*
11 *(3)*	**12** *(4)*	**13** *(4)*	**14** *(1)*	**15** *(3)*	**16** *(2)*	**17** *(2)*	**18** *(4)*	**19** *(4)*	**20** *(1)*
21 *(4)*	**22** *(1)*	**23** *(2)*	**24** *(2)*	**25** *(1)*	**26** *(2)*	**27** *(3)*	**28** *(3)*	**29** *(2)*	**30** *(2)*
31 *(2)*	**32** *(3)*	**33** *(4)*	**34** *(1)*						

Hints and Solutions

1. The innermost element is enlarged and becomes the outermost element. The outermost element reduces in size and becomes the inner most element. Hence, figure (3) is the correct answer.

2. Second figure is the mirror image of first figure. Hence, answer figure (2) will replace the question mark.

3. From first figure to second figure, whole figure is rotated 90° anti-clockwise. Hence, answer figure (4) is correct choice.

4. From first figure to second the inner element is enlarged. Hence, answer figure (2) is the correct choice.

5. From first figure to second, upper element enlarged and becomes the middle element, lower element becomes upper element and middle element becomes lower element.

6. From first figure to second, whole figure rotates 180° and inner designs come outside and outer designs come inside.

7. Wh ole figure rotates 90° in Clockwise direction.

8. The corners of the geometrical figure become shaded and the enlarged edges removed.

9. Inner shape becomes outer and vice-versa

10. From question figure (1) to (2), whole figure rotates through 180°, the same changes occurs from question figure (3) to answer figure (1).

11. From question figure (1) to (2), there is an increment of one design, the same changes occurs from question figure (3) to the answer figure (3).

12. From question figure (1) to (2), the two smaller lines, adjoining main figure are disappeared, same changes occur from question figure (3) to answer figure (4).

13. The design is rotating 90° in clockwise direction.

14. From question figure (1) to (2) position of figures are inter-changed. Similar, rule follows from the question figure (3) to answer figure (1).

15. From question figure (1) to (2) lines become shaded. Similar, rule will follow from the question figure (3) to answer figure (3).

16. From question figure (1) to (2), whole design rotates 135° in clockwise direction. Similar, rule follows from question figure (3) to answer figure (2).

17. From question figure (1) to (2), circle becomes smaller and shaded. Similar, rule follows from question figure (3) to answer figure (2).

18. From question figure (1) to (2), whole figure rotates 90° clockwise direction and two shaded design comes to opposite it. Similar, rule follows from question figure (3) to answer figure (4).

19. Second figure is the mirror image of first figure.

20. Likewise circle is connected to all of the corners of squares. Similarly circle will be connected to all of the vertices of triangle.

21. From curved Question figure (1) to (2) curved lines go to opposite direction and middle small line becomes large. Similar rule follows from the question figure (3) to answer figure (4).

22. Second figure is the mirror image of first figure.

23. In first pair, first figure becomes double. Similarly, this rule follows in third figure.

24. From first figure to second, a geometrical shape with a lesser edge appears inside the design in first figure.

25. From question figure (1) to (2), lower element becomes upper and shaded. Similarly answer figure (1) will be obtained from question figure (3).

26. First figure is moving 90° clockwise to get the second figure. Similarly third figure is moving 90° clockwise get the fourth figure.

27. From question figure (1) to (2) whole design divides into two parts. Similar, rule follows from the question figure (3) to answer figure (3).

28. Larger figure becomes smaller and thrice in number. Also, shaded figure becomes unshaded and vice-versa.

29. Smaller figure becomes larger and vice versa. Single figure becomes thrice and vice-versa. Also, shaded figure becomes unshaded.

30. In question figures first and second the upper figure and lower figure interchange their, positions and the middle figure becomes shaded. Answer figure (2) will occupy the blank space marked with the sign of interrogation.

31. The design is moving 45° in clockwise direction and a new larger design appears.

32. Both the half designs joined together to form a single design.

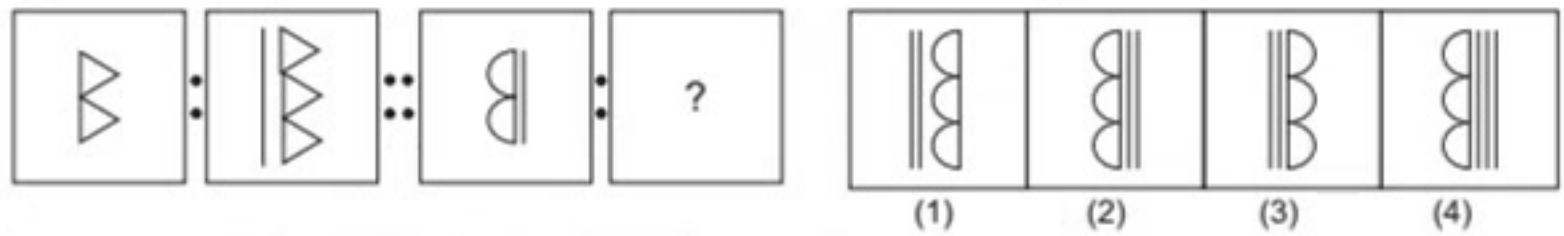
33. From first figure to second, similar design appears in opposite direction.

34. Whole figure is invested and becomes unshaded. The smaller shape inside the main figure comes outside and becomes shaded.

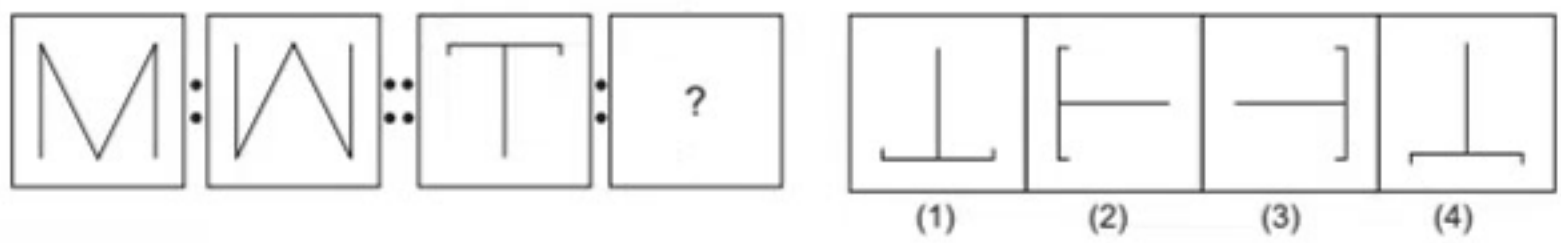
Practice Exercise

Directions (Q. Nos. 1-55) *In the following questions, the first two figures in the question figures are related to each other in same way. The same relationship holds between the third figure of the question figure and one of the answer figures* 1, 2, 3 *and* 4 *Identify the figure, which can replace the question mark*(?).

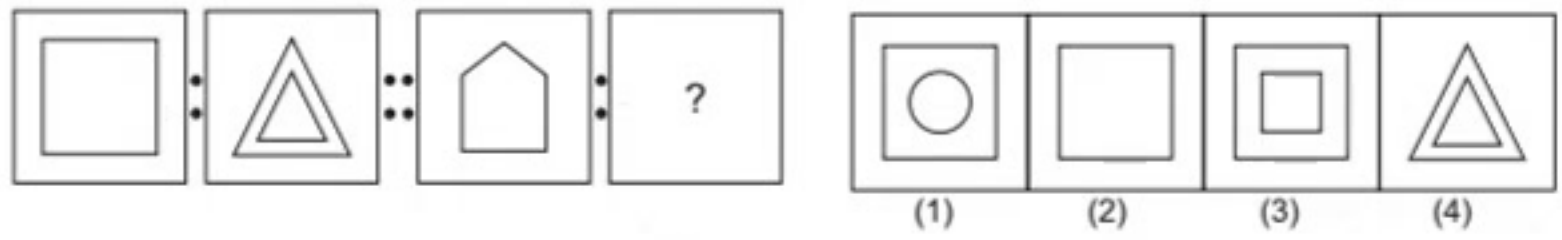
1. **Question Figures** **Answer Figures**



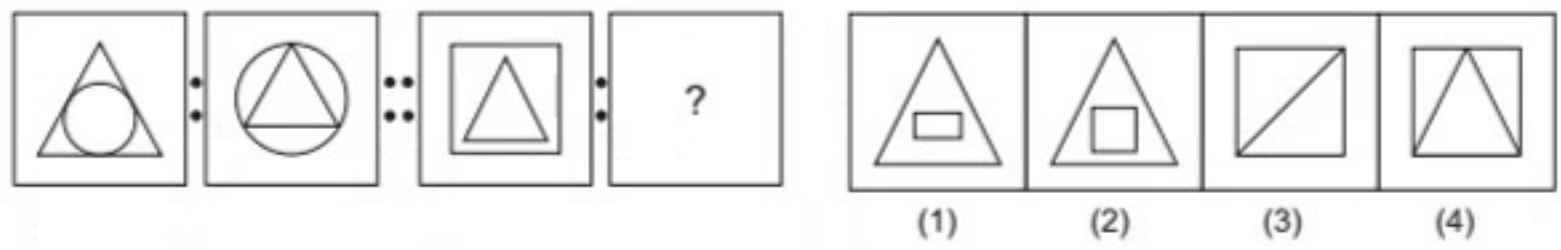
2.



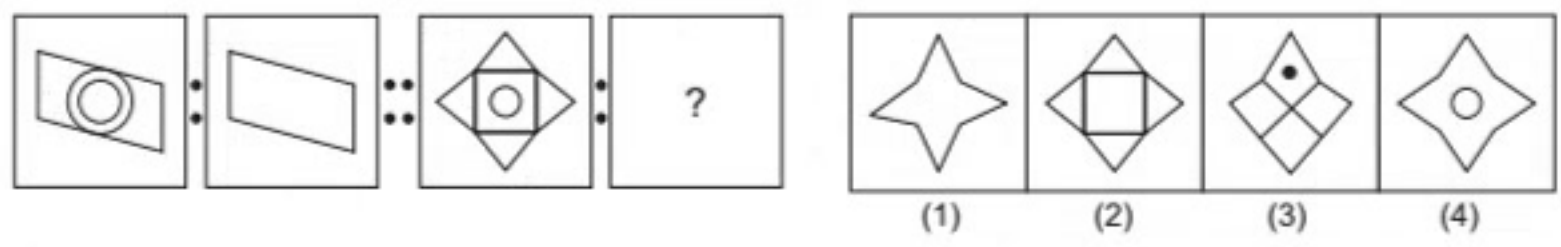
3.



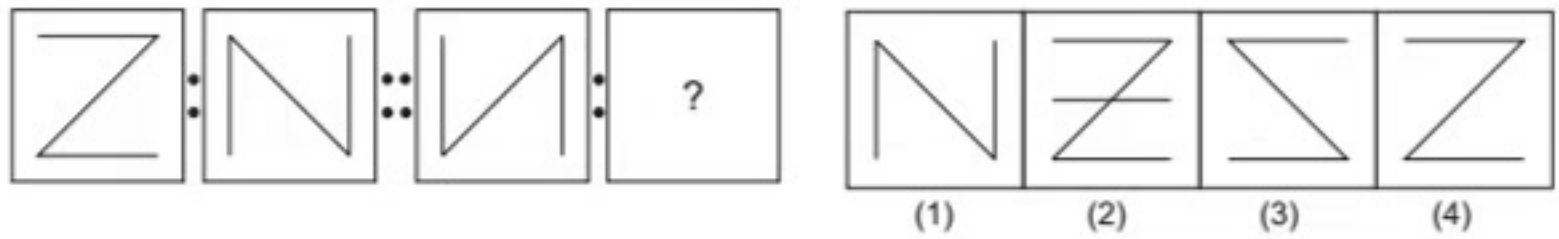
4.



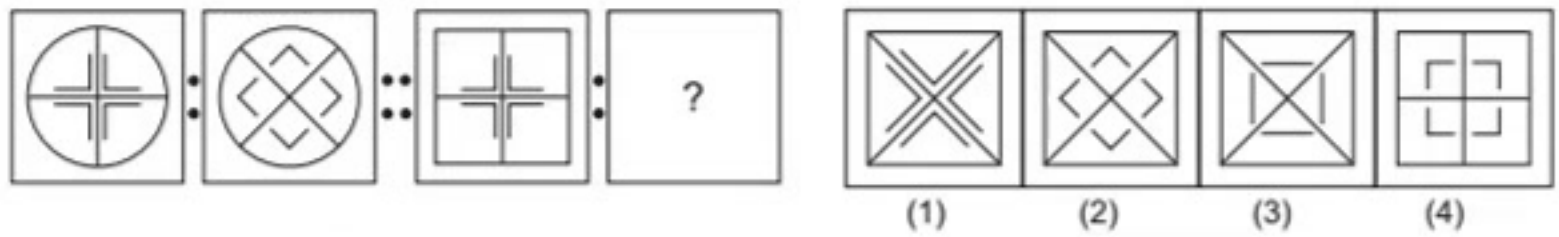
5.



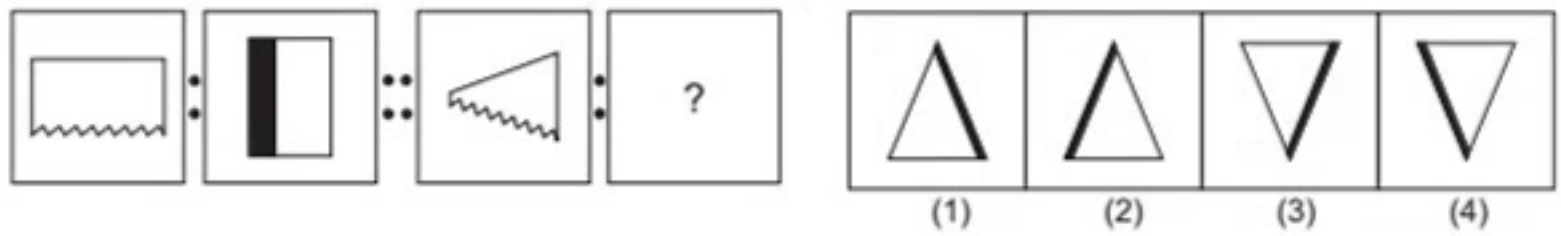
6. **Question Figures** **Answer Figures**



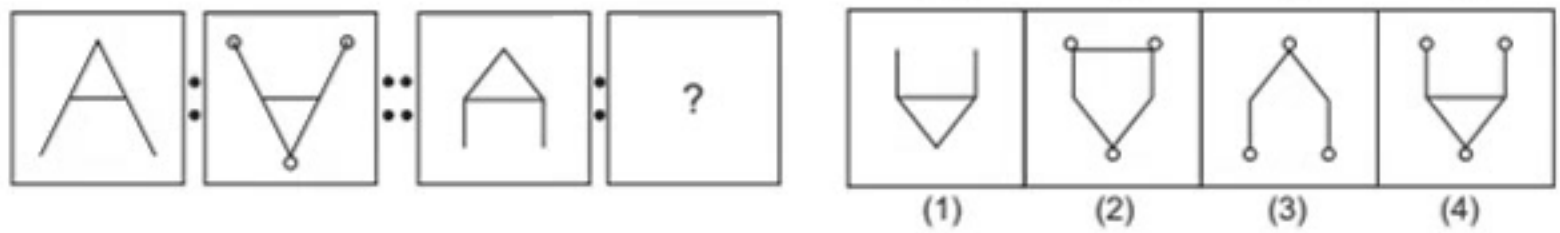
7.



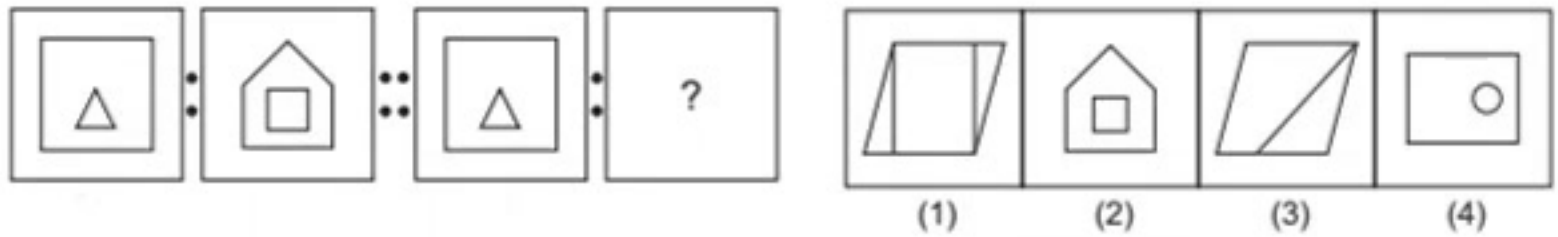
8.



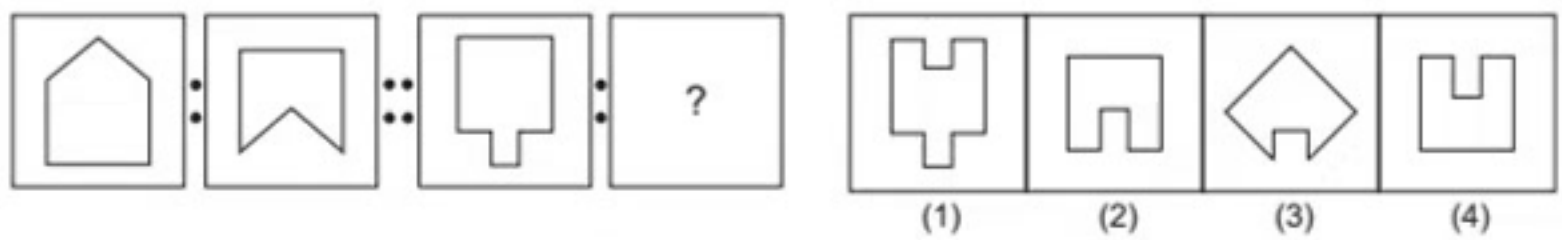
9.



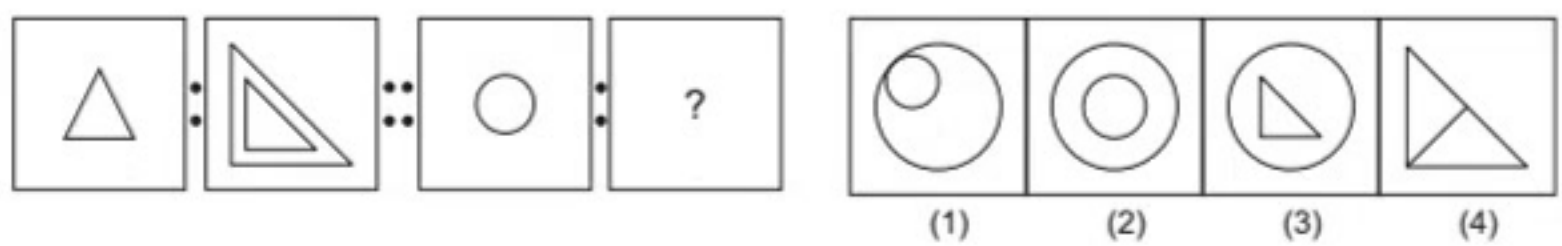
10.



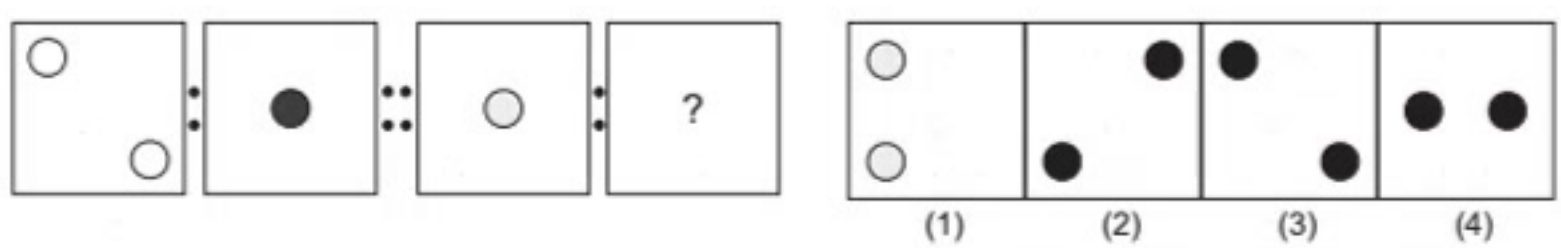
11.



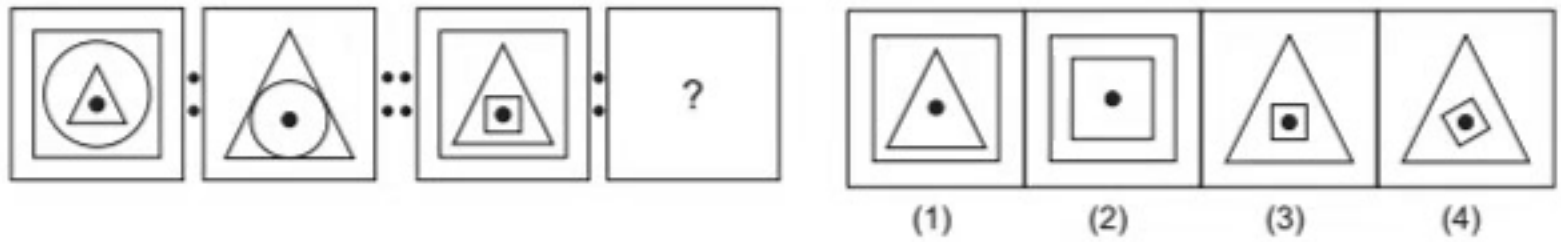
12.



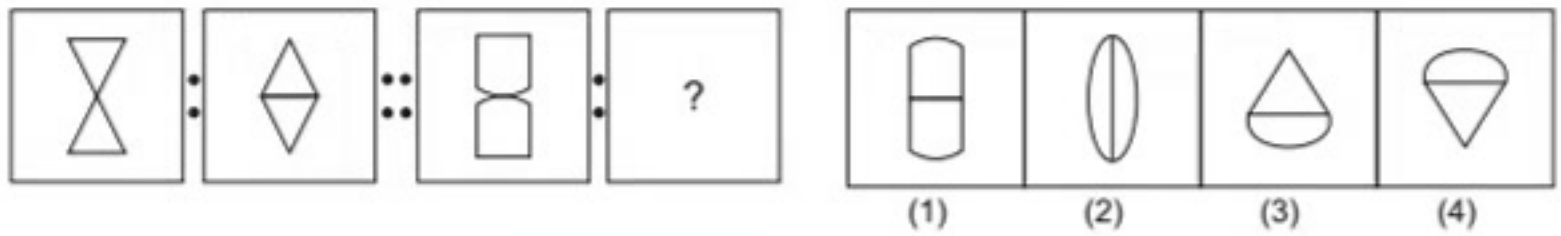
13.



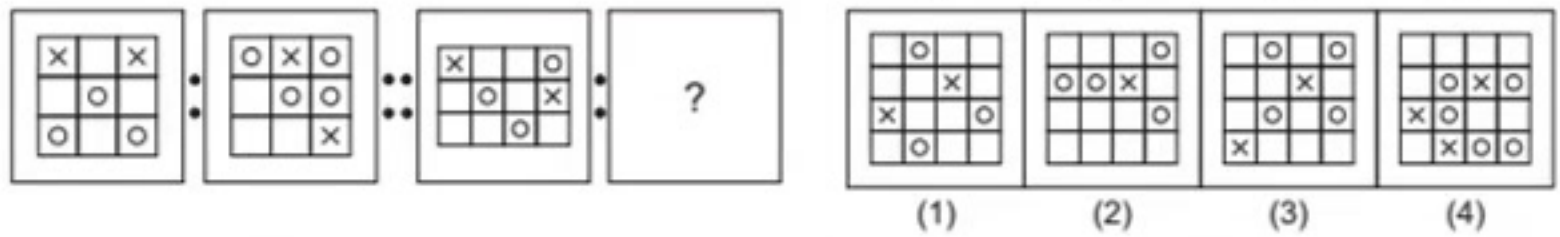
14. Question Figures **Answer Figures**



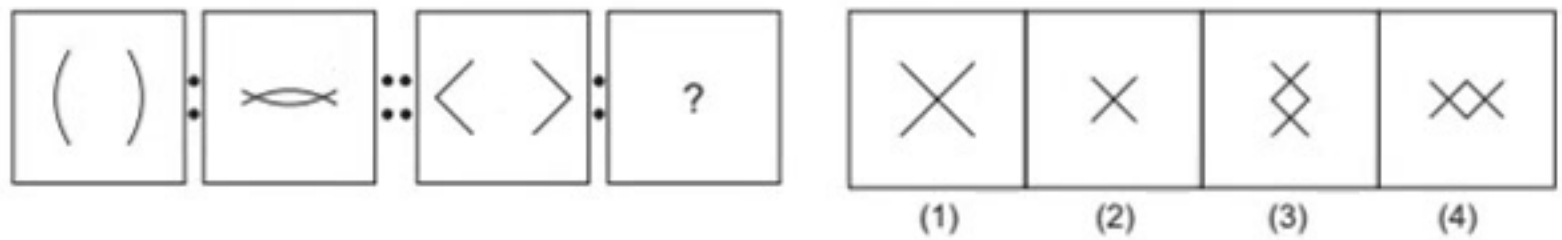
15.



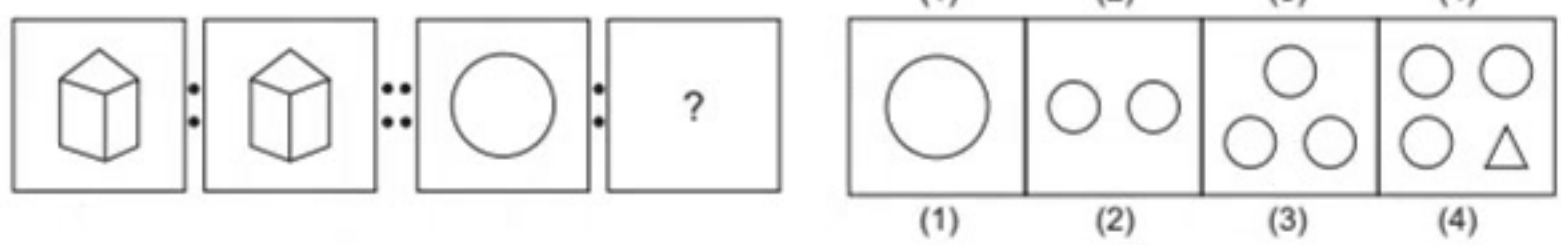
16.



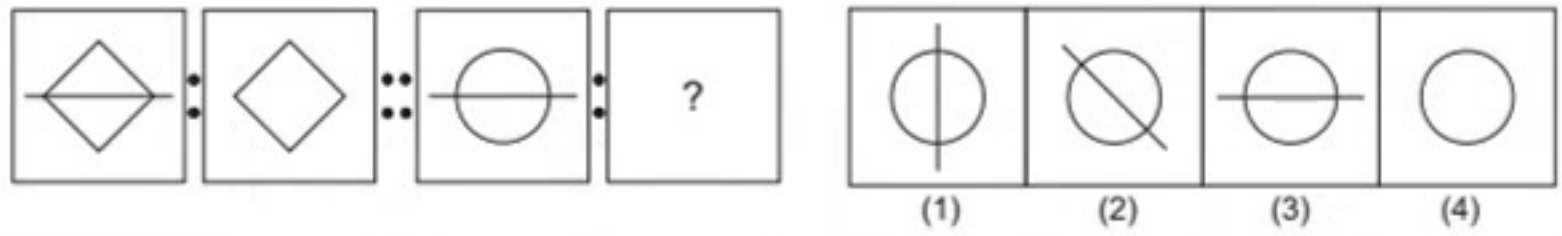
17.



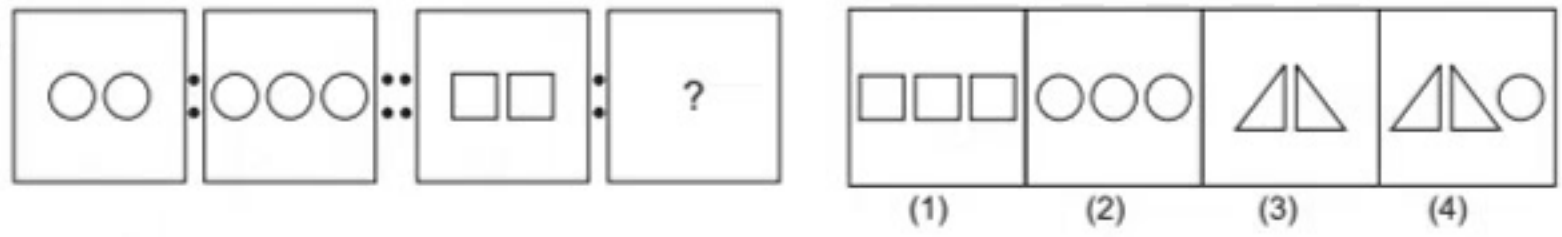
18.



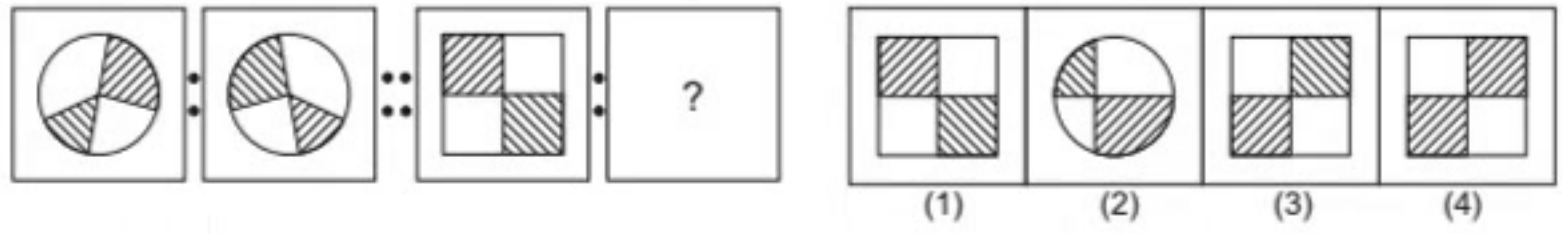
19.



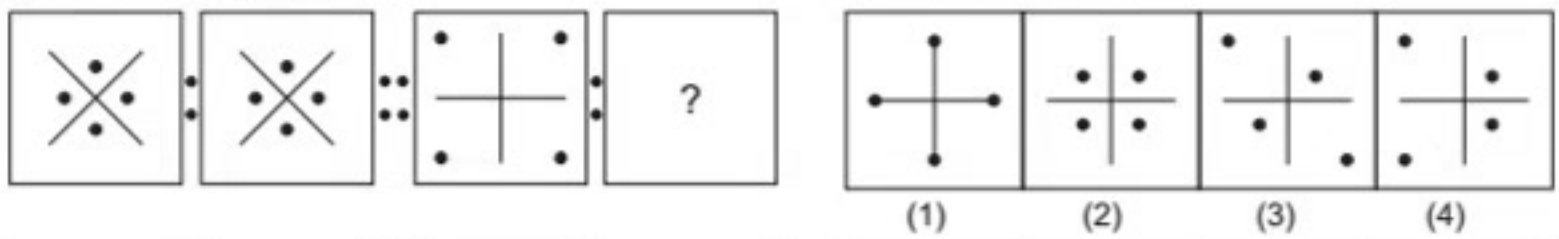
20.



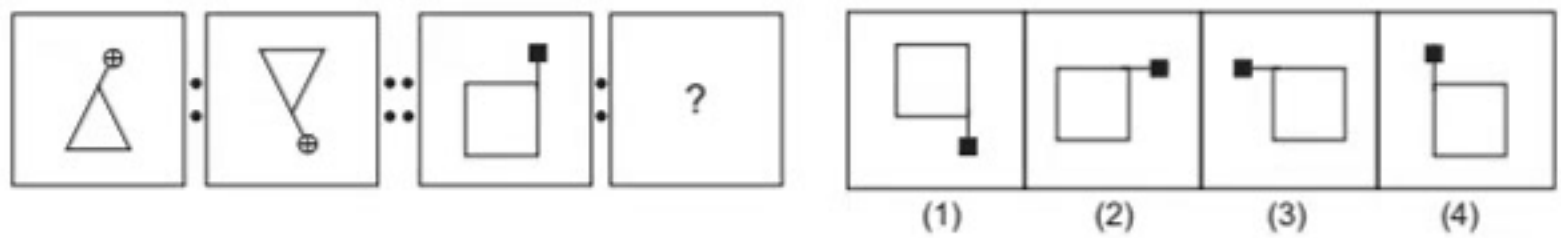
21.



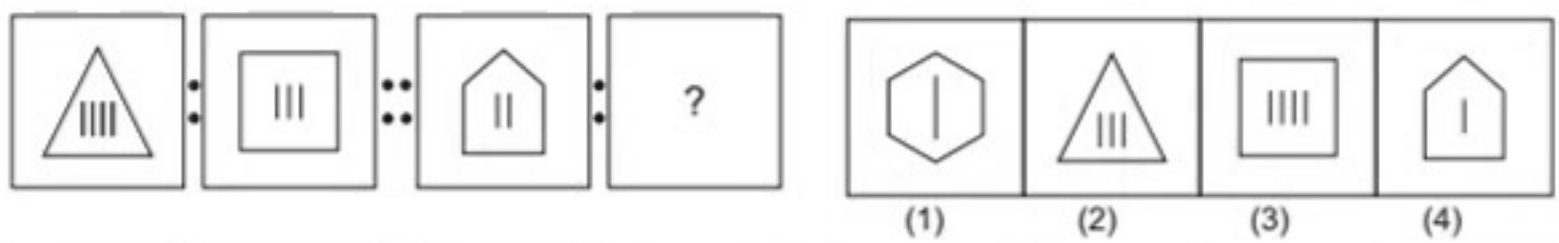
22. Question Figures **Answer Figures**



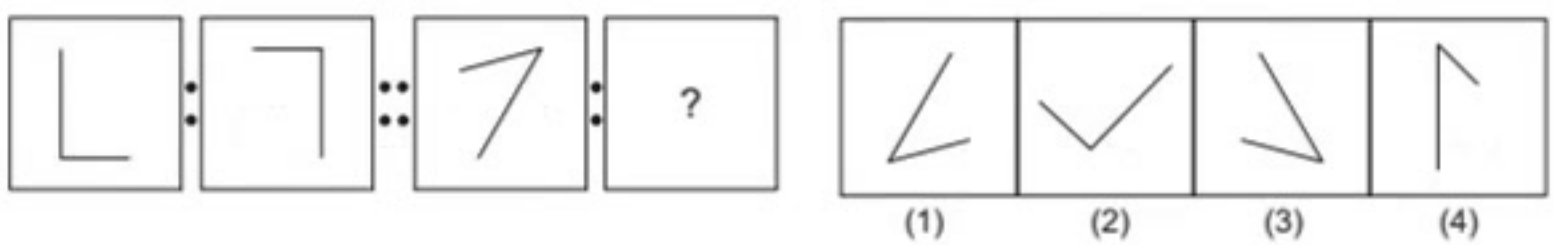
23.



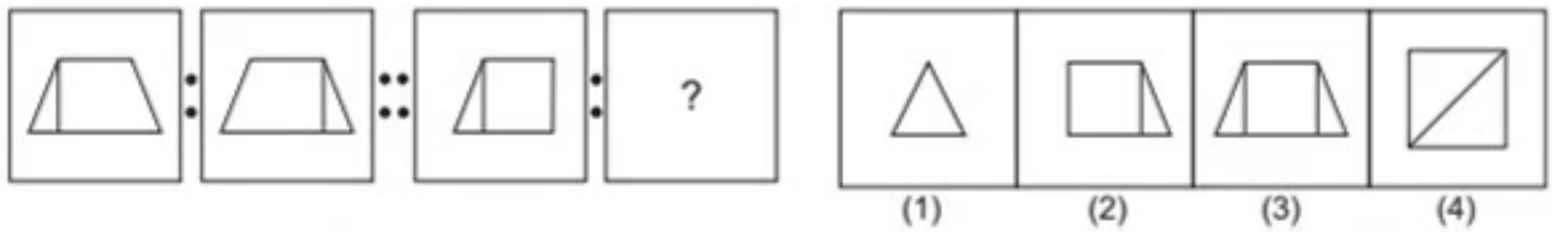
24.



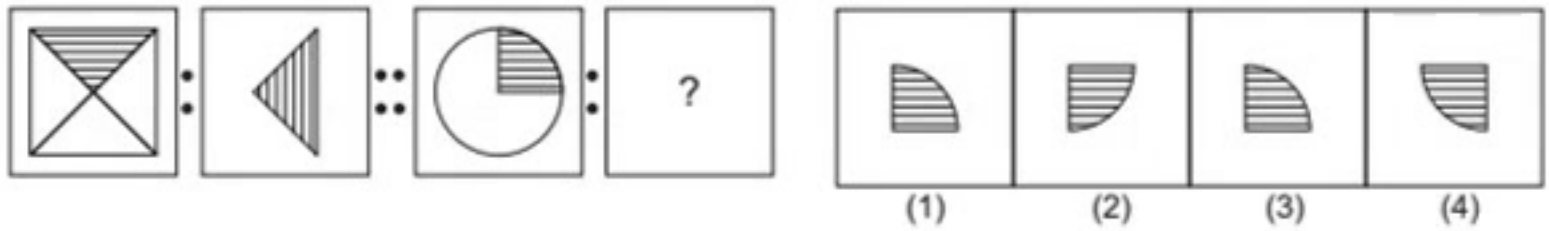
25.



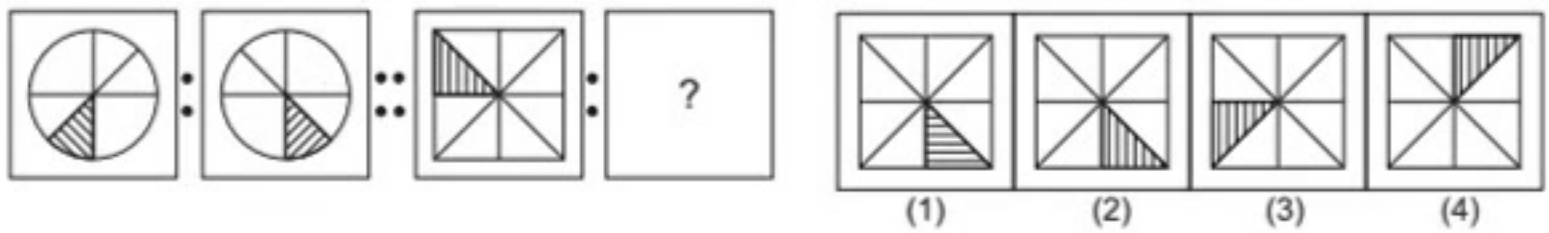
26.



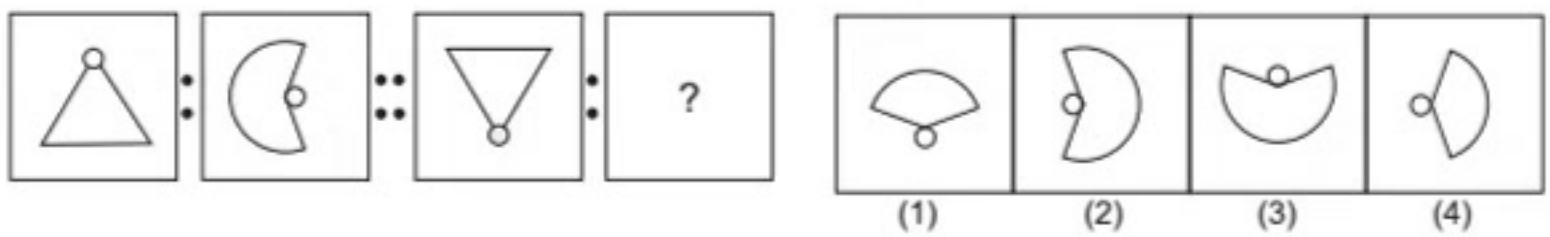
27.



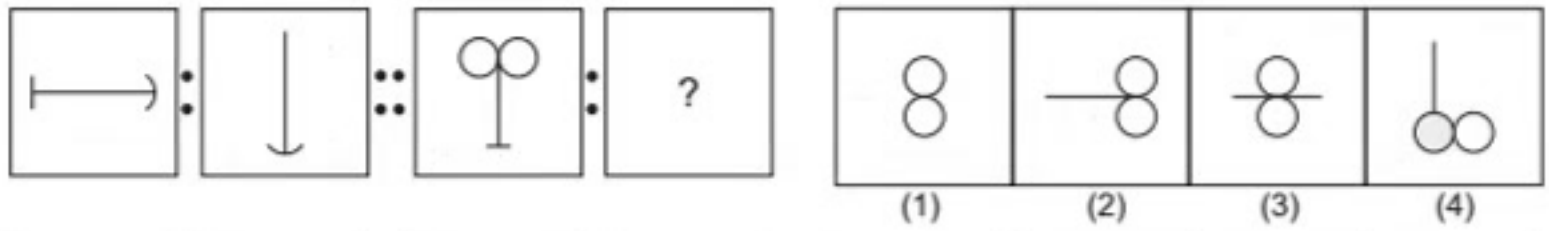
28.



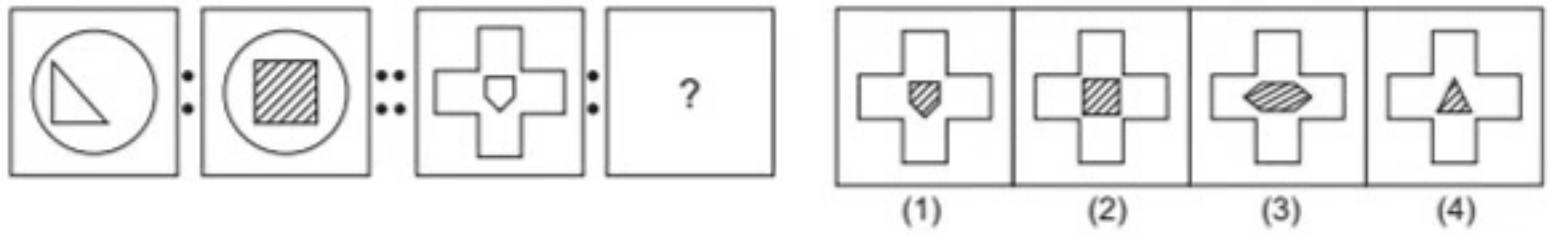
29.



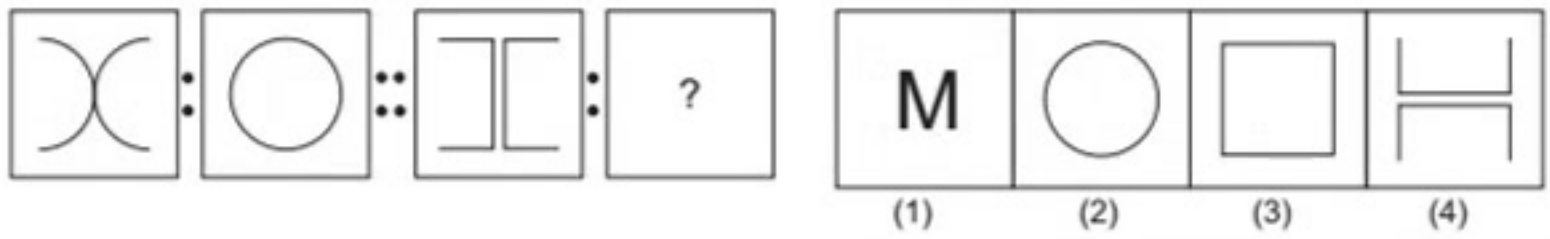
30. Question Figures **Answer Figures**



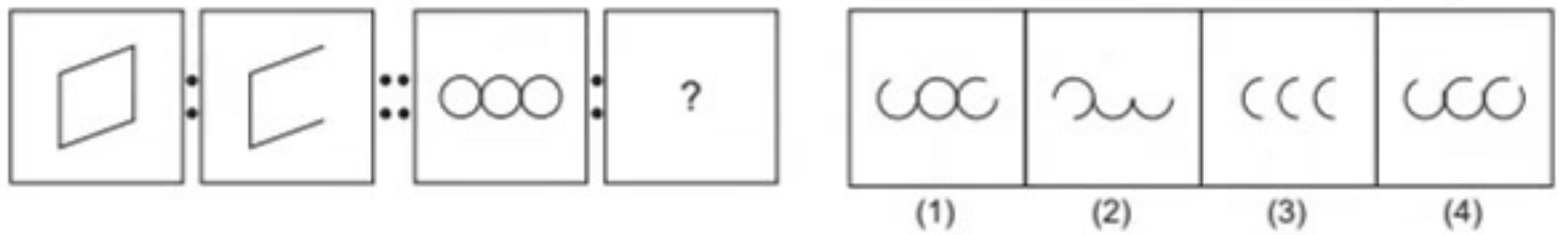
31.



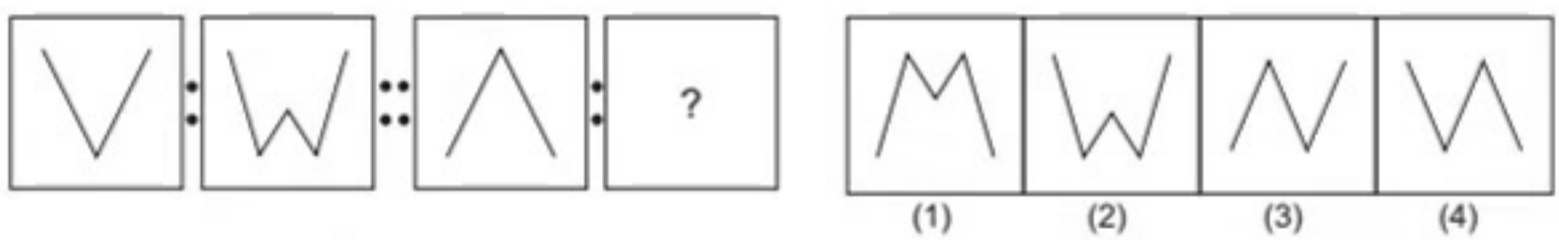
32.



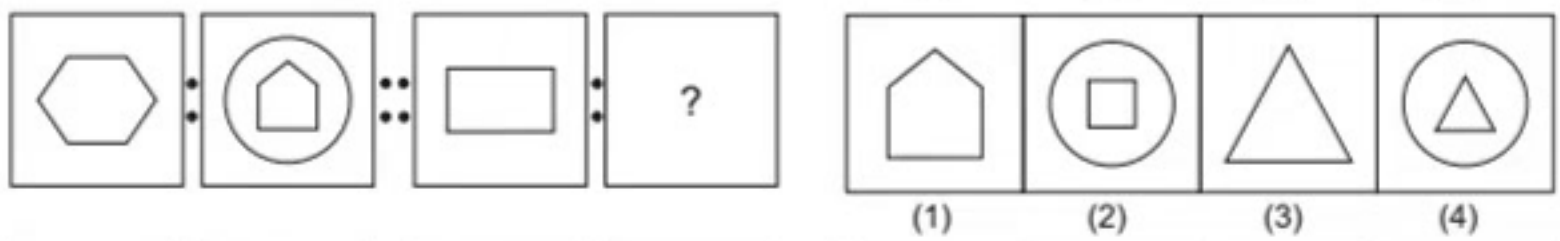
33.



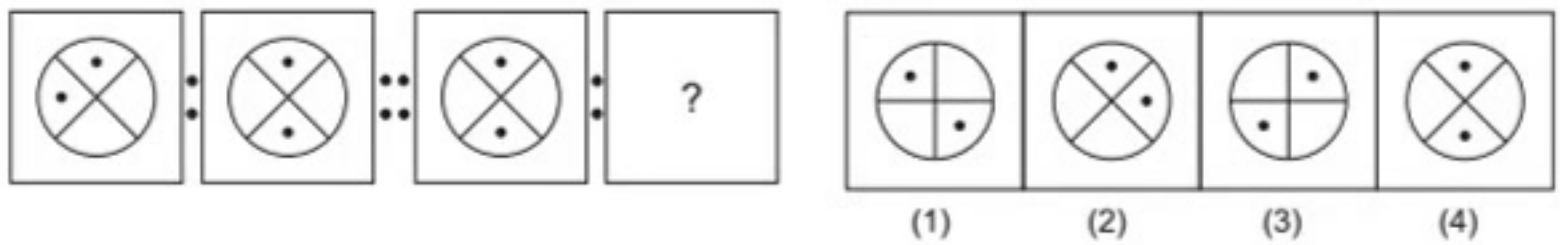
34.



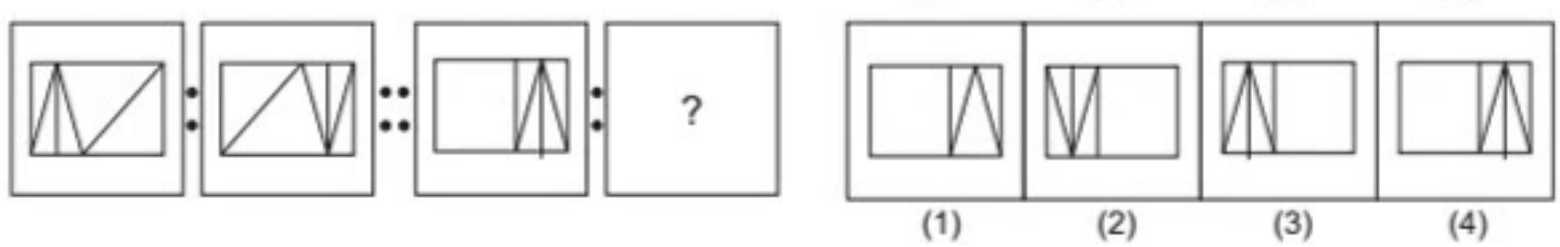
35.



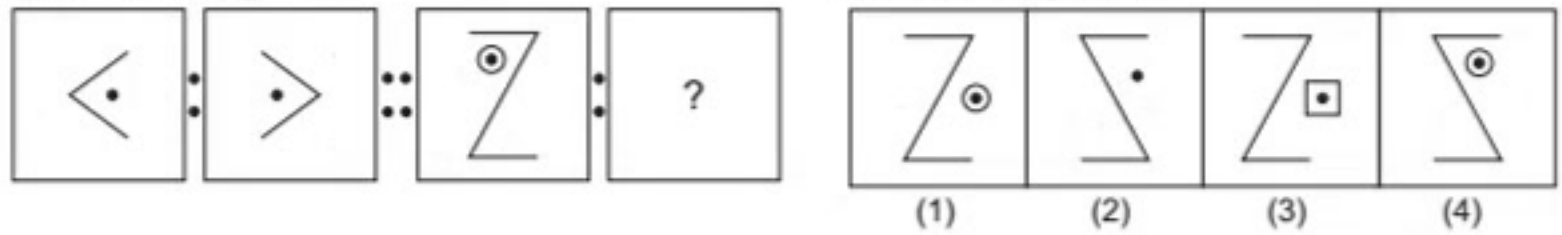
36.



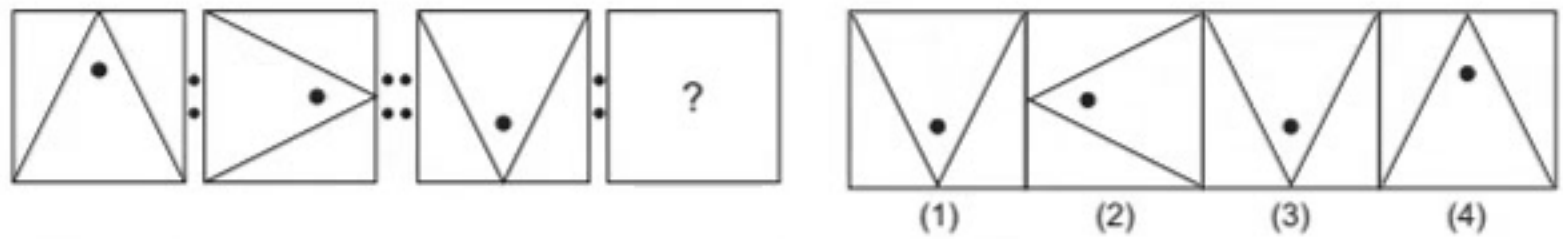
37.



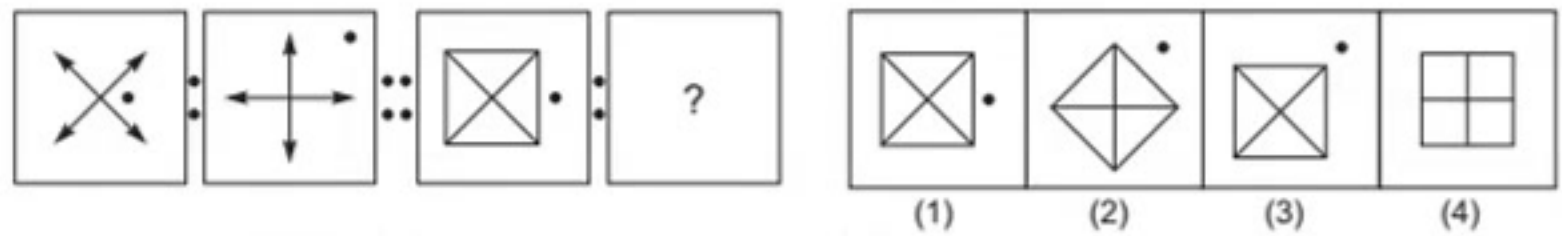
38. Question Figures **Answer Figures**



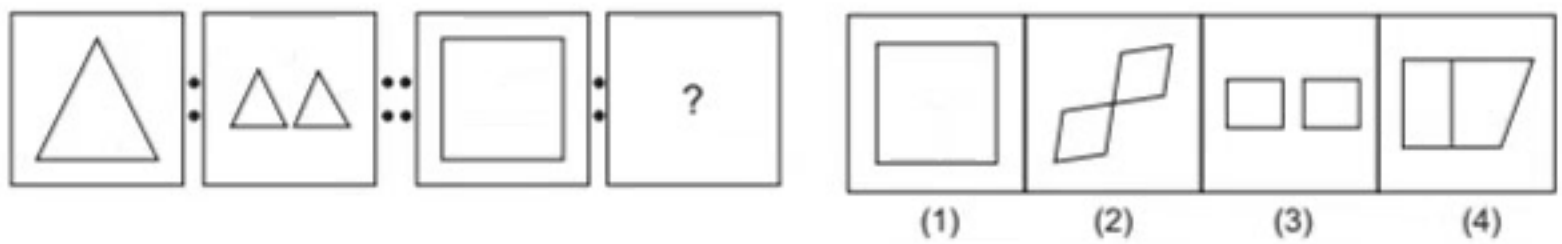
39.



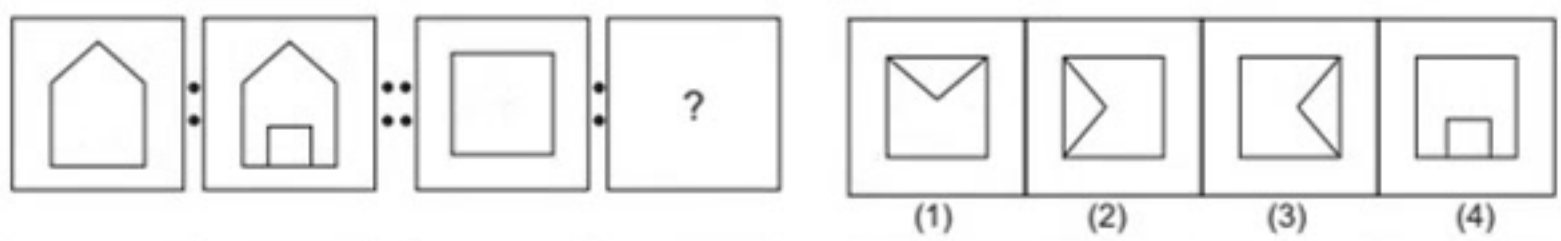
40.



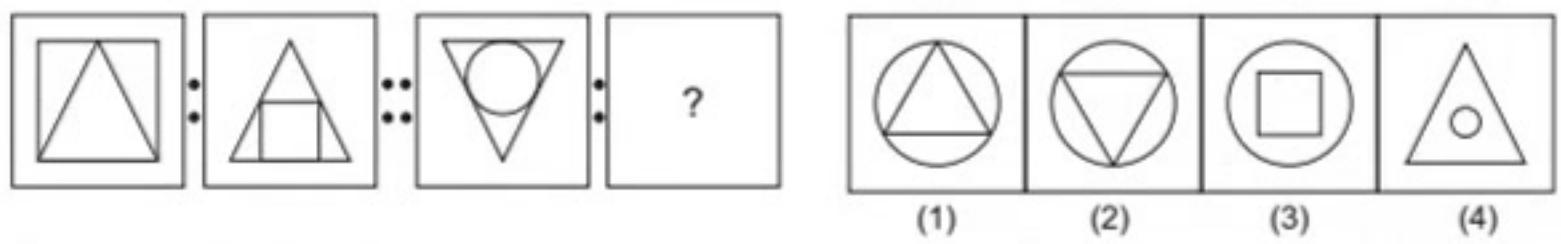
41.



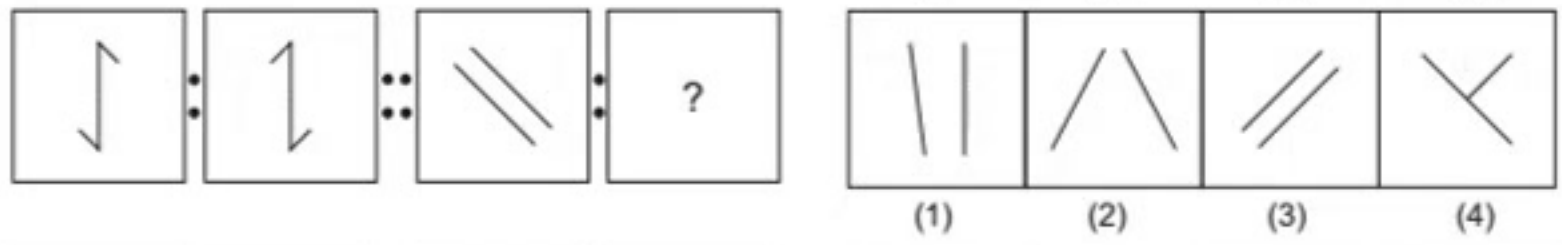
42.



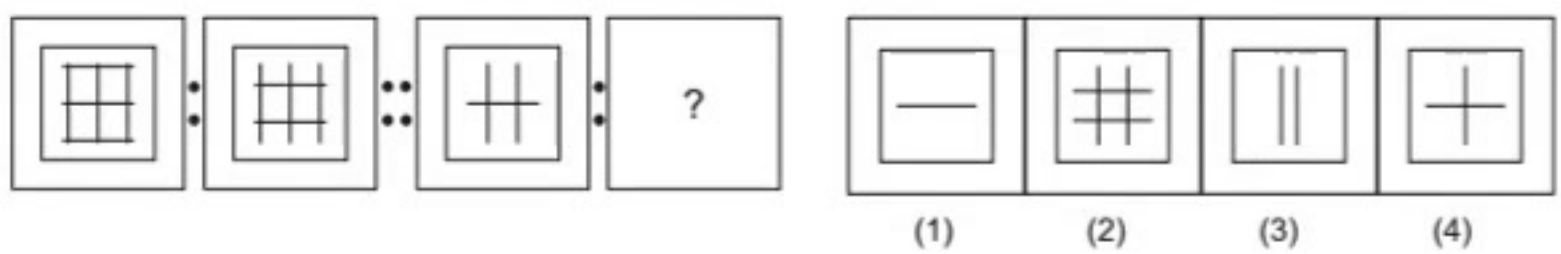
43.



44.



45.



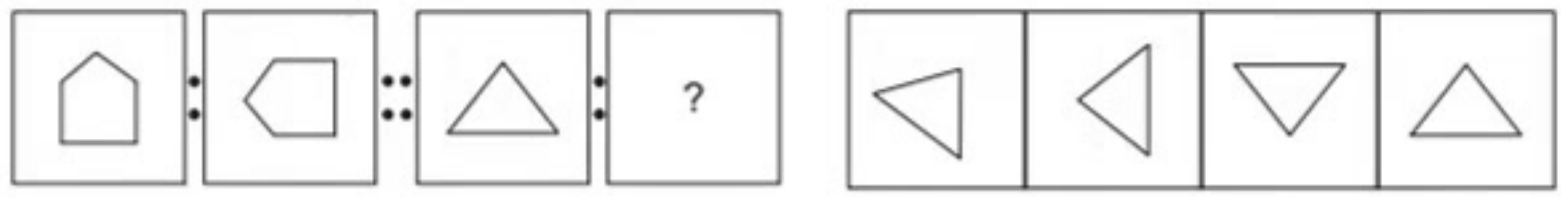
46. Question Figures **Answer Figures**

(1) (2) (3) (4)

47.

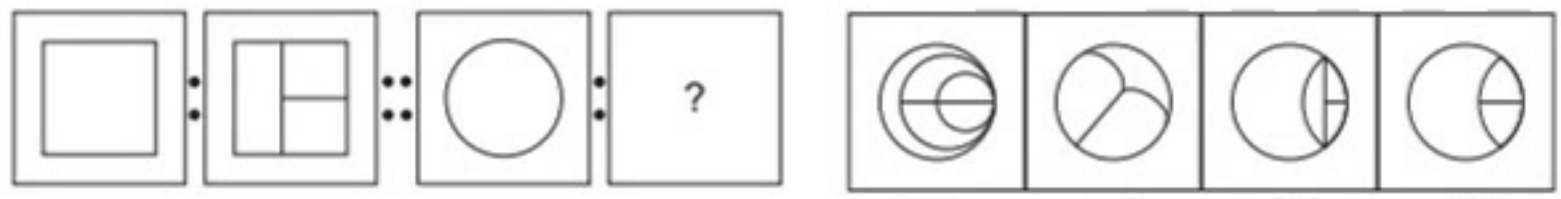
(1) (2) (3) (4)

48.



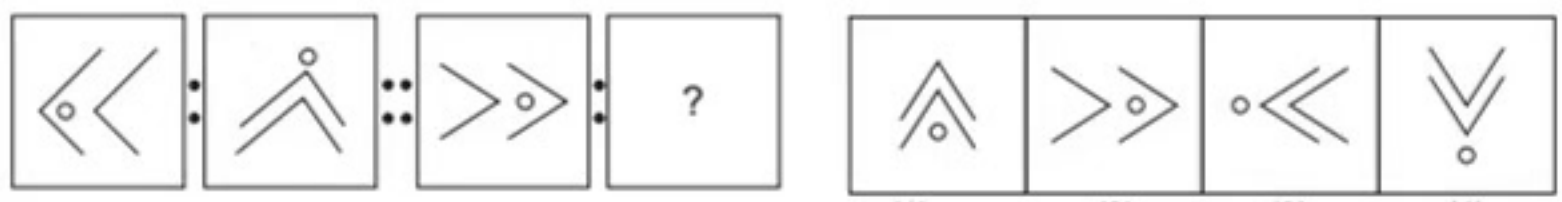
(1) (2) (3) (4)

49.



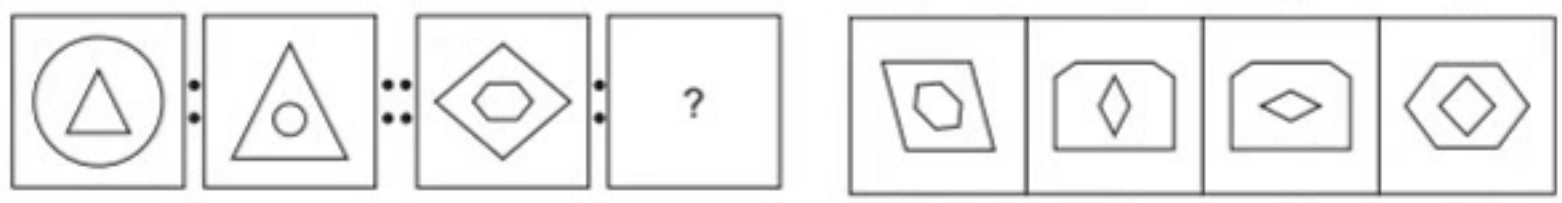
(1) (2) (3) (4)

50.



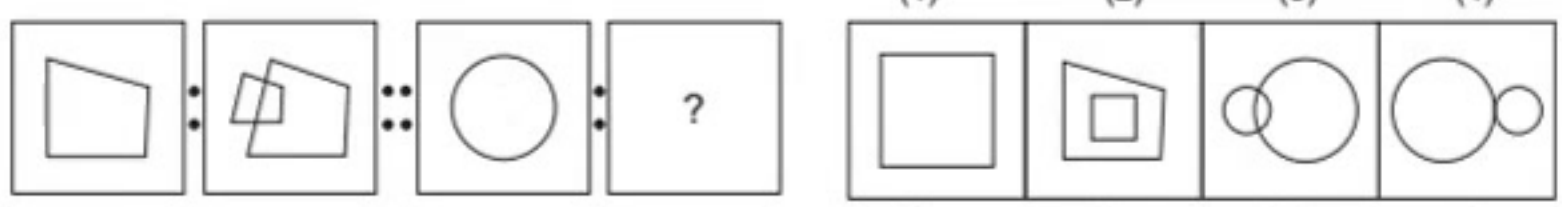
(1) (2) (3) (4)

51.



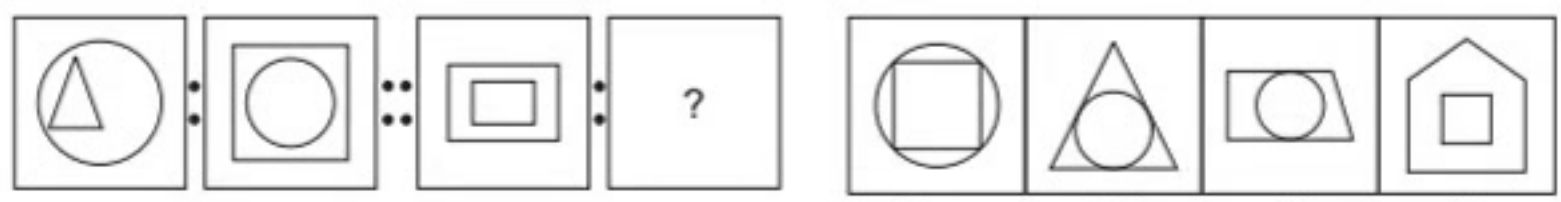
(1) (2) (3) (4)

52.



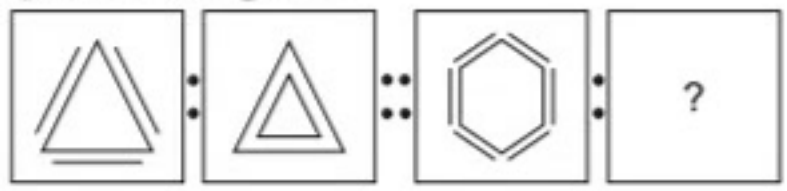
(1) (2) (3) (4)

53.

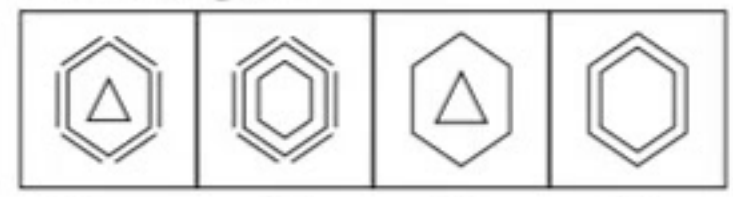


(1) (2) (3) (4)

54. Question Figures

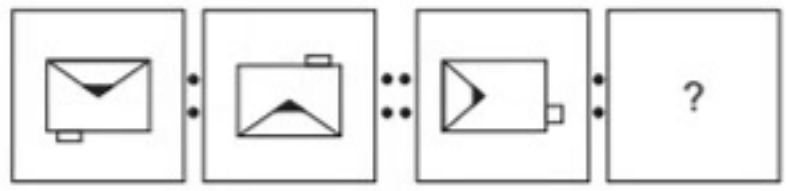


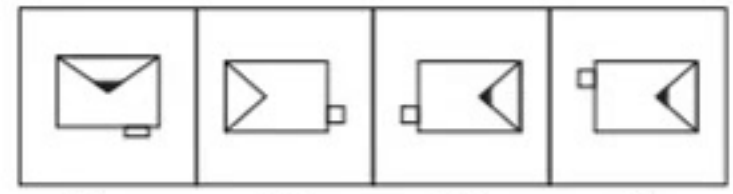
Answer Figures



(1) (2) (3) (4)

55.





(1) (2) (3) (4)

Answers

1 *(2)*	**2** *(1)*	**3** *(3)*	**4** *(2)*	**5** *(1)*	**6** *(3)*	**7** *(2)*	**8** *(2)*	**9** *(4)*	**10** *(2)*
11 *(4)*	**12** *(2)*	**13** *(3)*	**14** *(1)*	**15** *(1)*	**16** *(3)*	**17** *(4)*	**18** *(1)*	**19** *(4)*	**20** *(1)*
21. *(3)*	**22.** *(2)*	**23.** *(1)*	**24.** *(1)*	**25.** *(1)*	**26.** *(2)*	**27.** *(2)*	**28.** *(4)*	**29.** *(2)*	**30.** *(2)*
31. *(3)*	**32.** *(3)*	**33.** *(4)*	**34.** *(1)*	**35.** *(4)*	**36.** *(2)*	**37.** *(2)*	**38.** *(4)*	**39.** *(2)*	**40.** *(2)*
41. *(3)*	**42.** *(4)*	**43.** *(2)*	**44.** *(3)*	**45.** *(3)*	**46.** *(1)*	**47.** *(4)*	**48.** *(2)*	**49.** *(4)*	**50.** *(4)*
51. *(4)*	**52.** *(3)*	**53.** *(4)*	**54.** *(4)*	**55.** *(4)*					

Hints and Solutions

1. In the second figure, one design is added with a line.

2. The second figure is formed by rotating. The first figure by 180°.

3. The first question figure has four sides and the second question figure has three sides with same figure inside. Similarly, the question figure should have four sides in place of five sides with same figure inside.

4. From first figure to second, inner shape becomes outer and vice-versa.

5. From first figure to second, the inner design disappears.

6. From first figure to second, whole design rotates through 90° clockwise.

7. From figure (1) to (3) inner design remains same and the circle changes to rectangle.

8. The zig-zag portion of first figure becomes shaded and then the figure is turned 90° clockwise.

9. The design gets reversed and the circles appear at the edge of design.

10. The question figure 3 is same as the question figure 1. Thus, the answer figure will be same as the question figure 2.

11. Whole figure rotates through 180° and the outer part flips inside.

12. The triangle becomes double similarly circle becomes double.

13. The question figure 3 is same as the question figure 2. Similarly the answer figure will be same as the question figure 1. Also, shaded becomes unshaded and vice-versa.

14. Inner two designs are changing their place and outer design is deleted.

15. Both the designs are inverted and joined to form a new figure.

16. From first figure to second. The number of circle is increasing by one and the number of '×' remains same.

17. The arcs in 1st figure intersect each other in 2nd figure, then the resulting figure is moved 90°.

18. The question figure is same as the question figure 2. Similarly the answer figure will be same as the question figure 3.

19. In the question figures, the line segment is removed.

20. Two circles becomes three circles. Thus, two squares will become three squares.

21. The design is moving 90° in anti-clockwise direction.

22. In the figures, the dots move closure to the centre.

23. The design is inverted on its axis.

24. In the figures, the number of sides of the design are increasing by one and the number of internal lines are decreasing by one.

25. The design is rotating through 180°.

26. Second figure is the mirror image of first figure.

27. The shaded part comes out and moves 90° clockwise.

28. Second figure is the mirror image of first figure.

29. Third figure is obtained by rotating the first figure through 180°. Similarly, fourth figure will be obtained by rotating the second figure through 180°.

30. The design is moving 90° in clockwise direction and the small line attached to it is removed.

31. The number of sides of the inner design are increasing by one and gets shaded.

32. Two half designs are joining and forming a full design.

33. In the designs, one arm or side is removed.

34. The question figure 3 is inverted design of the question figure 1. Thus, the answer figure will be the inverted design of the question figure 2.

35. The side of the design is decreasing by one and comes inside of the circle.

36. In the designs, one dot is moving 90° anti-clockwise.

37. The right side design get reversed and comes at left side and the left side design get reversed and comes at right side.

38. Second figure is the mirror image of the first figure.

39. The design is moving 90° in clockwise direction.

40. The design is moving 45° clockwise and the black dot shifts at the right corner.

41. From first figure to second, the design becomes double.

42. A square is forming on the base of the design.

43. The inner design comes outside and the outer design goes inside.

44. Second figure is the inverted image of first.

45. In the inner design, the horizontal line is decreasing by one and the verticle line remains same.

46. The design is rotating 180°.

47. The design is formed by joining the ends of the line.

48. The design is rotating 90° anti-clockwise.

49. The design is dividing into three parts and two parts are equal.

50. The designs are moving 90° in clockwise direction and circle is shifted outside.

51. The inner design comes outside and the outer design goes inside.

52. One same design is intersecting on its left side.

53. Outer design comes inside and by increasing one side the inner design becomes outer design.

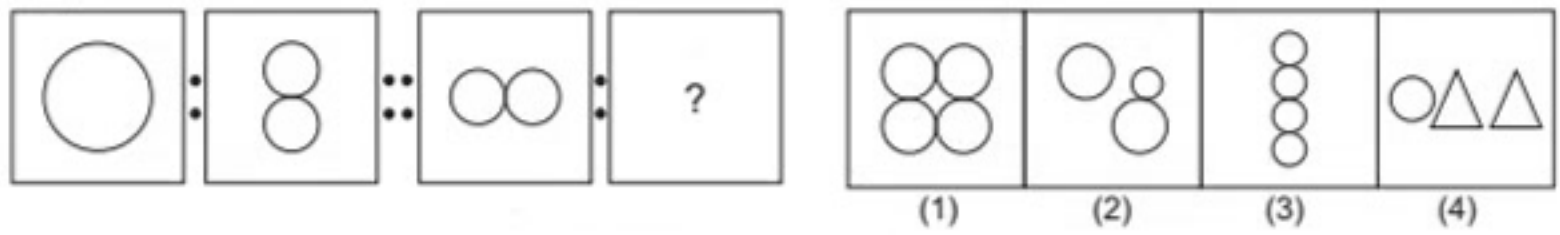
54. The design is formed by joining the outer lines.

55. The upper design comes downward and the lower design goes upward.

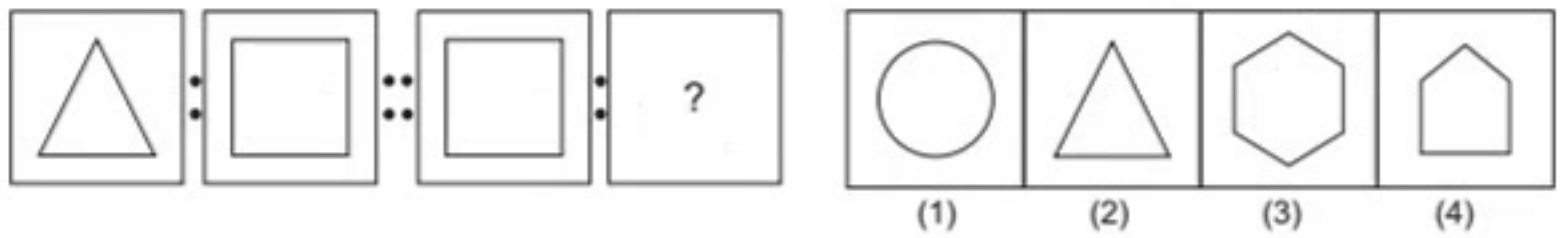
Self Practice

Directions (Q. Nos. 1-23) *In the following questions, the first two figures in the question figures are related to each other in same way. The same relationship holds between the third figure of the question figure and one of the answer figures* 1, 2, 3 *and* 4. *Identify the figure, which can replace the question mark*(?).

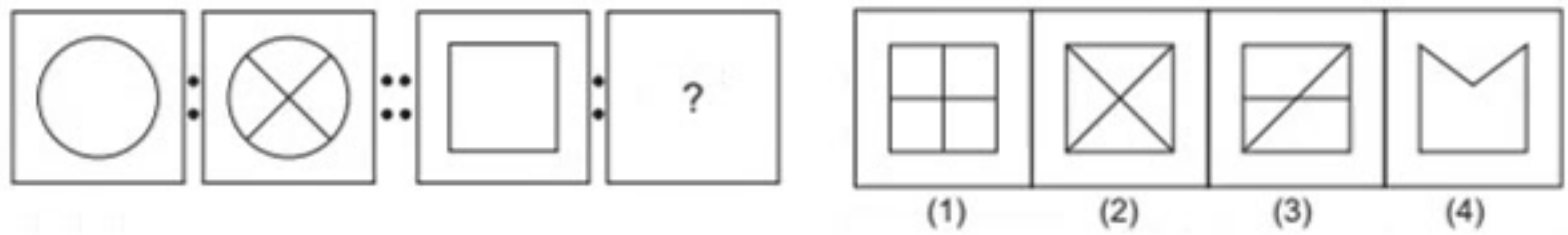
1. **Question Figures** **Answer Figures**



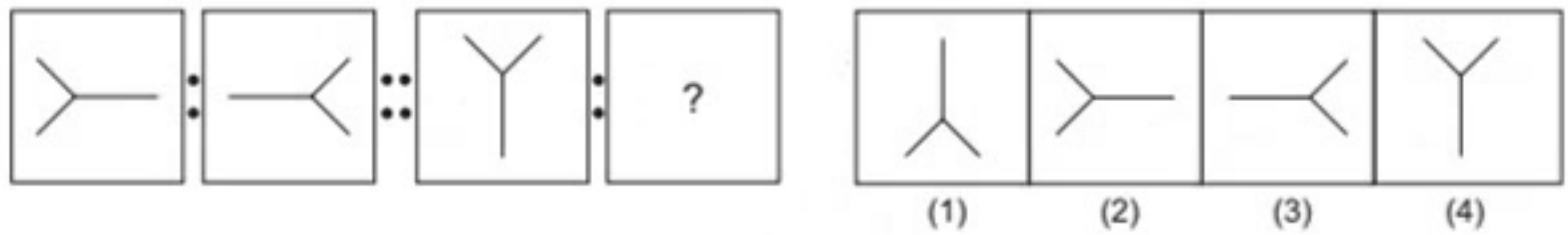
2.



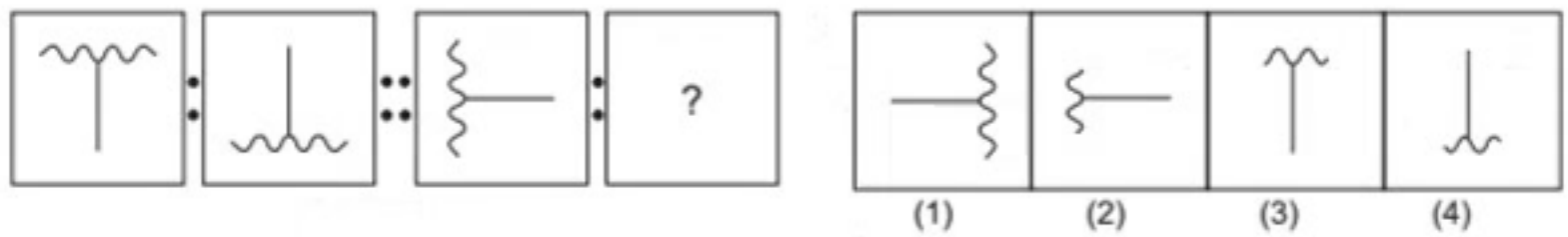
3.



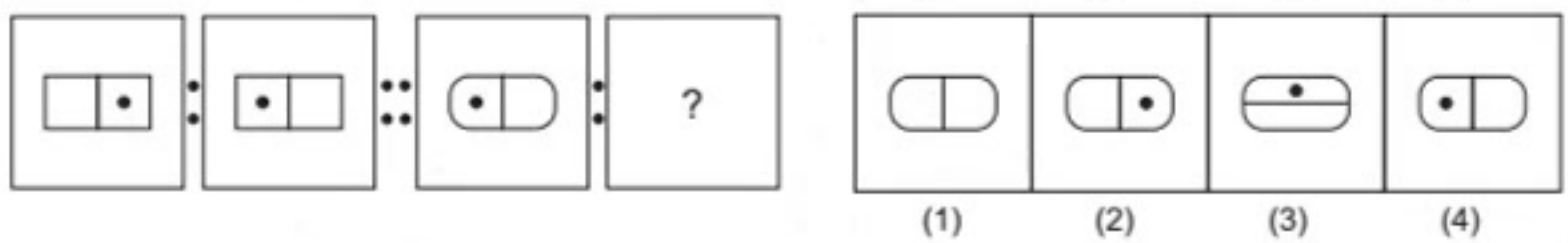
4.



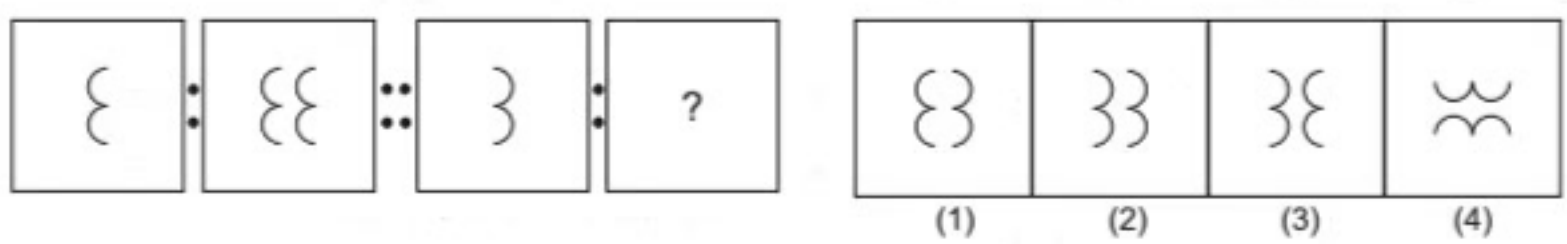
5.



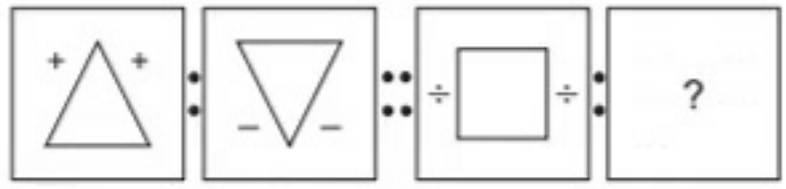
6.



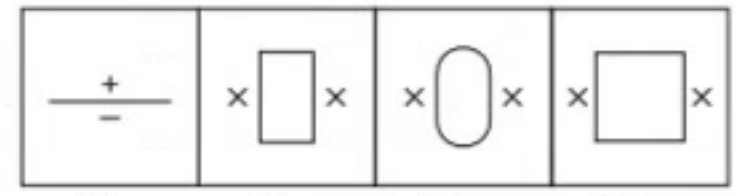
7.



8. Question Figures

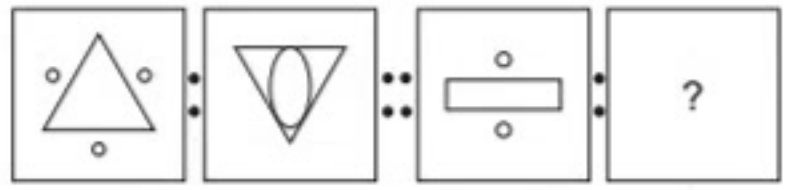


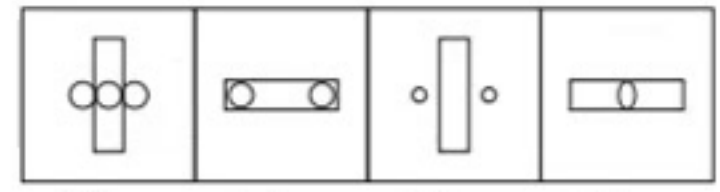
Answer Figures



(1) (2) (3) (4)

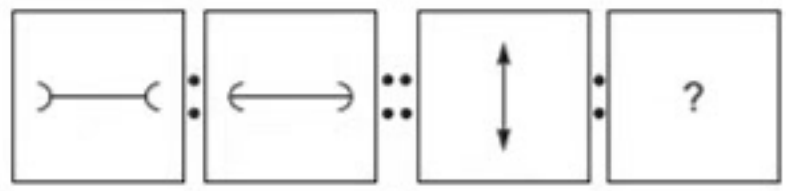
9.

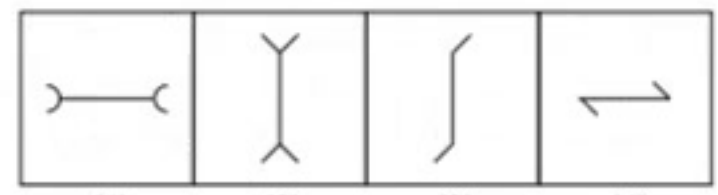




(1) (2) (3) (4)

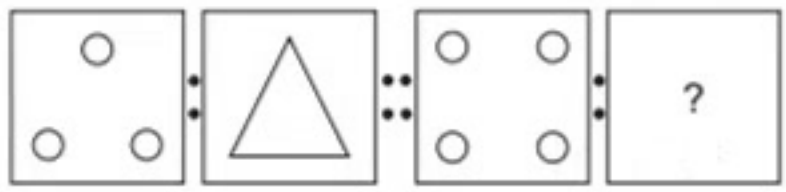
10.





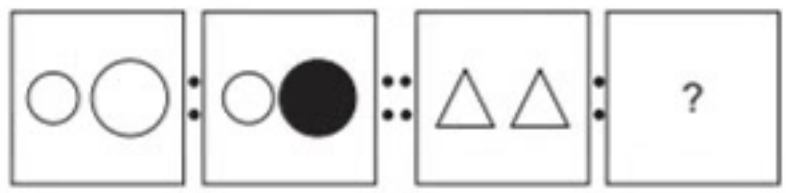
(1) (2) (3) (4)

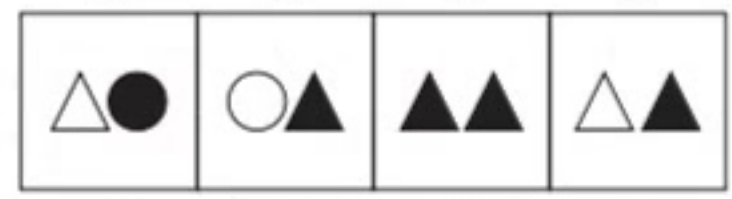
11.



(1) (2) (3) (4)

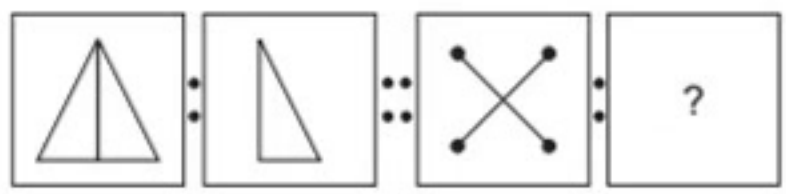
12.

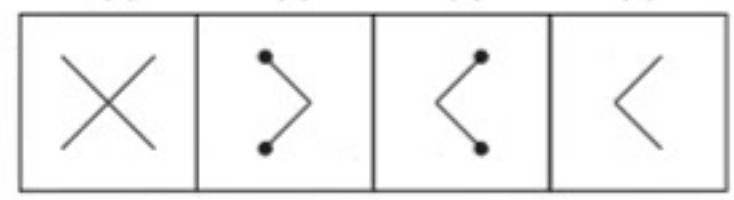




(1) (2) (3) (4)

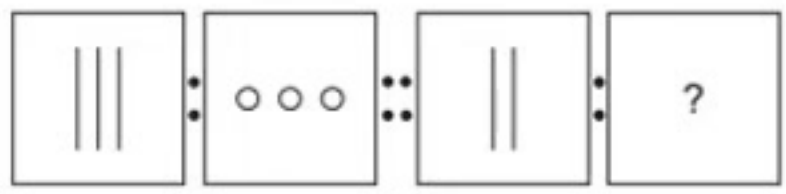
13.

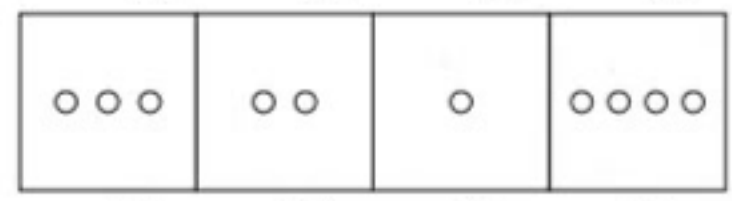




(1) (2) (3) (4)

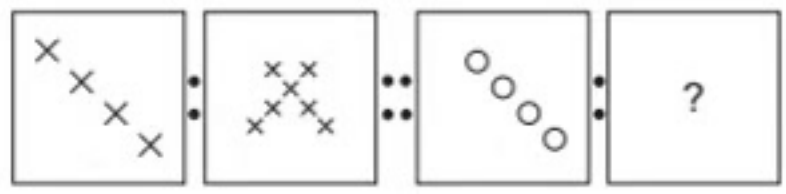
14.

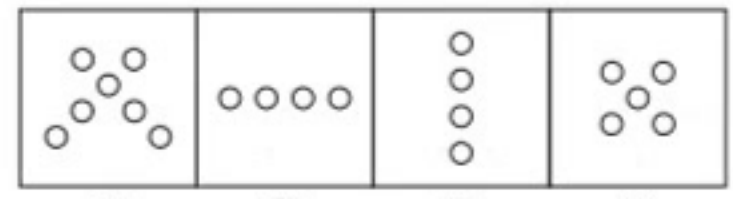




(1) (2) (3) (4)

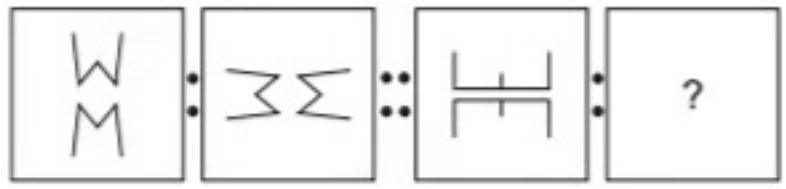
15.





(1) (2) (3) (4)

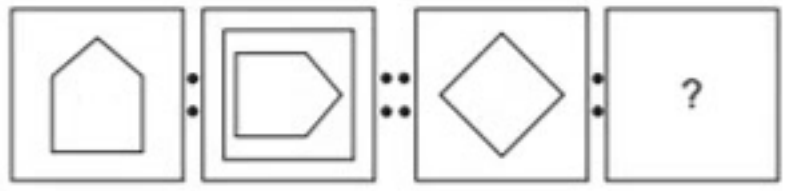
16. Question Figures

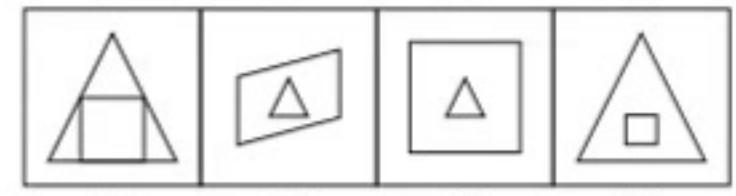


Answer Figures

(1) (2) (3) (4)

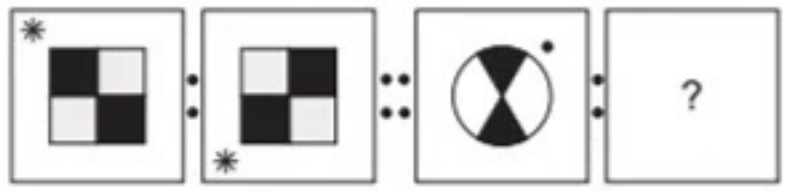
17.

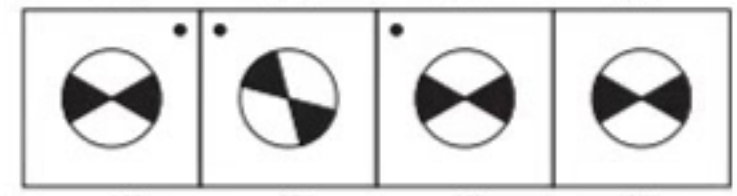




(1) (2) (3) (4)

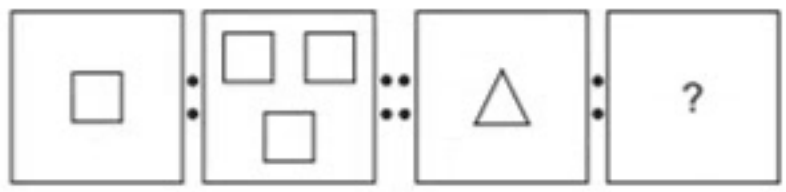
18.

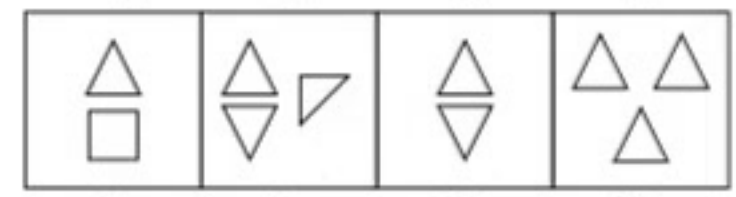




(1) (2) (3) (4)

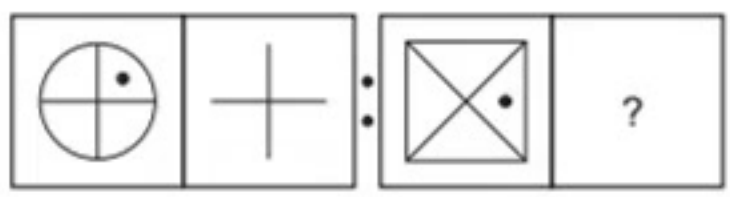
19.

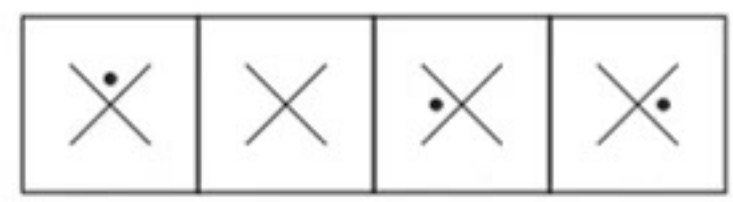




(1) (2) (3) (4)

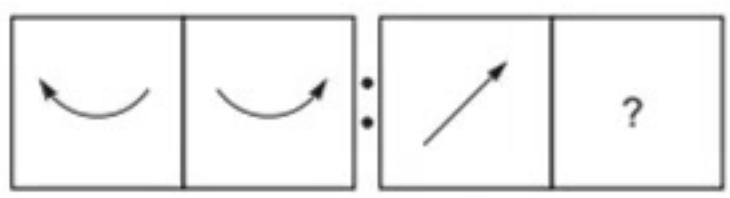
20.

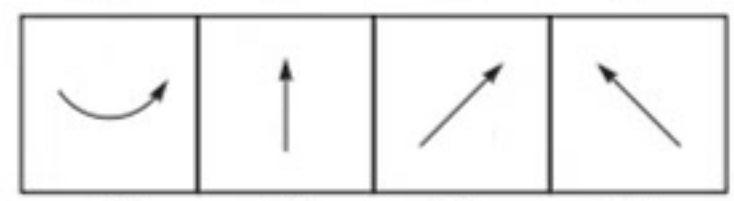




(1) (2) (3) (4)

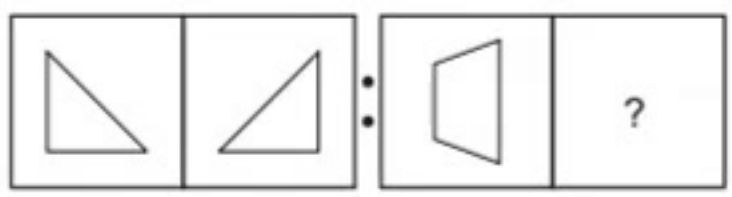
21.

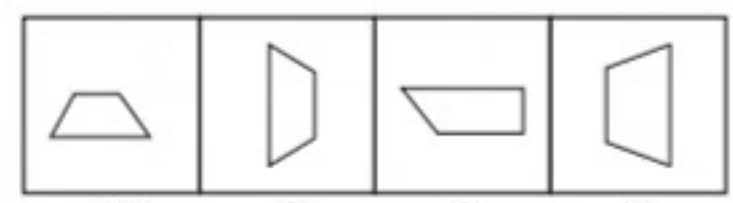




(1) (2) (3) (4)

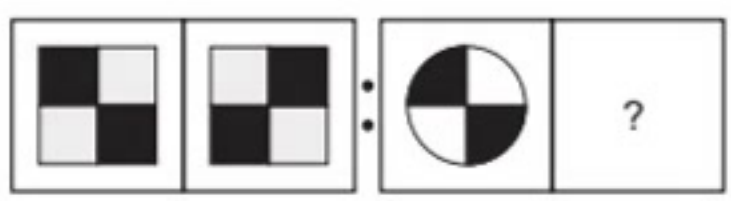
22.

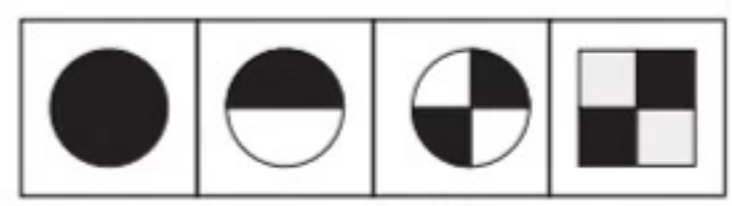




(1) (2) (3) (4)

23.





(1) (2) (3) (4)

Answers

1 (1)	**2** (4)	**3** (2)	**4** (1)	**5** (1)	**6** (2)	**7** (2)	**8** (4)	**9** (4)	**10** (2)
11 (1)	**12** (4)	**13** (3)	**14** (2)	**15** (1)	**16** (1)	**17** (4)	**18** (3)	**19** (4)	**20** (2)
21 (4)	**22** (2)	**23** (3)							

CHAPTER

06

GEOMETRICAL FIGURE COMPLETION

Geometrical figure completion test is based on formation of a square/circle/triangle by joining the piece given in the question figure with an another piece given in one of the options.

In the questions based on geometrical figure completion, a question figure which represents an incomplete square/circle/triangle is given, followed by four answer figures and only one of these four answer figures is appropriate to make a complete square/circle/triangle with the piece given in the question figure. A candidate is required to find out the correct answer figure.

Example **1.**

Que. Fig. **Ans. Fig.**

(1) (2) (3) (4)

Sol. **(4)** Answer figure (4) will complete the question figure of square.

Example **2.**

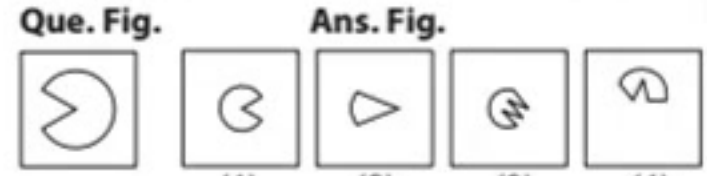
Que. Fig. **Ans. Fig.**

(1) (2) (3) (4)

Sol. **(2)** Answer figure (2) will complete the question figure of square.

Example **3.**

Que. Fig. **Ans. Fig.**



(1) (2) (3) (4)

Sol. **(2)** Answer figure (2) will complete the question figure of circle.

Example **4.**

Que. Fig. **Ans. Fig.**

(1) (2) (3) (4)

Sol. **(4)** Answer figure (4) will complete the question figure of triangle.

Entrance Corner

Directions (Q. Nos. 1-43) *In the following questions, one part of a geometrical figure (square, circle, triangle) is given on the left hand side that is question figure and the other one is among the four answer figures marked as* (1), (2), (3) *and* (4) *on the right hand side. Find the figure on the right hand side that completes the geometrical figure. Encircle the number given below the answer figures.*

Ques. Fig. **Ans. Fig.**

1.

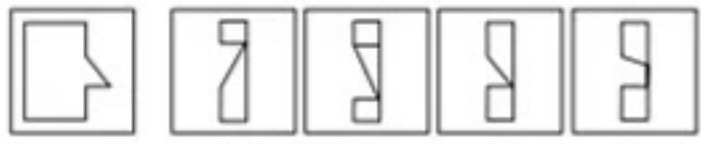
(1) (2) (3) (4)
[JNV 2019]

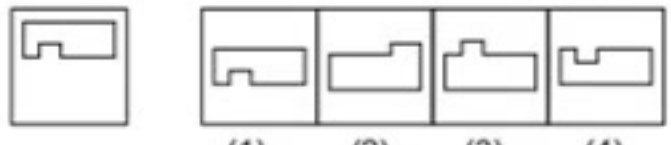
2.

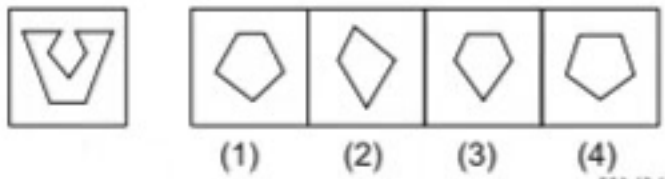
(1) (2) (3) (4)
[JNV 2019]

3.

(1) (2) (3) (4)
[JNV 2019]

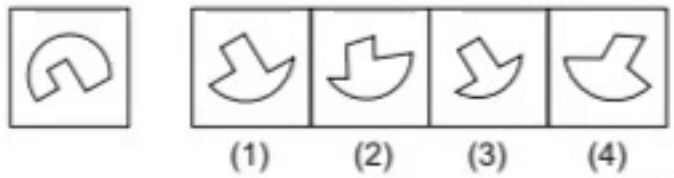
4.

(1) (2) (3) (4)
[JNV 2019]

5.

(1) (2) (3) (4)
[JNV 2018]

6.

(1) (2) (3) (4)
[JNV 2018]

7.

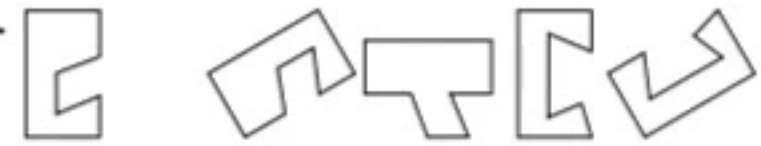
(1) (2) (3) (4)
[JNV 2018]

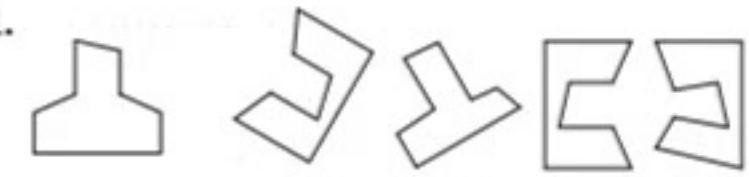
8.

(1) (2) (3) (4)
[JNV 2018]

Ques. Fig. **Ans. Fig.**

9.

(1) (2) (3) (4)
[JNV 2018]

10.

(1) (2) (3) (4)
[JNV 2017, 2005]

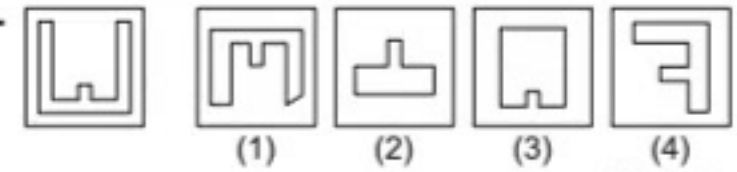
11.

(1) (2) (3) (4)
[JNV 2017, 2005]

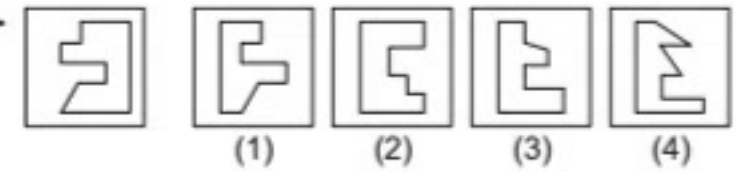
12.

(1) (2) (3) (4)
[JNV 2017]

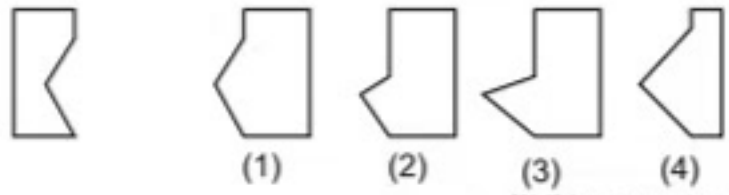
13.

(1) (2) (3) (4)
[JNV 2016, 2015]

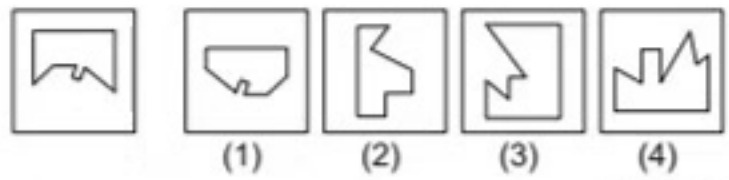
14.

(1) (2) (3) (4)
[JNV 2016]

15.

(1) (2) (3) (4)
[JNV 2016]

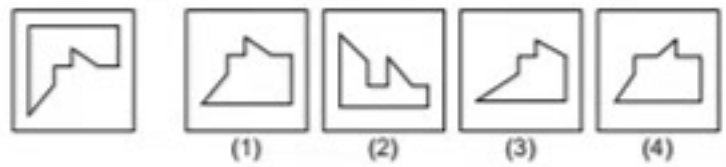
Ques. Fig. **Ans. Fig.**

16.


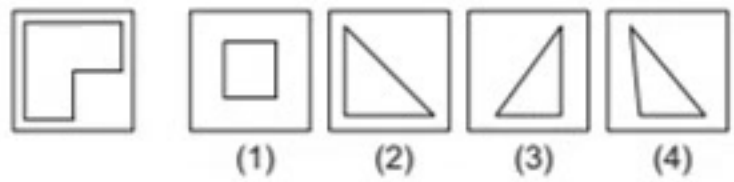
[JNV 2015, 2003]

17.


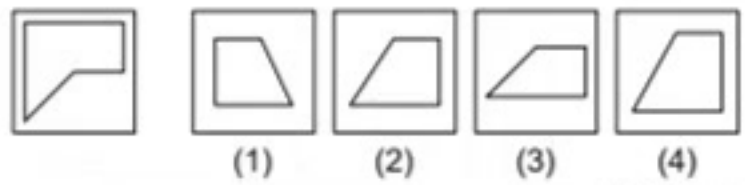
[JNV 2015]

18.


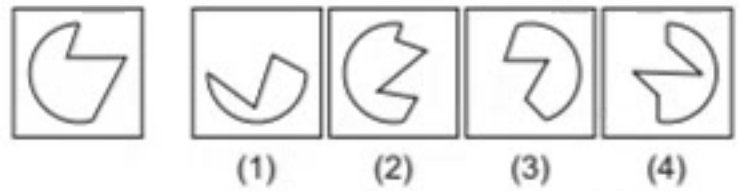
[JNV 2015]

19.


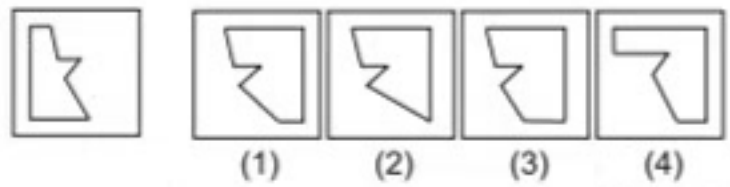
[JNV 2014]

20.


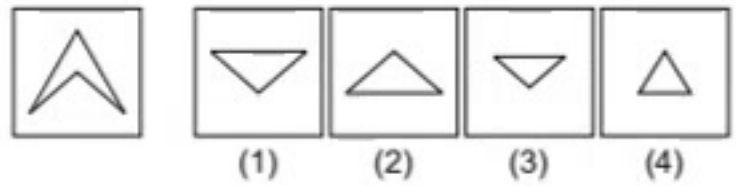
[JNV 2014]

21.


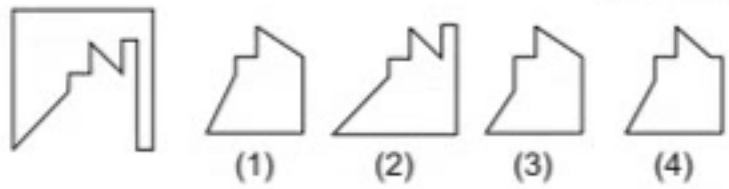
[JNV 2013]

22.


[JNV 2013]

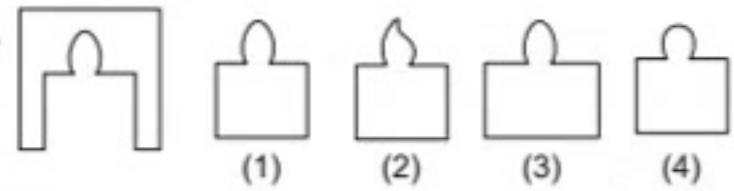
23.


[JNV 2013]

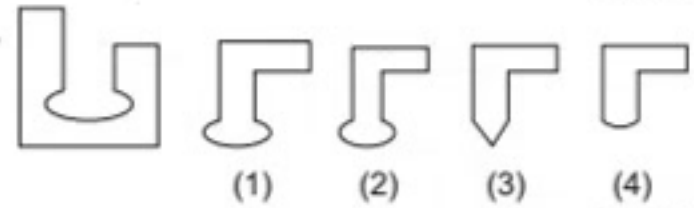
24.


[JNV 2012]

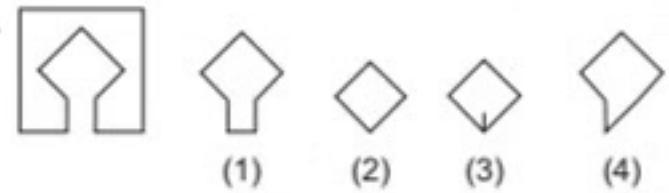
Ques. Fig. **Ans. Fig.**

25.


[JNV 2012]

26.


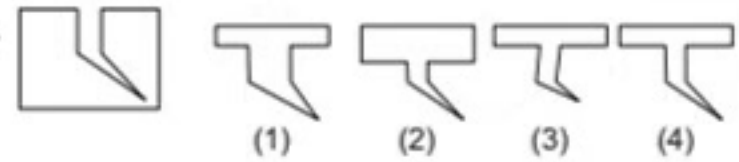
[JNV 2011]

27.


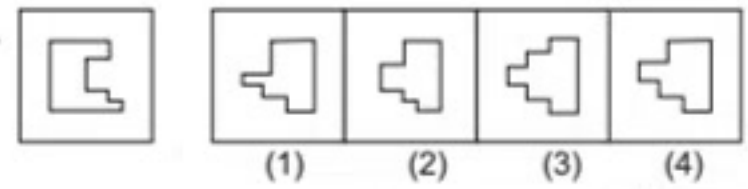
[JNV 2011]

28.

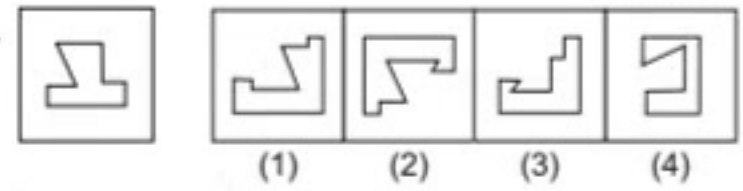
[JNV 2010]

29.


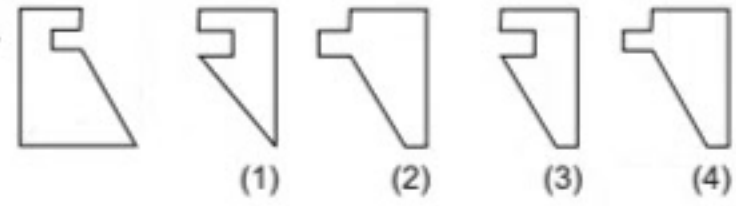
[JNV 2010]

30.


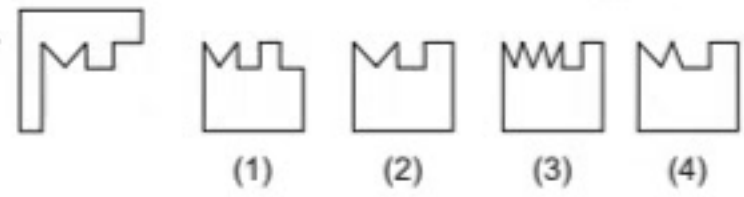
[JNV 2009]

31.


[JNV 2009]

32.


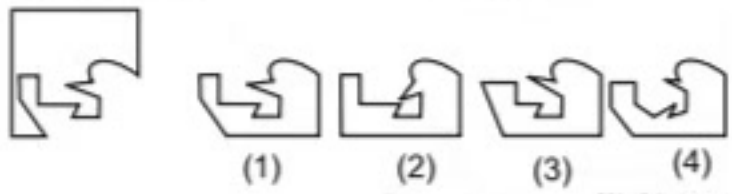
[JNV 2008]

33.


[JNV 2007]

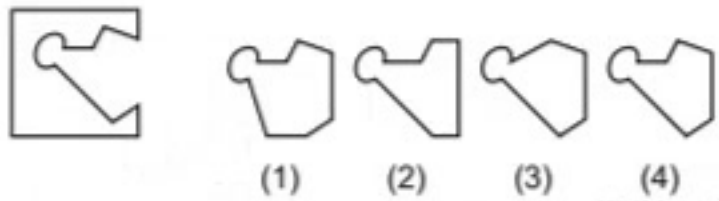
Ques. Fig. **Ans. Fig.**

34.



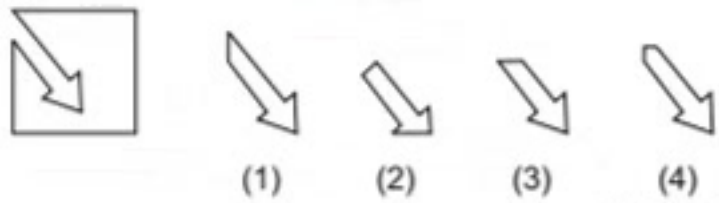
[JNV 2004]

35.



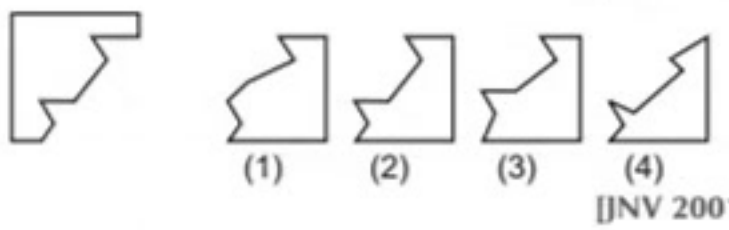
[JNV 2004]

36.



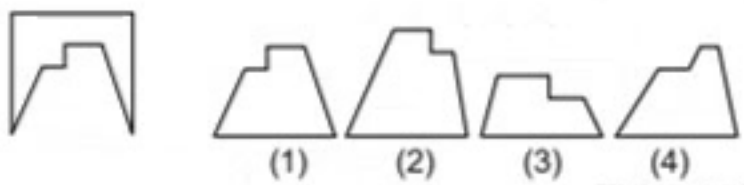
[JNV 2002]

37.



[JNV 2001]

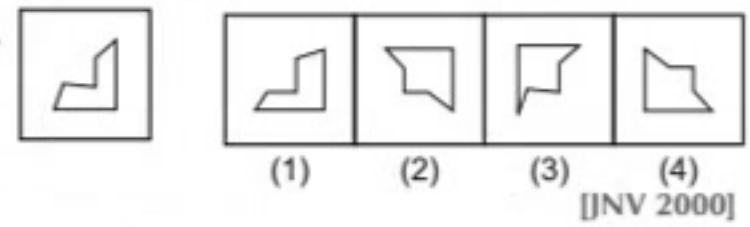
38.



[JNV 2001]

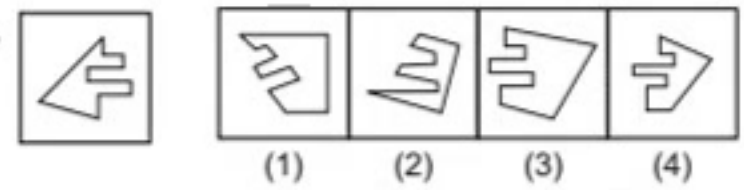
Ques. Fig. **Ans. Fig.**

39.



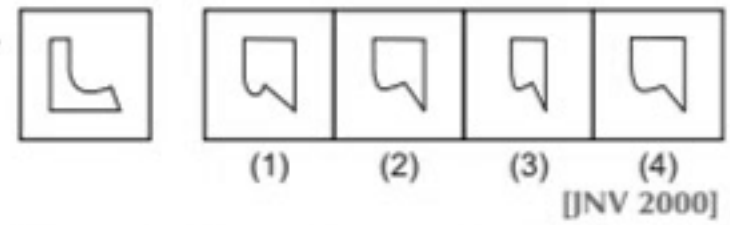
[JNV 2000]

40.



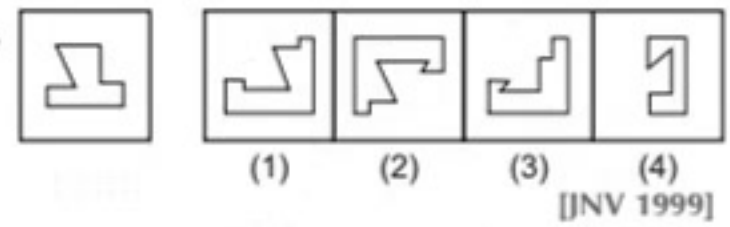
[JNV 2000]

41.



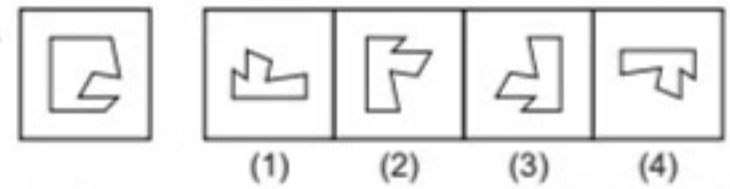
[JNV 2000]

42.



[JNV 1999]

43.



[JNV 1999]

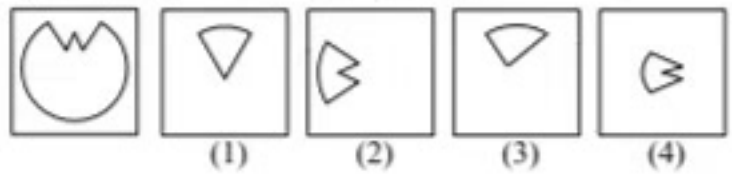
Answers

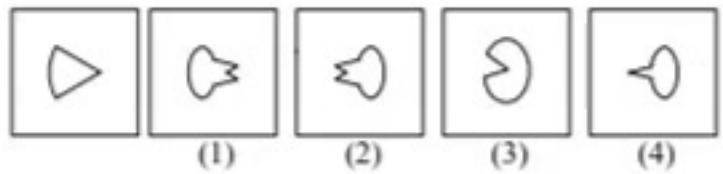
1 *(1)*	**2** *(2)*	**3** *(1)*	**4** *(3)*	**5** *(3)*	**6** *(3)*	**7** *(2)*	**8** *(1)*	**9** *(2)*	**10** *(2)*
11 *(3)*	**12** *(2)*	**13** *(4)*	**14** *(3)*	**15** *(1)*	**16** *(1)*	**17** *(1)*	**18** *(1)*	**19** *(1)*	**20** *(3)*
21 *(1)*	**22** *(2)*	**23** *(2)*	**24** *(2)*	**25** *(1)*	**26** *(1)*	**27** *(1)*	**28** *(1)*	**29** *(4)*	**30** *(2)*
31 *(4)*	**32** *(4)*	**33** *(2)*	**34** *(1)*	**35** *(4)*	**36** *(1)*	**37** *(3)*	**38** *(1)*	**39** *(3)*	**40** *(3)*
41 *(4)*	**42** *(4)*	**43** *(2)*							

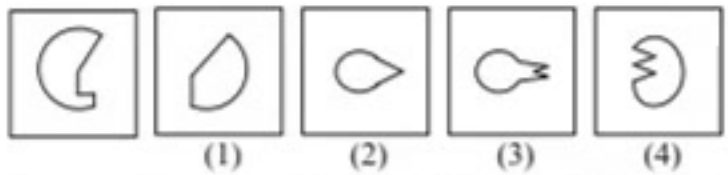
Practice Exercise

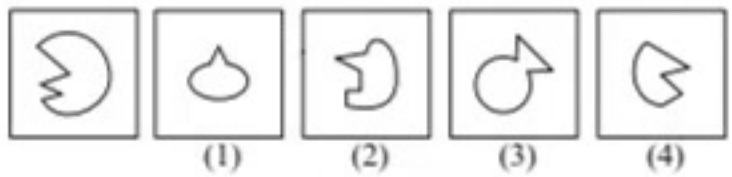
Directions (Q. Nos. 1-40) *In the following questions, one part of a square is given on the left hand side that is question figure and the other one is among the four answer figures marked as* (1), (2), (3) and (4) *on the right hand side. Find the figure on the right hand side that completes the square. Encircle the number given below the answer figures.*

Que. Fig. **Ans. Fig.**

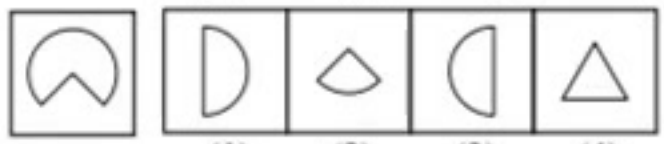
1. 
(1) (2) (3) (4)

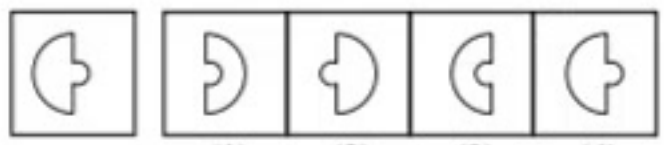
2. 
(1) (2) (3) (4)

3. 
(1) (2) (3) (4)

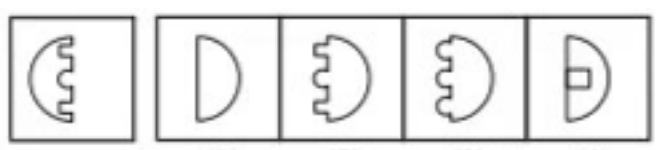
4. 
(1) (2) (3) (4)

5.
(1) (2) (3) (4)

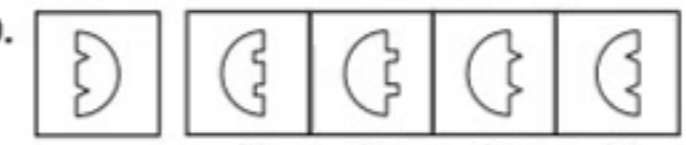
6. 
(1) (2) (3) (4)

7. 
(1) (2) (3) (4)

8.
(1) (2) (3) (4)

9. 
(1) (2) (3) (4)

Que. Fig. **Ans. Fig.**

10. 
(1) (2) (3) (4)

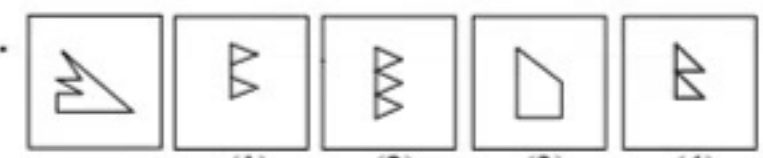
11.
(1) (2) (3) (4)

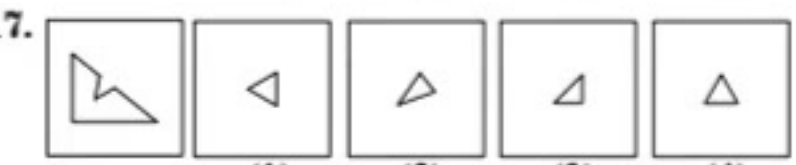
12.
(1) (2) (3) (4)

13.
(1) (2) (3) (4)

14.
(1) (2) (3) (4)

15.
(1) (2) (3) (4)

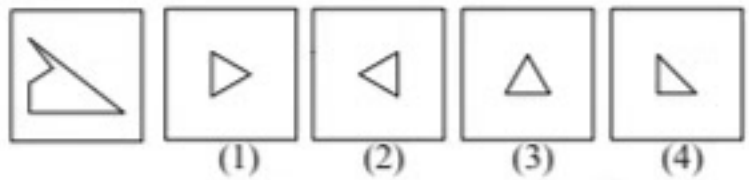
16. 
(1) (2) (3) (4)

17. 
(1) (2) (3) (4)

18.
(1) (2) (3) (4)

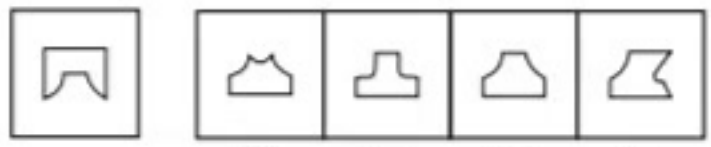
Que. Fig. **Ans. Fig.**

19.



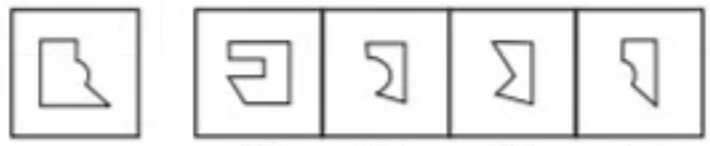
(1) (2) (3) (4)

20.



(1) (2) (3) (4)

21.

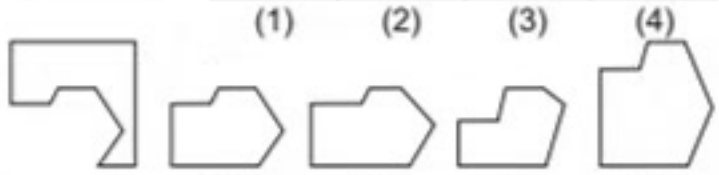


(1) (2) (3) (4)

22.

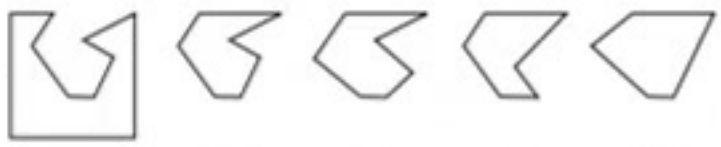
(1) (2) (3) (4)

23.



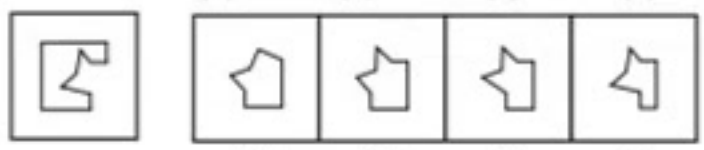
(1) (2) (3) (4)

24.



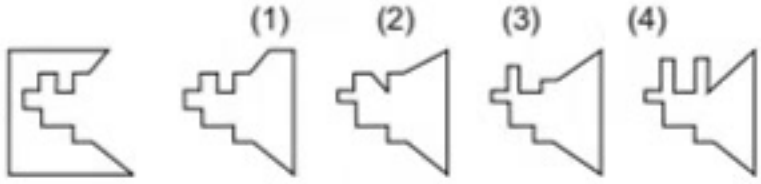
(1) (2) (3) (4)

25.



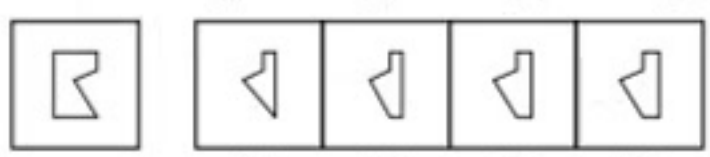
(1) (2) (3) (4)

26.



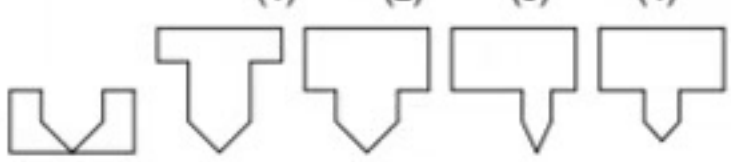
(1) (2) (3) (4)

27.



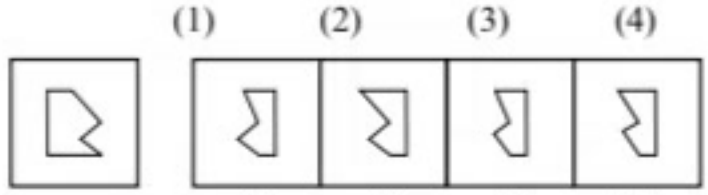
(1) (2) (3) (4)

28.



(1) (2) (3) (4)

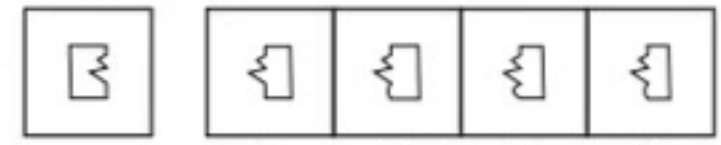
29.



(1) (2) (3) (4)

Que. Fig. **Ans. Fig.**

30.

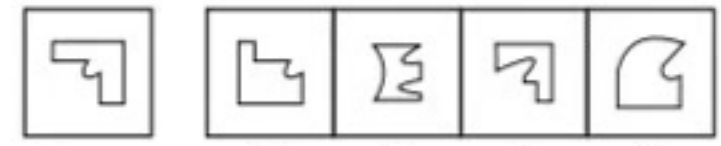


(1) (2) (3) (4)

31.

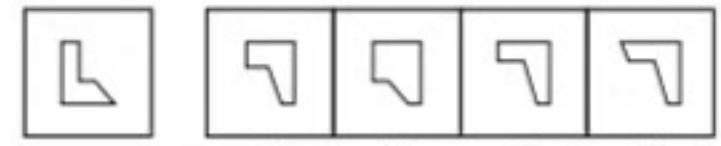
(1) (2) (3) (4)

32.



(1) (2) (3) (4)

33.

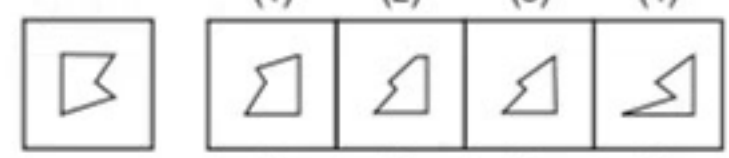


(1) (2) (3) (4)

34.

(1) (2) (3) (4)

35.

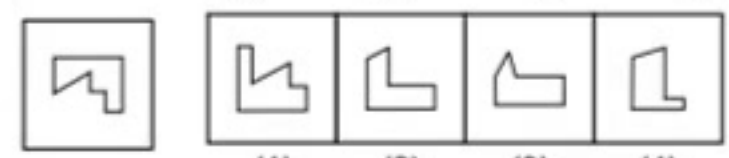


(1) (2) (3) (4)

36.

(1) (2) (3) (4)

37.

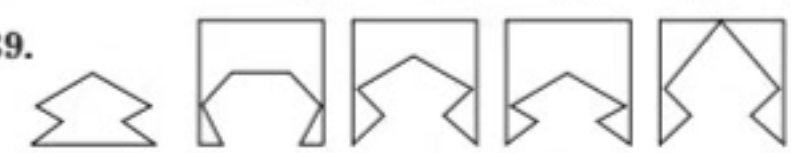


(1) (2) (3) (4)

38.

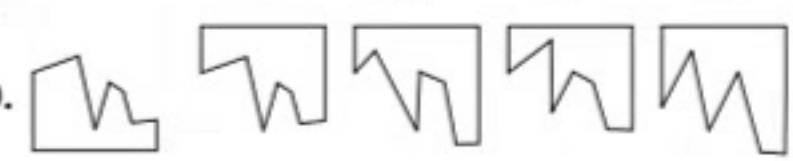
(1) (2) (3) (4)

39.



(1) (2) (3) (4)

40.



(1) (2) (3) (4)

Answers

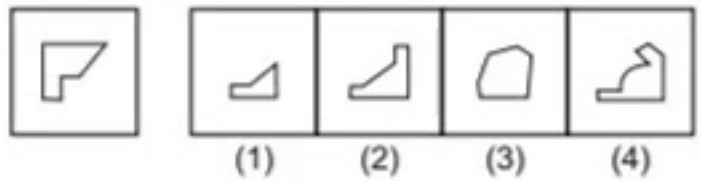
1 *(2)*	**2** *(3)*	**3** *(1)*	**4** *(4)*	**5** *(2)*	**6** *(2)*	**7** *(1)*	**8** *(3)*	**9** *(2)*	**10** *(3)*
11 *(2)*	**12** *(1)*	**13** *(1)*	**14** *(3)*	**15** *(3)*	**16** *(4)*	**17** *(2)*	**18** *(3)*	**19** *(1)*	**20** *(3)*
21 *(4)*	**22** *(1)*	**23** *(1)*	**24** *(1)*	**25** *(4)*	**26** *(1)*	**27** *(3)*	**28** *(2)*	**29** *(2)*	**30** *(1)*
31 *(1)*	**32** *(1)*	**33** *(2)*	**34** *(4)*	**35** *(4)*	**36** *(3)*	**37** *(1)*	**38** *(1)*	**39** *(3)*	**40** *(1)*

Self Practice

Directions (Q. Nos. 1-30) *In the following questions, one part of a square is given on the left hand side that is question figure and the other one is among the four answer figures marked as* (1), (2), (3) and (4) *on the right hand side. Find the figure on the right hand side that completes the square.*

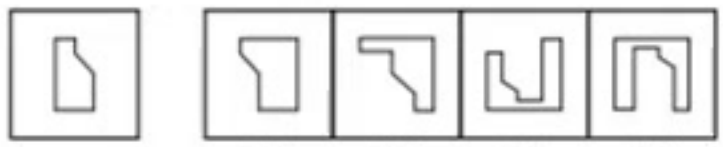
Que. Fig. Ans. Fig.

1.



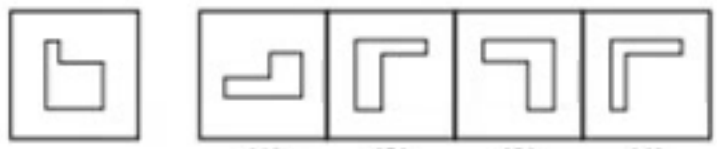
(1) (2) (3) (4)

2.



(1) (2) (3) (4)

3.

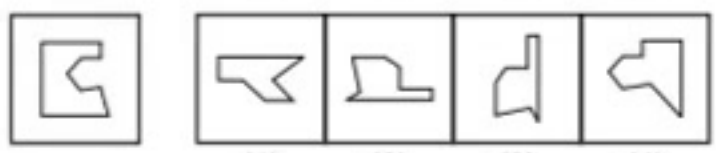


(1) (2) (3) (4)

4.

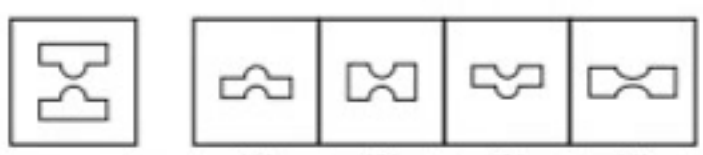
(1) (2) (3) (4)

5.



(1) (2) (3) (4)

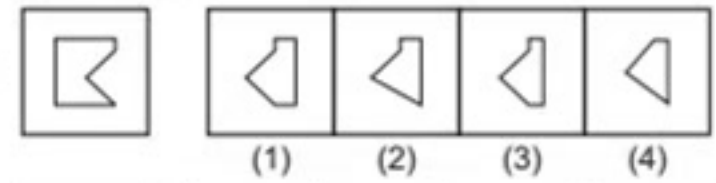
6.



(1) (2) (3) (4)

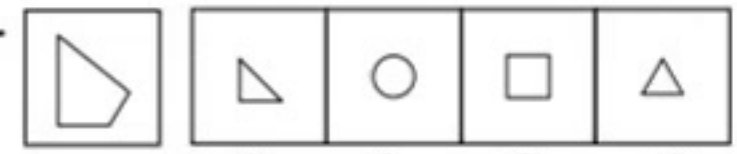
Que. Fig. Ans. Fig.

7.



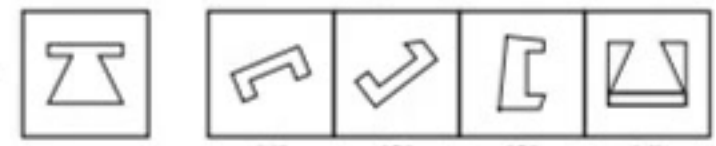
(1) (2) (3) (4)

8.



(1) (2) (3) (4)

9.



(1) (2) (3) (4)

10.

(1) (2) (3) (4)

11.

(1) (2) (3) (4)

12.

(1) (2) (3) (4)

Que. Fig. **Ans. Fig.**

13.

(1) (2) (3) (4)

14.

(1) (2) (3) (4)

15.

(1) (2) (3) (4)

16.

(1) (2) (3) (4)

17.

(1) (2) (3) (4)

18.

(1) (2) (3) (4)

19.

(1) (2) (3) (4)

20.

(1) (2) (3) (4)

21.

(1) (2) (3) (4)

Que. Fig. **Ans. Fig.**

22.

(1) (2) (3) (4)

23.

(1) (2) (3) (4)

24.

(1) (2) (3) (4)

25.

(1) (2) (3) (4)

26.

(1) (2) (3) (4)

27.

(1) (2) (3) (4)

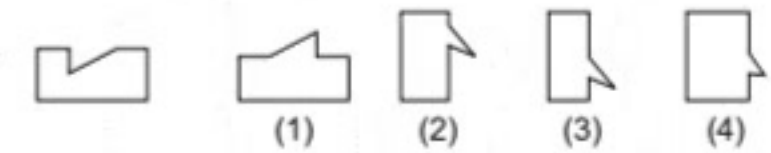
28.

(1) (2) (3) (4)

29.

(1) (2) (3) (4)

30.



(1) (2) (3) (4)

Answers

1 *(1)*	**2** *(1)*	**3** *(3)*	**4** *(3)*	**5** *(4)*	**6** *(2)*	**7** *(1)*	**8** *(4)*	**9** *(4)*	**10** *(1)*
11 *(1)*	**12** *(1)*	**13** *(3)*	**14** *(1)*	**15** *(4)*	**16** *(2)*	**17** *(3)*	**18** *(4)*	**19** *(1)*	**20** *(1)*
21 *(4)*	**22** *(1)*	**23** *(4)*	**24** *(3)*	**25** *(2)*	**26** *(2)*	**27** *(1)*	**28** *(2)*	**29** *(3)*	**30** *(1)*

CHAPTER

07

MIRROR IMAGE

The reflection of an object into the mirror is called mirror image or we can say that the figure obtained by putting a mirror in front of the real figure is called mirror image.

The questions based on mirror image are divided in two parts, i.e. first part which is known as question figure and in second part there is four answer figures. The student is required to find out the correct mirror image of the given problem figure.

While solving the problems, the students should follow some points

- If the position of mirror is not clear in the question, then use the mirror at the right side of an object.
- In the mirror image of an object lower and upper part remain constant while left and right get interchanged.
- In mirror image left part of an object becomes right part and right part becomes left part.

Mirror Image of Capital Letter

Letter	Mirror Image	Letter	Mirror Image	Letter	Mirror Image
A	A	J	ᒐ	S	Ƨ
B	ᗺ	K	ꓘ	T	T
C	Ɔ	L	⅃	U	U
D	ᗡ	M	M	V	V
E	Ǝ	N	И	W	W
F	ꟻ	O	O	X	X
G	⅁	P	ᑫ	Y	Y
H	H	Q	Ọ	Z	Z
I	I	R	Я	—	—

Note Unchanged image of letters are A, H, I, M, O, T, U, V ,W, X . (10 letters)

Mirror Image of Small Letters

Letter	Mirror Image	Letter	Mirror Image	Letter	Mirror Image
a	a	j	ᒑ	s	ƨ
b	d	k	ʞ	t	ʇ
c	ɔ	l	l	u	u
d	b	m	m	v	v
e	ɘ	n	n	w	w
f	ʇ	o	o	x	x
g	ᖃ	p	q	y	ʎ
h	h	q	p	z	z
i	i	r	ɹ	—	—

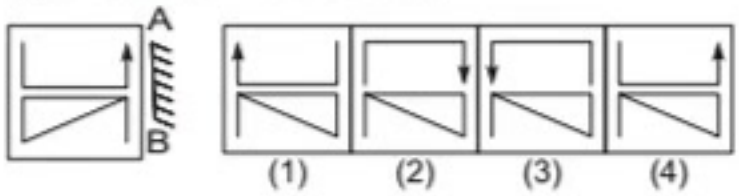
Mirror Image of Numbers

Number	1	2	3	4	5	6	7	8	9
Mirror Image	↿	ᄅ	Ɛ	↊	ᔕ	9	⅂	8	6

To understand the concept of the mirror image. Let us look on some of the following examples.

Example **1.** Which of the following answer figure would be the exact mirror image of question figure?

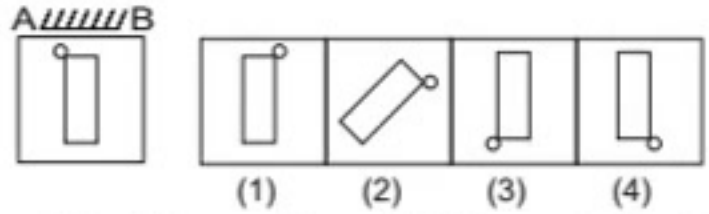
Ques. Fig. **Ans. Fig.**



Sol. **(1)** Answer figure (1) is the exact mirror image of question figure.

Example **2.**

Ques. Fig. **Ans. Fig.**



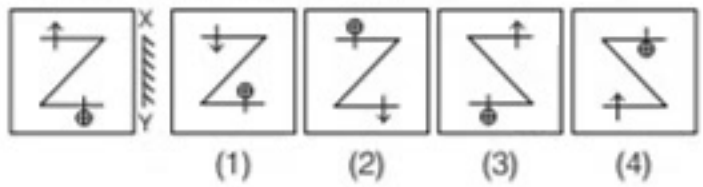
Sol. **(3)** Answer figure (3) is the exact mirror image of the question figure.

Entrance Corner

Directions (Q.Nos. 1-18) *In the given questions, there is a question figure and four answer figures* (1), (2), (3) *and* (4). *Find out the correct answer figure when a mirror is held on* XY *line.*

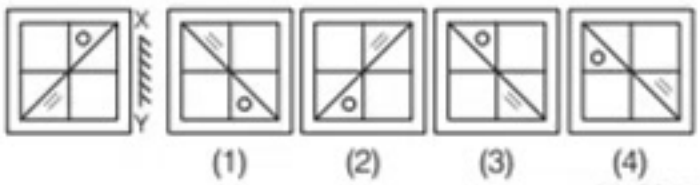
Ques. Fig. Ans. Fig.

1.



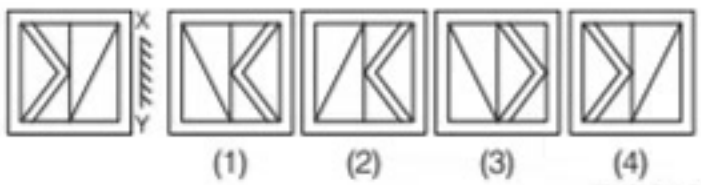
[JNV 2019]

2.



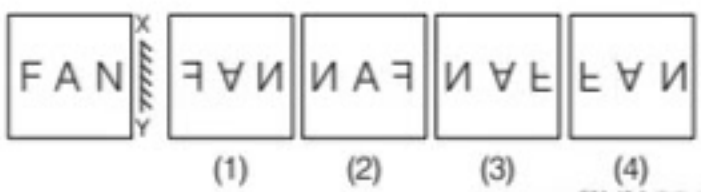
[JNV 2019]

3.



[JNV 2019]

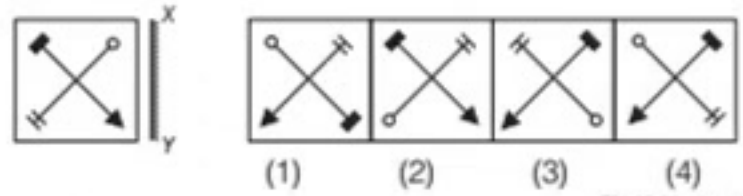
4.



[JNV 2019]

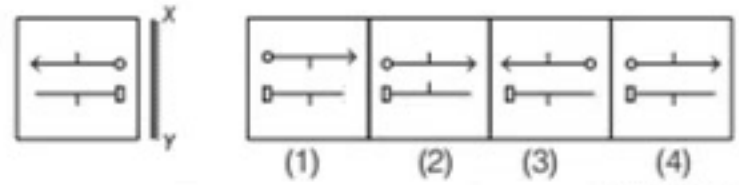
Ques. Fig. Ans. Fig.

5.



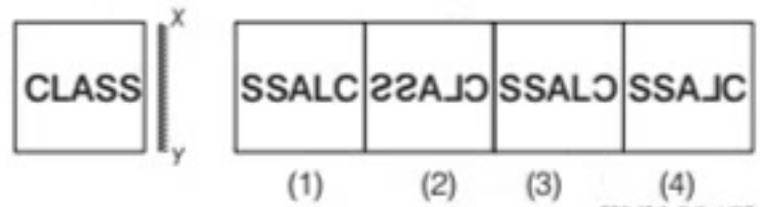
[JNV 2018]

6.



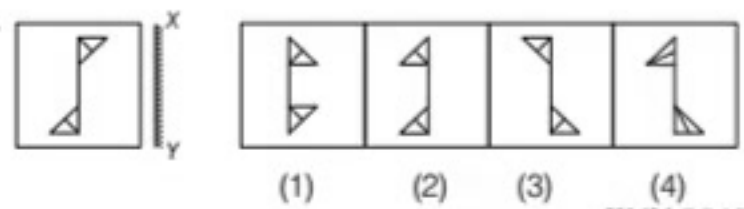
[JNV 2018]

7.



[JNV 2018]

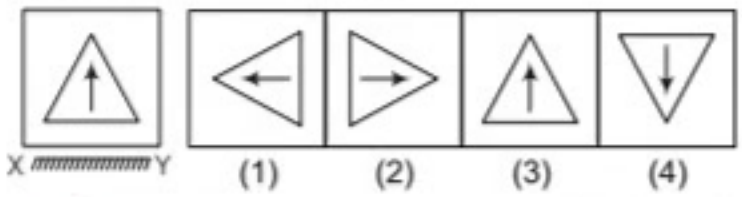
8.



[JNV 2018]

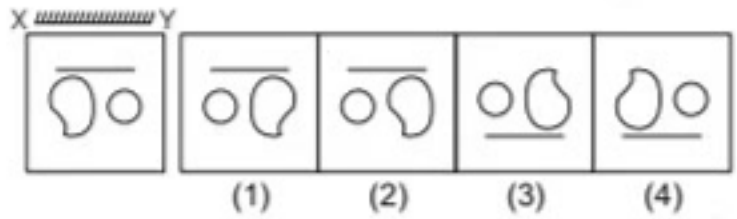
Ques. Fig. Ans. Fig.

9.



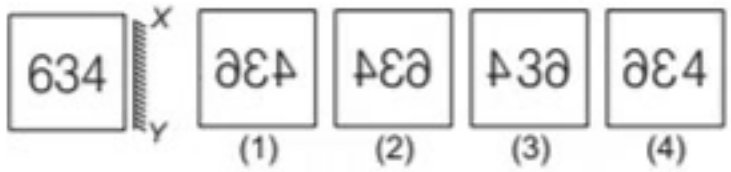
[JNV 2017]

10.



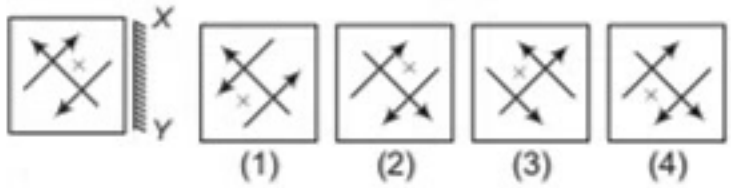
[JNV 2017]

11.



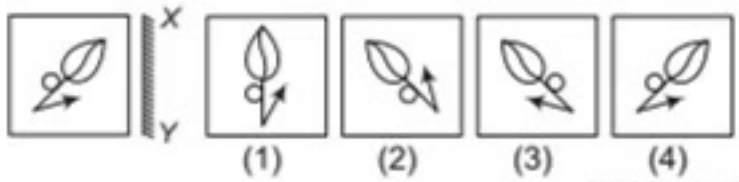
[JNV 2016]

12.



[JNV 2016]

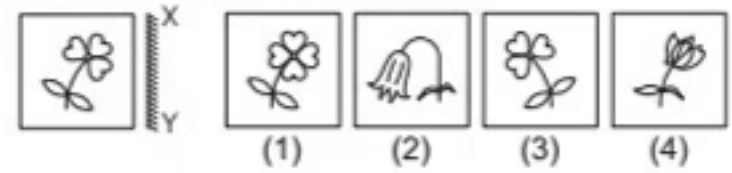
13.



[JNV 2015]

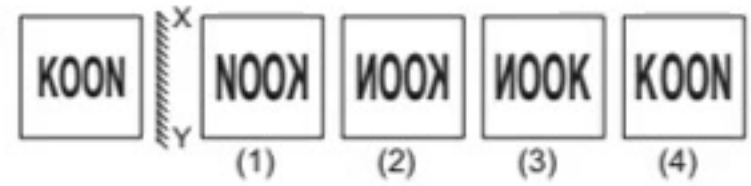
Ques. Fig. Ans. Fig.

14.



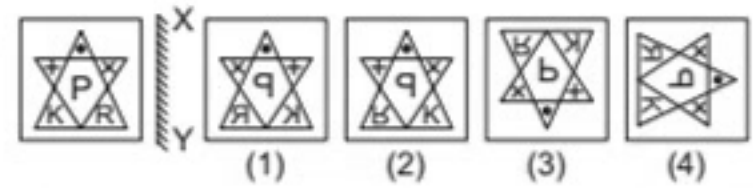
[JNV 2015]

15.



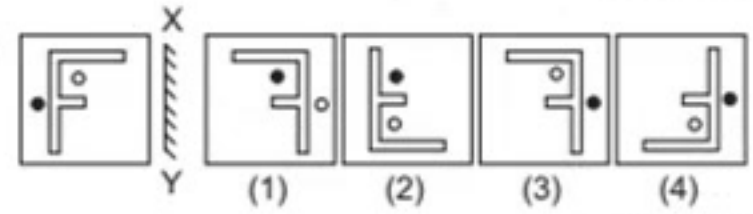
[JNV 2013]

16.



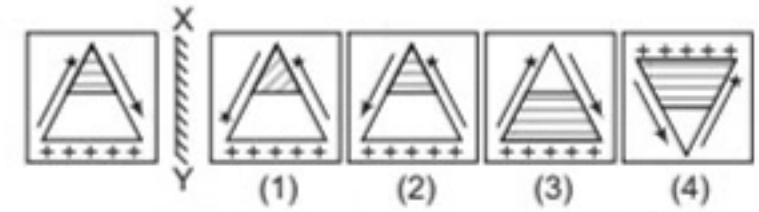
[JNV 2013]

17.



[JNV 2013]

18.



[JNV 2013]

Answers

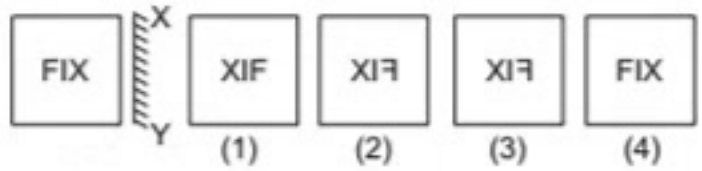
1 *(3)*	**2** *(3)*	**3** *(1)*	**4** *(2)*	**5** *(4)*	**6** *(4)*	**7** *(2)*	**8** *(3)*	**9** *(4)*	**10** *(4)*
11 *(2)*	**12** *(3)*	**13** *(3)*	**14** *(3)*	**15** *(2)*	**16** *(1)*	**17** *(3)*	**18** *(2)*		

Practice Exercise

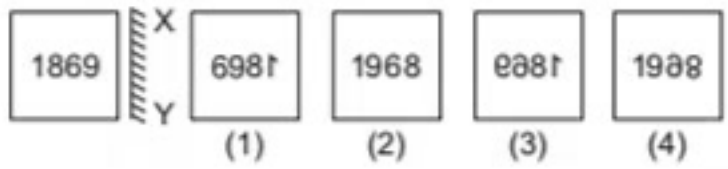
Directions (Q. Nos. 1-30) *In the given questions, there is a question figure and four answer figures* (1), (2), (3) *and* (4). *Find out the correct answer figure when a mirror is held on* XY *line.*

Ques. Fig. **Ans. Fig.**

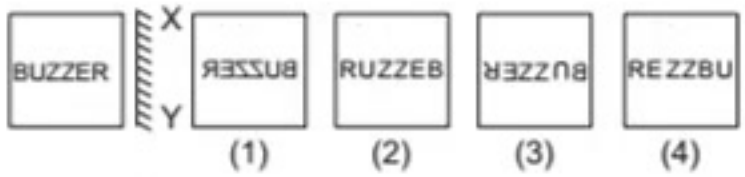
1.



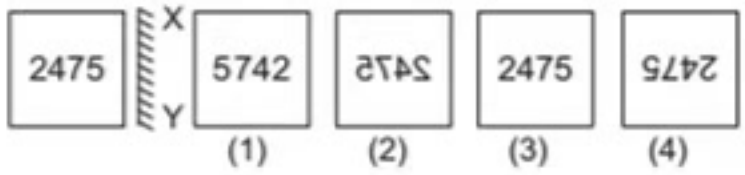
2.



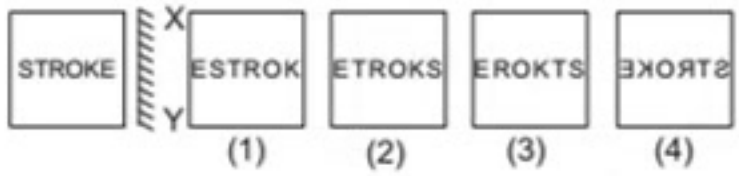
3.



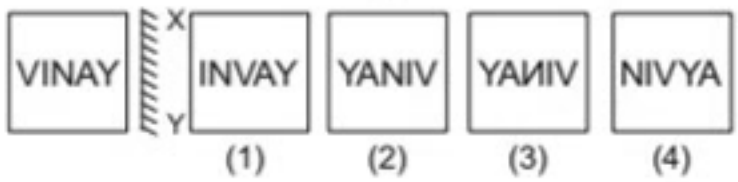
4.



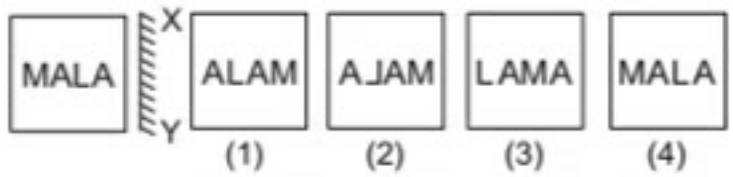
5.



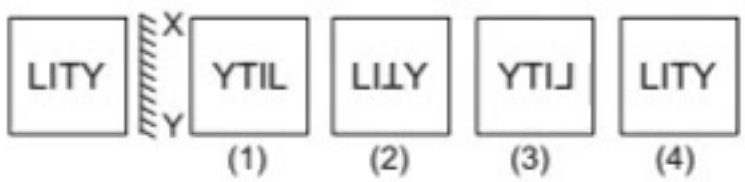
6.



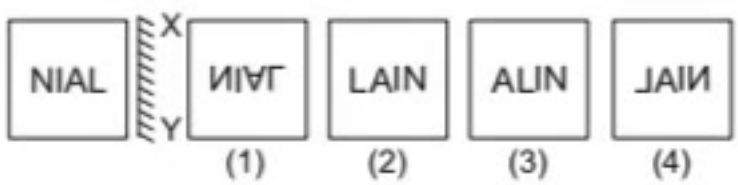
7.



8.

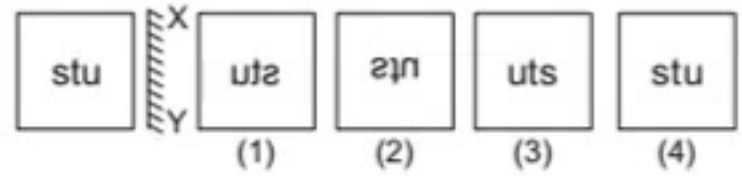


9.

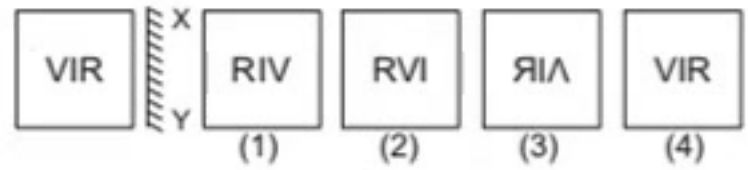


Ques. Fig. **Ans. Fig.**

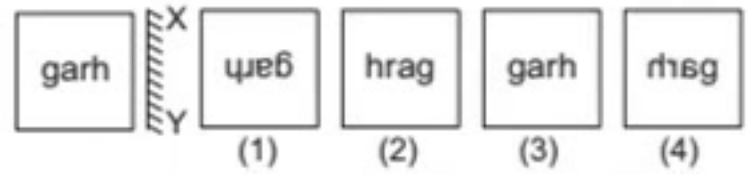
10.



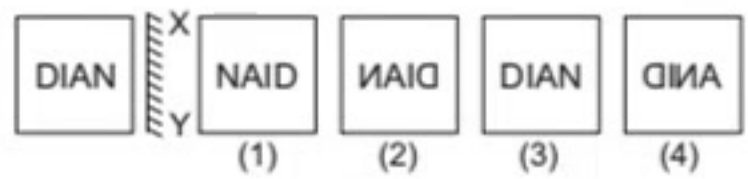
11.



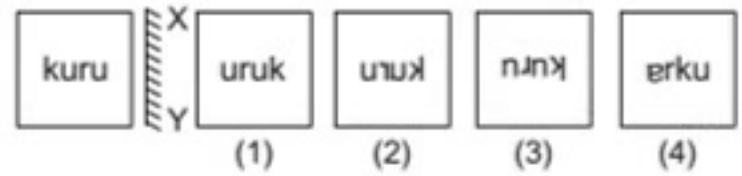
12.



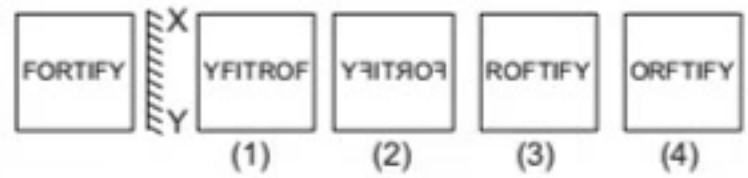
13.



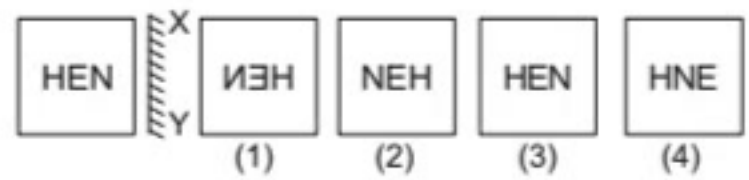
14.



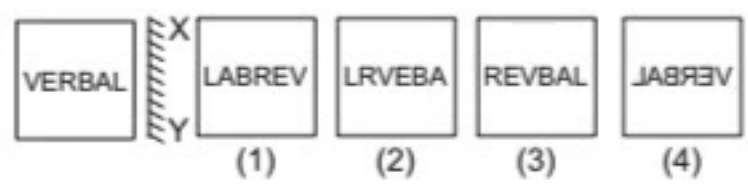
15.



16.

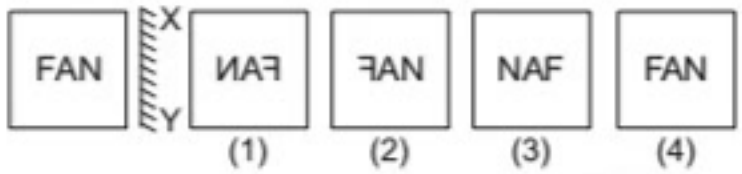


17.

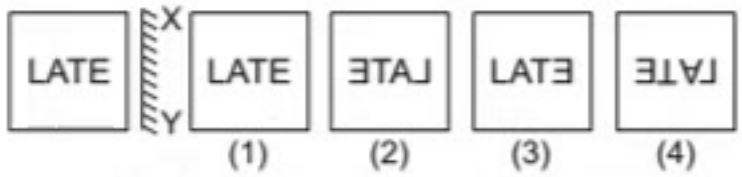


Ques. Fig. **Ans. Fig.**

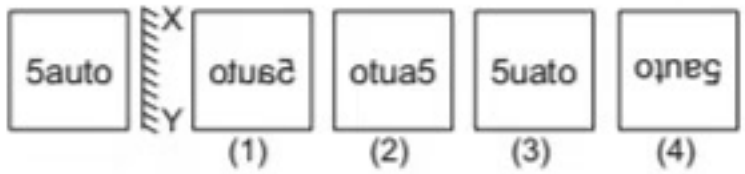
18.



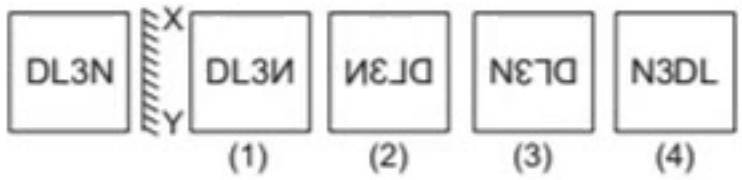
19.



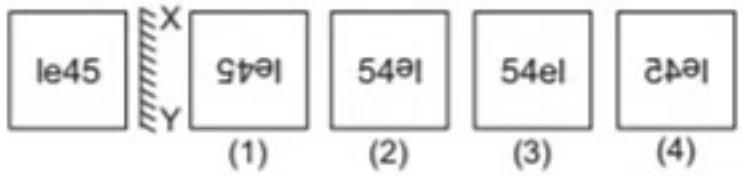
20.



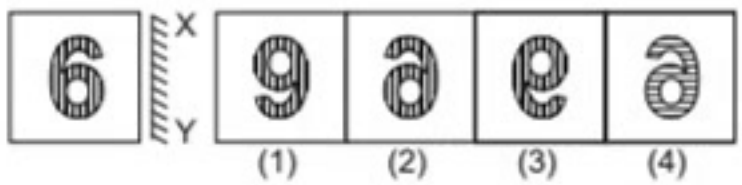
21.



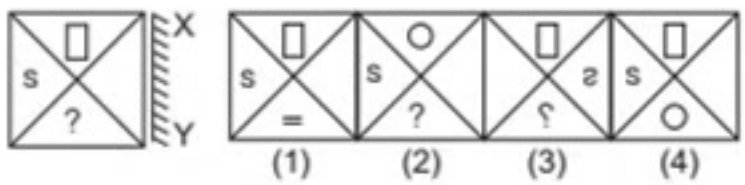
22.



23.

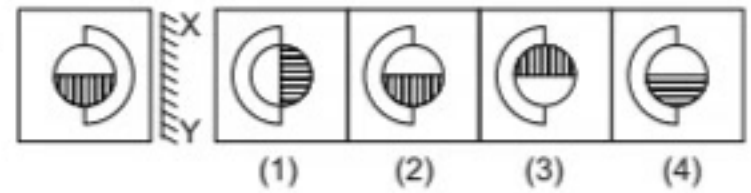


24.

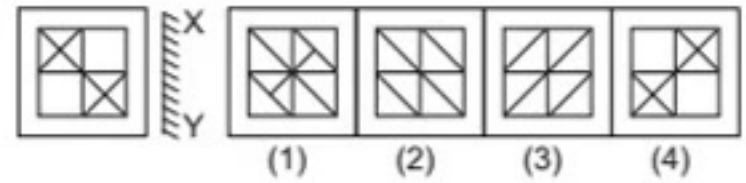


Ques. Fig. **Ans. Fig.**

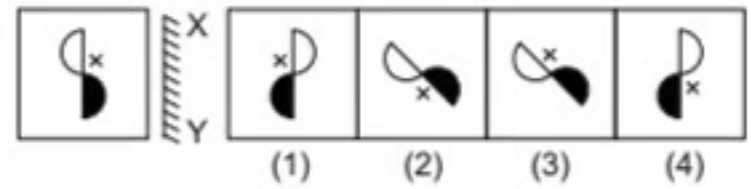
25.



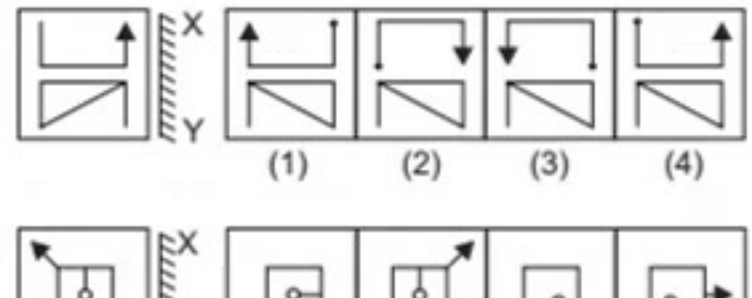
26.



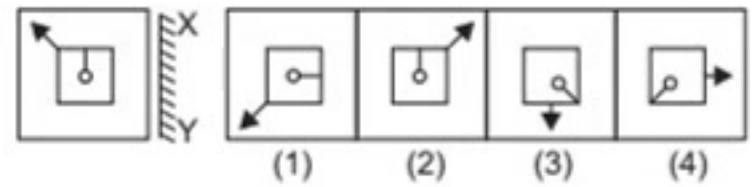
27.



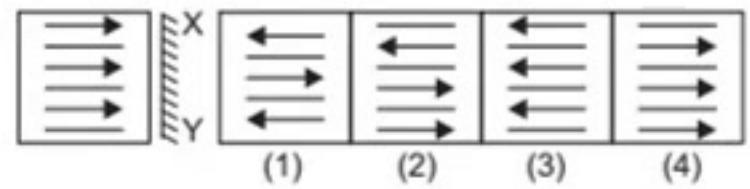
28.



29.



30.



Answers

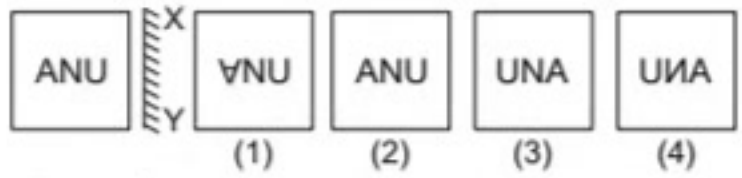
1 *(2)*	**2** *(3)*	**3** *(1)*	**4** *(2)*	**5** *(4)*	**6** *(3)*	**7** *(2)*	**8** *(3)*	**9** *(4)*	**10** *(1)*
11 *(3)*	**12** *(4)*	**13** *(2)*	**14** *(2)*	**15** *(2)*	**16** *(1)*	**17** *(4)*	**18** *(1)*	**19** *(2)*	**20** *(1)*
21 *(2)*	**22** *(4)*	**23** *(2)*	**24** *(3)*	**25** *(2)*	**26** *(4)*	**27** *(1)*	**28** *(1)*	**29** *(2)*	**30** *(3)*

Self Practice

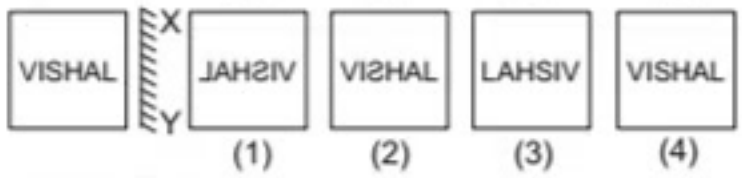
Directions (Q.Nos. 1-15) *In the given questions, there is a question figure and four answer figures* (1), (2), (3) *and* (4). *Find out the correct answer figure when a mirror is held on* XY *line.*

Ques. Fig. **Ans. Fig.**

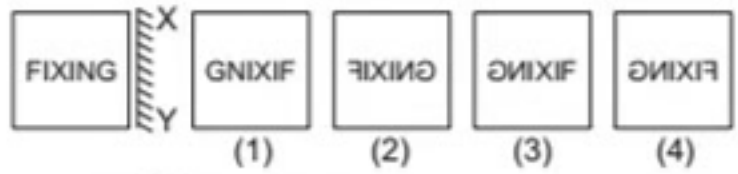
1.



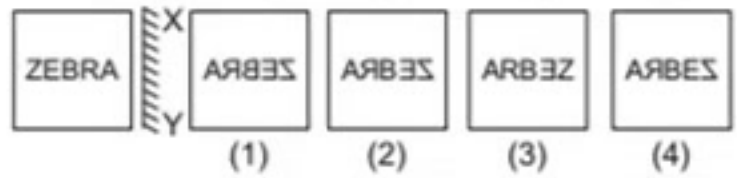
2.



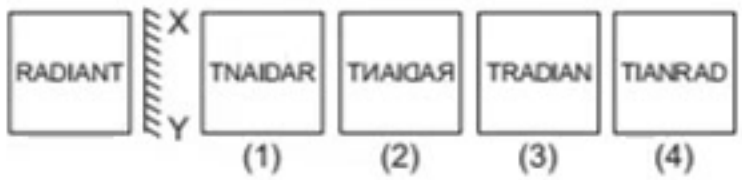
3.



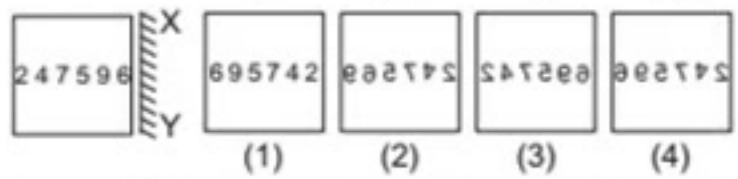
4.



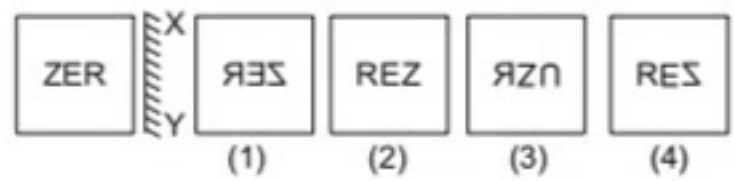
5.



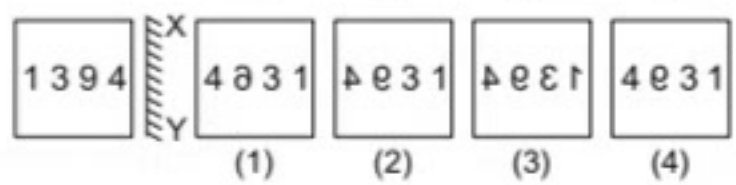
6.



7.

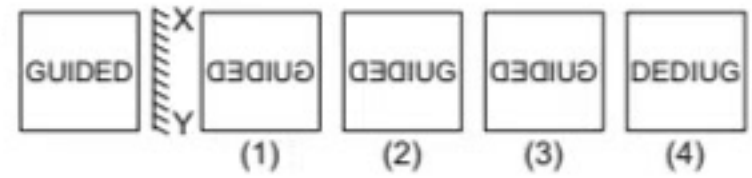


8.

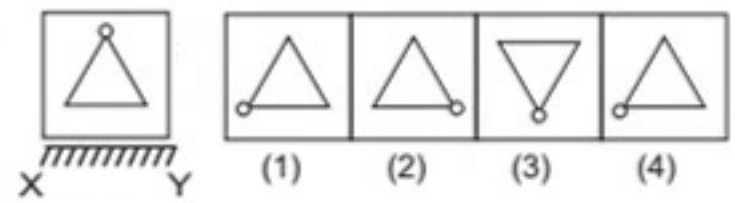


Ques. Fig. **Ans. Fig.**

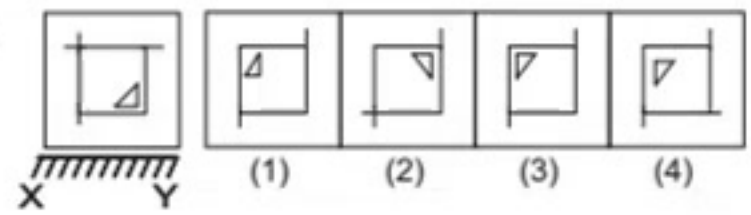
9.



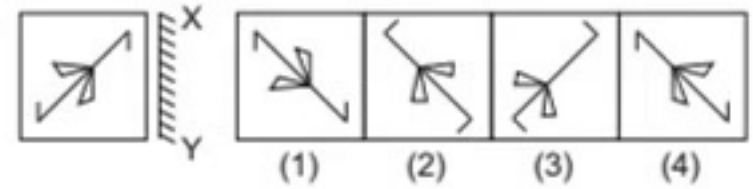
10.



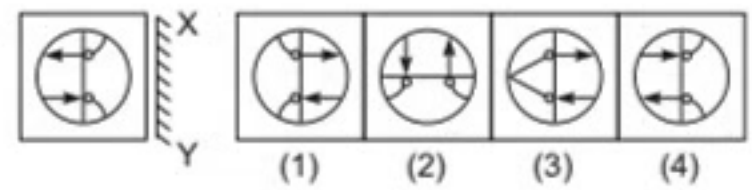
11.



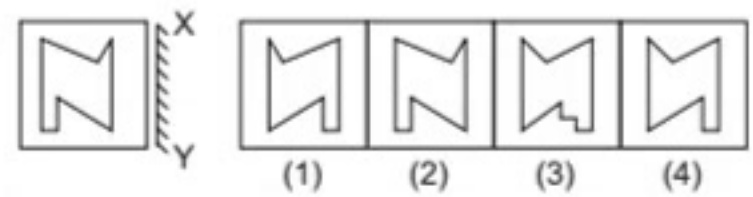
12.



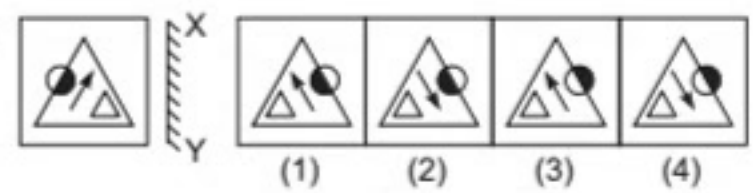
13.



14.



15.



Answers

1 *(4)*	**2** *(1)*	**3** *(4)*	**4** *(1)*	**5** *(2)*	**6** *(4)*	**7** *(1)*	**8** *(3)*	**9** *(1)*	**10** *(3)*
11 *(2)*	**12** *(4)*	**13** *(1)*	**14** *(1)*	**15** *(1)*					

CHAPTER

08

PUNCHED HOLE PATTERN

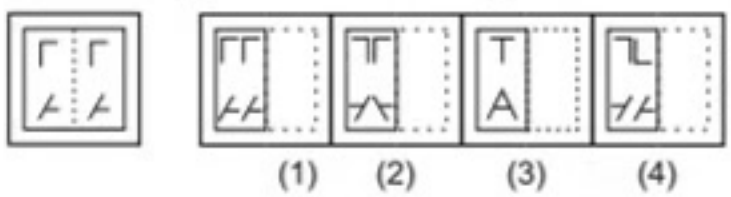
Paper Folding

Problems based on 'Paper folding' involves folding a transparent sheet along a dotted line so that the design on one side of the dotted line gets superimposed on the design on the other side.

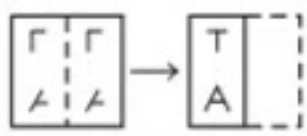
In such type of questions, a transparent sheet having a certain design and a dotted line on it is given. The candidates are required to identify the design (or pattern) that would be formed when the sheet is folded along the dotted line.

Example **1.**

Question figure **Answer figures**



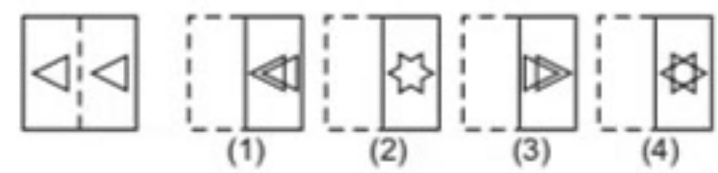
Sol. **(3)**



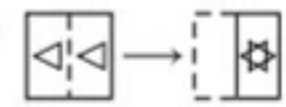
When paper is folded along the dotted line the right half goes to left side.

Example **2.**

Question figure **Answer figures**



Sol. **(4)**



When paper is folded along the dotted line the left half goes to right side.

Paper Cutting

In this type of question based on paper cutting, few figures are given showing the way in which a piece of paper is to be folded and then cut from a particular section. The dotted line is the reference line along which the paper is to be folded and the arrow indicates the direction of the fold.

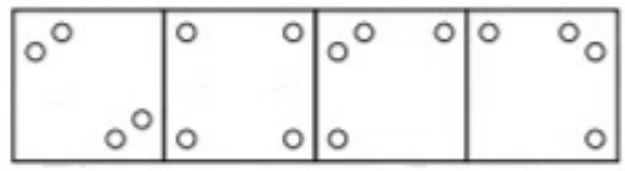
The candidates are required to identify the design or pattern that would be formed when the sheet is unfolded.

Students, while solving these questions must kept following points in mind

- Identify the way in which paper is folded.
- Determine the pattern of dotted lines, it shows the way in which a piece of paper is folded.
- Folded figure may cut from either of the sides as horizontally or vertically.

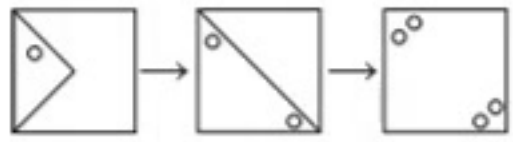
Example **3. Question figures**

Answer figure



(1) (2) (3) (4)

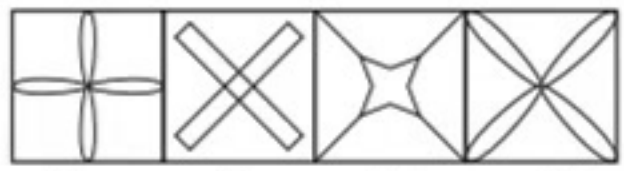
Sol. **(1)**



Answer figure (1) will appear when a piece of paper is folded and punched (cut) as shown in the question figure.

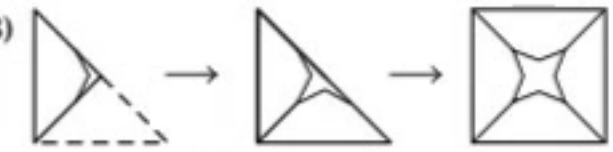
Example **4. Question figures**

Answer figure



(1) (2) (3) (4)

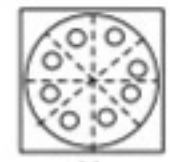
Sol. **(3)**



Answer figure (3) will appear when a piece of paper is folded and punched (cut) as shown in the question figure.

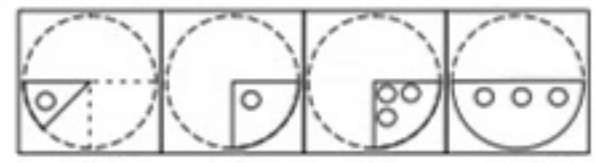
Example **5.** A paper sheet is folded in a particular manner and several punches (cuts) are made. When unfolded the paper sheet looks like the question figure (X). From the given options select the one that follows the manner in which the paper is folded and punched.

Question Figure



X

Answer Figures



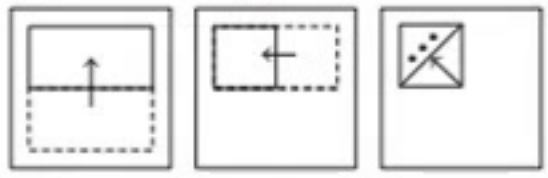
(1) (2) (3) (4)

Sol. **(1)** When we fold the question figure, then it looks like as answer figure (1).

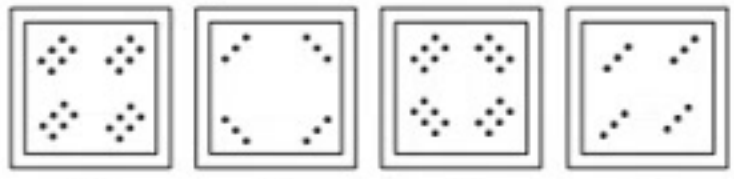
Entrance Corner

Directions (Q. Nos. 1-19) *In the given questions, there is a question figure, four the answer figures* (1), (2), (3) *and* (4). *Find out which answer figure can appear when a piece of paper is folded, punches and opend?*

1. Question figures

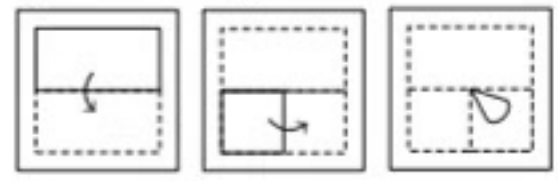


Answer figures

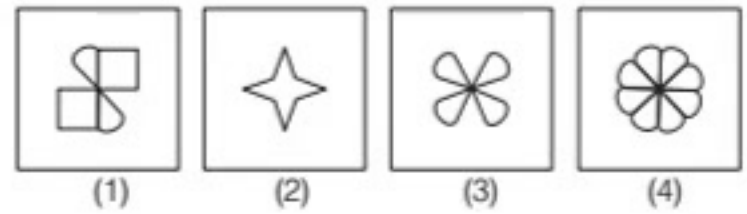


(1) (2) (3) (4)

2. Question figures

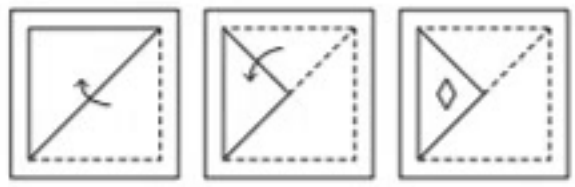


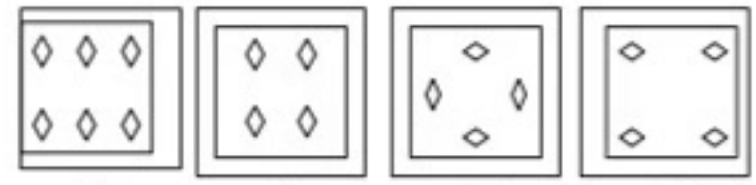
Answer figures



(1) (2) (3) (4)

3. Question figures **Answer figures**

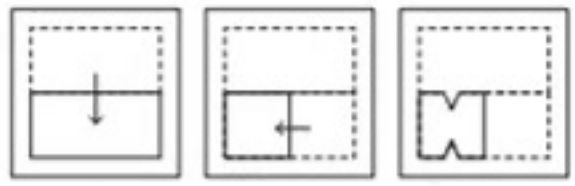


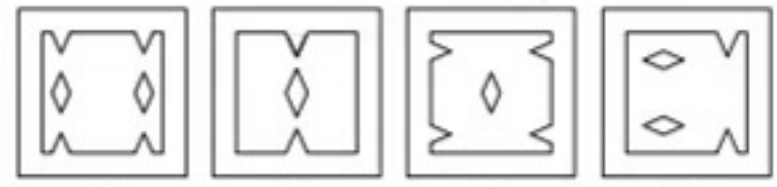


(1) (2) (3) (4)

[JNV 2016]

4.

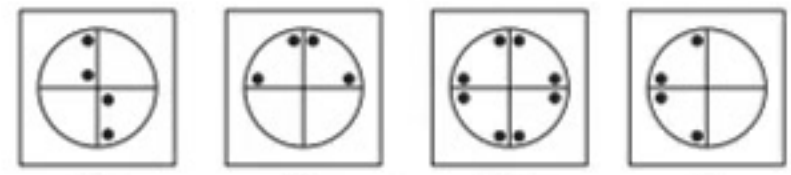




(1) (2) (3) (4)

[JNV 2015]

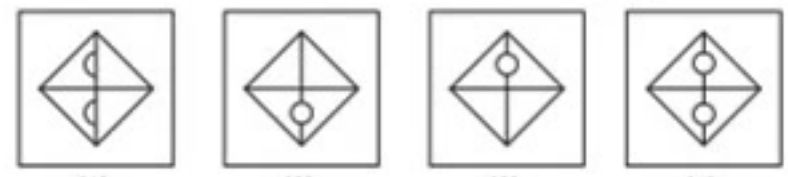
5.



(1) (2) (3) (4)

[JNV 2015]

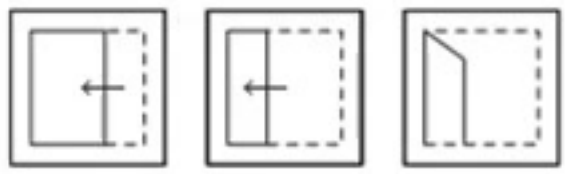
6.

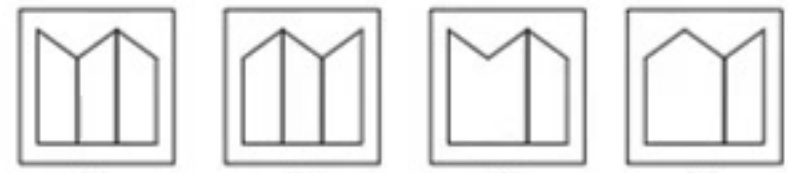


(1) (2) (3) (4)

[JNV 2014]

7.

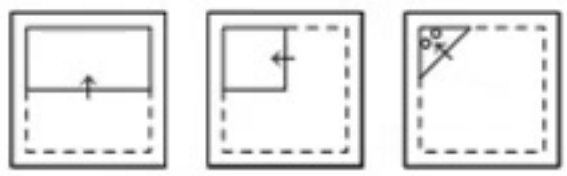


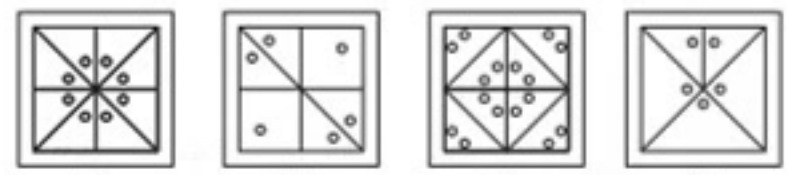


(1) (2) (3) (4)

[JNV 2014]

8.

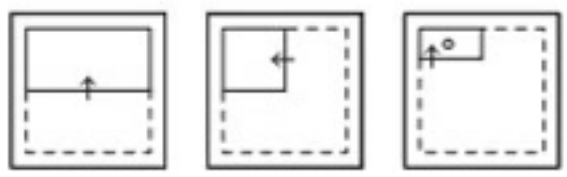


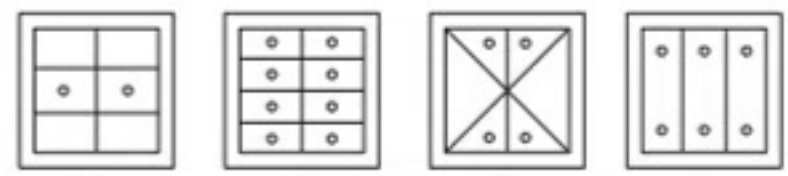


(1) (2) (3) (4)

[JNV 2013]

9.

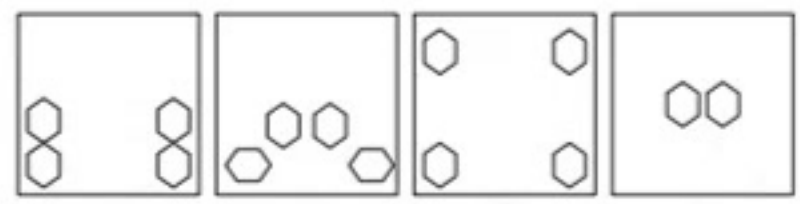




(1) (2) (3) (4)

[JNV 2013]

10.

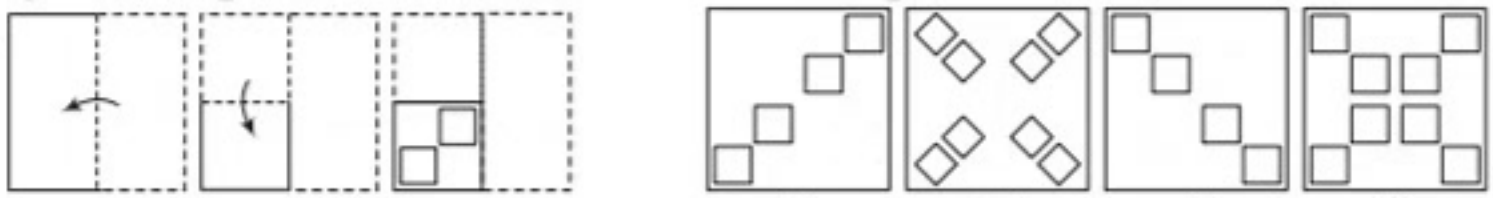


(1) (2) (3) (4)

[JNV 2017]

Question figuers **Answer figuers**

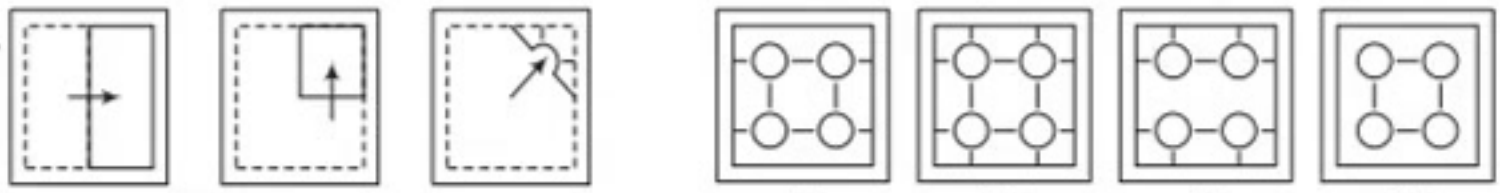
11.



(1) (2) (3) (4)

[JNV 2017]

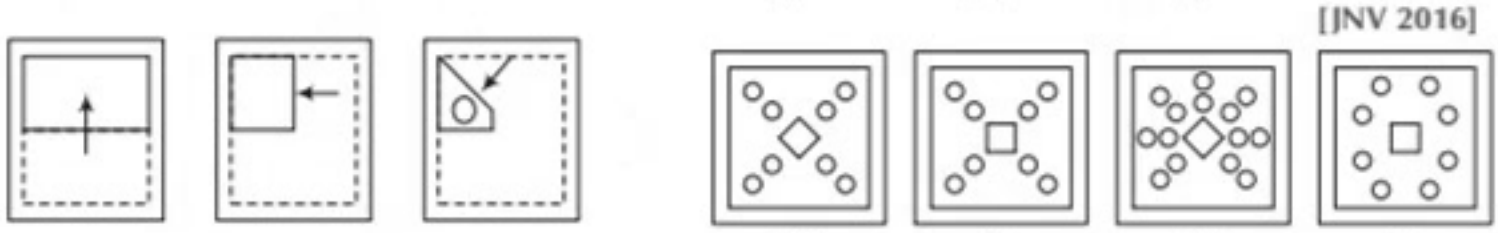
12.



(1) (2) (3) (4)

[JNV 2016]

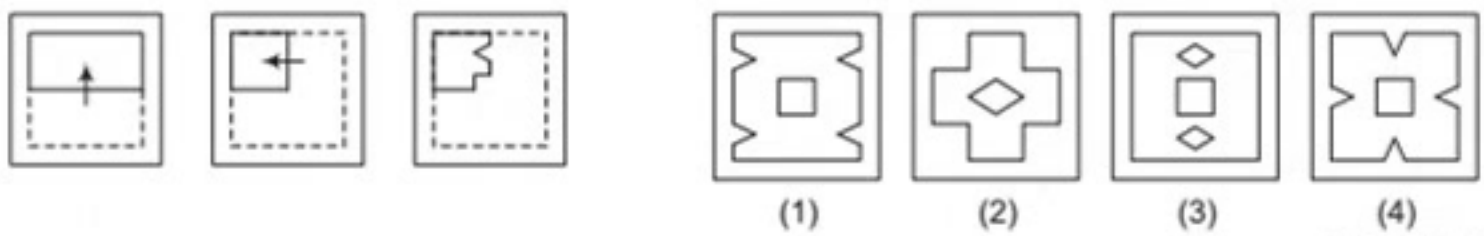
13.



(1) (2) (3) (4)

[JNV 2016]

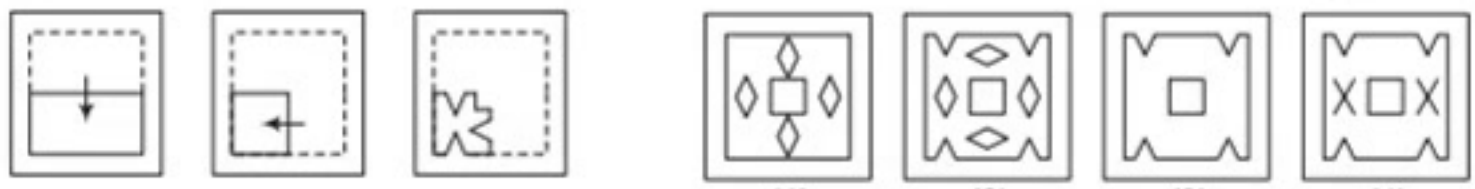
14.



(1) (2) (3) (4)

[JNV 2015]

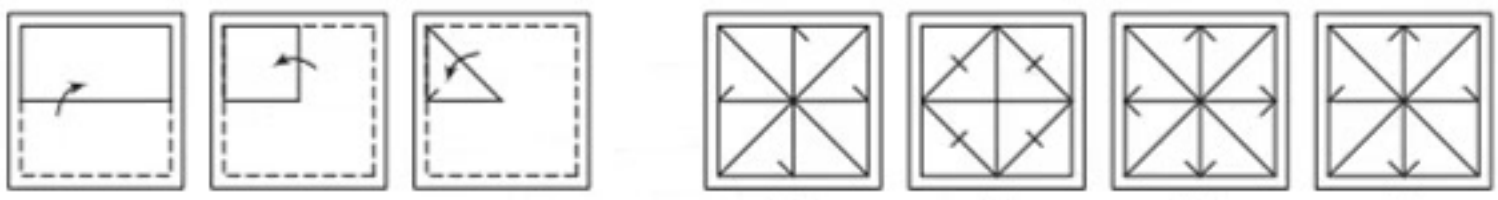
15.



(1) (2) (3) (4)

[JNV 2015]

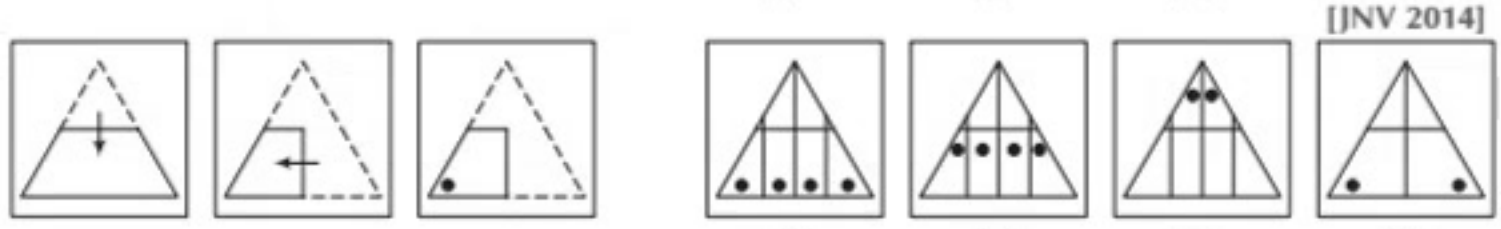
16.



(1) (2) (3) (4)

[JNV 2014]

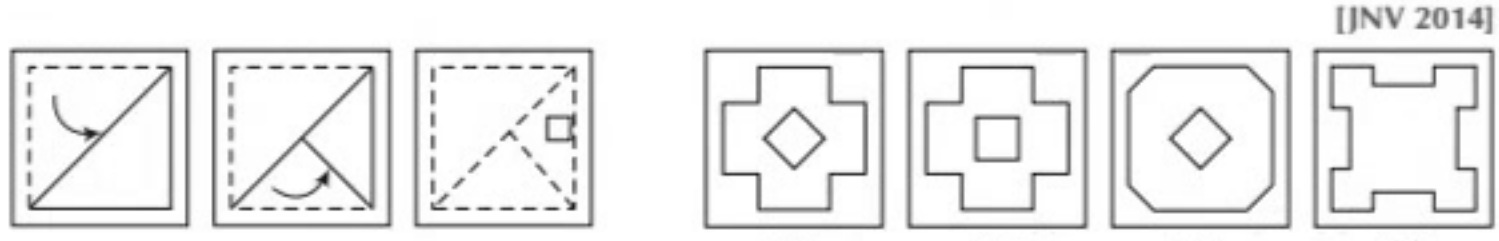
17.



(1) (2) (3) (4)

[JNV 2014]

18.

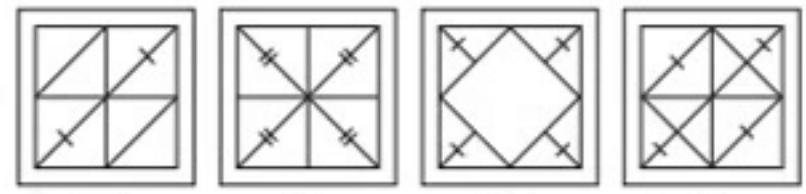


(1) (2) (3) (4)

[JNV 2013]

19. **Question figuers**

Answer figuers



(1) (2) (3) (4)

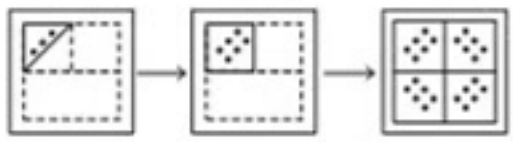
[JNV 2013]

Answers

1 *(3)*	**2** *(3)*	**3** *(3)*	**4** *(1)*	**5** *(3)*	**6** *(4)*	**7** *(1)*	**8** *(3)*	**9** *(2)*	**10** *(2)*
11 *(4)*	**12** *(2)*	**13** *(4)*	**14** *(3)*	**15** *(2)*	**16** *(3)*	**17** *(4)*	**18** *(4)*	**19** *(2)*	

Hints and Solutions

1. (3) When the paper is unfolded, it will appear as shown in answer figure (3).



2. (3) When the paper is unfolded, it will appear as shown in answer figure (3).

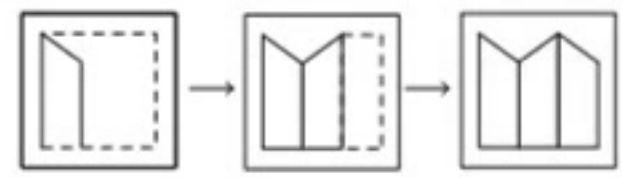
3. (3) When the paper is unfolded, it will appear as shown in answer figure (3).

4. (1) When the paper is unfolded, it will appear as shown in answer figure (1).

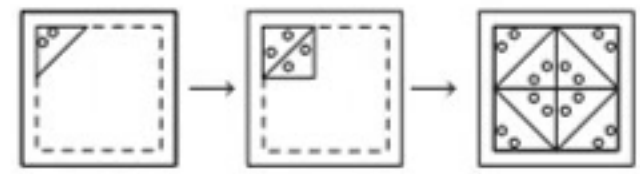
5. (3) When the paper is undolfed it will appear as shown in answer figure (3)

6. (4) When the paper is unfolded, it will appear as shown in answer figure (4)

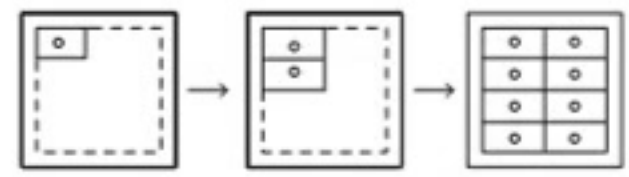
7. (1) When the paper is unfolded, it will appear as shown in answer figure (1)



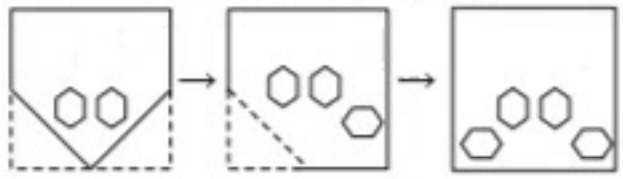
8. (3) When the paper is unfolded, it will appear as shown in answer figure (3)



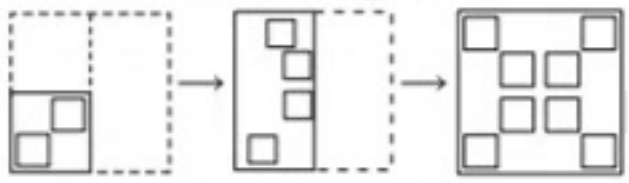
9. (2) When the paper is unfolded, it will appear as shown in answer figure (2).



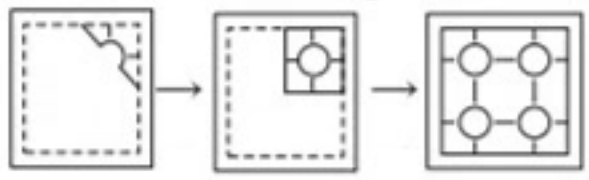
10. (2) When the paper is unfolded, it will appear as shown in answer figure (2)



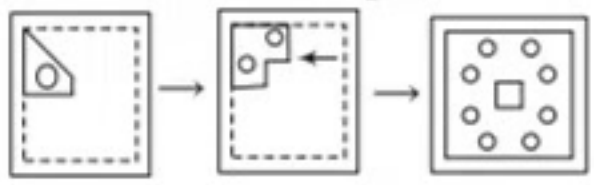
11. (4) When the paper is unfolded, it will appear as shown in answer figure (4)



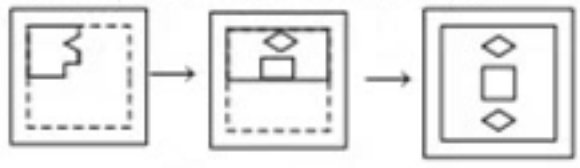
12. (2) When the paper is unfolded, it will appear as shown in answer figure (2).



13. (4) When the paper is unfolded, it will appear as shown in answer figure (4)

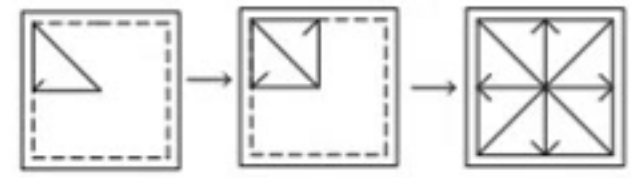


14. (3) When the paper is unfolded, it will appear as shown in answer figure (3)

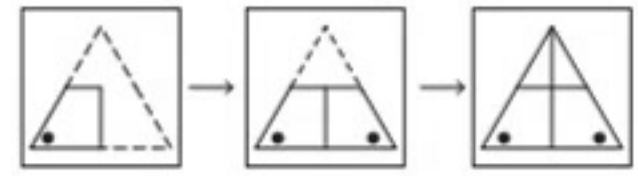


15. (2) When the paper is unfolded, it will appear as shown in answer figure (2).

16. (3) When the paper is unfolded, it will appear as shown in answer figure (3)

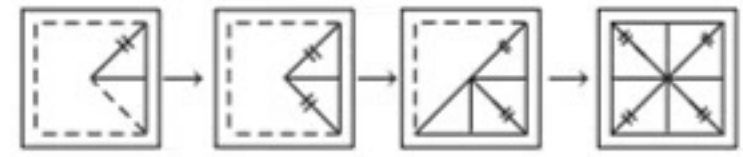


17. (4) When the paper is unfolded, it will appear as shown in answer figure (4)



18. (4) When the paper is unfolded, it will appear as shown in answer figure (4)

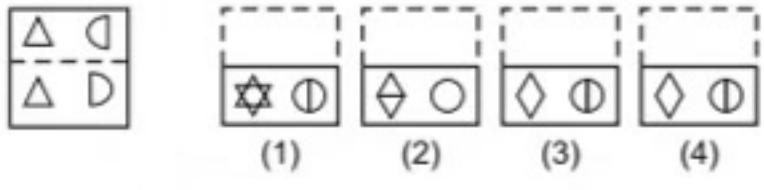
19. (2) When the paper is unfolded, it will appear as shown in answer figure (2).



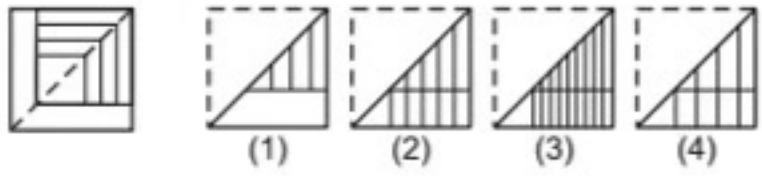
Practice Exercise

Directions (Q. Nos. 1-12) *In each of the following questions a square transparent sheet (question figure) with a pattern is given. Figure out from amongst the four alternatives as to how the pattern would appear when the transparent sheet (question figure) is folded at the dotted line?*

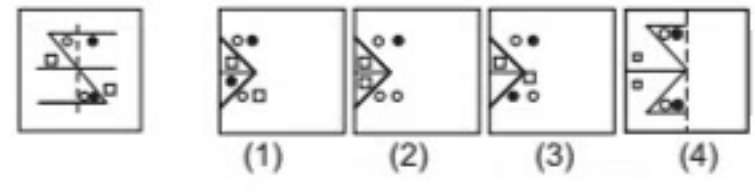
1. Question figure Answer figures



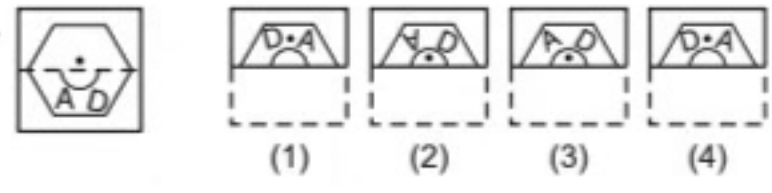
2.



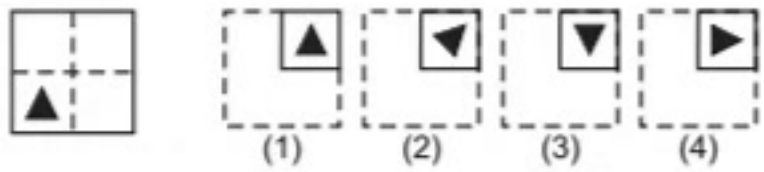
3. Question figure Answer figures



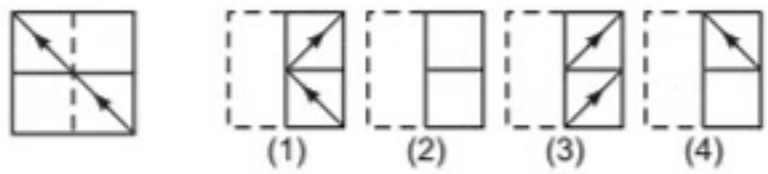
4.



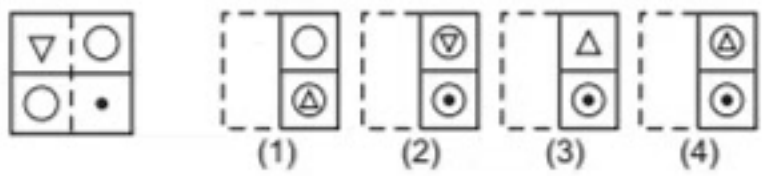
5. Question figure Answer figures



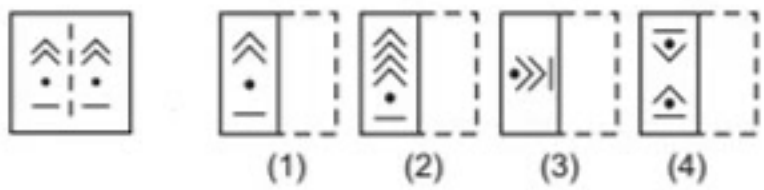
6.



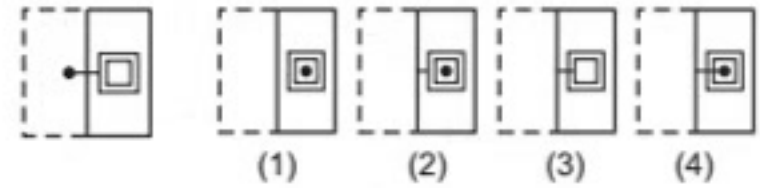
7.



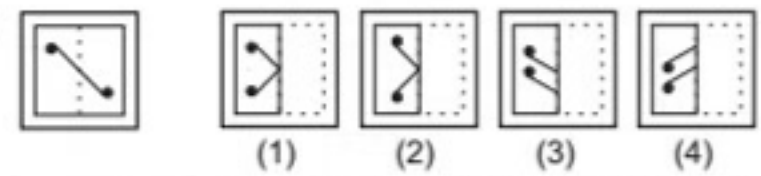
8.



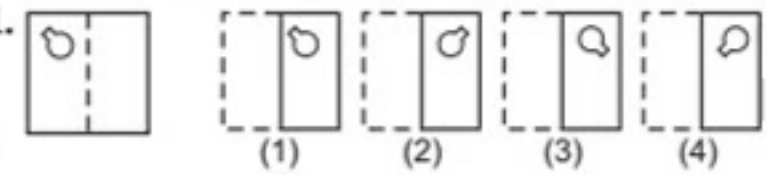
9. Question figure Answer figures



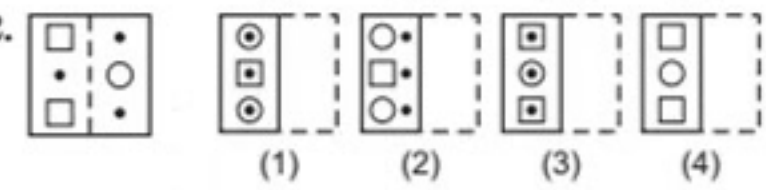
10.



11.

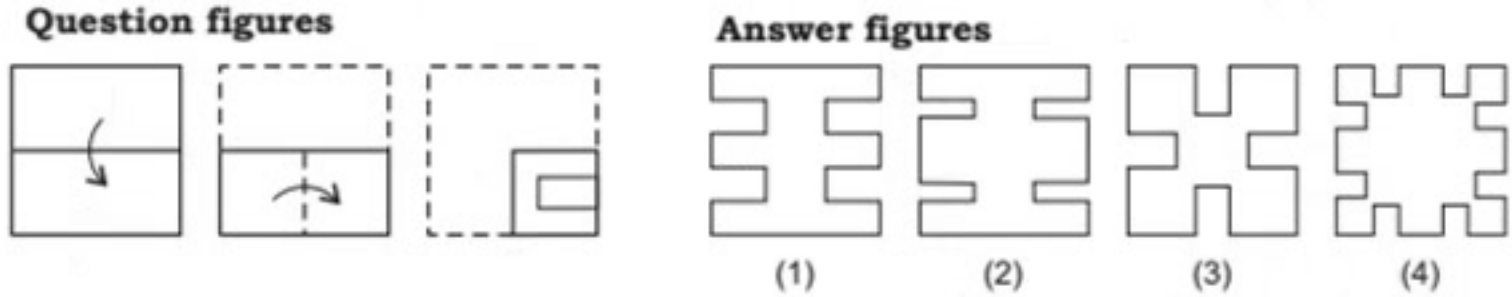


12.

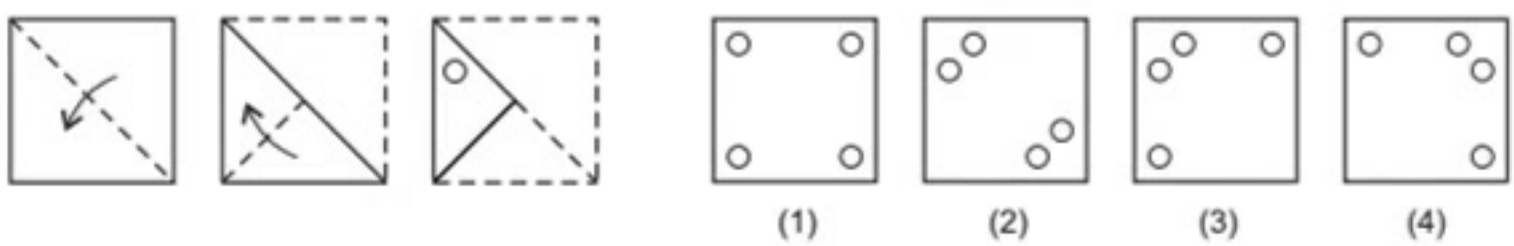


Directions (Q.Nos. 13-20) *In the given questions, there is a question figure and four the answer figures.* (1), (2), (3) *and* (4). *Find out which answer figure can appear when a piece of paper is folded, punches and opened?*

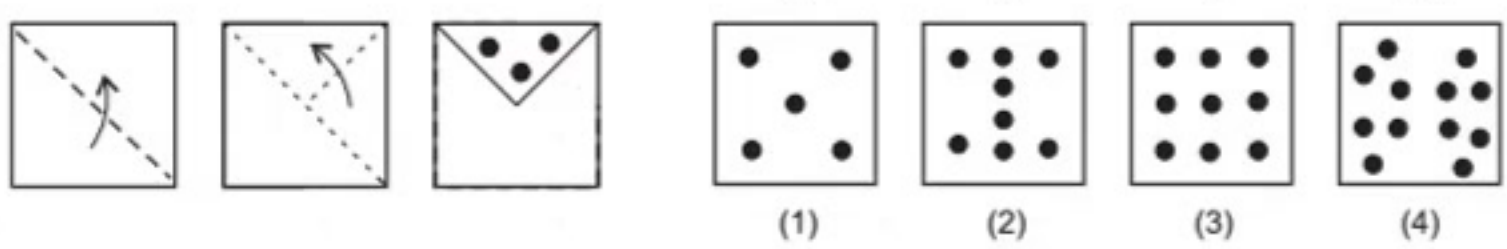
13. Question figures Answer figures



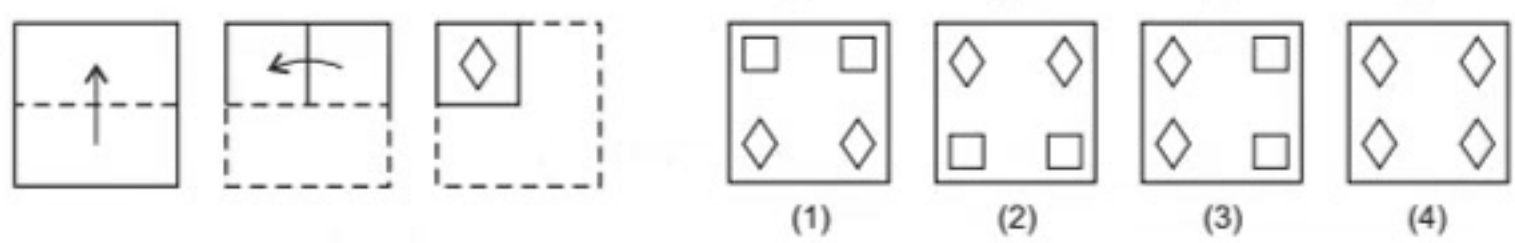
14.



15.

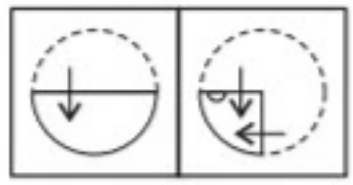


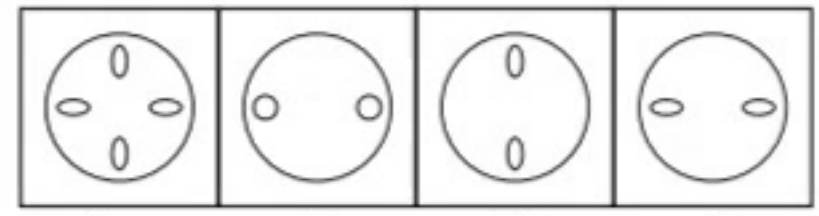
16.



Question figures **Answer figures**

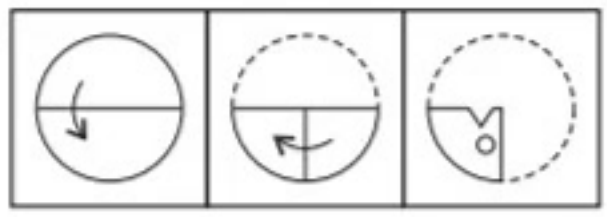
17.

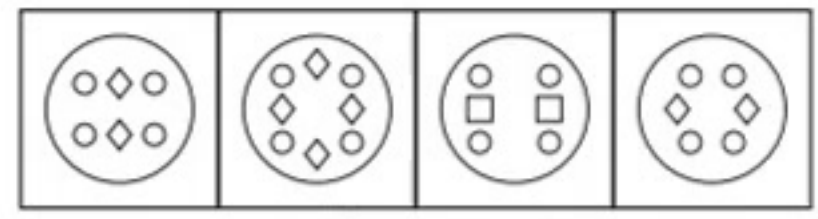




(1) (2) (3) (4)

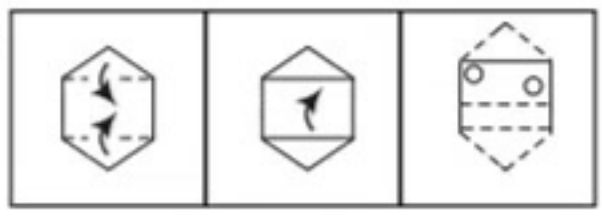
18.

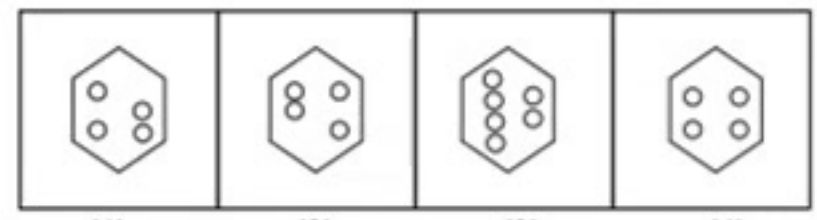




(1) (2) (3) (4)

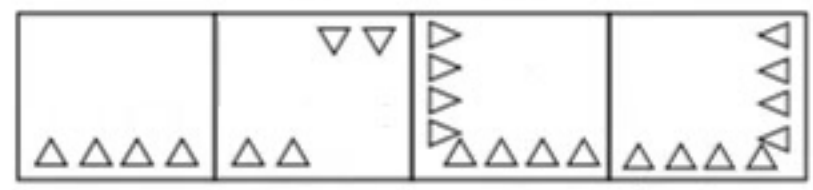
19.





(1) (2) (3) (4)

20.

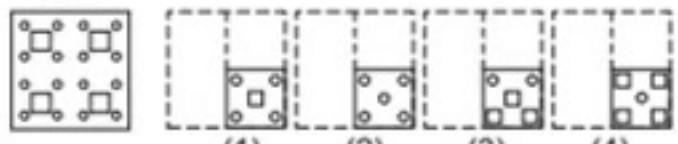


(1) (2) (3) (4)

Directions (Q. Nos. 21-25) *In each of the following question, a sheet (square/circle/triangle) of paper is folded and punch is made. When unfolded the paper sheet looks like the question figure. See the answer figures and select the one that follows the manner in which the paper is folded and punch is made.*

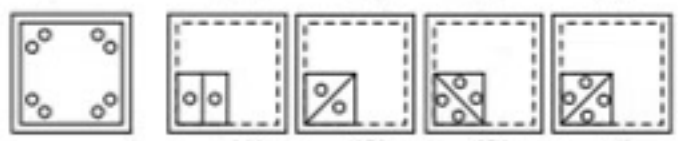
Question Figure **Answer Figures**

21.



(1) (2) (3) (4)

22.



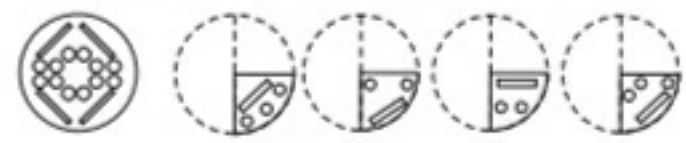
(1) (2) (3) (4)

23.

(1) (2) (3) (4)

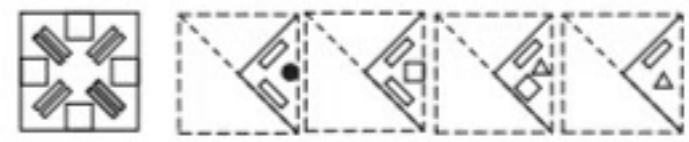
Question Figure **Answer Figures**

24.



(1) (2) (3) (4)

25.



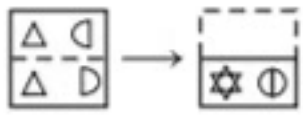
(1) (2) (3) (4)

Answers

1 *(1)*	**2** *(1)*	**3** *(4)*	**4** *(2)*	**5** *(3)*	**6** *(1)*	**7** *(2)*	**8** *(1)*	**9** *(4)*	**10** *(1)*
11 *(2)*	**12** *(3)*	**13** *(1)*	**14** *(2)*	**15** *(4)*	**16** *(4)*	**17** *(2)*	**18** *(4)*	**19** *(3)*	**20** *(4)*
21 *(1)*	**22** *(2)*	**23** *(1)*	**24** *(4)*	**25** *(2)*					

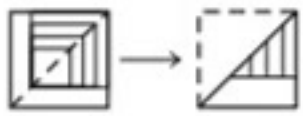
Hints and Solutions

1. (1)



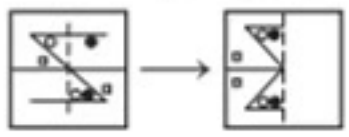
When a paper is folded along the dotted line the upper half figure goes to lower half.

2. (2)



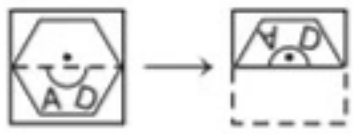
When a paper is folded along the dotted line the left half figure goes to right half.

3. (4)



When a paper is folded along the dotted line the right half figure goes to left half.

4. (2)

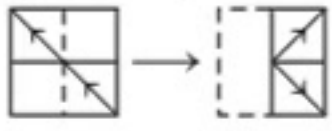


When a paper is folded along the dotted line the lower half figure goes to upper half.

5. (3)

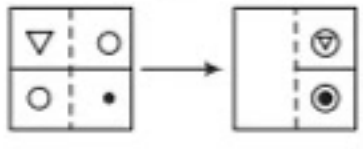
When a paper is folded along the dotted line the lower left figure goes to upper left and then goes to right corner.

6. (1)



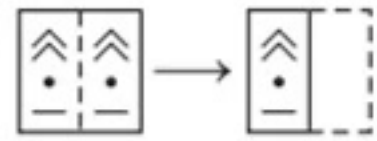
When a paper is folded along the dotted line the left half figure goes to right half.

7. (2)



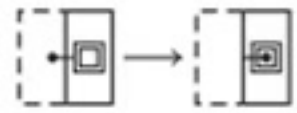
When a paper is folded along the dotted line the left half figure goes to right half.

8. (1)



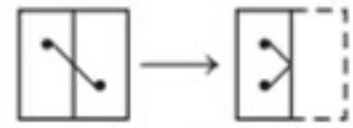
When a paper is folded along the dotted line the right half figure goes to left half.

9. (4)



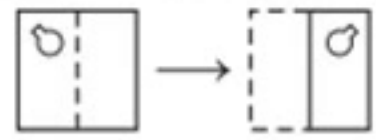
When a paper is folded along the dotted line the left half figure goes to right half.

10. (1)



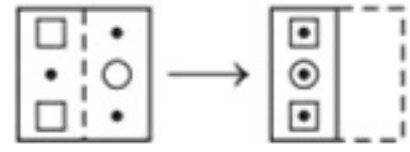
When a paper is folded along the dotted line the right half figure goes to left half.

11. (2)



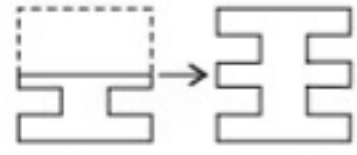
When a paper is folded along the dotted line the left half figure goes to right half.

12. (3)



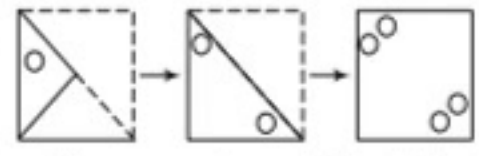
When a paper is folded along the dotted line the right half figure goes to left half.

13. (1)



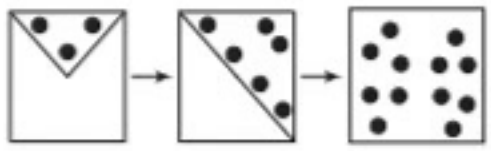
When the paper is unfolded, it will appear as shown in answer figure (1).

14. (2)



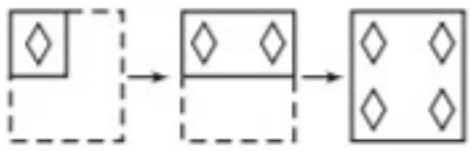
When the paper is unfolded, it will appear as shown in answer figure (2)

15. (4)



When the paper is unfolded, it will appear as shown in answer figure (4)

16. (4)



When the paper is unfolded, it will appear as shown in answer figure (4)

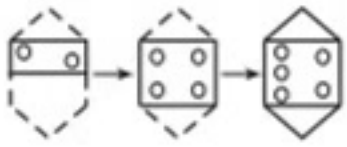
17. (2)

When the paper is unfolded, it will appear as shown in answer figure (2)

18. (4)

When the paper is unfolded, it will appear as shown in answer figure (4)

19. (3)

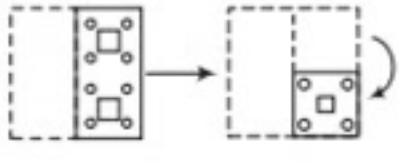


When the paper is unfolded, it will appear as shown in answer figure (3)

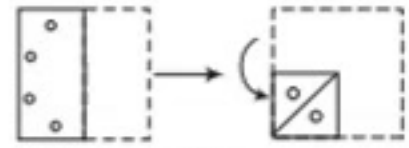
20. (4)

When the paper is unfolded, it will appear as shown in answer figure (4)

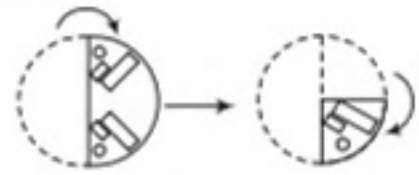
21. (1) The left hay of the transparent sheet is folded along the dotted line and is placed on the right half. Then, the upper half of the sheet is folded along the dotted line and placed on lower half of the sheet. The figure, thus obtained resembles the figure as shown in option (1)



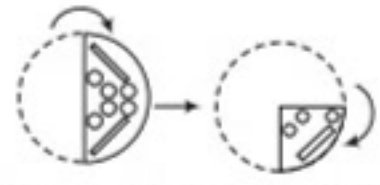
22. (2) The right half of the transparent sheet is folded along the dotted line and is placed on the left half. Then, the upper half of the sheet is folded along the dotted line and placed on lower half of the sheet. The figure, thus obtained resembles the figure as shown in option (2)



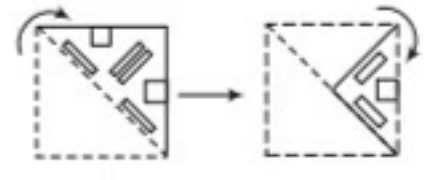
23. (1) The left half of the transparent sheet is folded along the dotted line and is placed on the right half. Then, the upper half of the sheet is folded along the dotted line and placed on lower half of the sheet. The figure, thus obtained resembles the figure as shown in option (1)



24. (4) The left half of the transparent sheet is folded along the dotted line and is placed on the right half. Then, the upper half of the sheet is folded along the dotted line and placed on lower half of the sheet.The figure, thus obtained resembles the figure as shown in option (4)



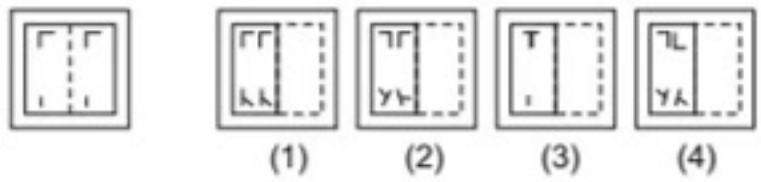
25. (2) The bottom left half of the transparent sheet is folded along the dotted line and is placed on the top right half. Then, the upper half of the sheet is folded along the dotted line and placed on lower half of the sheet. The figure, thus obtained resembles the figure as shown in option (2)



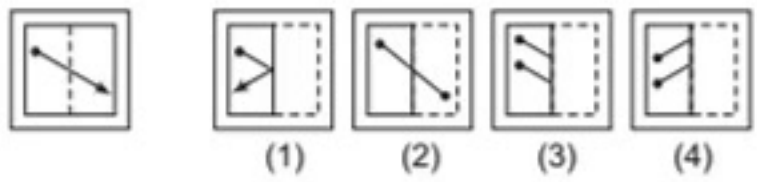
Self Practice

Directions (Q.Nos. 1-10) *In each of the following questions a square transparent sheet (question figure) with a pattern is given. Figure out from amongst the four alternatives as to how the pattern would appear when the transparent sheet (question figure) is folded at the dotted line?*

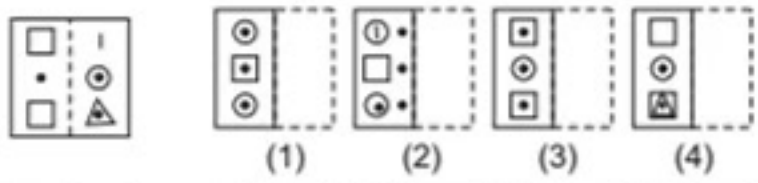
1. Que. fig. Ans. Fig.



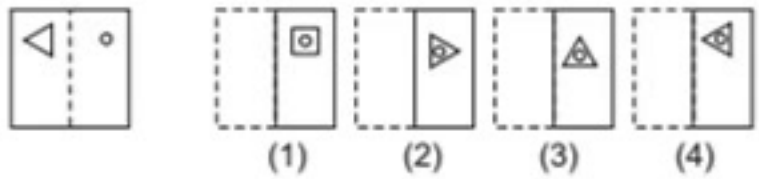
2.



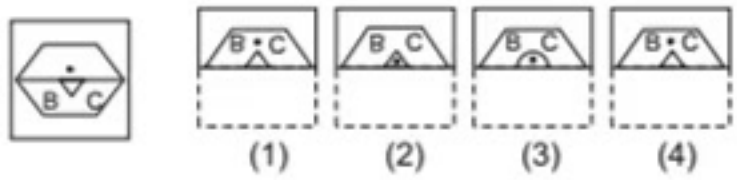
3.



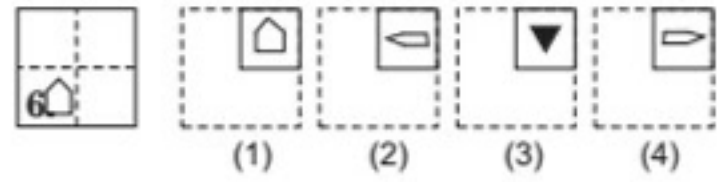
4.



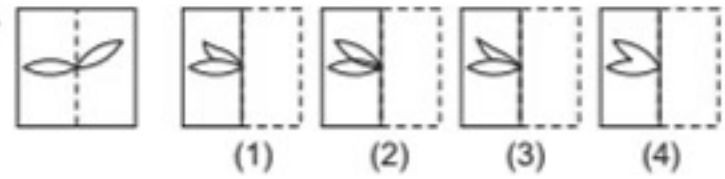
5.



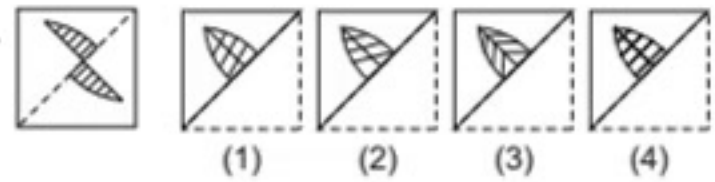
Que. fig. Ans. Fig.



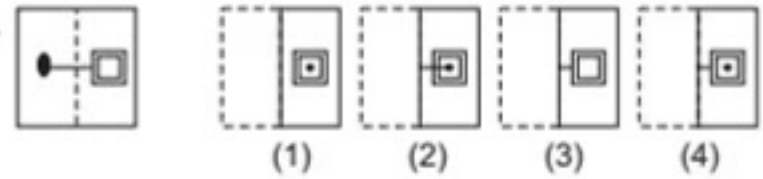
7.



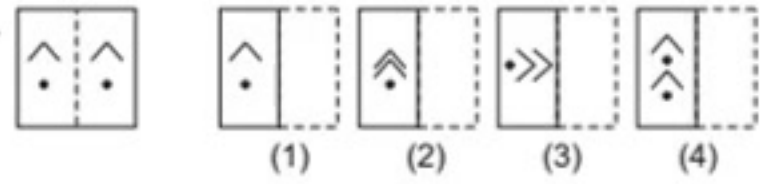
8.



9.

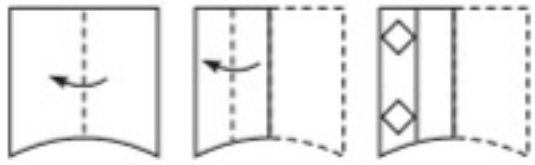


10.

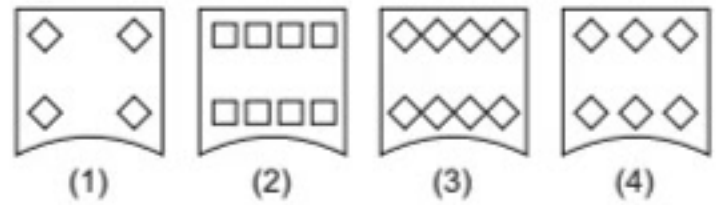


Directions (Q.Nos. 11 and 12) *In the given questions, there is a problem figure, four the answer figures* (1), (2), (3) *and* (4). *Find out which answer figure can appear when a piece of paper is folded, punches and opened?*

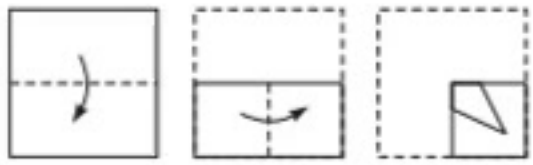
11. Question figures

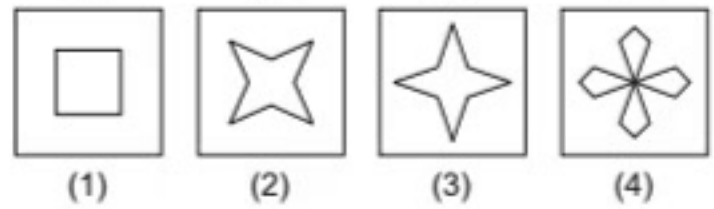


Answer figures



12.





Answers

1 *(3)*	**2** *(1)*	**3** *(3)*	**4** *(4)*	**5** *(2)*	**6** *(3)*	**7** *(2)*	**8** *(4)*	**9** *(2)*	**10** *(1)*
11 *(3)*	**12** *(2)*								

CHAPTER

09

SPACE VISUALISATION

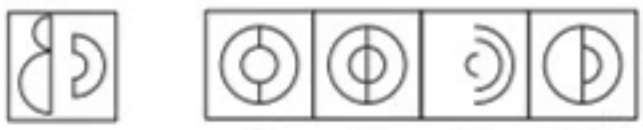
Space visualisation or formation of figures refers to the use of pieces of different designs to construct a desired figure. It requires a high spacial visualisation skill, as different fragmented parts of a figure are combined to form the desired figure.

In this chapter, two sets of figures are provided namely question figure and answer figures. A candidate is asked to arrange the different components of the question figure. So as to form one of the answer figure. Students, while solving these questions must kept following points in mind

- First of all, mark all the designs with numbers and any unique code.
- Corelate all the designs with the help of marked numbers and codes.

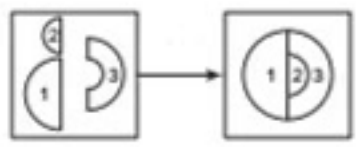
Example **1.**

Ques. Fig. **Ans. Fig.**



(1) (2) (3) (4)

Sol. **(4)**



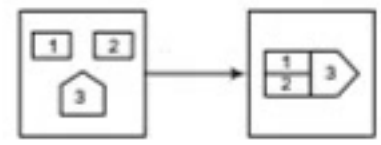
Answer figure (4) can be formed from the cut pieces of the question figure.

Example **2.**

Ques. Fig. **Ans. Fig.**

(1) (2) (3) (4)

Sol. **(1)**

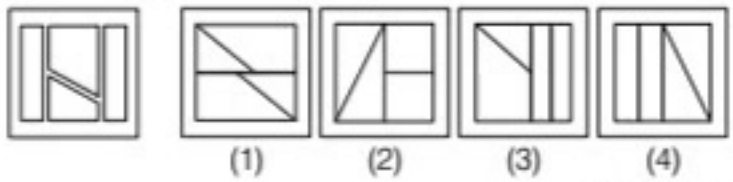


Answer figure (1) can be formed from the cut pieces of the question figure.

Entrance Corner

Directions (Q.Nos. 1-19) *In the given questions, there is a question figure, observe the answer figure* 1, 2, 3 *and* 4 *and find out the answer figure which can be formed from the cut pieces of question figure?*

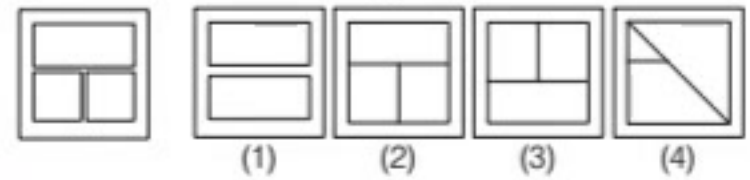
1. **Ques. Fig.** **Answer Fig.**



(1) (2) (3) (4)

[JNV 2019]

2. **Ques. Fig.** **Answer Fig.**

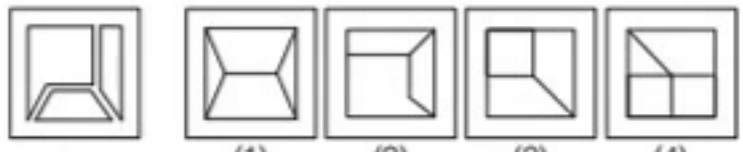


(1) (2) (3) (4)

[JNV 2019]

Ques. Fig. **Ans. Fig.**

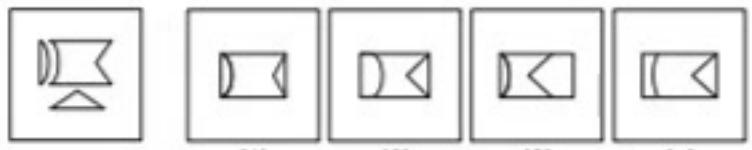
3.



(1) (2) (3) (4)

[JNV 2019]

4.



(1) (2) (3) (4)

[JNV 2019]

5.

(1) (2) (3) (4)

[JNV 2019]

6.

(1) (2) (3) (4)

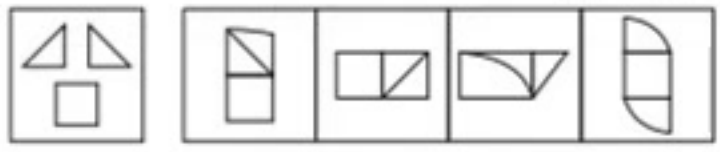
[JNV 2019]

7.

(1) (2) (3) (4)

[JNV 2019]

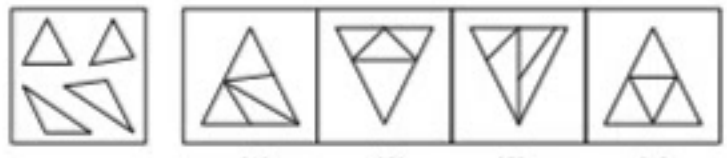
8.



(1) (2) (3) (4)

[JNV 2019]

9.



(1) (2) (3) (4)

[JNV 2019]

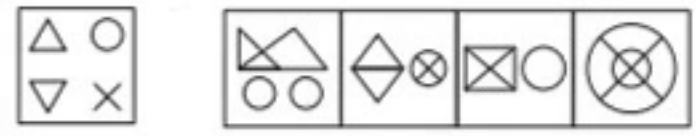
Ques. Fig. **Ans. Fig.**

10.

(1) (2) (3) (4)

[JNV 2017]

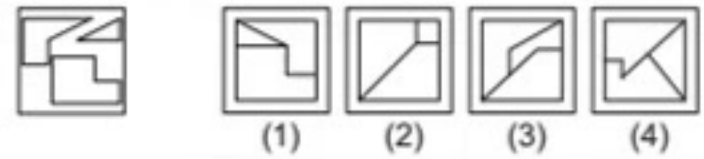
11.



(1) (2) (3) (4)

[JNV 2017]

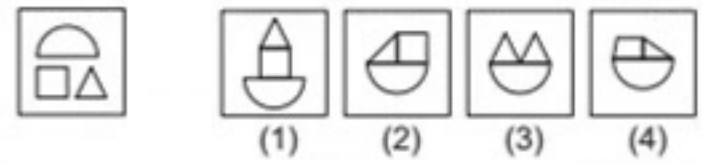
12.



(1) (2) (3) (4)

[JNV 2016]

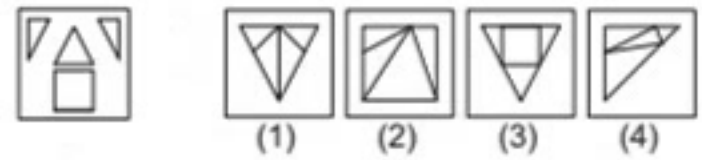
13.



(1) (2) (3) (4)

[JNV 2016]

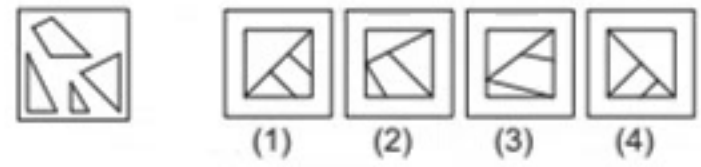
14.



(1) (2) (3) (4)

[JNV 2015]

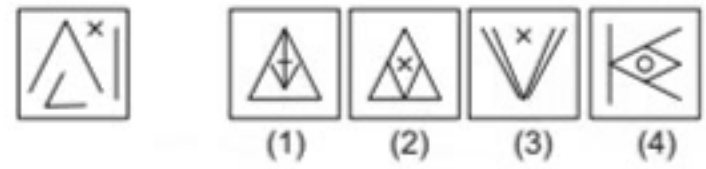
15.



(1) (2) (3) (4)

[JNV 2015]

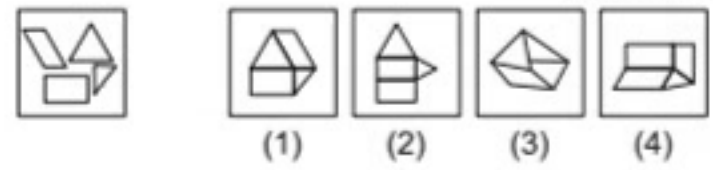
16.



(1) (2) (3) (4)

[JNV 2013]

17.



(1) (2) (3) (4)

[JNV 2013]

Answers

1 *(3)*	**2** *(2)*	**3** *(2)*	**4** *(1)*	**5** *(1)*	**6** *(4)*	**7** *(2)*	**8** *(2)*	**9** *(1)*	**10** *(4)*
11 *(2)*	**12** *(1)*	**13** *(1)*	**14** *(3)*	**15** *(2)*	**16** *(2)*	**17** *(1)*			

Practice Exercise

Directions (Q.Nos. 1-20) *In the given questions, there is a problem figure, observe the answer figure* (1), (2), (3) *and* (4) *and find out the answer figure which can be formed from the cut pieces of problem figure?*

Ques. Fig. **Ans. Fig.**

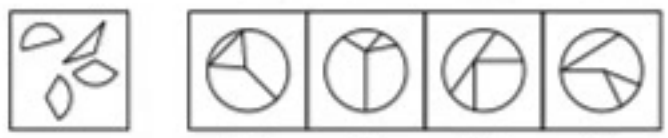
1.

(1) (2) (3) (4)

2.

(1) (2) (3) (4)

3.

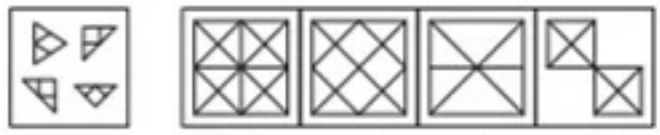


(1) (2) (3) (4)

4.

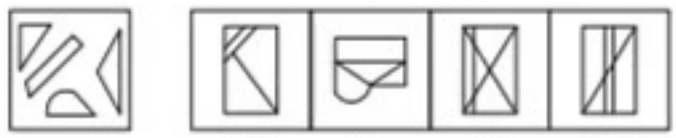
(1) (2) (3) (4)

5.



(1) (2) (3) (4)

6.

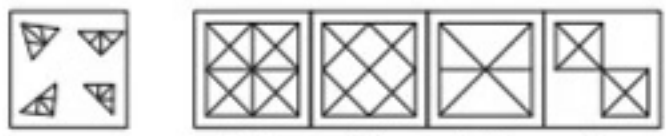


(1) (2) (3) (4)

7.

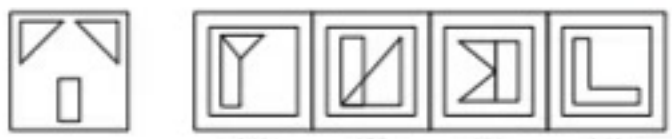
(1) (2) (3) (4)

8.



(1) (2) (3) (4)

9.



(1) (2) (3) (4)

Ques. Fig. **Ans. Fig.**

10.

(1) (2) (3) (4)

11.

(1) (2) (3) (4)

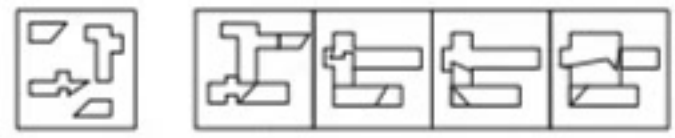
12.

(1) (2) (3) (4)

13.

(1) (2) (3) (4)

14.



(1) (2) (3) (4)

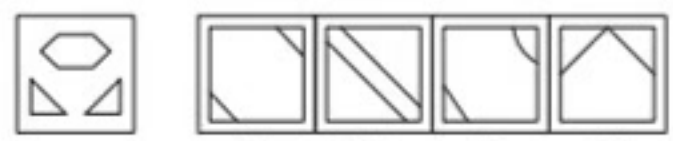
15.

(1) (2) (3) (4)

16.

(1) (2) (3) (4)

17.



(1) (2) (3) (4)

18.

(1) (2) (3) (4)

Answers

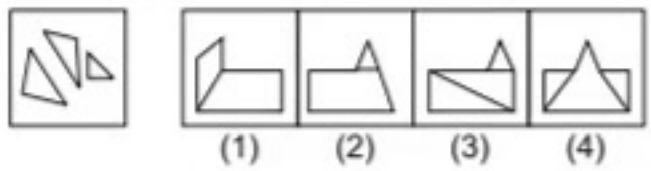
1 *(3)*	**2** *(1)*	**3** *(1)*	**4** *(2)*	**5** *(2)*	**6** *(2)*	**7** *(4)*	**8** *(1)*	**9** *(3)*	**10** *(1)*
11 *(2)*	**12** *(4)*	**13** *(1)*	**14** *(1)*	**15** *(1)*	**16** *(4)*	**17** *(1)*	**18** *(1)*	**19** *(4)*	**20** *(1)*

Self Practice

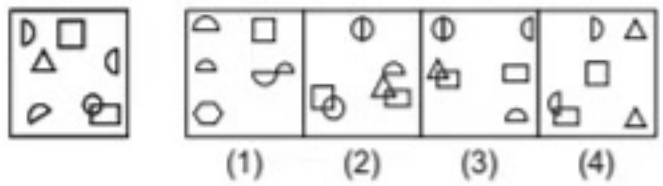
Directions (Q.Nos. 1-10) *In the given questions, there is a question figure, observe the answer figure* (1), (2), (3) *and* (4) *and find out the answer figure which can be formed from the pieces of question figure?*

Que. Fig. **Ans. Fig.**

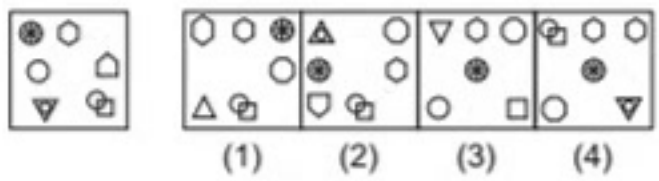
1.



2.

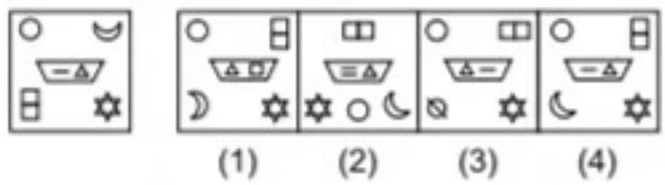


3.

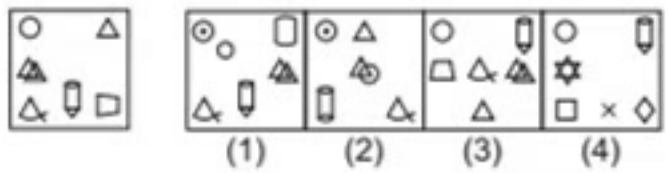


Que. Fig. Ans. Fig.

4.

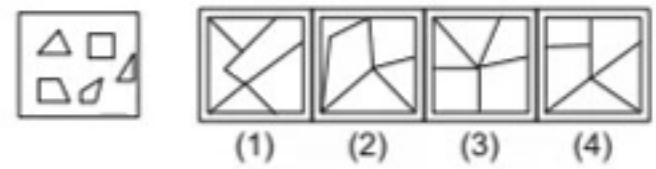


5.

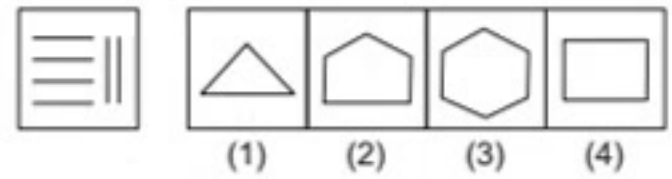


Ques. Fig. **Ans. Fig.**

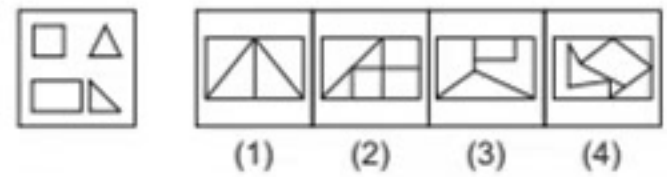
6.



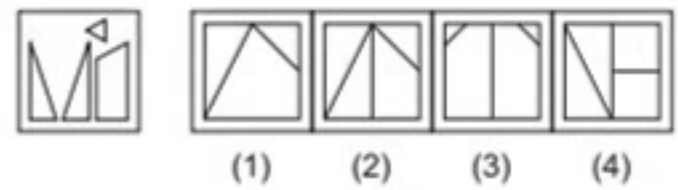
7.



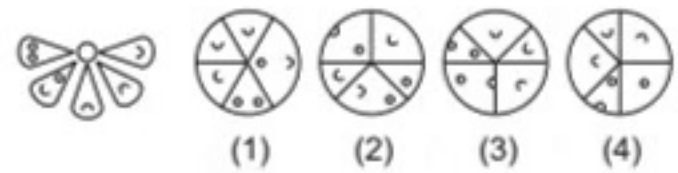
8.



9.



10.

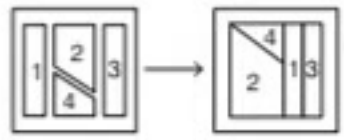


Answers

1 *(3)*	**2** *(2)*	**3** *(2)*	**4** *(4)*	**5** *(3)*	**6** *(3)*	**7** *(3)*	**8** *(2)*	**9** *(2)*	**10** *(1)*

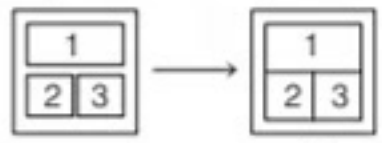
Hints and Solutions

1. Answer figure (3) can be formed from the cut out pieces given in the question figure.



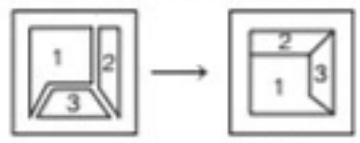
(3)

2. Answer figure (2) can be formed from the cut out pieces given in the question figure.



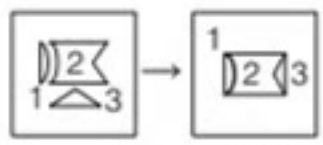
(2)

3. Answer figure (2) can be formed from the cut out pieces given in the question figure.



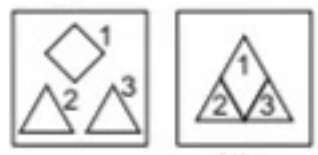
(2)

4. Answer figure (1) can be formed from the cut out pieces given in the question figure.



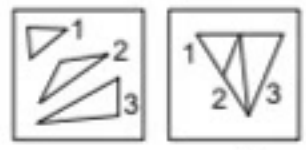
(1)

5. Answer figure (1) can be formed from the cut out pieces given in the question figure.



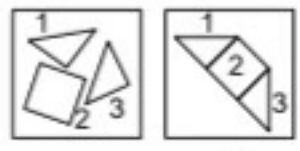
(1)

6. Answer figure (4) can be formed from the cut out pieces given in the question figure.



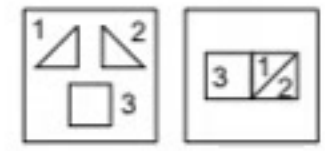
(4)

7. Answer figure (2) can be formed from the cut out pieces given in the question figure.



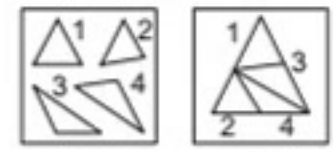
(2)

8. Answer figure (2) can be formed from the cut out pieces given in the question figure.



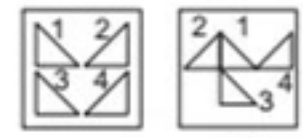
(2)

9. Answer figure (1) can be formed from the cut out pieces given in the question figure.



(1)

10. Answer figure (4) can be formed from the cut out pieces given in the question figure.



(4)

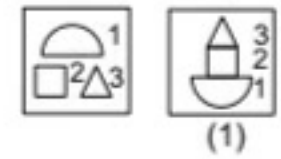
11. Answer figure (2) can be formed from the cut out pieces given in the question figure.

(2)

12. Answer figure (1) can be formed from the cut out pieces given in the question figure.

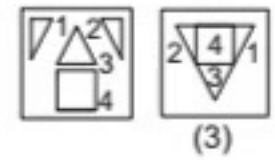
(1)

13. Answer figure (1) can be formed from the cut out pieces given in the question figure.



(1)

14. Answer figure (3) can be formed from the cut out pieces given in the question figure.

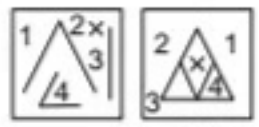


(3)

15. Answer figure (2) can be formed from the cut out pieces given in the question figure.

(2)

16. Answer figure (2) can be formed from the cut out pieces given in the question figure.

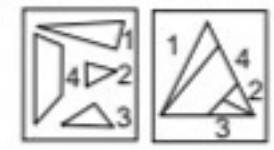


(2)

17. Answer figure (1) can be formed from the cut out pieces given in the question figure.

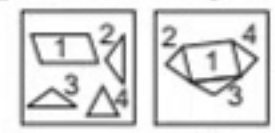
(1)

18. Answer figure (2) can be formed from the cut out pieces given in the question figure.



(2)

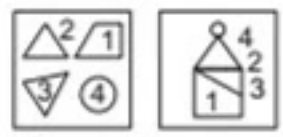
19. Answer figure (3) can be formed from the cut out pieces given in the question figure.



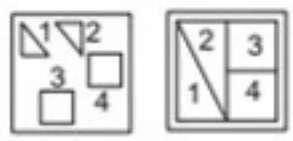
(3)

Practice Exercise

1. Answer figure (3) can be formed from the cut pieces given in the question figure.

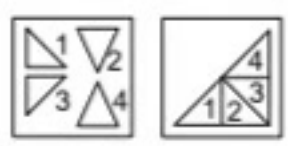


2. Answer figure (1) can be formed from the cut pieces given in the question figure.



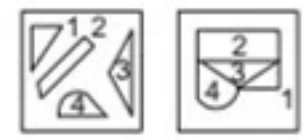
3. Answer figure (1) can be formed from the cut pieces given in the question figure.

4. Answer figure (2) can be formed from the cut pieces given in the question figure.

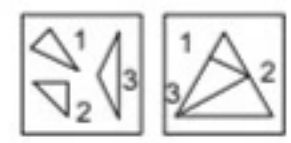


5. Answer figure (2) can be formed from the cut pieces given in the question figure.

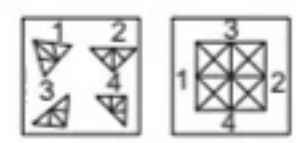
6. Answer figure (2) can be formed from the cut pieces given in the question figure.



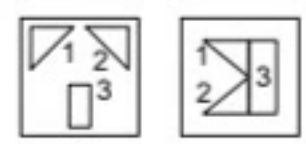
7. Answer figure (4) can be formed from the cut pieces given in the question figure.



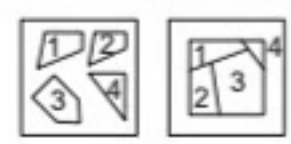
8. Answer figure (1) can be formed from the cut pieces given in the question figure.



9. Answer figure (3) can be formed from the cut pieces given in the question figure.

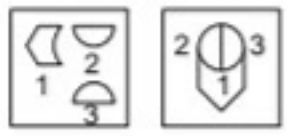


10. Answer figure (1) can be formed from the cut pieces given in the question figure.

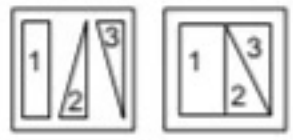


11. Answer figure (2) can be formed from the cut pieces given in the question figure.

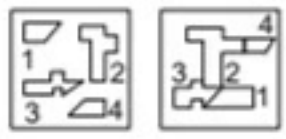
12. Answer figure (4) can be formed from the cut pieces given in the question figure.



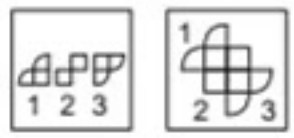
13. Answer figure (1) can be formed from the cut pieces given in the question figure.



14. Answer figure (1) can be formed from the cut pieces given in the question figure.



15. Answer figure (1) can be formed from the cut pieces given in the question figure.



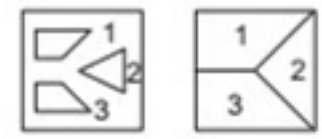
16. Answer figure (4) can be formed from the cut pieces given in the question figure.

17. Answer figure (1) can be formed from the cut pieces given in the question figure.

18. Answer figure (1) can be formed from the cut pieces given in the question figure.

19. Answer figure (4) can be formed from the cut pieces given in the question figure.

20. Answer figure (1) can be formed from the cut pieces given in the question figure.



CHAPTER

10

EMBEDDED FIGURE

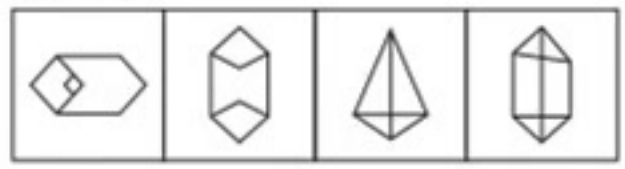
A figure is said to be hidden or embedded in another figure when the second figure completely contains the first figure. In such type of questions a question figure is given followed by four answer figures in such a way that question figure is hidden or embedded in one of the answer figures.

The students has to select such a figure in which question figure is hidden. This kind of tests are designed to test the students visual ability that how quickly he/she can recognise the figure that is hidden among other figures.

Example **1.**

Que. Fig.

Ans. Fig.



(1) (2) (3) (4)

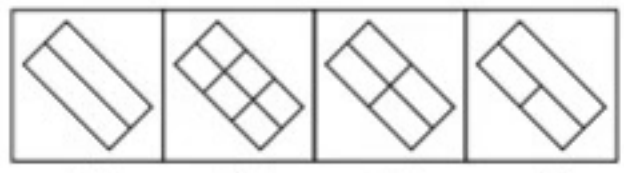
Sol. **(2)**

Hence, question figure is hidden in answer figure (2).

Example **2.**

Ques. Fig.

Ans. Fig.



(1) (2) (3) (4)

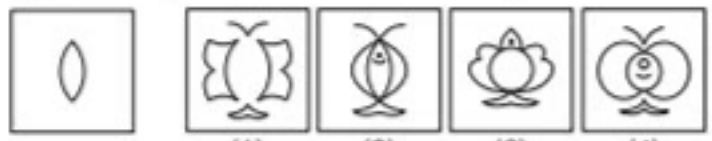
Sol. **(3)**

Hence, question figure is hidden in answer figure (3).

Entrance Corner

Directions (Q.Nos. 1-16) *In the given questions, there is a question figure and four answer figures* (1), (2), (3) *and* (4). *Select the one in which the question figure is hidden.*

1. Ques. Fig. Ans. Fig.



(1) (2) (3) (4)

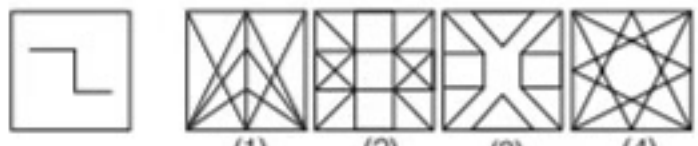
[JNV 2019]

2.

(1) (2) (3) (4)

[JNV 2019]

3.



(1) (2) (3) (4)

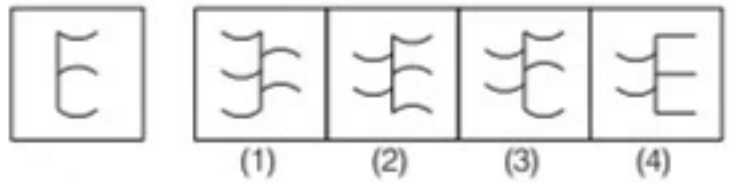
[JNV 2019]

4.

(1) (2) (3) (4)

[JNV 2018]

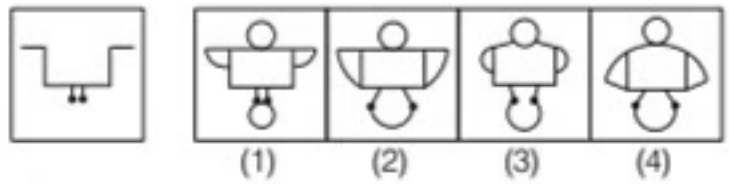
5.



(1) (2) (3) (4)

[JNV 2018]

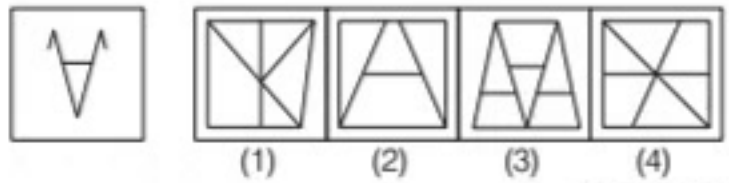
6.



(1) (2) (3) (4)

[JNV 2018]

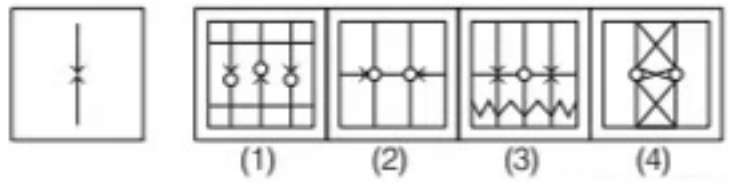
7.



(1) (2) (3) (4)

[JNV 2018]

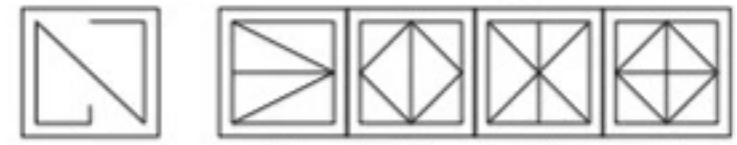
8.



(1) (2) (3) (4)

[JNV 2018]

9. Ques. Fig. Ans. Fig.



(1) (2) (3) (4)

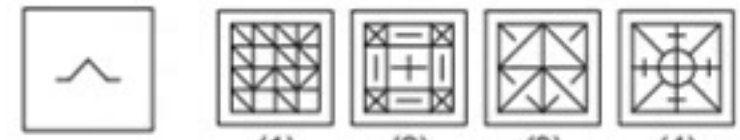
[JNV 2017]

10.

(1) (2) (3) (4)

[JNV 2017]

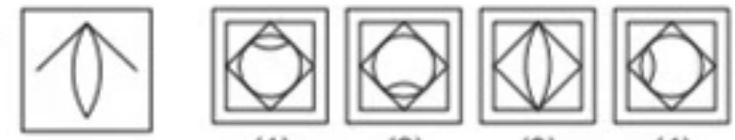
11.



(1) (2) (3) (4)

[JNV 2016]

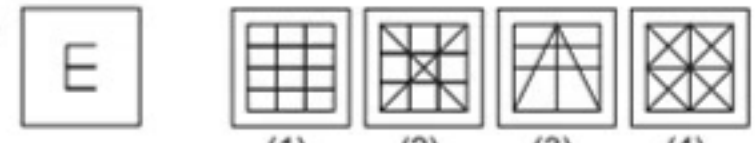
12.



(1) (2) (3) (4)

[JNV 2016]

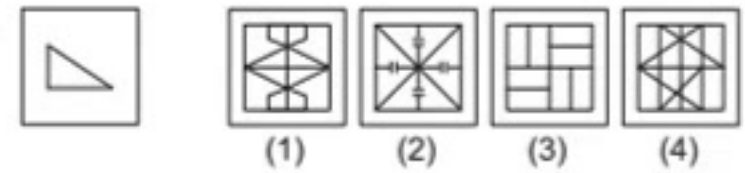
13.



(1) (2) (3) (4)

[JNV 2015]

14.



(1) (2) (3) (4)

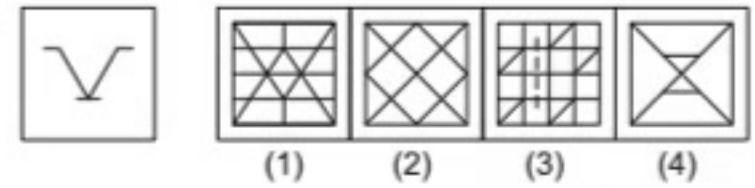
[JNV 2015]

15.

(1) (2) (3) (4)

[JNV 2014]

16.



(1) (2) (3) (4)

[JNV 2013]

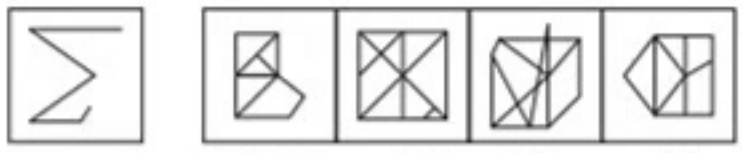
Answers

1 *(2)*	**2** *(1)*	**3** *(2)*	**4** *(1)*	**5** *(3)*	**6** *(1)*	**7** *(3)*	**8** *(3)*	**9** *(3)*	**10** *(1)*
11 *(1)*	**12** *(3)*	**13** *(1)*	**14** *(4)*	**15** *(3)*	**16** *(1)*				

Practice Exercise

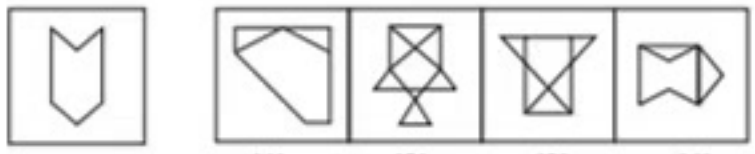
Directions **(Q.Nos. 1-26)** *In the given questions, there is a question figure and four answer figures* **(1), (2), (3)** *and* **(4)**. *Select the one in which the question figure is hidden.*

1. Ques. Fig. **Ans. Fig.**



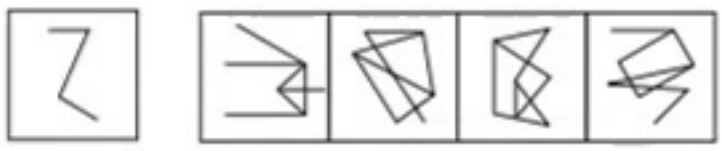
(1) (2) (3) (4)

2.



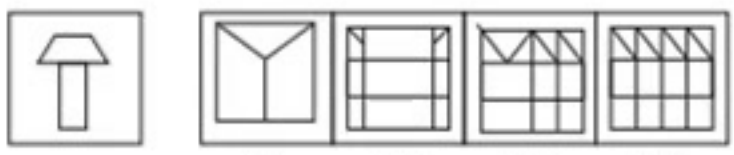
(1) (2) (3) (4)

3.



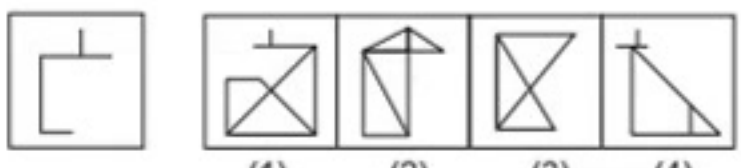
(1) (2) (3) (4)

4.



(1) (2) (3) (4)

5.

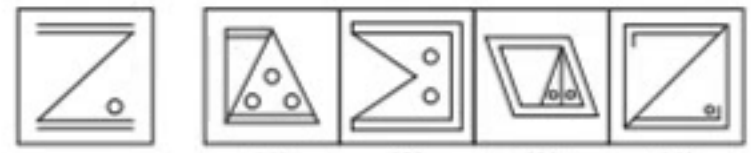


(1) (2) (3) (4)

6.

(1) (2) (3) (4)

7. Ques. Fig. **Ans. Fig.**



(1) (2) (3) (4)

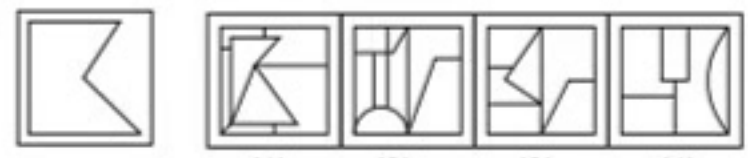
8.

(1) (2) (3) (4)

9.

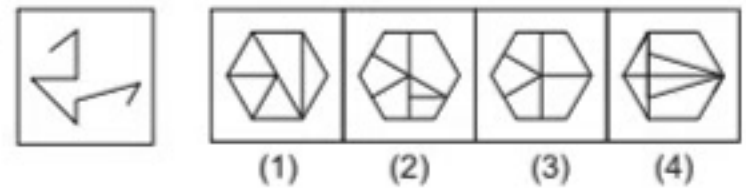
(1) (2) (3) (4)

10.



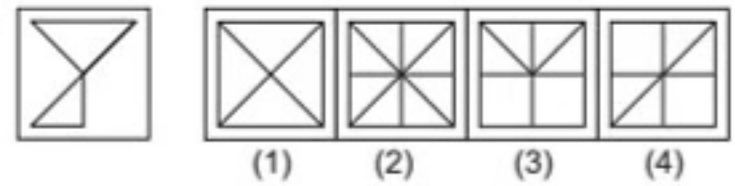
(1) (2) (3) (4)

11.



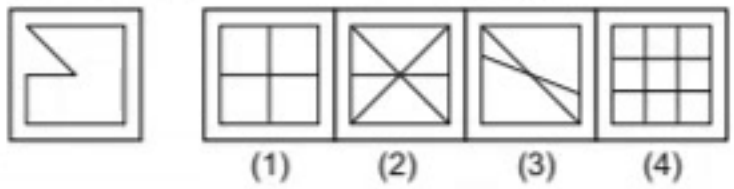
(1) (2) (3) (4)

12.

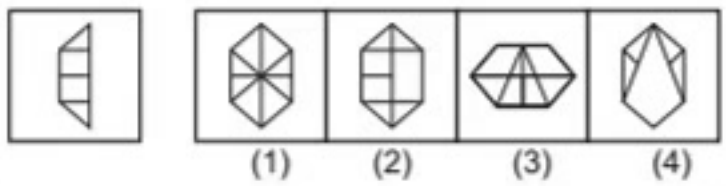


(1) (2) (3) (4)

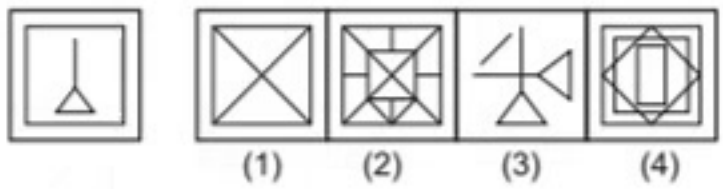
13. Ques. Fig. **Ans. Fig.**



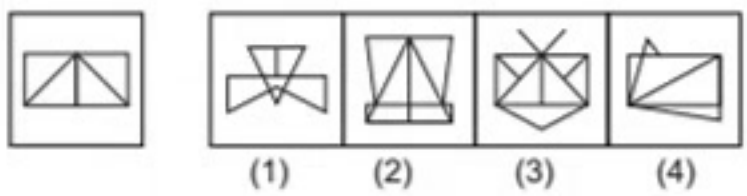
14.



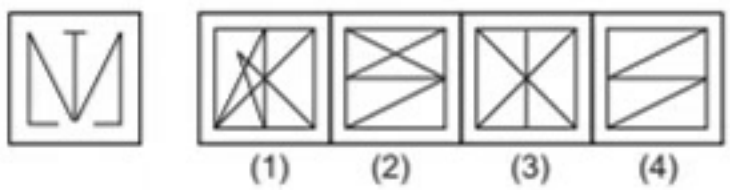
15.



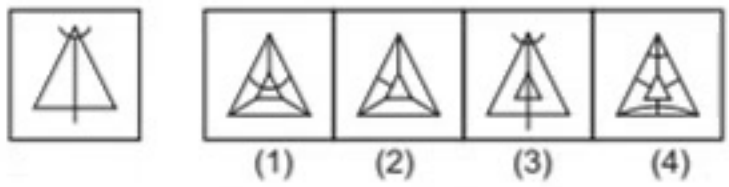
16.



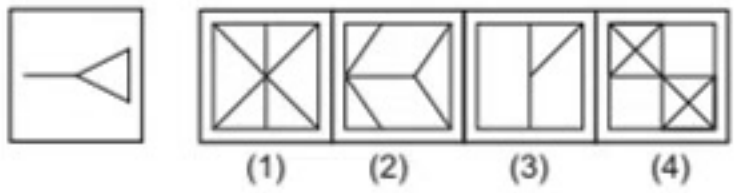
17.



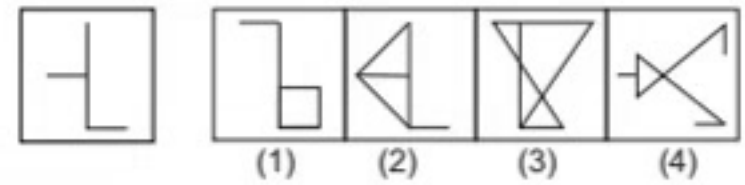
18.



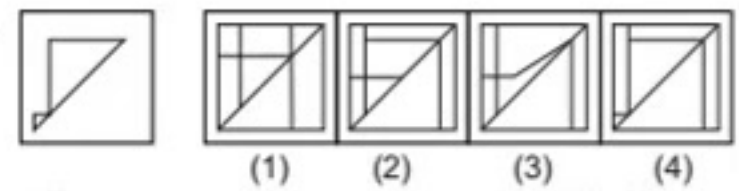
19.



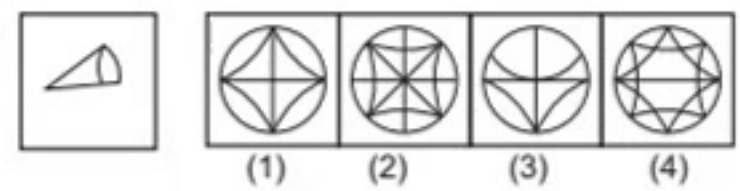
20. Ques. Fig. **Ans. Fig.**



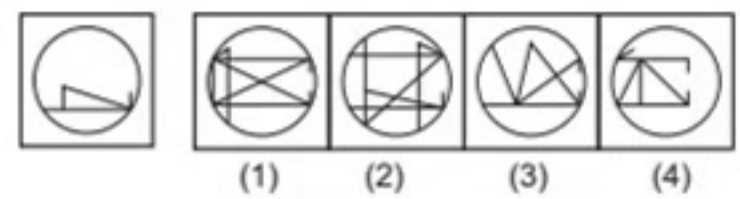
21.



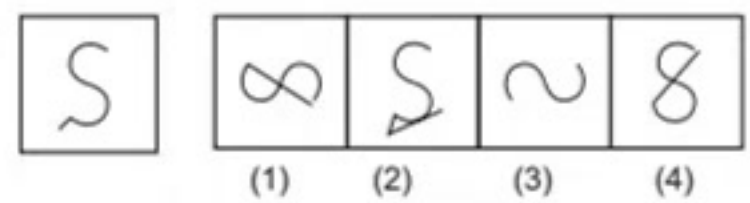
22.



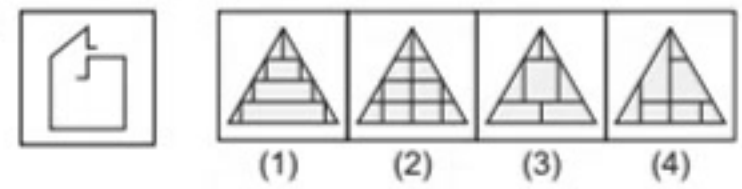
23.



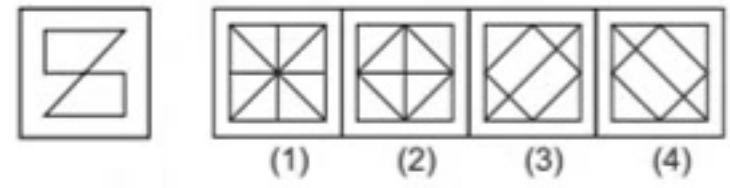
24.



25.



26.



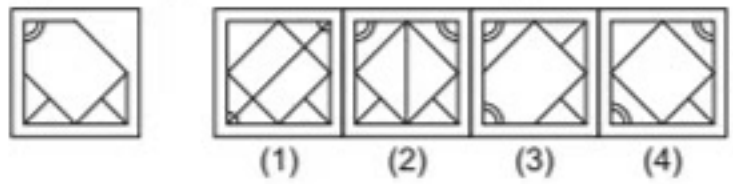
Answers

1 *(2)*	**2** *(2)*	**3** *(3)*	**4** *(3)*	**5** *(2)*	**6** *(4)*	**7** *(4)*	**8** *(4)*	**9** *(2)*	**10** *(1)*
11 *(4)*	**12** *(2)*	**13** *(2)*	**14** *(2)*	**15** *(3)*	**16** *(3)*	**17** *(2)*	**18** *(3)*	**19** *(2)*	**20** *(2)*
21 *(4)*	**22** *(2)*	**23** *(2)*	**24** *(2)*	**25** *(2)*	**26** *(1)*				

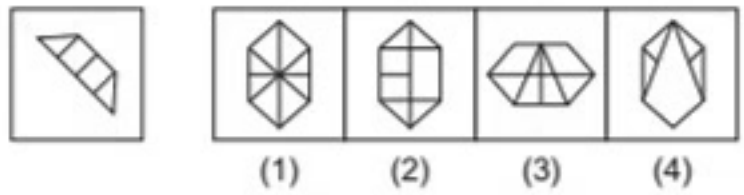
Self Practice

Directions (Q.Nos. 1-14) *In the given questions, there is a question figure and four answer figures* (1), (2), (3) *and* (4). *Select the one in which the question figure is hidden?*

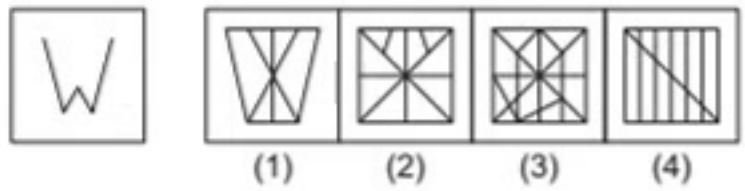
1. Ques. Fig. **Ans. Fig.**



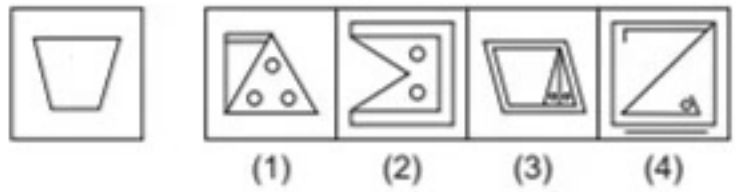
2.



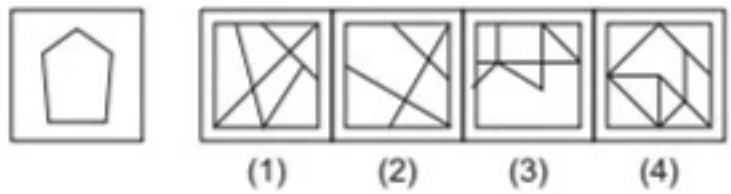
3.



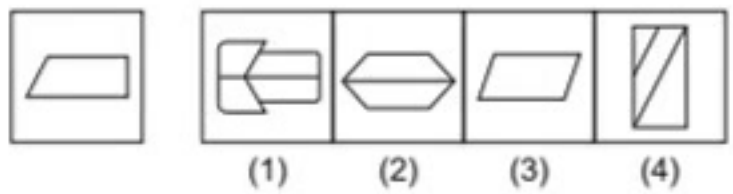
4.



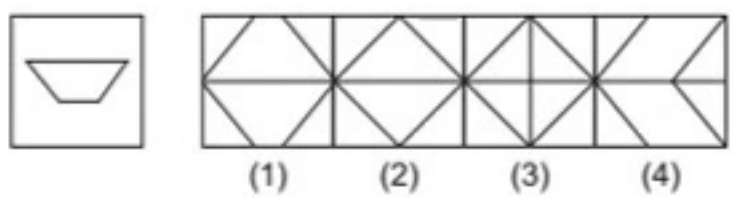
5.



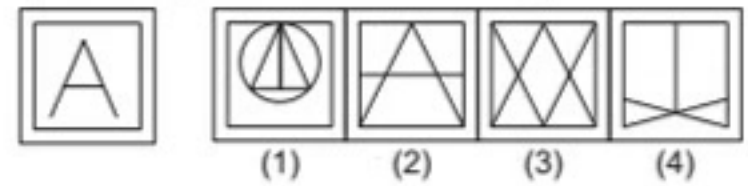
6.



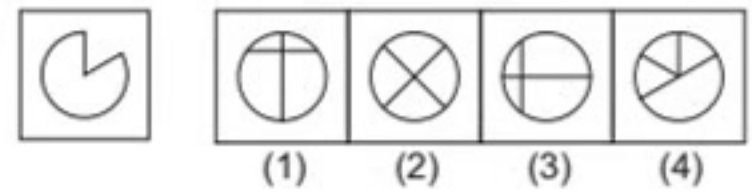
7.



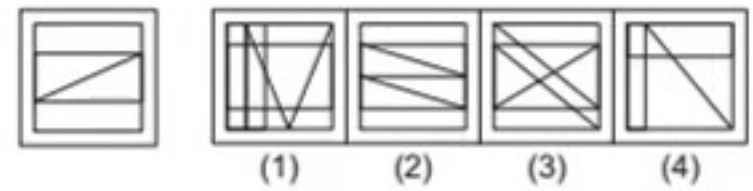
8. Ques. Fig. **Ans. Fig.**



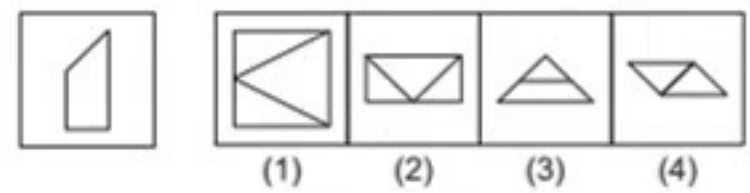
9.



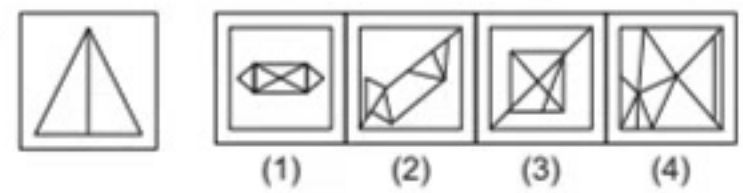
10.



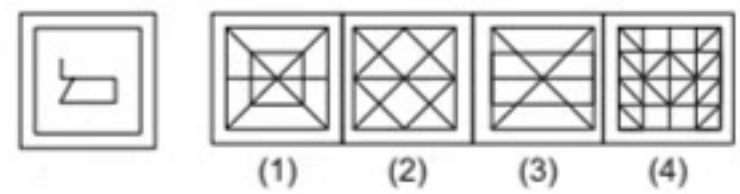
11.



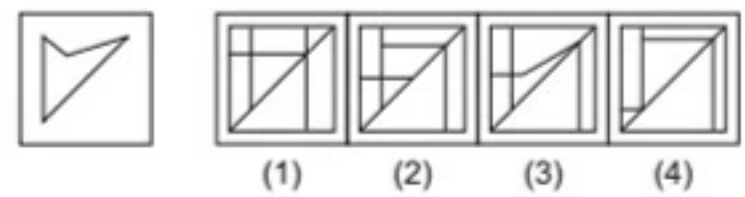
12.



13.



14.



Answers

1 *(2)*	**2** *(2)*	**3** *(1)*	**4** *(3)*	**5** *(2)*	**6** *(1)*	**7** *(1)*	**8** *(2)*	**9** *(4)*	**10** *(3)*
11 *(2)*	**12** *(3)*	**13** *(1)*	**14** *(3)*						

JAWAHAR
NAVODAYA
VIDYALAYA

ARITHMETIC TEST

CHAPTER

01

NUMBER AND NUMERIC SYSTEM

Number

In Hindu Arabic system, there are ten digits (i.e. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9). A number is formed by considering these digit as a group, which is called as numeral.

Systems

A numeric system is a set of characters and mathematical rules that are used to represent a number.

1. Indian system, **2.** International system

Indian/Hindu Arabic System

Periods	Crores		Lakhs		Thousands		Ones		
Values	Ten Crore 10,00,00,000	Crore 1,00,00,000	Ten Lakh 10,00,000	Lakh 1,00,000	Ten Thousand 10,000	Thousand 1,000	Hundred 100	Ten 10	One 1
Numeral	4	3	2	5	2	3	7	1	6

According to the Indian system, the above numeral is written as 43, 25, 23, 716. It is read as forty three crore twenty five lakh twenty three thousand seven hundred sixteen.

International System

Periods	Millions			Thousands			Ones		
Values	Hundred Million 100,000,000	Ten Million 10,000,000	Million 1,000,000	Hundred Thousand 100,000	Ten Thousand 10,000	Thousand 1,000	Hundred 100	Ten 10	One 1
Numeral	4	3	2	5	2	3	7	1	6

It is most commonly used system in the world. In this system above numeral is written as

432, 523, 716. It is read as four hundred thirty two million five hundred twenty three thousand seven hundred sixteen.

Example **1.** Write the following in words

(i) 8275 (ii) 76901 (iii) 1234578

Sol. (i) 8275 = Eight thousand two hundred seventy five.

(ii) 76901 = Seventy six thousand nine hundred one.

(iii) 1234578 = Twelve lakh thirty four thousand five hundred seventy eight.

Example **2.** Write the following in figures

(i) Seventy thousand three hundred sixty four.

(ii) One lakh twenty five thousand four hundred twenty.

(iii) Five crore fifty lakh five thousand five hundred five.

Sol. (1) 70364 (2) 125420 (3) 55005505

Face Value

The face value of a digit in a numeral is equal to the digit number itself, irrespective of the place occupied.

e.g., In 364, face value of '6' is 6.

Place Value

The place value of a digit in a numeral depends on the place it occupies.

Place value of a digit = Face value of the digit × Value of the place occupied

e.g., In 3548 the place value of 5 is $5 \times 100 = 500$

Example **3.** Find the difference between face value and place value of 8 in 35829.

(1) 834
(2) 729
(3) 792
(4) None of the above

Sol. **(3)** In 35829

Face value = 8 and place value = $8 \times 100 = 800$

$\therefore$ Difference = $800 - 8 = 792$

Least and Greatest Numbers

We know that, 1 is the least one digit number and 9 is the greatest one digit number. For finding the least number of n digit, we write $(n-1)$ zeros in the right side of 1 and for greatest number of n digit, we write the number 9 n times.

e.g., Least 4 digit number = 1000

Greatest 4 digit number = 9999

Successor and Predecessor of a Number

Successor is the number just after the given number and predecessor is the number just before the given number. To get successor or predecessor of a number we add or subtract 1 from it.

e.g., Successor of 856979 is 856980 and predecessor is 856978.

Roman Numbers

The numbers which we use are called 'Arabric Numbers' but sometimes we use the another system for writing numbers called roman system.

Mostly, roman numbers are used to denote the class standard and position (Rank) of a candidate, in faces of clocks, in page numbering etc.

The letters used in roman numbers are

I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, M = 1000

Roman Numerals Chart

Roman	Arabic	Roman	Arabic
I	1	XVII	17
II	2	XVIII	18
III	3	XIX	19
IV	4	XX	20
V	5	XXX	30
VI	6	XL	40
VII	7	L	50
VIII	8	XC	90
IX	9	C	100
X	10	D	500
XI	11	DI	501
XII	12	DL	550
XIII	13	CM	9000
XIV	14	MD	1500
XV	15	MM	2000
XVI	16		

Types of Numbers

There are following types of number

Natural Numbers

The counting numbers such as 1, 2, 3, 4, ... are called as natural numbers.

The set of natural numbers is denoted by N.

$N = \{1, 2, 3, 4, \ldots\}$

(i) 1 is the smallest natural number.

(ii) 0 is not a natural number.

Whole Numbers

All natural numbers together with 0 (zero) are called whole numbers.

The set of whole numbers is denoted by W.

$W = \{0, 1, 2, 3, 4, \ldots\}$

Here, 0 is the smallest whole number.

Integer Numbers

All natural numbers together with 0 and negative numbers are called integer numbers.

The set of integer numbers is denoted by I.

$I = \{\ldots\ldots, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \ldots\}$

(i) $I^+ = 1, 2, 3, 4, \ldots$ are positive integers.

(ii) $I^- = -1, -2, -3, -4, \ldots$ are negative integers.

(iii) 0 (zero) is neither positive integer nor negative integer.

Even Numbers

The natural numbers which are divisible by 2 are called as even numbers. *e.g.*, 2, 4, 6, 8, 10, ...

Here, 2 is the smallest even number.

Odd Numbers

The natural numbers which are not divisible by 2 are called as odd numbers. *e.g.*, 1, 3, 5, 7, 9, ...

Here, 1 is the smallest odd number.

Rational Numbers

Numbers which can be written in the form $\frac{p}{q}$ $(q \neq 0)$, where p and q are integers, are called rational numbers.

e.g., $\frac{5}{4}, \frac{1}{7}, \frac{3}{8}$.

Irrational Numbers

Numbers which cannot be written in the form $\frac{p}{q}$ $(q \neq 0)$, where p and q are integers, are called irrational numbers. *e.g.*, $\sqrt{2}, \sqrt{5}$.

Prime Numbers

The natural numbers greater than 1 which are not divisible by any number except 1 and itself are called prime numbers. *e.g.*, 2, 3, 5, 7, ...

(i) 2 is the smallest prime number and again it is the only even prime number.

(ii) The prime numbers upto 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.

(iii) The elements in the set of natural numbers, prime numbers and whole numbers are infinite.

Composite Numbers

Numbers other than 1 which are not prime are called composite numbers. As 4, 6, 8, 9 are all composite numbers.

(i) 4 is the smallest composite number.

(ii) 1 is neither prime nor composite.

Entrance Corner

1. Which of the following statement is correct? [JNV 2019]

(1) Zero is an odd number
(2) Zero is an even number
(3) Zero is a prime number
(4) Zero is neither odd nor even number

2. What is the sum of the place value of 5 in the number 584356? [JNV 2019]

(1) 10 (2) 50050 (3) 5050 (4) 500050

3. The difference between the greatest and the smallest 5-digit numbers, formed by the digits 0, 3, 6, 7 and 9 without repetition, is [JNV 2019]

(1) 93951 (2) 67061 (3) 66951 (4) 60840

4. Find the differences between 5 digits greater and 5 digits smaller number with different digits. [JNV 2018]

(1) 41976 (2) 88531 (3) 98531 (4) 108999

5. Using the different digits, find the smallest number of 4 digits in which 9 is in tens place. [JNV 2018]

(1) 1290 (2) 1092
(3) 2091 (4) 2190

6. Which is the smallest 5 digit number formed by digits 5,1,6 when two digits can be used twice? [JNV 2018]

(1) 11565 (2) 51156
(3) 11556 (4) 11655

7. In which of the following numbers only one prime number lie. [JNV 2018]
(1) 40 and 50 (2) 60 and 70
(3) 80 and 90 (4) 90 and 100

8. What is quotient when 76076 is divided by 13? [JNV 2018]
(1) 5652 (2) 5852 (3) 5762 (4) 5662

9. Which one is the smallest number? [JNV 2016]
(1) 7413 (2) 7130 (3) 7985 (4) 7545

10. The difference between the smallest number of six-digits and the largest number of four-digits is [JNV 2016]
(1) 90001 (2) 91000 (3) 90100 (4) 90010

11. Which one of the following is the correct statement for the numbers 56 and 84? [JNV 2016]
(1) Both the numbers are prime
(2) Both the numbers are co-prime
(3) Both the numbers are multiple of 14
(4) Both the numbers are odd

12. Five digits greatest number to be formed with the help of 7, 2, 4, 8 and 0 is (each digit using once time) [JNV 2015]
(1) 80742 (2) 87042 (3) 87420 (4) 87402

13. Which statement is true for 11 and 21? [JNV 2015]
(1) Both are divisible numbers
(2) Both are even numbers
(3) Both are co-prime numbers
(4) Both are multiple of 3

14. Five digits greatest odd number to be formed with the help of 3, 5, 7, 9 and 0 is [JNV 2014]
(1) 90573 (2) 97530 (3) 97503 (4) 97053

15. Highest two digits prime number is [JNV 2013]
(1) 93 (2) 97 (3) 91 (4) 99

16. Find the greatest five digit even number using the 3, 0, 5, 7 and 8 digits. [JNV 2013]
(1) 83570 (2) 85703 (3) 87530 (4) 87350

17. Find the greatest five digit number using the 9, 6, 3 and 0 digits (Any one digit repeated twice.) [JNV 2012]
(1) 96630 (2) 96300 (3) 99630 (4) 90963

18. The difference between the place values of two 7s in 27307 is [JNV 2011]
(1) 6993 (2) 7300 (3) 307 (4) 40

19. Which one of the following is a prime number? [JNV 2011]
(1) 81 (2) 83 (3) 85 (4) 87

20. Eighty thousand nine hundred and five is represented in number form as [JNV 2011]
(1) 8095 (2) 80905 (3) 809005 (4) 8009005

21. Sixteen lakh eight hundred and thirteen may be written in digit as [JNV 2010]
(1) 16813 (2) 160830 (3) 1600813 (4) 160813

22. The place value of 5 in 214.56 [JNV 2010]
(1) 5×1 (2) 5×10
(3) 5×0.1 (4) 5×0.01

23. Find a prime even number out of the following numbers. [JNV 2008]
(1) 4 (2) 6
(3) 2 (4) 13

24. In a question of division if divisor is 51, quotient 16 and remainder 27, then the dividend will be [JNV 2004, 1994]
(1) 843 (2) 483
(3) 94 (4) 1393

Answers

1. (4)	**2.** (4)	**3.** (3)	**4.** (2)	**5.** (2)	**6.** (3)	**7.** (4)	**8.** (2)	**9.** (2)	**10.** (1)
11. (3)	**12.** (3)	**13.** (3)	**14.** (3)	**15.** (2)	**16.** (3)	**17.** (3)	**18.** (1)	**19.** (2)	**20.** (2)
21. (3)	**22.** (3)	**23.** (3)	**24.** (1)						

Hints and Solutions

1. Zero is neither odd nor even number.

2. Given, 5 84 356

Place values of 5 → $\boxed{5}$ 84 3 $\boxed{5}$ 6

i.e. 500000 and 50

Sum of place values of 5 = 500000 + 50

= 500000

3. Given digits = 0, 3, 6, 7, 9

Greatest 5-digit number = 97630

Smallest 5-digit number = 30679

∴The difference between the greatest and the smallest numbers = 97630 − 30679 = 66951

4. 5-digit largest number = 98765

5-digit smaller number = 10234

Required difference = 98765 − 10234 = 88531

5. The smallest number of four digits by using different digit = 1092

6. The 5-digit smallest number using digit 5, 1, 6 by using two digits twice = 11556

7. Between 90 and 100 only one prime number '97' exist.

8. 13)76076 | 5852 quotient

65
110
104
67
65
26
26
0 Remainder.

9. The smallest number is 7130.

10. Smallest number of 6-digits = 100000

Largest number of 4-digits = 9999

Then, the required difference = 100000 − 9999

= 90001

11. 56 = 14 × 4 and 84 = 14 × 6

It is clear from the above factors both numbers are multiple of 14.

12. Five digits greatest number to be formed with the help of 7, 2, 4, 8 and 0 digit = 87420

13. Both 11 and 21 are co-prime numbers.

14. Required odd number

Ten Th	Th	Hun	Ten	Unit
9	7	50	0	3

15. In the given number 97 is the two digits largest prime number.

16. Required largest five digits even number

= 87530

17. Required largest five digits (any one digit repeated twice) number = 99630

18. ∵ Place values of two 7s in 27307 are

= 7000 and 7

∴ Difference = (7000 − 7) = 6993

19. 83 is a prime number.

20. Eighty thousand nine hundred and five represented in number form as 80905

23. Prime number = 2, 3, 5, 7, 11, 13, 17 etc.

∴ Prime even number = 2

24. As we know,

Dividend = Divisor + Quotient + Remainder

Dividend = 51 × 16 + 27 = 816 + 27 = 843

Practice Exercise

1. 12 thousands + 13 hundreds + 2 tens is equal to

(1) 12132 (2) 13320
(3) 130132 (4) 121320

2. The difference between the greatest number of four digits and the smallest number of five digits is

(1) 1 (2) 11
(3) 1111 (4) 8999

3. The place value of 5 in 64532981 is

(1) five thousand (2) fifty thousand
(3) five lakh (4) fifty lakh

4. Ninety thousand and ninety nine may be written in digit as

(1) 90000909 (2) 9000099 (3) 90909 (4) 90099

5. The difference between the largest and the smallest numbers of three digits is

(1) 999 (2) 998 (3) 899 (4) 888

6. In number 36490, when the digits 6 and 9 are interchanged, then the difference between the original and the new number is
(1) 2870 (2) 2960 (3) 2970 (4) 3970

7. Find the sum of the face values of 9 and 6 in 907364.
(1) 15 (2) 20 (3) 9 (4) 18

8. Find the smallest number, which by adding or subtracting to or from an even number will be an odd number.
(1) 0 (2) 1 (3) 2 (4) 3

9. Using digits 1, 0, 5 and 7, the greatest 4 digit number formed is
(1) 1075 (2) 1057 (3) 5017 (4) 7510

10. The smallest 4-digits even number formed by the digits 0, 1, 2 and 3 is
(1) 1023 (2) 1032 (3) 3201 (4) 3210

11. The sum of the greatest and the smallest number of four digits is
(1) 8999 (2) 10999 (3) 11110 (4) 11111

12. Find the difference between largest and smallest 5 digit number, which are formed from digits 0, 2, 5, 6 and 8.
(1) 65925 (2) 69552 (3) 65952 (4) 65592

13. The smallest odd number formed by using the digits 1, 0, 3, 4 and 5 is
(1) 10345 (2) 10453 (3) 10543 (4) 10534

14. How many prime numbers are there between 80 and 100?
(1) 6 (2) 7 (3) 8 (4) 3

15. The number which when multiplied by 13 is increased by 180 is
(1) 15 (2) 5 (3) 12 (4) 25

16. The smallest number of four digits is
(1) 1001 (2) 0001 (3) 0010 (4) 1000

17. Sum of all prime numbers between 1 and 10 is
(1) 15 (2) 17 (3) 18 (4) 16

Answers

1. (2)	**2.** (1)	**3.** (3)	**4.** (4)	**5.** (3)	**6.** (3)	**7.** (1)	**8.** (2)	**9.** (4)	**10.** (2)
11. (2)	**12.** (3)	**13.** (1)	**14.** (4)	**15.** (1)	**16.** (4)	**17.** (2)			

Hints and Solutions

1. 12 thousands + 13 hundreds + 2 tens
$= 12000 + 1300 + 20 = 13320$

2. $\because$ Smallest number of five digits $= 10000$
Greatest number of four digits $= 9999$
$\therefore$ Difference $= (10000 - 9999) = 1$

3. The place value of 5 in 64532981 is
$= 500000$ or 5 lakh

4. Ninety thousand and ninety nine $= 90099$

5. $\because$ Difference $= 999 - 100 = 899$

6. $\because$ Original number $= 36490$
New number $= 39460$
$\therefore$ Difference $= (39460 - 36490) = 2970$

7. The face value is the value of digit itself.
So, required sum $= 9 + 6 = 15$

8. 8 is an even number by adding or subtracting 1 to or from it, the result will be 9 and 7 respectively which are odd numbers.

9. 7510

10. 1032

11. Greatest number of four digit $= 9999$
Smallest number of four digit $= 1000$
Sum $= 9999 + 1000 = 10999$

12. Given, digits $= 0, 2, 5, 6$ and 8
Largest 5-digit number $= 86520$
Smallest 5-digit number $= 20568$
$\therefore$ Required difference $= 86520 - 20568$
$= 65952$

13. The required odd number formed is 10345.

14. 3 prime numbers are between 80 and 100.

15. $13 \times 15 - 15 = 180$

17. Prime number between 1 and 10
$= 2 + 3 + 5 + 7 = 17$

Self Practice

1. One lakh, thirty five thousand, four hundred and twenty six is written in figures as
(1) 133256 (2) 135426 (3) 153263 (4) 153353

2. The difference between the place value and face value of 4 in 45689, is
(1) 40000 (2) 39999 (3) 39996 (4) 39000

3. The predecessor of 8000 is
(1) 7999 (2) 8001 (3) 7989 (4) 7988

4. The greatest number of 5 digits which starts from 8 and ends with 7 is
(1) 89997 (2) 88997 (3) 88887 (4) 87987

5. The least number formed with the digit 0, 4, 2, 6 is
(1) 0462 (2) 4026 (3) 0246 (4) 2046

6. What is the greatest number that forms from the digits 3, 5, 0, 6?
(1) 6503 (2) 6530 (3) 6350 (4) 6053

7. How many numbers are of 4 digits?
(1) 9000 (2) 1000 (3) 900 (4) None of these

8. Find the least number formed by the digits 7, 0, 0 and 2.
(1) 7200 (2) 2007 (3) 2070 (4) 7020

9. In the given number 890436, if you write 0 in place of 4, by how much the resulting number be less than this given number?
(1) 40 (2) 400 (3) 436 (4) 36

10. The sum of all odd numbers less than 10 is
(1) 15 (2) 25 (3) 23 (4) 24

11. The sum of all prime numbers less than 15 is
(1) 39 (2) 42 (3) 41 (4) 45

12. How many prime numbers are there in between 1 and 10?
(1) 2 (2) 3 (3) 4 (4) 5

13. Which one of the following statements is true?
(1) All even numbers are composite numbers
(2) All odd numbers are prime numbers
(3) There are infinitely prime numbers
(4) A prime number can be written as the product of more than two natural numbers

14. The sum of 3 even numbers will be
(1) always even (2) always odd
(3) sometimes even and sometimes odd (4) None of these

15. What will remain after subtracting 11 ten times from 121?
(1) 0 (2) 11 (3) 22 (4) 10

Answers

1. (2)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (2)	**6.** (2)	**7.** (1)	**8.** (2)	**9.** (2)	**10.** (2)
11. (3)	**12.** (3)	**13.** (3)	**14.** (1)	**15.** (2)					

CHAPTER

02

FOUR FUNDAMENTAL OPERATIONS ON WHOLE NUMBERS

Whole Numbers

All natural numbers together with 0 (zero) are called whole numbers. Addition as well as multiplication of two whole numbers must be a whole number but same is not true while having the operation like subtraction and division on whole number.

Fundamental Operations

Closure Law

For addition	For multiplication
$1+2=3$	$2\times3=6$
$4+5=9$	$4\times5=20$

Commutative Law

For addition	For multiplication
$2+3=3+2$	$2\times3=3\times2$
$11+7=7+11$	$11\times7=7\times11$

Associative Law

For addition

$1+(2+3)=(1+2)+3$

$5+(9+11)=(5+9)+11$

For multiplation

$1\times(2\times3)=(1\times2)\times3$

$5\times(9\times11)=(5\times9)\times11$

Distributive Law

$2\times(4+5)=2\times4+2\times5$

$(11+7)\times5=11\times5+7\times5$

Identity Elements

Zero is the identity element for addition and 1 is the identity element for multiplication.

Properties of Zero

- When zero is added or subtracted from any number, the result is the number itself.
  e.g., $4+0=4, 18+0=18$
  $6-0=6, 24-0=24$
- Product of any whole number and zero is zero.
  e.g., $4\times0=0$
- If we divide zero by any whole number, the result is zero.
  e.g., $0\div10=0, 0\div4=0$
- If power of any number is zero, then the value of that number will be 1.
  e.g., $1^0=1, 4^0=1$

Properties of One

The product of any whole number and 1 is the whole number itself.

e.g., $18\times1=18, 5\times1=5$

Tests of Divisibility

Test of divisibility may be derived from the properties of multiples of specific divisors.

Divisibility by 2

Any number, having last digit is either 2, 4, 6, 8 or zero is divisible by 2.

e.g., 12, 86, 130, 242 and 306 are divisible by 2.

Divisibility by 3

If the sum of the digits of a number is divisible by 3, the number is also divisible by 3.

e.g., 426

$4 + 2 + 6 = 12$ which is divisible by 3. Hence, 426 is divisible by 3.

Divisibility by 4

If the last two digits of a number are divisible by 4, the number is divisible by 4. The number having two or more zeros at the end is also divisible by 4.

e.g., 3<u>24</u>, 8<u>24</u>, 56<u>32</u>, 35<u>00</u>, 43<u>20</u>, are divisible by 4.

Divisibility by 5

If a number ends in 5 or 0, the number is divisible by 5.

e.g., 1345

As its last digit is 5, it is divisible by 5.

Divisibility by 6

A number is divisible by 6, when it is divisible by 2 as well as 3. This rule can be obtained from the fact that 2 and 3 are the two factors or submultiples of 6.

(i) The number should end with an even digit or 0.

(ii) The sum of its digits should be divisible by 3.

e.g., 4554

Here, as the number is even, so it is divisibly by 2.

Also, the sum of digits $= 4 + 5 + 5 + 4 = 18$,

which is divisible by 3.

So, the number 4554 is divisible by 6.

Divisibility by 8

If the last three digits of a number is divisible by 8, the number is also divisible by 8. Also, if the last three digits of a number are zeros, the number is divisible by 8.

e.g., 3<u>648</u>

Since, 648 is divisible by 8, 3648 is divisible by 8.

Divisibility by 9

If the sum of all the digits, of a number is divisible by 9, the number is also divisible by 9.

e.g., 39681 : $3 + 9 + 6 + 8 + 1 = 27$ is divisible by 9, hence the number is also divisible by 9.

Divisibility by 10

Any number which ends with zero is divisible by 10.

e.g., The numbers 150, 540, 1860, 2210 etc. are divisible by 10.

Divisibility by 11

If the sums of digits at odd and even places are equal by a number divisible by 11, then the number is also divisible by 11.

e.g., 3245682 : Odd place value $= 3 + 4 + 6 + 2 = 15$ and even place value $= 2 + 5 + 8 = 15$

As, odd place value = even place value, the number is divisible by 11.

Important Facts

- If a number is made by writing a digit 6 times, then the number is divisible by 7, 11 and 13. *e.g.*, 888888 is divisible by 7, 11 and 13.
- If a number is made by writing a 2 digit number 3 times, then the number is divisible by 7 and 13. *e.g.*, 939393 is divisible by both 7 and 13.
- If a number is made by repeating a 3 digit number 2 times, then the number is divisible by 7, 11 and 13. *e.g.*, 973973 is divisible by 7, 11 and 13.

Example **1.** 85536 is divisible by which number, without actual division?

(1) 5 (2) 3
(3) 7 (4) 13

Sol. **(2)** Sum of the digits $= 8 + 5 + 5 + 3 + 6 = 27$

As 27 is divisible by 3, so the given number 85536 is divisible by 3.

Other Important Formulae

- Dividend = Divisor × Quotient + Remainder
- $\text{Divisor} = \dfrac{\text{Dividend} - \text{Remainder}}{\text{Quotient}}$

Example **2.** On dividing 18270 by a certain number, the quotient is 186 and the remainder is 42. Find the divisor.

(1) 48 (2) 79
(3) 98 (4) 108

Sol. **(3)** $\text{Divisor} = \dfrac{\text{Dividend} - \text{Remainder}}{\text{Quotient}}$

$$= \frac{18270 - 42}{186}$$

$$= \frac{18228}{186} = 98$$

So, divisor is 98.

Example **3.** What least number should be added to the least number of four digits, so that the resulting number is exactly divisible by 89?

(1) 68 (2) 64
(3) 51 (4) 52

Sol. **(1)** Least number of four digits = 1000

```
89) 1000 (11
     89
    ---
     110
     89
    ---
      21
```

∴ Required number = 89 − 21 = 68

Unit Digit

Extreme right digit of a number is known as unit digit of that number.

Unit Digit in the Multiplication of Numbers

If we want to the unit digit in the multiplication of some numbers, we can do so by multiplying only the unit digits of the given numbers.

e.g., Unit digit in $786 \times 498 \times 189 \times 592$

= Unit digit in $6 \times 8 \times 9 \times 2$

= Unit digit in $864 = 4$

Entrance Corner

1. When −1 is multiplied by itself 100 times, the product is c

(1) 1 (2) −1 (3) 100 (4) −100

2. A store sells a packet of 5 apples in ₹25 and a single apple in ₹ 6, if a lady purchase 27 apples. How much money will she pay? [JNV 2018]

(1) ₹ 128 (2) ₹ 130
(3) ₹ 137 (4) ₹ 150

3. Kaku got 7 marks less than Bakshi while Raman got 3 marks more than Kaku. If the total marks obtained by all three is 76. Find the marks obtained by Raman. [JNV 2018]

(1) 22 (2) 25 (3) 29 (4) 31

4. Ram got 8 marks more than Shyam in an examination. Anil got 4 marks more than Ram in the same examination. If all three of them got 128 marks together as a total, Ram's marks would be [JNV 2016]

(1) 36 (2) 44 (3) 48 (4) 54

5. Rajesh's weight is 5 kg less than Ram's weight and Neha's weight is 3 kg more than Ram's weight. If the weight of three is 103 kg, then the weight of Ram is [JNV 2015]

(1) 34 kg (2) 38 kg (3) 33 kg (4) 35 kg

6. In an examination Karan got 10 marks more than Bhavna. Isha got 5 marks less than Bhavna. If Trio get a total of 170, then what is the marks obtained by Isha? [JNV 2014]

(1) 65 (2) 55 (3) 50 (4) 45

7. 1000000 is obtained, when a number is subtracted from the sum of 893645 and 635489, find that number. [JNV 2014]

(1)106355 (2) 364511
(3) 51329 (4) 529134

8. A shopkeeper charges ₹ 10 for every bottle of coke or ₹ 240 for every crate of 30 bottles. If Vandana wants to buy 185 bottle of coke, what amount she will have to pay? [JNV 2014]

(1) ₹ 1480 (2) ₹ 1490
(3) ₹ 1600 (4) ₹ 1850

9. What is the maximum difference between the smallest number formed by 7 numerals and the largest number formed by 6 numerals? [JNV 2014]

(1) 1 (2) 35802
(3) 38502 (4) 999998

10. Unit digit of product of first ten prime number is [JNV 2014]

(1) 6 (2) 4 (3) 2 (4) 0

11. The difference between the highest and lowest five digits number using 0, 3, 6, 8 and 9 digit (each digits using once time). [JNV 2013]

(1) 94941 (2) 61821 (3) 61740 (4) 67941

12. The sum of two numbers is 234560. If one number is more than other number by ten thousand ten. Find the greatest number. [JNV 2013]

(1) 112272 (2) 112275 (3) 132285 (4) 117280

13. Find out the unit's digit in the product of $(3207 \times 12 \times 17 \times 13)$. [JNV 2013]
(1) 0 (2) 3 (3) 4 (4) 7

14. Which of the following is the smallest four digits number? [JNV 2011]
(1) 1000 (2) 1100 (3) 1300 (4) 1900

15. The multiple of 7 between 14 and 77 is [JNV 2011]
(1) 10 (2) 9 (3) 8 (4) 7

16. What value must be given to *, so that the number 6912* is divisible by 25? [JNV 2011, 1997]
(1) 3 (2) 5 (3) 4 (4) 7

17. The value of $20.91 \div 0.17$ is [JNV 2011]
(1) 0.0123 (2) 1.230 (3) 12.30 (4) 123.0

18. 14 rows in a park 420 cars stand in every row. Then, how many cars will stand in the park? [JNV 2010]
(1) 5880 (2) 434 (3) 406 (4) 30

19. A number
- is less than 50 - multiple of 7
- have 3 factors

Then, the number is [JNV 2010]
(1) 14 (2) 42 (3) 49 (4) 70

20. What should be added to 65° to make it a right angle? [JNV 2008]
(1) 35° (2) 45° (3) 40° (4) 25°

21. In a well water level was 18 m below. Due to rains water level increased by 3.5 m. What is the water level in the well now? [JNV 2008]
(1) 14.5 m (2) 15.6 m (3) 21.5 m (4) 3.5 m

22. What is the greatest four digits number in which all the digits are different? [JNV 2007]
(1) 9876 (2) 9768 (3) 9867 (4) 9786

23. 2408 × 200 is equal to [JNV 2007]
(1) 480160 (2) 480016
(3) 481600 (4) 461600

24. The product of three numbers is 7980. In which the product of two numbers is 228, then what is the third number? [JNV 2007]
(1) 25 (2) 15 (3) 16 (4) 35

25. The sum of the greatest and the smallest 4 digit numbers is [JNV 2004]
(1) 8999 (2) 10999
(3) 11110 (4) 111111

26. The product of two numbers is 8192. One of the number is two times the second number, the smaller number is [JNV 2004]
(1) 8 (2) 16 (3) 32 (4) 64

27. The smallest odd number formed by the digits 1, 0, 3, 4 and 5 will be [JNV 2004]
(1) 10345 (2) 10453
(3) 10543 (4) 10534

28. The number 13013 is divisible by 13. The smallest 5 digit number beginning with 14 and exactly divisible by 13 is [JNV 2003, 1995]
(1) 14040 (2) 14001
(3) 14014 (4) 14027

29. In a question of division if divisor is 51, quotient 16 and remainder 27, then the dividend will be [JNV 2003, 1995]
(1) 843 (2) 483
(3) 9 (4) 1393

Answers

1. (2)	**2.** (3)	**3.** (2)	**4.** (2)	**5.** (4)	**6.** (3)	**7.** (4)	**8.** (2)	**9.** (1)	**10.** (4)
11. (4)	**12.** (2)	**13.** (3)	**14.** (1)	**15.** (3)	**16.** (2)	**17.** (4)	**18.** (1)	**19.** (2)	**20.** (4)
21. (1)	**22.** (1)	**23.** (3)	**24.** (4)	**25.** (2)	**26.** (4)	**27.** (1)	**28.** (2)	**29.** (1)	

Hints and Solutions

1. According to the question,
$\therefore$ Required answer $= (-1) \times (1)^{100} = (-1)^{101} = -1$

2. Price of packet of 5 apples is ₹ 25.
Price of a single apple = ₹ 6
Now, 27 apples = 5×5 packet + 2 apple
$= 5 \times 25 + 2 \times 6 = 125 + 12 =$ ₹ 137
$\therefore$ Price of 27 apples = ₹ 137

3. $\therefore$ Let marks obtained by Kaku = x
Marks obtained by Raman = $x + 3$
Marks obtained by Bakshi = $x + 7$
According to the question
$$x + x + 3 + x + 7 = 76$$

$3x + 10 = 76 \Rightarrow 3x = 66 = 22$

$\therefore$ Marks obtains by Raman $= x + 3 = 22 + 3 = 25$

4. Let the marks obtained by Shyam be x.
Then, marks obtained by Ram $= x + 8$
and marks obtained by Anil $= x + 8 + 4$
$= x + 12$
According to the question,
$x + x + 8 + x + 12 = 128$, $3x + 20 = 128$
$3x = 108$, $x = 36$
So, marks obtained by Ram $= x + 8 = 36 + 8 = 44$

5. Suppose Ram's weight $= x$ kg
Then, Rajesh's weight $= (x - 5)$ kg
and Neha's weight $= (x + 3)$ kg
Then, $x + (x - 5) + (x + 3) = 103$
$\Rightarrow \quad 3x - 2 = 103 \Rightarrow 3x = 105$
$\therefore \quad x = \frac{105}{3} = 35$ kg

6. Let the score of Bhavna be x, then
Score of Karan $= x + 10$
Score of Isha $= x - 5$
According to the question,
$x + 10 + x - 5 + x = 170$
$\Rightarrow \quad 3x + 5 = 170 \Rightarrow 3x = 165$
$\therefore \quad x = 55$
Obtained mark of Isha $= 55 - 5 = 50$

7. Sum $= 893645 + 635489 = 1529134$
Let the number which is to be subtracted is x, then $1529134 - x = 1000000$
$\Rightarrow x = 1529134 - 1000000 = 529134$

8. Given, 1 crate $= 30$ bottles
185 bottles $= 6$ crate $+ 5$ bottles
$= 6 \times 240 + 5 \times 10 = 1440 + 50 =$ ₹ 1490

9. Smallest number of seven digit $= 1000000$
Greatest number of six digit $= 999999$
Required difference $= 1000000 - 999999 = 1$

10. First ten prime numbers
2, 3, 5, 7, 11, 13, 17, 19, 23, 29
Product of first ten prime numbers
$2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times 19 \times 23 \times 29$
$\therefore$ Unit digit of product of $2 \times 3 \times 5 = 0$
Hence, the unit digit of first ten prime number $= 0$(0 multiplied by any number gives always 0).

11. Largest number of 5 digits $= 98630$
Samallest number of 5 digits $= 30689$
Hence, required difference
$= 98630 - 30689 = 67941$

12. Suppose, first number $= x$
and second number $= x + 10010$
Then, $x + x + 10010 = 234560$
$\Rightarrow \quad 2x = 234560 - 10010$
$\Rightarrow \quad 2x = 224550 \Rightarrow x = 112275$
Hence, greatest number $= x + 10010$
$= 112275 + 10010 = 122285$

13.
$$\begin{array}{ccccccc} 3207 & \times & 12 & \times & 17 & \times & 13 \\ \uparrow & & \uparrow & & \uparrow & & \uparrow \\ 7 & & 2 & & 7 & & 3 \end{array}$$
$\therefore$Unit's digits are 7, 2, 7 and 3.
Hence, required product $= 7 \times 2 \times 7 \times 3 = 294$
$\therefore$ Unit's digit $= 4$

14. Smallest four digits number $= 1000$

15. Multiples of 7 between 14 and 77
$= 21, 28, 35, 42, 49, 56, 63, 70$
So, total numbers of multiples are $= 8$

16. The numbers divisible by 25 are only the numbers with last digits 25, 50, 75 and 100. So, 5 is required number.

17. $\because 20.91 \div 0.17 = \frac{2091}{100} \times \frac{100}{17} = 123.0$

18. Requird number of cars $= 14 \times 420 = 5880$

19. Required number $= 42$
$\therefore$Factors of $42 = 2 \times 3 \times 7$

20. Right angle is 90°.
$\therefore \quad 90° - 65° = 25°$

21. Required level $= 18 - 3.5 = 14.5$ m

22. Arrange it in descending order starting from 9.
Hence, required number $= 9876$

23. $2408 \times 200 = 481600$

24. Third number $= \frac{7980}{228} = 35$

25. The greatest 4 digit number $= 9999$
The smallest 4 digit number $= 1000$
Total $= 10999$

26. Let the number be x and $2x$.
$\therefore \quad x \times 2x = 8192$
$x \times x = \frac{8192}{2} = 4096$
$\Rightarrow \quad x^2 = 4096$
$\Rightarrow \quad x = \sqrt{4096}$
$\Rightarrow \quad x = 64$

28. The smallest five digit number beginning with 14 is 14000.
13) 14000 (1076

```
 13
100
 91
 90
 78
 12
```

∴The required number will be

$= 14000 + (13 - 12)$

$= 14000 + 1$

$= 14001$

29. As we know,

Dividend = Divisor + Quotient + Remainder

Dividend $= 51 \times 16 + 27$

$= 816 + 27 = 843$

Practice Exercise

1. On dividing a number by 9, the quotient is 12 and remainder is 7. The number is
(1) 114 (2) 93 (3) 115 (4) 108

2. What least number must be subtracted from 543 to get a number exactly divisible by 8?
(1) 9 (2) 1 (3) 5 (4) 7

3. The number 4318 should be divided by which number, so that the quotient is 17.
(1) 253 (2) 254 (3) 244 (4) 354

4. What must be added to 2910, so that the quotient is 243 on dividing by 12?
(1) 7 (2) 4 (3) 5 (4) 6

5. Which of the greatest four digits number, is exactly divisible by 88?
(1) 9944 (2) 9988 (3) 9996 (4) 9966

6. Which one of the following numbers is exactly divisible by 11?
(1) 1552 (2) 1331 (3) 1882 (4) 1902

7. If 10 * 4 divisible by 3, the number at * is
(1) 4 (2) 1 (3) 2 (4) 3

8. If the number 325 * 6 is exactly divisible by 3, the number which comes at the place of * is
(1) 4 (2) 2 (3) 3 (4) 1

9. If 34*24 is divisible by 9, the number at * is
(1) 5 (2) 9 (3) 2 (4) 3

10. Find the unit's digit in the product of (4326×5321).
(1) 6 (2) 8
(3) 1 (4) 3

11. The unit's digit in the product $(2467)^{153} \times (341)^{72}$ is
(1) 9 (2) 3 (3) 1 (4) 7

12. A man's monthly salary is ₹ 25000. He spent ₹ 2500 on clothes, ₹ 4000 on food, ₹ 3000 on house rent and ₹ 3500 on education monthly. His monthly saving is
(1) ₹ 1200 (2) ₹ 1800
(3) ₹ 12000 (4) None of these

13. The unit digit in the product of $163 \times 87* \times 239$ be 1, then the digit that the place of * will be
(1) 1 (2) 3 (3) 7 (4) 9

14. On dividing 55055 by 11, the quotient obtained is
(1) 550 (2) 5005 (3) 505 (4) 50005

15. If the number 9708*3 is divisible by 9 and 3, the number which comes at the place of * is
(1) 0 (2) 1 (3) 3 (4) 6

16. Find the greatest number of 4 digits which is exactly divisible by 75
(1) 9975 (2) 9927 (3) 7799 (4) 9978

Answers

1. (3)	**2.** (4)	**3.** (2)	**4.** (4)	**5.** (1)	**6.** (2)	**7.** (2)	**8.** (2)	**9.** (1)	**10.** (1)
11. (4)	**12.** (3)	**13.** (2)	**14.** (2)	**15.** (1)	**16.** (1)				

Hints and Solutions

1. Dividend = Quotient × Divisor + Remainder

$= 12 \times 9 + 7 = 108 + 7 = 115$

2.

```
8)  543  (67
    48
    ---
     63
     56
    ---
      7   Remainder
```

∴ 7 is the required least number.

3. The required number $= \frac{4318}{17} = 254$

4. The required number $= (243 \times 12) - 2910$

$= 2916 - 2910 = 6$

5. The greatest number of four digits is 9999.

```
88)  9999  (113
     88
     ----
      119
      88
     ----
      319
      264
     ----
       55
```

∴ Required number $= 9999 - 55 = 9944$

6. ∵ In 1331; $(1 + 3) - (3 + 1) = 0$

[The difference between the sum of digits at even places and sum of the digits at odd places is 0].

7. For divisibility by 3, the sum of digits of a number must be divisible by 3, sum of the digits of the number $10 * 4 = 1 + 0 + 4 = 5$, which must be 6, so the digit at * place must be $(6 - 5) = 1$.

8. For divisibility by 3, the sum of digits of a number must be divisible by 3.

The sum of digits of the number 325 * 6

$= 3 + 2 + 5 + 6 = 16$, which must be 18.

So, the digit at * place must be $(18 - 16) = 2$.

9. For divisibility by 9, the sum of digits of a number must be divisible by 9.

The sum of digits of the number 34*24

$= 3 + 4 + 2 + 4 = 13$, which must be 18.

So, the digit at * place must be $(18 - 13) = 5$.

10. Product of unit's digit $= 6 \times 1 = 6$

∴ Required digit = 6

11. Unit's digit of $(2467) \times (341)$

$= 7 \times 1 = 7$

12. Total spent = 2500 + 4000 + 3000 + 3500

= ₹ 13000,

Salary = ₹ 25000

∴ His monthly saving = 25000 − 13000

= ₹ 12000

13. $163 \times 87 * \times 239$

The unit digit in product of 3, *, 9 should be 1.

∴ The required number of * should be 3.

∵ $3 \times 3 \times 9 = 81$

14.

```
11)  55055  (5005
     55
     ----
      055
       55
     ----
       ×
```

15. If the sum of digits of a number is divisible by both 9 and 3, that number will also be divisible by 9 and 3. Here, sum of digits $= 9 + 7 + 0 + 8 + * + 3 = 27 + *$, 27 is divisible by both 9 and 3.

∴ The number, which comes at the place of * is 0.

16. $9999 \div 75$, remainder = 24

∴ The required number

$= 9999 - 24$

$= 9975$

Self Practice

1. The greatest number of five digits exactly divisible by 8 is
(1) 99992 (2) 99984 (3) 90000 (4) 10000

2. In the election, a candidate '*A*' gets 252130 votes while, candidate '*B*' gets 113717 votes. Then, the number of votes with which candidate '*A*' wins are
(1) 148413 (2) 138413 (3) 365847 (4) None of these

3. Which one of the numbers is exactly divisible by 3?
(1) 2572 (2) 3411 (3) 2732 (4) 3521

4. Which of the following numbers is exactly divisible by 9?
(1) 20756 (2) 10836 (3) 31525 (4) 53162

5. Which of the numbers is exactly divisible by 8?
(1) 444 (2) 8442 (3) 8096 (4) 8844

6. If 2*345 is divisible by 9 what will come at *?
(1) 4 (2) 1 (3) 9 (4) 8

7. What least number should be subtracted from 413, so that the resulting number is exactly divisible by 13?
(1) 12 (2) 10 (3) 11 (4) 17

8. ₹ 125000 is to be distributed among 5 persons. Then, the share of each person is
(1) ₹ 2500 (2) ₹ 20000 (3) ₹ 25000 (4) ₹ 20005

9. The greatest number of three digits divisible by 5 is
(1) 9990 (2) 990 (3) 995 (4) 105

10. What least number should be added to 64 to make it divisible by 7?
(1) 4 (2) 6 (3) 12 (4) 3

11. The number 7254*38 is divisible by 9, then the number which comes at the place of * is
(1) 4 (2) 7 (3) 6 (4) 5

12. 57244 is divisible by
(1) 11, 4 (2) 4, 7 (3) 7, 11 (4) 7, 9

13. The number between 800 and 900 divisible completely by 13 and 17 is
(1) 878 (2) 884 (3) 888 (4) 868

14. What is the unit digit in $(44 \times 88 \times 11)$?
(1) 1 (2) 3 (3) 2 (4) 5

Answers

1. (1)	**2.** (2)	**3.** (2)	**4.** (2)	**5.** (3)	**6.** (1)	**7.** (2)	**8.** (3)	**9.** (3)	**10.** (2)
11. (2)	**12.** (1)	**13.** (2)	**14.** (3)						

CHAPTER

03

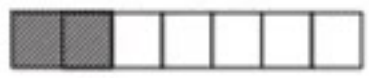
FRACTIONAL NUMBER AND FUNDAMENTAL OPERATIONS

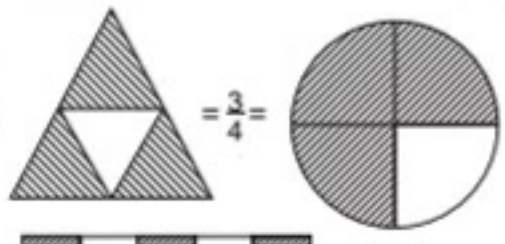
Fraction

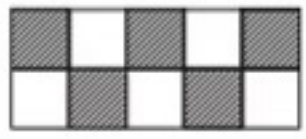
When a number quantity or an object is divided into equal parts, one or more of such equal parts is known as fraction. It is formed as $\frac{x}{y}$, where $y \neq 0$, which represents x number of parts out of y number of equal parts of a object. Every fraction has a numerator and a denominator.

Here, x is called numerator and y is called denominator.

Some figures are given below to understand the fraction in better way.

1.  $= \frac{2}{7}$

2.  $= \frac{3}{4} =$

3.  $= \frac{5}{10} = \frac{1}{2}$

Types of Fraction

Proper Fraction

If numerator is less than the denominator of a fraction, then fraction is called proper fraction.

e.g. $\frac{8}{11}, \frac{4}{9}, \frac{19}{27}$ etc.

The value of proper fraction is always less than 1.

Improper Fraction

A fraction whose numerator is equal to or greater than the denominator is called an improper fraction.

e.g. $\frac{17}{12}, \frac{12}{7}, \frac{18}{5}$ etc.

The value of an improper fraction is always more than or equal to 1.

Mixed Fraction

A fraction combined with whole number part and a fractional part is called mixed fraction.

e.g. $1\frac{7}{16}, 2\frac{9}{4}, 3\frac{4}{11}$ etc.

Equivalent Fractions

Equivalent fractions can be defined as fractions with different numerators and denominators that represent the same value or proportion of the whole.

e.g. $\frac{3}{5}, \frac{6}{10}, \frac{30}{50}$ etc are equal

The representation of the same ratio as multiplying or dividing numerator and denominator by common factor does not alter the value of the fraction.

Reciprocal Fraction

If numerator and denominator of a fraction are interchange to each other, then the new fraction is called a reciprocal fraction.

e.g. Reciprocal fraction of $\frac{4}{5}$ is $\frac{5}{4}$.

Addition of Fractions

When Denominators are Equal Here, we simply add the numerators and keep the denominators same as all the denominators of the fraction are given same.

e.g. $\frac{1}{9} + \frac{8}{9} + \frac{5}{9} = \frac{1+8+5}{9} = \frac{14}{9}$

When Fractions are Mixed with Equal Denominators

Here, firstly we add all the whole part and simply add the numerator and keep and denominator same as all the denominators of the fraction are given same. And lastly we sum up these two parts and get the final result.

e.g. $7\frac{2}{8}+4\frac{1}{8}+3\frac{3}{8}=(7+4+3)+\frac{2+1+3}{8}$

$$=14+\frac{6}{8}=14\frac{6}{8}$$

When Denominators are Unequal

If denominators are unequal, then we take the LCM of denominators and make equivalent fraction having same denominator further sum up numerator.

e.g. $\frac{5}{3}+\frac{2}{5}+\frac{3}{10}$

Here, LCM (3, 5, 10) = 30

$\therefore \quad \frac{5}{3}=\frac{5}{3}\times\frac{10}{10}=\frac{50}{30}, \frac{2}{5}=\frac{2}{5}\times\frac{6}{6}=\frac{12}{30}$

and $\quad \frac{3}{10}=\frac{3}{10}\times\frac{3}{3}=\frac{9}{30}$

$\therefore \quad \frac{5}{3}+\frac{2}{5}+\frac{3}{10}=\frac{50+12+9}{30}=\frac{71}{30}$

When Fractions are Mixed with Unequal Denominators

Here, firstly we add all the whole part and fraction part make equivalent fraction having same denominator and further sum up numerator.

e.g., $5\frac{2}{3}+4\frac{1}{2}+3\frac{1}{6}=(5+4+3)+\left(\frac{2}{3}+\frac{1}{2}+\frac{1}{6}\right)$

$$=12+\left(\frac{2\times2+3\times1+1\times1}{6}\right)$$

$$=12+\frac{8}{6}=12+\frac{4}{3}=12+1\frac{1}{3}$$

$$=12+1+\frac{1}{3}=13\frac{1}{3}$$

Subtraction of Fractions

The method of subtraction of fraction is same as that of their addition. Here, we have to take care regarding signs.

When Denominators are Equal

Here, we simply subtract the numerator and keep the denominators same as all the denominators of the fraction are given same.

e.g. $\frac{8}{9}-\frac{4}{9}-\frac{2}{9}=\frac{8-4-2}{9}=\frac{2}{9}$

When Fractions are Mixed with Equal Denominators

Here, firstly we subtract all the whole part and simply subtract the numerator and keep the denominators same as all the denominators of the fraction are given same as. And lastly we sum up there two parts and get the final result.

e.g. $8\frac{7}{4}-4\frac{5}{4}=(8-4)+\frac{7-5}{4}=4+\frac{2}{4}=4\frac{2}{4}$

When Denominators are Unequal

If denominator are unequal, then we take the LCM of denominators and make equivalent fraction having same denominator. Further subtract the numerator

e.g. $\frac{2}{3}-\frac{1}{2}=\frac{2\times2-1\times3}{6}=\frac{4-3}{6}=\frac{1}{6}$

When Fractions are Mixed with Unequal Denominators

Here, firstly we subtract all the whole part and fraction part make equivalent fraction having same denominators and further subtract the numerator.

e.g. $9\frac{1}{3}-8\frac{1}{4}=(9-8)+\frac{1}{3}-\frac{1}{4}=1+\frac{1\times4-1\times3}{3\times4}$

$$=1+\frac{1}{12}=1\frac{1}{12}$$

Multiplication of Fractions

- Convert the mixed fraction, if any into improper fraction.
- Multiply the numerators which gives the numerator of the product and multiply the denominators to get the denominator of the product.

(i) $\frac{1}{3}\times\frac{2}{3}=\frac{1\times2}{3\times3}=\frac{2}{9}$

(ii) $1\frac{2}{3}\times2\frac{3}{1}=\frac{5}{3}\times\frac{5}{1}=\frac{5\times5}{3\times1}=\frac{25}{3}$

Division of Fractions

- First convert mixed fraction into improper fraction, if any is given.
- In division of fraction first of all interchange the position of numerator and denominator of the second fraction.

Now, multiply of first fractioni and interchange second fraction.

e.g. $\frac{1}{4}\div\frac{1}{2}=\frac{1}{4}\times\frac{2}{1}=\frac{2}{4}=\frac{1}{2}$

LCM and HCF of Fractions

Suppose we have fractional number of the form $\frac{a}{b}, \frac{c}{d}$ and $\frac{e}{f}$, then

$$\text{LCM of fractions} = \frac{\text{LCM of numerators } (a, c, e)}{\text{HCF of denominators } (b, d, f)}$$

$$\text{and HCF of fractions} = \frac{\text{HCF of numerators } (a, c, e)}{\text{LCM of denominators} (b, d, f)}$$

Example Find the LCM and HCF of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$.

(1) $\frac{45}{4}, \frac{1}{48}$ (2) $\frac{35}{4}, \frac{1}{24}$ (3) $\frac{25}{4}, \frac{1}{12}$ (4) $\frac{1}{12}, \frac{25}{4}$

Sol. **(1)** LCM of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$

$$= \frac{\text{LCM of } 3, 5, 9}{\text{HCF of } 8, 12, 16} = \frac{45}{4}$$

HCF of $\frac{3}{8}, \frac{5}{12}$ and $\frac{9}{16}$

$$= \frac{\text{HCF of } 3, 5, 9}{\text{LCM of } 8, 12, 16} = \frac{1}{48}$$

Comparison of Fraction

Firstly, we change the given fraction in decimal fraction and compare them from compare, we can write of fractions in ascending and descending orders.

e.g.

(i) greater fraction in $\frac{1}{2}, \frac{3}{4}$ and $\frac{5}{6}$

$\frac{1}{2} = 0.5; \frac{3}{4} = 0.75; \frac{5}{6} = 0.833\ldots$

So, $\frac{5}{6}$ is greater fraction.

(ii) Descending order of $\frac{7}{12}, \frac{5}{8}$ and $\frac{11}{15}$ can be determined as the following way.

$$\frac{7}{12} = 0.59, \frac{5}{8} = 0.63, \frac{11}{15} = 0.74$$

Clearly, $0.74 > 0.63 > 0.59$

$\therefore$ $\frac{11}{15} > \frac{5}{8} > \frac{7}{12}$

Important Facts

- In two or more fractions, if denominators are same, then fraction with greater numerator is greater and fraction with lesser numerator is lesser.
- In two or more fractions, if numerators are same, then fraction with greater denominator is lesser and fraction with lesser denominator is greater.
- If difference between numerator and denominator of given fractions are same then the fraction having the greatest numerator is greatest and the fraction having the lowest numerator is lowest.

Entrance Corner

1. There are 500 eggs in a box. $\frac{3}{25}$ got broken, $\frac{4}{5}$ of the remaining eggs were sold. The number of eggs left is [JNV 2019]

(1) 80 (2) 88
(3) 40 (4) 36

2. A drum is $\frac{2}{3}$ full, if 50 L more required to fill it up, how much is the capacity of the drum? [JNV 2019]

(1) 150 L (2) 120 L
(3) 100 L (4) 90 L

3. $\frac{3}{4}$th of 144 is how much greater than $\frac{2}{3}$rd of 96? [JNV 2015]

(1) 20 (2) 44
(3) 54 (4) 64

4. 1/5th part of a drum is filled with milk. What is the capacity of drum if it require 28 L more to fall the drum completely? [JNV 2014]

(1) 30 L (2) 32 L
(3) 35 L (4) 140 L

5. $\frac{1}{3}$rd of a drum is filled with water. If need another 60 L water to filled whole drum, then what is the capacity of drum? [JNV 2013]

(1) 120 L (2) 90 L (3) 60 L (4) 30 L

6. What should be taken out of $\frac{3}{7}$ to get $\frac{2}{7}$? [JNV 2012]

(1) $\frac{5}{7}$ (2) 1 (3) $\frac{1}{7}$ (4) $\frac{3}{7}$

7. $\frac{1}{3}$rd of a property is worth ₹ 1500.Find $\frac{1}{5}$th of the property. [JNV 2012]

(1) ₹ 600 (2) ₹ 900 (3) ₹ 1200 (4) ₹ 1000

8. The sum of the fraction $\frac{2}{9}$, $\frac{4}{3}$ and $\frac{6}{18}$ is [JNV 2011]

(1) $\frac{17}{9}$ (2) $\frac{16}{9}$
(3) $\frac{2}{5}$ (4) $\frac{11}{18}$

9. The value of $5-\left(2\frac{1}{2}-\frac{3}{4}\right)+\left(3\frac{1}{2}-1\frac{1}{4}\right)$ is [JNV 2007]

(1) $4\frac{1}{2}$ (2) $5\frac{1}{2}$
(3) $5\frac{1}{4}$ (4) $3\frac{1}{2}$

10. Which of the following numbers are in ascending order? [JNV 2004]

(1) $\frac{1}{3}, \frac{1}{2}, 0.25$ (2) $0.25, \frac{1}{2}, \frac{1}{3}$
(3) $0.25, \frac{1}{3}, \frac{1}{2}$ (4) $\frac{1}{2}, \frac{1}{3}, 0.25$

11. The sum of the fractions $\frac{4}{3}$, $\frac{5}{9}$ and $\frac{6}{18}$ is [JNV 2003]

(1) $\frac{2}{5}$ (2) $\frac{11}{18}$
(3) $\frac{19}{9}$ (4) $\frac{20}{9}$

12. The product of two numbers is $\frac{5}{4}$. If one number is $\frac{5}{6}$, what is the other number? [JNV 2002]

(1) 2 (2) $\frac{1}{2}$ (3) $\frac{3}{2}$ (4) $\frac{2}{3}$

13. The correct arrangement of the fractional numbers $\frac{17}{25}$, $\frac{17}{13}$, $\frac{17}{19}$ and $\frac{17}{27}$ in ascending order is [JNV 2001]

(1) $\frac{17}{19}, \frac{17}{13}, \frac{17}{27}, \frac{17}{25}$ (2) $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$
(3) $\frac{17}{27}, \frac{17}{19}, \frac{17}{13}, \frac{17}{25}$ (4) $\frac{17}{13}, \frac{17}{25}, \frac{17}{19}, \frac{17}{27}$

14. Which of the following is the largest fraction? [JNV 2000]

(1) $\frac{5}{6}$ (2) $\frac{9}{10}$ (3) $\frac{7}{9}$ (4) $\frac{10}{11}$

15. Which of the following is the smallest fraction? [JNV 1999]

(1) $\frac{1}{10}$ (2) $\frac{2}{15}$ (3) $\frac{3}{8}$ (4) $\frac{4}{9}$

16. $\frac{5}{6}$ of an hour is equal to [JNV 1999]

(1) $\frac{1}{2}$ h (2) 40 min
(3) 50 min (4) 55 min

17. $\frac{4}{5}$ of 0.025 is equal to [JNV 1999]

(1) 0.0002 (2) 0.002 (3) 0.02 (4) 0.2

18. Find the product of $0.4 \times 0.04 \times 0.004$. [JNV 1998]

(1) 0.00064 (2) 0.0064
(3) 64 (4) 0.000064

19. $\frac{1}{3}$rd part of a certain amount was given to Sita and rest to Gita. If Gita got ₹ 524, what did Sita get? [JNV 1998]

(1) ₹ 262 (2) ₹ 412 (3) ₹ 200 (4) ₹ 400

20. Simplify $\frac{8 \times 21 \times 24}{48 \times 7 \times 15}$. [JNV 1998]

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{1}{7}$ (4) $\frac{1}{2}$

21. Which fraction should be added to the sum of $5\frac{3}{4}$, $4\frac{4}{5}$ and $7\frac{3}{8}$ to make the result a whole number? [JNV 1998]

(1) $\frac{1}{40}$ (2) $\frac{2}{40}$ (3) $\frac{3}{40}$ (4) $\frac{4}{40}$

22. $2.205 \div 0.15$ is equal to [JNV 1997]

(1) 1.47 (2) 14.7
(3) 147 (4) 0.147

23. Which is the smallest fraction? [JNV 1997]

(1) $\frac{2}{5}$ (2) $\frac{7}{5}$ (3) $\frac{6}{5}$ (4) $\frac{7}{8}$

24. The product of two fractions is 6. If one fraction is $\frac{5}{3}$. Find the other. [JNV 1997]

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{18}{5}$ (4) $\frac{12}{5}$

25. In a class of 30 students the number of girls is $\frac{1}{5}$th of the number of the boys. How many boys are there in the class? [JNV 1997]

(1) 25 (2) 18 (3) 20 (4) 19

26. $\frac{1}{3}$rd of a number is 15. Find $\frac{1}{5}$th of the number. [JNV 1997]

(1) 9 (2) 6 (3) 4 (4) 5

27. If $\frac{4}{5}$ of an estate be worth ₹ 1680, find the value of half of the estate. [JNV 1996]

(1) ₹ 1080 (2) ₹ 1200 (3) ₹ 1000 (4) ₹ 1050

28. By how much does $\frac{6}{7/8}$ exceed $\frac{6/7}{8}$? [JNV 1996]

(1) $6\frac{2}{3}$ (2) $6\frac{3}{4}$ (3) $7\frac{1}{2}$ (4) $8\frac{3}{4}$

29. Arrange there fractions in ascending order $\frac{3}{4}, \frac{1}{6}, \frac{9}{8}, \frac{10}{13}$. [JNV 1995]

(1) $\frac{9}{8}, \frac{1}{6}, \frac{3}{4}, \frac{10}{13}$ (2) $\frac{10}{13}, \frac{9}{8}, \frac{1}{6}, \frac{3}{4}$

(3) $\frac{3}{4}, \frac{9}{8}, \frac{1}{6}, \frac{10}{13}$ (4) $\frac{1}{6}, \frac{3}{4}, \frac{10}{13}, \frac{9}{8}$

30. Arrange these fractions in descending order $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}, \frac{1}{7}$. [JNV 1995]

(1) $\frac{7}{8}, \frac{5}{6}, \frac{2}{3}, \frac{1}{7}$ (2) $\frac{5}{6}, \frac{1}{7}, \frac{2}{3}, \frac{7}{8}$

(3) $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}, \frac{1}{7}$ (4) $\frac{1}{7}, \frac{2}{3}, \frac{5}{6}, \frac{7}{8}$

Answers

1. (2)	**2.** (1)	**3.** (2)	**4.** (3)	**5.** (2)	**6.** (3)	**7.** (2)	**8.** (1)	**9.** (2)	**10.** (3)
11. (4)	**12.** (3)	**13.** (2)	**14.** (4)	**15.** (1)	**16.** (3)	**17.** (3)	**18.** (4)	**19.** (1)	**20.** (2)
21. (3)	**22.** (2)	**23.** (1)	**24.** (3)	**25.** (1)	**26.** (1)	**27.** (4)	**28.** (2)	**29.** (4)	**30.** (1)

Hints and Solutions

1. According to the question,

Total eggs = 500

$\frac{3}{25}$ got broken i.e. broken eggs $= \frac{3}{25} \times 500 = 60$

$\therefore$ Remaining eggs $= 500 - 60 = 440$

Now, $\frac{4}{5}$ of the remaining eggs were sold i.e.

$$= \frac{4}{5} \times 440 = 88 \times 4 = 352$$

Hence, number of eggs left $= 500 - (60 + 352)$

$$= 500 - 412 = 88$$

2. $\because$ Empty part of the drum $= 1 - \frac{2}{3} = \frac{1}{3}$

If $\frac{1}{3}$ part requires = 50 L

Then, 1 part requires $= 50 \div \frac{1}{3} = 50 \times 3 = 150$ L

3. According to the question, $\frac{3}{4}$th of 144

$= 144 \times \frac{3}{4} = 108$ and $\frac{2}{3}$rd of $96 = 96 \times \frac{2}{3} = 64$

$\therefore$ Required difference $= 108 - 64 = 44$

4. Fraction of drum filled with $= \frac{1}{5}$

Remaining part $= 1 - \frac{1}{5} = \frac{4}{5}$

According to the question, $\frac{4}{5}$ part = 28 L

4 part $= 28 \times 5 = 140$ L

1 part $= \frac{140}{4} = 35$ L

5. Suppose capacity of the drum = x L

Water in drum $= \frac{x}{3}$ L

Then, $x - \frac{x}{3} = 60 \Rightarrow \frac{3x - x}{3} = 60$

$\Rightarrow \quad \frac{2x}{3} = 60 \Rightarrow 2x = 180$

$\therefore \quad x = 90$ L

6. Let x be taken out.

Then, $\frac{3}{7} - x = \frac{2}{7} \Rightarrow x = \frac{3}{7} - \frac{2}{7} \Rightarrow x = \frac{1}{7}$

7. Suppose total property = ₹ x

Then, $x \times \frac{1}{3} = 1500 \Rightarrow x = 1500 \times 3$

$\Rightarrow \quad x =$ ₹ 4500

$\therefore \frac{1}{5}$th of the property $= 4500 \times \frac{1}{5} =$ ₹ 900

8. Sum of the fraction

$$= \frac{2}{9} + \frac{4}{3} + \frac{6}{18} = \frac{4 + 24 + 6}{18} = \frac{34}{18} = \frac{17}{9}$$

9. $5-\left[\frac{5}{2}-\frac{3}{4}\right]+\left[\frac{7}{2}-\frac{5}{4}\right]=5-\left[\frac{10-3}{4}\right]+\left[\frac{14-5}{4}\right]$

$=5-\frac{7}{4}+\frac{9}{4}=\frac{20-7+9}{4}=\frac{22}{4}=\frac{11}{2}=5\frac{1}{2}$

10. $\because \quad \frac{1}{3}=0.33, \frac{1}{2}=0.50$

$\therefore$ In ascending order the numbers will be written as $0.25<0.33<0.50$ or $0.25, \frac{1}{3}, \frac{1}{2}$

11. $\frac{4}{3}+\frac{5}{9}+\frac{6}{18}=\frac{6\times4+2\times5+1\times6}{18}$

$=\frac{24+10+6}{18}=\frac{40}{18}=\frac{20}{9}$

12. $\because$ Product of two numbers $=\frac{5}{4}$

One number $=\frac{5}{6}$

Other number $=\frac{5}{4}\div\frac{5}{6}=\frac{5}{4}\times\frac{6}{5}=\frac{3}{2}$

13. $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$ are in ascending order.

(In like fractions with equal numerators, the fraction with greatest denominators is the smallest.)

14. $\frac{5}{6}=0.833, \frac{9}{10}=0.900, \frac{7}{9}=0.777, \frac{10}{11}=0.090$

$\therefore$ Largest fraction $=\frac{10}{11}$

15. $\frac{1}{10}=0.1, \frac{2}{15}=0.13, \frac{3}{8}=0.375, \frac{4}{9}=0.444$

$\therefore$ Smallest fraction $=\frac{1}{10}$

16. $\frac{5}{6}$ of 1 h $=\frac{5}{6}\times60$ min $=50$ min

17. $\frac{4}{5}\times0.025=\frac{4}{5}\times\frac{25}{1000}=\frac{1}{50}=0.02$

18. $0.4\times0.04\times0.004=0.000064$

19. Let the total amount be ₹ x.

$\therefore$ Gita get $=x-\frac{x}{3}=\frac{3x-x}{3}=₹\frac{2x}{3}$

According to the question,

$\frac{2x}{3}=524\Rightarrow 2x=3\times524\Rightarrow x=\frac{3\times524}{2}=₹786$

Sita get $=786\times\frac{1}{3}=₹262$

20. $\frac{8\times21\times24}{48\times7\times15}=\frac{4032}{5040}=\frac{4}{5}$

21. $5\frac{3}{4}+4\frac{4}{5}+7\frac{3}{8}=\frac{23}{4}+\frac{24}{5}+\frac{59}{8}=\frac{717}{40}$

$\frac{717}{40}$ becomes whole number when $\frac{3}{40}$ is added to it.

$\frac{717}{40}+\frac{3}{40}=\frac{720}{40}=18$

Which is a whole number.

22. $2.205\div0.15=\frac{2.205}{0.15}=\frac{2205}{1000}\times\frac{100}{15}=\frac{2205}{150}$

$=14.7$

23. $\frac{2}{5}=0.4, \frac{7}{5}=1.4, \frac{6}{5}=1.2, \frac{7}{8}=0.875$

$\therefore \frac{2}{5}$ is the smallest fraction.

24. Let the other fraction be x.

Then, $\quad x\times\frac{5}{3}=6\Rightarrow\frac{5x}{3}=6$

$\therefore \quad x=\frac{6\times3}{5}=\frac{18}{5}$

25. Let the number of boys be x.

Then, number of girls is $\frac{x}{5}$.

According to the question, $x+\frac{x}{5}=30$

$\Rightarrow\frac{6x}{5}=30\Rightarrow 6x=5\times30\Rightarrow x=\frac{5\times30}{6}=25$

$\therefore$ Number of boys $=25$

26. Let the number be x. Then, $\frac{1}{3}x=15\Rightarrow x=45$

Then, $\frac{x}{5}$ of $45=45\times\frac{1}{5}=9$

27. Let the value of estate be ₹ x.

According to the question, $\frac{4x}{5}=1680$

$\therefore \quad x=\frac{1680\times5}{4}=₹2100$

Value of half of the estate $=\frac{1}{2}\times2100=₹1050$

28. $6\div\frac{7}{8}=6\times\frac{8}{7}=\frac{48}{7}, \quad \frac{6}{7}\div8=\frac{6}{7}\times\frac{1}{8}=\frac{3}{28}$

$\frac{48}{7}-\frac{3}{28}=\frac{192-3}{28}=\frac{189}{28}=6\frac{21}{28}=6\frac{3}{4}$

29. $\frac{3}{4}=0.75, \frac{1}{6}=0.166, \frac{9}{8}=1.125, \frac{10}{13}=0.769$

Ascending order, 0.16, 0.75, 0.76, 1.125

i.e., $\frac{1}{6}, \frac{3}{4}, \frac{10}{13}, \frac{9}{8}$

30. $\frac{5}{6}=0.833, \frac{7}{8}=0.875, \frac{2}{3}=0.66, \frac{1}{7}=0.142$

Descending order, 0.875, 0.833, 0.66, 0.142

i.e., $\frac{7}{8}, \frac{5}{6}, \frac{2}{3}, \frac{1}{7}$

Practice Exercise

1. $12 + \frac{\square}{6} = 13\frac{1}{6}$, which number should be written $\square$ to prove statement true?

(1) 1 (2) 7 (3) 13 (4) 25

2. Which of the following fractions is not equal to the other three?

(1) 4/5 (2) 9/15 (3) $\frac{3}{5}$ (4) $\frac{6}{10}$

3. Which of the following numbers are in ascending order?

(1) $\frac{12}{19}, \frac{12}{25}, \frac{12}{29}, \frac{12}{37}$ (2) $\frac{12}{29}, \frac{12}{37}, \frac{12}{19}, \frac{12}{25}$

(3) $\frac{12}{37}, \frac{12}{29}, \frac{12}{19}, \frac{12}{25}$ (4) $\frac{12}{37}, \frac{12}{29}, \frac{12}{25}, \frac{12}{19}$

4. $\frac{2}{3} + \frac{5}{7}$ is equal to

(1) $\frac{2+5}{3+7}$ (2) $\frac{2+5}{3\times7}$

(3) $\frac{2\times7+3\times5}{3+7}$ (4) $\frac{2\times7+3\times5}{3\times7}$

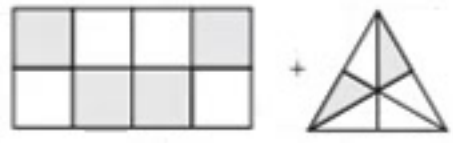
5. The product of $3\frac{1}{2}$ and $3\frac{1}{2}$ is

(1) 7 (2) $9\frac{1}{2}$ (3) $9\frac{1}{4}$ (4) $12\frac{1}{4}$

6. $1\frac{2}{3} \times 1\frac{3}{5}$ is equal to

(1) $2\frac{2}{3}$ (2) $1\frac{2}{5}$ (3) $2\frac{2}{5}$ (4) $1\frac{5}{8}$

7. Find the value of



(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{6}$ (4) $\frac{5}{6}$

8. $2\frac{1}{2} \times 3\frac{1}{3} \times 4\frac{1}{4}$ is equal to

(1) $9\frac{1}{24}$ (2) $24\frac{1}{24}$ (3) $29\frac{1}{24}$ (4) $35\frac{5}{12}$

9. Write in ascending order of the following fractional numbers $\frac{5}{17}, \frac{9}{17}, \frac{8}{17}$ and $\frac{10}{17}$.

(1) $\frac{10}{17}, \frac{9}{17}, \frac{8}{17}, \frac{5}{17}$ (2) $\frac{8}{17}, \frac{5}{17}, \frac{10}{17}, \frac{9}{17}$

(3) $\frac{5}{17}, \frac{9}{17}, \frac{10}{17}, \frac{8}{17}$ (4) $\frac{5}{17}, \frac{8}{17}, \frac{9}{17}, \frac{10}{17}$

10. Which one of the following fractions are expressed in descending order?

(1) $\frac{17}{25}, \frac{17}{27}, \frac{17}{13}, \frac{17}{19}$ (2) $\frac{17}{13}, \frac{17}{19}, \frac{17}{25}, \frac{17}{27}$

(3) $\frac{17}{27}, \frac{17}{19}, \frac{17}{13}, \frac{17}{25}$ (4) $\frac{17}{27}, \frac{17}{19}, \frac{17}{25}, \frac{17}{13}$

11. The product of two numbers is 5/4. If one number is 5/6, what is the other number?

(1) 2 (2) $\frac{1}{2}$ (3) $\frac{3}{2}$ (4) $\frac{2}{3}$

12. There is 500 eggs in a box. 4/25 eggs were broken, 2/5 of remaining eggs were sold. The number of eggs left is

(1) 80 (2) 252 (3) 100 (4) 120

13. Mohan Lal gives 1/4th part of his total money to his son, 1/3rd part to his wife and 1/8th part to his daughter. Then, remaining part of his money is

(1) $\frac{7}{24}$ (2) $\frac{5}{24}$ (3) $\frac{11}{24}$ (4) $\frac{1}{8}$

14. Which of the following fractions is greatest?

$$\frac{7}{12}, \frac{11}{16}, \frac{12}{17}, \frac{13}{18}, \frac{31}{36}$$

(1) $\frac{13}{18}$ (2) $\frac{12}{17}$ (3) $\frac{31}{36}$ (4) $\frac{7}{12}$

15. If one-fifth of one-fourth of a number is $\frac{5}{80}$, find the number.

(1) $\frac{4}{5}$ (2) $\frac{5}{4}$ (3) $\frac{2}{3}$ (4) $\frac{3}{2}$

16. What is the $\frac{3}{4}$th of $\frac{1}{5}$ of given figure?

(1) $\frac{1}{30}$ (2) $\frac{3}{40}$ (3) $\frac{3}{20}$ (4) $\frac{5}{24}$

17. If $\frac{2}{3}, \frac{23}{30}, \frac{9}{10}, \frac{11}{15}$ and $\frac{4}{5}$ are written in ascending order, then the fraction in the middle most will be

(1) $\frac{23}{30}$ (2) $\frac{4}{5}$ (3) $\frac{2}{3}$ (4) $\frac{11}{15}$

Answers

1. (2)	**2.** (1)	**3.** (4)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (4)	**8.** (4)	**9.** (4)	**10.** (2)
11. (3)	**12.** (2)	**13.** (1)	**14.** (3)	**15.** (2)	**16.** (2)	**17.** (1)			

Hints and Solutions

1. $12+\frac{\square}{6}=13\frac{1}{6} \Rightarrow \frac{72+\square}{6}=\frac{79}{6}$

$\square = 79-72=7$

2. (1) $\frac{4}{5}=\frac{4}{5}$ (2) $\frac{9}{15}=\frac{3}{5}$ (in its lowest term)

(3) $\frac{3}{5}=\frac{3}{5}$ (4) $\frac{6}{10}=\frac{3}{5}$ (in its lowest term)

As, (2), (3) and (4) are equal.

Hence, only $\frac{4}{5}$, i.e., (1) is not equal to other three fractions.

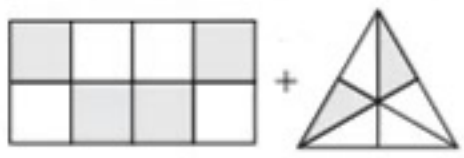
3. When the numerators are the same, the ascending order is determined by the descending order of the denominators.

4. $\because \frac{2}{3}+\frac{5}{7}=\frac{2\times7+3\times5}{3\times7}$

5. $3\frac{1}{2}\times3\frac{1}{2}=\frac{7}{2}\times\frac{7}{2}=\frac{49}{4}=12\frac{1}{4}$

6. $1\frac{2}{3}\times1\frac{3}{5}=\frac{5}{3}\times\frac{8}{5}=\frac{8}{3}=2\frac{2}{3}$

7.



$=\frac{4}{8}+\frac{2}{6}=\frac{1}{2}+\frac{1}{3}=\frac{3+2}{6}=\frac{5}{6}$

8. $2\frac{1}{2}\times3\frac{1}{3}\times4\frac{1}{4}=\frac{5}{2}\times\frac{10}{3}\times\frac{17}{4}$

$=\frac{850}{24}=\frac{425}{12}=35\frac{5}{12}$

9. When the denominators are the same, the ascending order is determined by the ascending order of numerators.

i.e. $\frac{5}{17}, \frac{8}{17}, \frac{9}{17}, \frac{10}{17}$

10. Since, numerators are same.

So, descending order,

$\frac{17}{13}, \frac{17}{19}, \frac{17}{25}, \frac{17}{27}$

11. The product of two numbers $=\frac{5}{4}$

One number $=\frac{5}{6}$

Other number $=\frac{5}{4}\div\frac{5}{6}=\frac{5}{4}\times\frac{6}{5}=\frac{3}{2}$

12. Total eggs $=500$

Number of broken eggs $=500\times\frac{4}{25}=80$

$\therefore$ Remaining eggs $=500-80=420$

Number of sold eggs $=420\times\frac{2}{5}=168$

Hence, required remaining eggs $=420-168$
$=252$

13. Remaining part of money $=1-\left(\frac{1}{4}+\frac{1}{3}+\frac{1}{8}\right)$

$=1-\left(\frac{6+8+3}{24}\right)=1-\frac{17}{24}=\frac{24-17}{24}=\frac{7}{24}$

14. Here, difference between numerator and denominator of all the fractions is 5. Therefore, the fraction with greatest numerator is the greatest.

Hence, $\frac{31}{36}$ is the greatest amongst the given fractions.

15. Let the required number be x.

Then, $\frac{1}{5}\times\frac{1}{4}\times x=\frac{5}{80}$, $x=\frac{5}{80}\times5\times4=\frac{5}{4}$

Hence, the required number is $\frac{5}{4}$.

16. It is clear from the figure that the fraction is

$\frac{3}{6}=\frac{1}{2}$

$\therefore$ Required value

$=\frac{3}{4}\times\frac{1}{5}\times\frac{1}{2}=\frac{3}{40}$

17. $\frac{2}{3}, \frac{23}{30}, \frac{9}{10}, \frac{11}{15}, \frac{4}{5}=\frac{20}{30}, \frac{23}{30}, \frac{27}{30}, \frac{22}{30}, \frac{24}{30}$

In ascending order, $\frac{20}{30}, \frac{22}{30}, \frac{23}{30}, \frac{24}{30}, \frac{27}{30}$

$\therefore$ Required fraction $=\frac{23}{30}$

Self Practice

1. Which is the greatest fraction in $\frac{2}{3}, \frac{2}{5}, \frac{1}{2}, \frac{1}{3}$?

(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{2}{5}$ (4) $\frac{2}{3}$

2. $\frac{1}{8} - \frac{1}{9}$ is equal to

(1) $\frac{1}{72}$ (2) $\frac{1}{36}$ (3) $\frac{3}{72}$ (4) $\frac{7}{72}$

3. $\frac{1}{4} \times \frac{4}{5} \times \frac{5}{7} \times \frac{14}{25}$ is equal to

(1) $\frac{2}{25}$ (2) $\frac{1}{25}$ (3) $\frac{3}{25}$ (4) $\frac{4}{25}$

4. $\frac{2}{7}$th part of a certain sum was donated and $\frac{1}{4}$th was spent on education. The balance amount will be

(1) $\frac{13}{28}$ (2) $\frac{11}{28}$ (3) $\frac{5}{28}$ (4) $\frac{14}{28}$

5. If $\frac{3}{4}x = 48$, the value of x is

(1) 16 (2) 64 (3) 40 (4) 72

6. What is subtracted from 3/4 to get remainder 2/3?

(1) $\frac{1}{2}$ (2) $\frac{2}{12}$ (3) $\frac{1}{3}$ (4) $\frac{1}{12}$

7. Which is the smallest fraction?

(1) $\frac{3}{5}$ (2) $\frac{1}{2}$ (3) $\frac{2}{3}$ (4) $\frac{3}{4}$

8. $\frac{7 \times 7 \times 7}{21 \times 21 \times 21}$ is equal to

(1) $\frac{21}{63}$ (2) $\frac{1}{27}$ (3) $\frac{21}{42}$ (4) $\frac{1}{9}$

9. $3\frac{1}{5} \div 1\frac{2}{3}$ is equal to

(1) $\frac{46}{25}$ (2) $\frac{48}{25}$ (3) $\frac{44}{25}$ (4) $\frac{42}{25}$

10. On subtracting $\frac{1}{3}$ from 2, what will remain?

(1) $1\frac{1}{3}$ (2) $1\frac{2}{3}$ (3) $\frac{4}{3}$ (4) $1\frac{1}{2}$

11. $\frac{45 \times 36}{9}$ is equal to

(1) 160 (2) 170 (3) 180 (4) 190

Answers

1. (4)	**2.** (1)	**3.** (1)	**4.** (1)	**5.** (2)	**6.** (4)	**7.** (2)	**8.** (2)	**9.** (2)	**10.** (2)
11. (3)									

CHAPTER

04

FACTORS AND MULTIPLES INCLUDING THEIR PROPERTIES

Factors

If a number is exactly divisible by the another number, without leaving any remainder, then the second number is said to be a factor of first number. In other words, an exact divisor of a number is called a factor of the number.

- 1 is the factor of every number.
- Every number is a factor of itself.
- Factors of a number are less than or equal to that number.
- Number of factors of that number are finite.

Example **1.** Find number of factors of 250.

(1) 7 (2) 8 (3) 9 (4) 6

Sol. **(2)** $250 = 2 \times 125 = 5 \times 50 = 10 \times 25 = 250 \times 1$

So, 1, 2, 5, 10, 25, 50, 125 and 250 are all factors of 250.

Hence, number of factors of 250 is 8.

Common Factors

When we find the factors of two or more numbers and then find some factors are the same ("Common") then they are the "Common Factors".

Example **2.** What are the common factors of 20 and 25?

(1) 4 (2) 5 (3) 6 (4) 7

Sol. **(2)** The factors of 20 = 1, 2, 4, 5, 10, 20

The factors of 25 = 1, 5, 25

and the common factors of 20 and 25 are 1 and 5.

Multiples

A multiple of a number is the number obtained by multiplying it with other (or same) number. In other words, the product of two or more numbers is said to be a multiple of each of those numbers.

e.g. $5 \times 1 = 5$, $5 \times 2 = 10$, $5 \times 3 = 15$, $5 \times 4 = 20$; Hence, 5, 10, 15 and 20 all are multiples of 5.

- Multiple of a number is greater than or equal to that number.
- Every number is a multiple of itself.
- Every multiple of a number is exactly divisible by the number. Number of multiples of a number are infinite.

Example **3.** Find the first five multiples of 20 between 100 and 300.

(1) 125, 130, 145, 165, 180
(2) 115, 130, 145, 165, 180
(3) 125, 135, 145, 165, 180
(4) 120, 140, 160, 180, 200

Sol. **(4)** Multiples of 20 between 100 and 300 are 120 (20×6), 140 (20×7), 160 (20×8), 180 (20×9), 200 (20×10).

Common Multiples

A number that can be divided exactly by two or more different numbers.

e.g. common multiple of 24 and 36 is 4, because

$$4 \times 6 = 24,\ 4 \times 9 = 36$$

Prime Factor

The prime factors of a quantity are all of the prime quantities that will exactly divide the given quantity.

e.g. $28 = 2 \times 2 \times 7$ etc.

Example **4.** Find the prime factors of 96.

(1) 4 (2) 5 (3) 6 (4) 7

Sol. **(3)** $96 = 2 \times 48 = 2 \times 2 \times 24$

$= 2 \times 2 \times 2 \times 12 = 2 \times 2 \times 2 \times 2 \times 6 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$

Thus, the prime factors of 96 are 2, 2, 2, 2, 2 and 3.

Entrance Corner

1. Which of the following numbers is divisible by 3, 4, 5 and 6? [JNV 2019]
(1) 36 (2) 60 (3) 80 (4) 90

2. A common multiple of both 9 and 7 is A. This number is in between 1200 and 1300. What is number A? [JNV 2018]
(1) 1197 (2) 1260 (3) 1206 (4) 1266

3. The sum of the first four multiples of 6, is [JNV 2016]
(1) 66 (2) 56 (3) 72 (4) 60

4. The sum of first five multiple of 6 is [JNV 2015]
(1) 90 (2) 54 (3) 30 (4) 84

5. The difference between ten's digit and unit's digit of the sum of the first five multiple of 6 is [JNV 2015]
(1) 6 (2) 7 (3) 8 (4) 9

6. Which of the following is not a factor of 316? [JNV 2011, 2002]
(1) 1 (2) 8 (3) 79 (4) 158

7. What is the prime factorization of 37800? [JNV 2005]
(1) $2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 7 \times 7$
(2) $2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 7$
(3) $8 \times 27 \times 25 \times 7$
(4) $2 \times 4 \times 25 \times 27 \times 7$

8. Factors of 30 are [JNV 2004]
(1) 2, 3, 5 (2) 1, 2, 3, 5, 110
(3) 1, 2, 3, 10, 15 (4) 1, 2, 3, 5, 6, 10, 15, 30

9. How many times does 9 come in writing the number from 1 to 100? [JNV 2004]
(1) 9 (2) 100 (3) 20 (4) 21

10. The number of prime factors of 105 is [JNV 2001]
(1) 2 (2) 3 (3) 4 (4) 5

11. The total number of the factors of 24 is [JNV 2000]
(1) 8 (2) 7 (3) 4 (4) 9

12. The factor of each odd number is [JNV 1999]
(1) 0 (2) 1
(3) 3 (4) 5

Answers

1. (2)	**2.** (2)	**3.** (4)	**4.** (1)	**5.** (4)	**6.** (2)	**7.** (2)	**8.** (4)	**9.** (3)	**10.** (2)
11. (1)	**12.** (2)								

Hints and Solutions

1. From the options,
Multiples of 60 $= 2 \times 2 \times 3 \times 5$ or $4 \times 3 \times 5$ or 6×10
Hence, number 60 is divisible by 3,4,5 and 6.

2. A common multiple of 9 and 7 both is A.
Then number will completely divide both 9 and 7. We observed that only two numbers 1197 and 1260 is in between 1200 and 1300 is completely divide by 9 and 7. But only number 1260.
Thus, the number A is 1260.

3. First four multiple of 6 = 6, 12, 18 and 24
Then, require sum $= 6 + 12 + 18 + 24$
$= 60$

4. First five multiple of 6 is as follows 6×1, 6×2, 6×3, 6×4, 6×5. or 6, 12, 18, 24, 30
$\therefore$ Required sum $= 6 + 12 + 18 + 24 + 30 = 90$

5. First five multiple of 6 is as follows 6×1, 6×2, 6×3, 6×4, 6×5 or 6, 12, 18, 24, 30
$\because$ Sum of first five multiple of 6
$= 6 + 12 + 18 + 24 + 30 = 90$
$\therefore$ Required difference of ten's and unit's digits
$= 9 - 0 = 9$

6. $\because$ Factors of 316 are 1×316, 2×158 and 4×79
(1, 2, 4, 79, 158, 316)
$\therefore$ 8 is not a factor of 316.

7.

2	37800
2	18900
2	9450
3	4725
3	1575
3	525
5	175
5	35
	7

∴Prime factorization

$= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 7$

8. Factors of 30 are

$1 \times 30, 2 \times 15, 3 \times 10$ and 5×6

∴Factors of 30 are

1, 2, 3, 5, 6, 10, 15, 30

9. 9, 19, 29, 39, 49, 59, 69, 79, 89 = 9

90, 91, 92, 93, 94, 95, 96, 97, 98 = 9

99 = 2

Total = 20

10.

3	105
5	35
	7

Prime factors of 105 are 3, 5 and 7.

∴ Number of factors of 105 = 3

11. All the factors of 24 are 1×24,

$2 \times 12, 3 \times 8$ and 4×6

So, number of factors are

(1, 2, 3, 4, 6, 8, 12, 24) = 8

12. 1 is the factor of each odd number.

Practice Exercise

1. The total number of the factors of 81 is
(1) 6 (2) 5 (3) 4 (4) 7

2. The total number of the factors of 54 is
(1) 6 (2) 8 (3) 7 (4) 5

3. The prime factors of 120 are
(1) $2 \times 2 \times 3 \times 8$ (2) $2 \times 9 \times 5$
(3) $2 \times 2 \times 2 \times 6$ (4) $2 \times 2 \times 2 \times 3 \times 5$

4. The prime factors of 48 are
(1) $2 \times 2 \times 12$ (2) 2×24
(3) $2 \times 2 \times 2 \times 6$ (4) $2 \times 2 \times 2 \times 2 \times 3$

5. What are the numbers of multiples of 5 which are less than 45?
(1) 9 (2) 8 (3) 7 (4) 10

6. Which of the following is not a factor of 144?
(1) 2 (2) 3 (3) 5 (4) 1

7. Which of the following is not a factor of 128?
(1) 8 (2) 2 (3) 3 (4) 4

8. Total number of the factors of 210 is
(1) 16 (2) 8 (3) 10 (4) 14

9. All prime factors of 150 are
(1) 2, 3, 5 (2) 3, 5, 10
(3) 2, 3, 5, 5 (4) None of these

10. Which one of the following is true?
(1) 1 is a factor of every number
(2) The factors of a number are uncountable
(3) The multiples of a number are countable
(4) 1 is a multiple of every number

11. The sum of first five even multiples of 2 is
(1) 28 (2) 32 (3) 40 (4) 30

12. The sum of first 8 multiple of 3 is
(1) 108 (2) 110 (3) 107 (4) 105

13. The numbers x, $x + 2$, $x + 4$ are all prime so x is
(1) 3 (2) 2
(3) 11 (4) 17

14. Which of the following is a prime factor?
(1) $84 = 2 \times 2 \times 3 \times 7$
(2) $112 = 2 \times 2 \times 14 \times 2$
(3) $70 = 14 \times 5$
(4) $45 = 5 \times 9$

15. Which of the following is a prime factor?
(1) $48 = 2 \times 2 \times 2 \times 6$ (2) $63 = 3 \times 3 \times 7$
(3) $81 = 3 \times 3 \times 9$ (4) $54 = 2 \times 3 \times 9$

16. Common multiple number for 18 and 54 is
(1) 8 (2) 9
(3) 7 (4) 4

17. The number x, $x-2$ and $x-6$ are all prime numbers, so find the value of x.
(1) 15 (2) 17 (3) 19 (4) 21

18. Common multiple for the numbers 4, 8 and 10, within the first 10 multiples is
(1) 40 (2) 20 (3) 50 (4) 48

19. Which of the following is not a prime factor?
(1) $81 = 3 \times 3 \times 3 \times 3$
(2) $102 = 2 \times 3 \times 17$
(3) $64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$
(4) $98 = 7 \times 14$

20. Which of the following is a prime factor of 168?
(1) $2 \times 2 \times 6 \times 7$ (2) $2 \times 4 \times 3 \times 7$
(3) $2 \times 2 \times 2 \times 21$ (4) $2 \times 2 \times 2 \times 3 \times 7$

21. Which of the following is always a factor of prime number?
(1) 1 (2) 2 (3) 4 (4) 7

22. Common multiple of numbers 6, 8 and 12, within the first 10 multiples are
(1) 24, 40 (2) 24, 48 (3) 40, 60 (4) 36, 40

23. The sum of first four multiple of 7 is
(1) 60 (2) 68 (3) 70 (4) 74

Answers

1. (2)	**2.** (2)	**3.** (4)	**4.** (4)	**5.** (2)	**6.** (3)	**7.** (3)	**8.** (1)	**9.** (3)	**10.** (1)
11. (4)	**12.** (1)	**13.** (1)	**14.** (1)	**15.** (2)	**16.** (2)	**17.** (3)	**18.** (1)	**19.** (4)	**20.** (4)
21. (1)	**22.** (2)	**23.** (3)							

Hints and Solutions

1. $\because$ Factors of 81 are 1×81, 3×27 and 9×9

$\therefore$ Number of factors $= (1, 3, 9, 27, 81) = 5$

2. $\because$ Factors of 54 are 1×54, 2×27

3×18 and 6×9.

$\therefore$ Number of factors $= (1, 2, 3, 6, 9, 18, 27, 54)$
$= 8$

3.

2	120
2	60
2	30
3	15
5	5
	1

$\therefore$ Prime factors of $120 = 2 \times 2 \times 2 \times 3 \times 5$

4.

2	48
2	24
2	12
3	6
3	3
	1

$\therefore$ Prime factors of $120 = 2 \times 2 \times 2 \times 2 \times 3$

5. Multiples of 5 less than 45
$= 5, 10, 15, 20, 25, 30, 35, 40$

Hence, required number of multiples is 8.

6. Factors of $144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 1$

So, 5 is not a factor of 144.

7. Factors 128
$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 1$
$= 2 \times 2 \times 2 \times 2 \times 2 \times 4 \times 1 = 2 \times 2 \times 2 \times 2 \times 8 \times 1$

So, 3 is not the factor of 128.

8. Factors of 210 are 1×210, 2×105

3×70, 5×42, 6×35, 7×30 and 10×21, 14×15

Number of factors $= 1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 30, 35, 42, 70, 105, 210$

Hence, number of factor is 16.

9.

2	150
3	75
5	25
5	5
	1

Prime factors of 150 = 2, 3, 5, 5

10. 1 is a factor of every number.

11. ∵ First 5 even multiples of 2 = 2, 4, 6, 8, 10

Sum of these multiples = 2 + 4 + 6 + 8 + 10
= 30

12. ∵ First 8 multiple of 3 are 3, 6, 9, 12, 15, 18, 21 and 24.

∴Sum of these multiples
= 3 + 6 + 9 + 12 + 15 + 18 + 21 + 24 = 108

13. 3 (∵ $x = 3$, $x + 2 = 3 + 2 = 5$ and $x + 4 = 3 + 4 = 7$)

14. Prime factors of 84 = $2 \times 2 \times 3 \times 7$

Prime factors of 112 = $2 \times 2 \times 2 \times 2 \times 2 \times 7$

Prime factor of 70 = $2 \times 5 \times 7$

Prime factors of 45 = $3 \times 3 \times 5$

So, factors of 84 are prime factors.

15. Prime factors of 48 = $2 \times 2 \times 2 \times 2 \times 3$

Prime factors of 63 = $3 \times 3 \times 7$

Prime factors of 81 = $3 \times 3 \times 3 \times 3$

Prime factors of 54 = $2 \times 3 \times 3 \times 3$

So, factors of 63 are prime factors.

16. Factors of 18 = $2 \times 3 \times 3$

Factors of 54 = $2 \times 3 \times 3 \times 3$

∴Common multiple = $3 \times 3 = 9$

17. From option (3), $x = 19$,

$x - 2 = 19 - 2 = 17$

$x - 6 = 19 - 6 = 13$

18. First 10 multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

8 = 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

10 = 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

Hence, common multiple = 40

19. Prime factors of 81 = $3 \times 3 \times 3 \times 3$

Prime factors of 102 = $2 \times 3 \times 17$

Prime factors of 64 = $2 \times 2 \times 2 \times 2 \times 2 \times 2$

Prime factors of 98 = $2 \times 7 \times 7$

So, factor of 98 are not prime factors.

20. Prime factors of 168 = $2 \times 2 \times 2 \times 3 \times 7$

21. 1 is the factor of prime number.

22. First 10 multiple of

6 = 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

8 = 8, 16, 24, 32, 40, 48, 56, 64, 72, 80

12 = 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

So, common multiples are 24 and 48.

23. First 4 multiples of 7 = 7, 14, 21, 28

Sum of these multiples = 7 + 14 + 21 + 28
= 70

Self Practice

1. Sum of first five odd multiples of 3 are
(1) 45 (2) 75 (3) 90 (4) 60

2. The number of multiples of 3 between 18 and 54
(1) 11 (2) 12 (3) 10 (4) 14

3. Sum of first five multiples of 6 are
(1) 90 (2) 30 (3) 60 (4) 120

4. The prime factors of 75 are
(1) $3\times5\times3$ (2) 3×25 (3) 5×15 (4) $3\times5\times5$

5. All prime factors of 182 are
(1) 2 and 13 (2) 2 and 7 (3) 2, 7 and 13 (4) None of these

6. The prime factors of 210 are
(1) 5 (2) 4 (3) 3 (4) 2

7. The prime factors of 2310 are
(1) 2, 3, 5, 7, 11 (2) 2, 3, 4, 7 (3) 2, 4, 6, 7, 11 (4) None of these

8. Prime factors of 240 are
(1) $2\times2\times4\times3\times5$ (2) $2\times2\times2\times2\times3\times5$ (3) $4\times4\times3\times5$ (4) $4\times4\times15$

9. Multiple of first three multiple of 4
(1) 380 (2) 384 (3) 390 (4) 400

10. The number of multiple of 7 between 21 and 77
(1) 6 (2) 7 (3) 8 (4) 9

11. Prime factors of 68 are
(1) 2×34 (2) $2\times2\times17$ (3) 4×17 (4) 1×68

12. Prime factors of 88 are
(1) 3 (2) 4 (3) 6 (4) 8

13. Common multile of number 7 and 17 within 5 multiple
(1) 14, 42 (2) 14, 30 (3) 14, 28 (4) 21, 56

14. Which of the following is true?
(1) Every number is a factor of itself
(2) Number of multiples of a number are infinite
(3) A number is exactly divisible by its factors
(4) All are true

15. Which of the following is not true?
(1) Every number is a multiple of itself
(2) 1 is not the factor of all numbers
(3) Exact divisor of a number is a factor of that number
(4) All are true

Answers

1. (2)	**2.** (1)	**3.** (1)	**4.** (4)	**5.** (3)	**6.** (2)	**7.** (1)	**8.** (2)	**9.** (2)	**10.** (2)
11. (2)	**12.** (2)	**13.** (3)	**14.** (4)	**15.** (2)					

CHAPTER

05

LCM AND HCF OF NUMBERS

LCM

LCM (Least Common Multiple) of two or more numbers is a number which is smallest common multiple of the numbers, *e.g.*, Multiple of 5 are 5, 10, 15, 20, 25, 30, 35, 40.

Multiple of 6 are 6, 12, 18, 24, 30, 36, 42.

e.g. Among the multiple of 5 and 6; 30 is the smallest multiple, which is common to both.

So, 30 is LCM of 5 and 6.

Similarly, 28 is the LCM of 4 and 7.

Methods for Finding LCM

There are two methods for finding LCM

1. Prime factorisation method
2. Division method

Prime Factorisation Method

Step I Write each of the given numbers as product of prime factors.

Step II Find the product of the highest powers of the prime factors, which will be the LCM.

Example **1.** Find the LCM of 54 and 21.

(1) 350 (2) 256
(3) 378 (4) 415

Sol. **(3)** Prime factors of,

$$54 = 2 \times 3 \times 3 \times 3$$

In both numbers, $21 = 3 \times 7$

Factor '2' appears maximum 'one' time.

Factor '3' appears maximum 'three' times.

Factor '7' appears maximum 'one' time.

$\therefore$ Product $= 2 \times 3 \times 3 \times 3 \times 7 = 378$, which is the required LCM.

Division Method

Step I Write the given numbers in a row

Step II Write the factor on the left hand side, which can divide maximum of the numbers.

Step III Write down the quotients and the undivided numbers in the row below the first row.

Step IV Repeat steps II and III until we get a row, where all the numbers are prime to each other.

Step V The product of all the factors/divisors and the numbers left in the last row is the required LCM.

Example **2.** Find the LCM of 36, 56, 105 and 108.

(1) 6730 (2) 7577 (3) 6578 (4) 7560

Sol. **(4)**

2	36, 56, 105, 108
2	18, 28, 105, 54
3	9, 14, 105, 27
7	3, 14, 35, 9
	3, 2, 5, 9

36 is a factor/submultiple of 108 ($36 \times 3 = 108$). 56 and 108 are divisible by 2. So, we write 2 on the left side and perform Step III.

Next factors are 2, 3 and 7.

Thereafter, we find that 2, 5 and 9 left in the last row have no common divisor *i.e.*, 2, 5, 9 are co-prime to each other, though 9 itself is not a prime number.

So, we find the product of 2, 2, 3, 7, 2, 5 and 9 to get the required LCM. LCM $= 2 \times 2 \times 3 \times 7 \times 2 \times 5 \times 9 = 7560$

Questions Based on Bells

To solve the problems based on ringing bells at different intervals, the student has to take LCM of different intervals.

Example Six bells commence ringing together and ring at intervals of 2, 4, 6, 8, 10 and 12 seconds respectively. After what interval of time will they ring again together?

Sol. According to question, first we take the LCM of intervals

LCM of 2, 4, 6, 8, 10 and 12.

So, after each 120 seconds, they would ring together.

2	2, 4, 6, 8, 10, 12
2	1, 2, 3, 4, 5, 6
2	1, 1, 3, 2, 5, 3
3	1, 1, 3, 1, 5, 3
	1, 1, 1, 1, 5

$\Rightarrow \quad 2 \times 2 \times 2 \times 3 \times 5 = 120$

HCF

HCF (Highest Common Factor) is the greatest number that divides both the given numbers or more numbers. i.e., HCF is a greatest common factor of all the given numbers.

It is also known as Greatest Common Divisor (GCD).

e.g. 15 is the greatest number that divides both 30 and 75. So, 15 is the HCF of 30 and 75.

Methods for Finding HCF

There are two methods for finding HCF

1. Prime factorisation method
2. Division method

Prime Factorisation Method

Step I Write each number as product of its prime factors.

Step II Multiply the factors with lowest powers which are common to all numbers.

Example **3.** Find the HCF of 140, 168 and 224.

(1) 25 (2) 28
(3) 38 (4) 20

Sol. **(2)** Factorising the given numbers

2	140
2	70
5	35
	7

2	168
2	84
2	42
3	21
	7

2	224
2	112
2	56
2	28
2	14
	7

Thus, $140 = 2 \times 2 \times 5 \times 7$

$168 = 2 \times 2 \times 2 \times 3 \times 7$

$224 = 2 \times 2 \times 2 \times 2 \times 2 \times 7$

Common prime factors are $2 \times 2 \times 7$

$\therefore$ HCF $= 2 \times 2 \times 7 = 28$

Division Method

Step I Divide the greater number by the smaller number.

Step II Next, divide the preceding divisor by the remainder. Continue until you get zero as remainder. The last divisor is the required HCF.

Example **4.** Find the HCF of 45 and 108.

(1) 12 (2) 7 (3) 9 (4) 10

Sol. **(3)** $\because$ 45< 108

```
∴   45) 108 (2
         90
        18 ) 45 (2
              36
               9) 18 (2
                  18
                   ×
```

$\therefore$ Required HCF = 9

Example **5.** Find the HCF of 24 and 30.

(1) 6 (2) 7 (3) 8 (4) 5

Sol. **(1)** By prime factorization method,

$24 = 2 \times 2 \times 2 \times 3; 30 = 2 \times 3 \times 5$

HCF = Highest Common Factor of 24 and 30

$= 2 \times 3 = 6$

Alternate Method

By Division method,

```
24)30(1
   24
    6)24(4
      24
       ×
```

$\therefore$ HCF = The last divisor = 6

Entrance Corner

1. The number of numbers which are multiples of both 3 and 5 in the first 100 natural numbers is [JNV 2019]
(1) 10 (2) 9 (3) 7 (4) 6

2. The HCF of two numbers 14 and 28 is 14. Find the LCM. [JNV 2018]
(1) 28 (2) 196 (3) 298 (4) 98

3. What is the four digit smallest number which is completely divided by 2,3,8,10? [JNV 2019]
(1) 1020 (2) 1060 (3) 1080 (4) 1120

4. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is [JNV 2017, 2009]
(1) 1197 (2) 2394 (3) 4932 (4) 2384

5. HCF of 128, 288 and 160 is [JNV 2016]
(1) 16 (2) 24 (3) 32 (4) 48

6. If the product of two co-prime numbers is 117, their LCM will be [JNV 2016]
(1) 9 (2) 13 (3) 39 (4) 117

7. The greatest number which will divide 1277 and 1368 leaving 3 as the remainder in each case is [JNV 2015]
(1) 68 (2) 77 (3) 91 (4) 97

8. LCM of 114 and 95 is [JNV 2015]
(1) 570 (2) 950 (3) 1140 (4) 5700

9. Three bells ring at intervals of 12, 15 and 18 min, respectively. They started ringing simultaneously at 9 : 00 am. What will be the next time when they all ring simultaneously? [JNV 2014]
(1) 10 : 00 am (2) 11 : 00 am
(3) 12 : 00 pm (4) 1 : 00 pm

10. Greatest number, which is to be divided by 280 and 1245 leaves the remainder 4 and 3 respectively, is [JNV 2014]
(1) 138 (2) 148 (3) 145 (4) 178

11. Find the HCF of 45, 75 and 165. [JNV 2013]
(1) 15 (2) 45 (3) 75 (4) 2475

12. Find the smallest number divided by 42, 98 and 70. [JNV 2013]
(1) 1470 (2) 1740 (3) 1070 (4) 980

13. Find the LCM of 12,18 and 24. [JNV 2012]
(1) 72 (2) 48 (3) 60 (4) 84

14. LCM of 42, 70, 98 and 126 is [JNV 2011]
(1) 126 (2) 2205 (3) 4410 (4) 8820

15. Find the common factor of 12 and 15. [JNV 2010]
(1) 1, 2, 4 (2) 1, 3, 5 (3) 1, 12 (4) 1, 3

16. What is the greatest number that divides both 16 and 20 exactly? [JNV 2008]
(1) 40 (2) 32 (3) 80 (4) 4

17. Find the least number which is divisible by 15 and 18. [JNV 2008]
(1) 60 (2) 54 (3) 90 (4) 100

18. Find the LCM of 30, 40 and 60. [JNV 2008]
(1) 300 (2) 120 (3) 180 (4) 500

19. What will be the HCF of 48, 144 and 576? [JNV 2007]
(1) 576 (2) 144 (3) 48 (4) 1

20. What is the LCM of 16, 80 and 48? [JNV 2005]
(1) 8 (2) 16 (3) 240 (4) 480

21. The difference between the LCM and HCF of the numbers 30, 36 and 90 is [JNV 2004]
(1) 366 (2) 354 (3) 186 (4) 174

22. Three bells start ringing together at 8 : 35 am, if they ring after 12 s, 15 s and 18 s respectively each time, the next time they will ring together at [JNV 2004]
(1) 8 : 38 am (2) 8 : 40 am
(3) 8 : 41 am (4) 8 : 45 am

23. The LCM of 8, 12, 20 and 36 is [JNV 2003]
(1) 120 (2) 180 (3) 360 (4) 720

24. The HCF of two co-prime numbers is [JNV 2003]
(1) 1
(2) 0
(3) sum of the numbers
(4) difference of the numbers

25. Three bells start ringing together at 8 : 30 am. If they ring after 4 min, 5 min and 6 min respectively each time, the next time they will ring together at [JNV 2003]
(1) 8 : 45 am (2) 9 : 30 am
(3) 9 : 45 am (4) 10 : 15 am

26. The LCM of 12, 24 and 30 is [JNV 2002]
(1) 2 (2) 30 (3) 60 (4) 120

27. LCM of 3, 5 and 9 is [JNV 2000]
(1) 25 (2) 45 (3) 65 (4) 85

28. HCF of 8, 18, 24 is [JNV 2000]
(1) 2 (2) 4
(3) 6 (4) 8

29. Six bells begin tolling together and toll at interval of 2 s, 4 s, 6 s, 8 s, 10 s, 12 s, respectively. The time after which they will toll together is [JNV 1999]
(1) 2 min (2) 103 s
(3) 150 s (4) 1 min

30. Find the greatest number which divides 18 and 30 completely. [JNV 1999]
(1) 6 (2) 8
(3) 10 (4) 12

31. The greatest number which will divide 2112 and 2792 leaving 4 as the remainder in each case is [JNV 1999]
(1) 68 (2) 58 (3) 78 (4) 188

32. Find the LCM of 18, 24 and 60. [JNV 1999]
(1) 120 (2) 360
(3) 480 (4) 520

33. Find the HCF of 84 and 105. [JNV 1998]
(1) 19 (2) 20 (3) 21 (4) 22

34. Find the LCM of 20, 40, 60 is [JNV 1997]
(1) 100 (2) 120 (3) 140 (4) 240

35. Find the measure of the greatest length which can measure 24 m, 32 m and 44 m completely. [JNV 1997]
(1) 2 m (2) 3 m (3) 4 m (4) 5 m

Answers

1. (4)	**2.** (1)	**3.** (3)	**4.** (2)	**5.** (3)	**6.** (4)	**7.** (3)	**8.** (1)	**9.** (3)	**10.** (1)
11. (1)	**12.** (1)	**13.** (1)	**14.** (3)	**15.** (4)	**16.** (4)	**17.** (3)	**18.** (2)	**19.** (3)	**20.** (3)
21. (4)	**22.** (1)	**23.** (3)	**24.** (1)	**25.** (2)	**26.** (4)	**27.** (2)	**28.** (1)	**29.** (1)	**30.** (1)
31. (1)	**32.** (2)	**33.** (3)	**34.** (2)	**35.** (3)					

Hints and Solutions

1. $\because$ LCM of 3 and 5 = 15
The numbers which are multiples of both 3 and 5
$= 15\times1, 15\times2, 15\times3, 15\times4, 15\times5, 15\times6$
$= 15, 30, 45, 60, 75, 90$
Total numbers = 6

2. We know that,
Product of two numbers = HCF × LCM
$$14\times28 = 14\times \text{LCM} \Rightarrow \text{LCM} = \frac{14\times28}{14} = 28$$

3. LCM of 2,3,8,10

2	2, 3, 8, 10
3	1, 3, 4, 5
4	1, 1, 4, 5
5	1, 1, 1, 5
	1, 1, 1, 1

$= 2\times3\times4\times5 = 120$
$\therefore$ The four digit smallest number is multiple of
$120 = 120\times9 = 1080$

4. $$\text{Other number} = \frac{\text{HCF}\times\text{LCM}}{\text{First number}}$$
$$= \frac{38\times98154}{1558}$$
$$= 2394$$

5. $128 = 2\times2\times2\times2\times2\times2\times2$
$288 = 2\times2\times2\times2\times2\times3\times3$
$160 = 2\times2\times2\times2\times2\times5$
So, the required HCF = Common factor between given numbers
$= 2\times2\times2\times2\times2 = 32$

6. $\because 117 = 3\times3\times13$
Here, 9 and 13 are co-prime, so the required LCM $= 9\times13 = 117$

7. Required greatest number

= HCF of (1277 − 3) and (1368 − 3)

= HCF of 1274 and 1365

1274)1365(1 and 91)1365(15

1274 1365

91)1274(14 ×

1274

×

∴Greatest number = 91

8.

2	114, 95
3	57, 95
19	19, 95
5	1, 5
	1, 1

∴Required LCM = 2 × 3 × 19 × 5 = 570

9. The LCM of 12, 15 and 18

⇒ 2×2×3×5×3 = 180

Here, 60 min = 1 h; 180 min = 3 h

Hence, bells would rung after 3 h at 12:00 pm.

10. Required HCF = (280 − 4) and (1245 − 3)

= 276 and 1242

276) 1242 (4

1104

138) 276 (2

276

×

∴ Required greatest number = 138

11. HCF of 45, 75 and 165

45) 75 (1

45

30) 45 (1

30

15) 30 (2

30

×

15) 165 (1

15

15)15(1

15

×

∴ HCF = 15

12. Required smallest number = LCM of 42, 98 and 70

2	42, 98 ,70
7	21, 49, 35
3	3, 7, 5
5	1, 7, 5
7	1, 7, 1
	1, 1, 1

∴ Required number = 2×7×3×5×7 = 1470

13.

2	12, 18, 24
2	6, 9, 12
2	3, 9, 6
3	3, 9, 3
3	1, 3, 1
	1, 1, 1

LCM of 12, 18 and 24 = 2×2×2×3×3

= 72

14.

2	42, 70, 98, 126
3	21, 35, 49, 63
7	7, 35, 49, 21
	1, 5, 7, 3,

∴ LCM = 2×3×7×5×7×3 = 4410

15. 12 = 1×2×2×3;

15 = 1×3×5

∴ Common factor = 1, 3

16. 16) 20 (1

16

4) 16 (4

16

×

So, 4 is the greatest number.

17. LCM of 15 and 18

2	15, 18
3	15, 9
3	5, 3
5	5, 1
	1, 1

∴ Required number = 2×3×3×5

= 90

18.

2	30, 40, 60
2	15, 20, 30
3	15, 10, 15
5	5, 10, 5
	1, 2, 1

∴ Required LCM = 2×2×3×5×2 = 120

19. 48) 144 (3

144

×

Again, 48) 576 (12

48

96

96

×

∴ HCF = 48

20. LCM of 16, 80 and 48

2	16, 80, 48
2	8, 40, 24
2	4, 20, 12
2	2, 10, 6
	1, 5, 3

$\therefore$ LCM $= 2\times2\times2\times2\times5\times3 = 16\times15 = 240$

21.

2	30, 36, 90
2	15, 18, 45
3	15, 9, 45
3	5, 3, 15
5	5, 1, 5
	1, 1, 1

$\therefore$ LCM $= 2\times2\times3\times3\times5 = 180$

36) 90 (2
72
18) 36 (2
36
×
18) 30 (1
18
12) 18 (1
12
6) 12 (2
12
× HCF = 6

$\therefore$ Difference $= 180 - 6 = 174$

22.

2	12, 15, 18
3	6, 15, 9
	2, 5, 3

LCM $= 2\times3\times2\times5\times3 = 180$ s or 3 min

After 3 min the bells will toll together

i.e. 8:35 + 3min = 8:38 am

23.

2	8, 12, 20, 36
2	4, 6, 10, 18
3	2, 3, 5, 9
	2, 1, 5, 3

LCM $= 2\times2\times3\times2\times5\times3 = 360$

24. The HCF of two co-prime number is always 1.

25. The LCM of 4, 5 and 6 = 60

Hence, after 60 min *i.e.*, after 1 h.

They will ring together *i.e.*, at 9 : 30 am.

26.

2	12, 24, 30
2	6, 12, 15
3	3, 6, 15
	1, 2, 5

$\therefore$ LCM $= 2\times2\times3\times2\times5 = 120$

27.

3	3, 5, 9
	1, 5, 3

$\therefore$ LCM $= 3\times5\times3 = 45$

28. 8) 18 (2
16
2) 8 (4
8
×
2) 24 (12
24
×

$\therefore$ Required HCF = 2

29.

2	2, 4, 6, 8, 10, 12
2	1, 2, 3, 4, 5, 6
3	1, 1, 3, 2, 5, 3
	1, 1, 1, 2, 5, 1

$\therefore$ Required time $= 2\times2\times3\times2\times5 = 120$ s

$= 2$ min

30. 18) 30 (1
18
12) 18 (1
12
6) 12 (2
12
×

The greatest number is 6.

31. $2112 - 4 = 2108$

$2792 - 4 = 2788$

2108) 2788 (1
2108
680) 2108 (3
2040
68) 680 (10
680
×

Hence, the required greatest number is 68.

32.

2	18, 24, 60
2	9, 12, 30
3	9, 6, 15
	3, 2, 5

$\therefore$ LCM $= 2\times2\times3\times3\times2\times5 = 360$

33. 84) 105 (1
84
21) 84 (4
84
×

∴ HCF = 21

34.

2	20, 40, 60
2	10, 20, 30
5	5, 10, 15
	1, 2, 3

∴ LCM = $2 \times 2 \times 5 \times 2 \times 3 = 120$

35. 24) 32 (1
24
8) 24 (3
24
×
8) 44 (5
40
4) 8 (2
8
×

Hence, the greatest measure is 4 m.

Practice Exercise

1. LCM of $2 \times 3 \times 5$ and $3 \times 5 \times 7$ is equal to
(1) 3 (2) 3×5
(3) $2 \times 3 \times 5 \times 7$ (4) $2 \times 3 \times 5 \times 3 \times 5 \times 7$

2. What is the number, which when divided by 8, 12 and 15, leaves a remainder 3 in each case?
(1) 63 (2) 66 (3) 123 (4) 183

3. Which of the following smallest four digit number divisible by 2, 3, 4, 5, 6 and 7?
(1) 1260 (2) 420
(3) 840 (4) 2100

4. Find the LCM of 8,14 and 26.
(1) 728 (2)782 (3) 872 (4) 278

5. Find the LCM of $2 \times 3 \times 5 \times 7$ and $3 \times 5 \times 7 \times 11$.
(1) $2 \times 3 \times 5 \times 7 \times 11$ (2) $2 \times 3^2 \times 5^2 \times 7^2 \times 11$
(3) $3 \times 5 \times 7$ (4) None of these

6. Vishal, Monu and Puneet start running around a circular ground and complete one round in 24 s, 6 s and 14 s respectively, in how much time will they meet again at the starting point?
(1) 1 min 32 s (2) 4 min 8 s
(3) 3 min 25 s (4) 2 min 48 s

7. Hemu, Anshul and Gaurav start running around a circular stadium and complete one round in 27s, 9s, and 36s, respectively. In how much time will they meet again at starting point?
(1) 2 min 36 s (2) 2 min 25 s
(3) 3 min 11 s (4) 1 min 48 s

8. Three bells ring at intervals of 15 s, 21s and 16 s, respectively. All bells ring simultaneously at 12: 00 noon. They will again ring simultaneously at
(1) 28 min past 12
(2) 25 min past 12
(3) 26 min past 12
(4) 24 min past 12

9. Three bells ring at intervals of 12 s, 9 s and 24 s, respectively. All bells ring simultaneously at 3: 00 pm. They will again ring simultaneously after
(1) 2 min 36 s (2) 2 min 12 s
(3) 1 min 12 s (4) 1 min 24 s

10. Raghav, Arun and Rinku joggning around a rectangular park and complete one round in 24 s, 18 s and 10 s, respectively. In how much time will they meet again at strating point?
(1) 5 min (2) 6 min
(3) 5 min 38 s (4) 6 min 14 s

11. Find the LCM of 12, 30, 60 is
(1) 20 (2) 30 (3) 60 (4) 80

12. The greatest number less than 1500, which is divisible by both 16 and 18, is
(1) 1440 (2) 1404 (3) 1386 (4) 1368

13. HCF of $5 \times 7 \times 9 \times 11 \times 13$ and $9 \times 11 \times 13 \times 17$ is equal to
(1) 13
(2) 33
(3) $9 \times 11 \times 13$
(4) $5 \times 7 \times 9 \times 11 \times 13 \times 17$

14. The HCF and LCM of two numbers are 4 and 48, respectively. If one of these number is 12, then the other number is
(1) 16 (2) 12
(3) 8 (4) 4

15. The LCM and HCF of two numbers are 96 and 8, respectively. One number is 32, then the other number is
(1) 256 (2) 24
(3) 12 (4) 768

16. The LCM and HCF of two numbers are 180 and 3, respectively. If one of the two numbers be 45, then the other number is
(1) 12 (2) 60
(3) 135 (4) 540

17. The product of two numbers is 216 and their HCF is 3, then their LCM is
(1) 648 (2) 219 (3) 213 (4) 72

18. HCF of two numbers is 20 and their LCM is 120. If one number is 60 find the other.
(1) 40 (2) 50 (3) 30 (4) 60

19. Find the HCF of 15, 30, 45 is
(1) 10 (2) 15 (3) 20 (4) 25

20. Find the greatest number which divides 36 and 48 completely.
(1) 10 (2) 11 (3) 12 (4) 13

21. Two numbers are in the ratio 3 : 4 and the product of their LCM and HCF is 10800. Find the sum of the numbers.
(1) 190 (2) 70
(3) 210 (4) 200

22. The LCM of two numbers is 1820 and their HCF is 26. If one number is 130, then the other number is
(1) 70 (2) 1690
(3) 364 (4) 1264

Answers

1. (3)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (1)	**6.** (4)	**7.** (4)	**8.** (1)	**9.** (3)	**10.** (2)
11. (3)	**12.** (1)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (1)	**17.** (4)	**18.** (1)	**19.** (2)	**20.** (3)
21. (3)	**22.** (3)								

Hints and Solutions

1. LCM of $2 \times 3 \times 5$
and $3 \times 5 \times 7 = 2 \times 3 \times 5 \times 7$.

2.

2	8, 12, 15
2	4, 6, 15
3	2, 3, 15
	2, 1, 5

$\therefore$ LCM $= 2 \times 2 \times 3 \times 2 \times 5 = 120$

$\therefore$ To get remainder 3 in each case, the required number $= 120 + 3 = 123$.

3.

2	2, 3, 4, 5, 6, 7
3	1, 3, 2, 5, 3, 7
	1, 1, 2, 5, 1, 7

$\therefore$ LCM $= 2 \times 3 \times 2 \times 5 \times 7 = 420$

Now, smallest number of four digit, which is divisible by 2, 3, 4, 5, 6 and 7 is the multiple of 420.

$\therefore$ $420 \times 3 = 1260$ is the required number.

4.

2	8, 14, 26
2	4, 7, 13
2	2, 7, 13
7	1, 7, 13
13	1, 1, 13
	1, 1, 1

Hence, required LCM $= 2 \times 2 \times 2 \times 7 \times 13 = 728$

5. First number $= 2 \times 3 \times 5 \times 7$

Second number $= 3 \times 5 \times 7 \times 11$

$\therefore$ LCM $= 2 \times 3 \times 5 \times 7 \times 11$

6. Required time to meet again
= LCM of 24, 6 and 14

Now, $24 = 2 \times 2 \times 2 \times 3$

$6 = 2 \times 3$; $14 = 2 \times 7$

$\therefore$ LCM $= 2 \times 2 \times 2 \times 3 \times 7 = 168$ s

$= 2$ min 48s

Clearly, they will meet again afte 2 min 48 s.

7. Required time to meet again = LCM of 27, 9 and 36

Now, $27 = 3 \times 3 \times 3$

$9 = 3 \times 3$

$36 = 2 \times 2 \times 3 \times 3$

$\therefore$ LCM $= 3 \times 3 \times 3 \times 2 \times 2$

$= 108$ s $= 1$ min 48 s

Clearly, they will meet again 1 min 48 s.

8. Required time to ring again = LCM of 15, 21 and 16

Now, $15 = 3 \times 5$; $21 = 3 \times 7$

$16 = 2 \times 2 \times 2 \times 2$

$\therefore$ LCM $= 3 \times 5 \times 7 \times 2 \times 2 \times 2 \times 2$

$= 1680$ s $= 28$ min

Clearly, all the bell will ring at 28 min past 12.

9. Required time to ring again = LCM of 12, 9 and 24

Now, $12 = 2 \times 2 \times 3$

$9 = 3 \times 3$

$24 = 2 \times 2 \times 2 \times 3$

$\therefore$ LCM $= 2 \times 2 \times 2 \times 3 \times 3 = 72$ s

$= 1$ min 12 s

Clearly, all the bell will ring after 1 min 12 s.

10. Required time to meet again = LCM of 24, 18 and 10

Now, $24 = 2 \times 2 \times 2 \times 3$

$18 = 2 \times 3 \times 3$

$10 = 2 \times 5$

$\therefore$ LCM $= 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 360$ s $= 6$ min

Clearly, they will meet again after 6 min.

11.

2	12, 30, 60
2	6, 15, 30
3	3, 15, 15
5	1, 5, 5
	1, 1, 1

$\therefore$ LCM $= 2 \times 2 \times 3 \times 5 = 60$

12. LCM of 16 and 18

2	16, 18,
8	8, 9,
9	1, 9,
	1, 1,

$= 2 \times 8 \times 9 = 144$

On dividing 1500 by 144, then the remainder is 60.

Hence, required number $= 1500 - 60 = 1440$

13. HCF of $5 \times 7 \times 9 \times 11 \times 13$ and $9 \times 11 \times 13 \times 17$.

The common factors $= 9 \times 11 \times 13$

14. $\because$ Other number $= \dfrac{\text{HCF} \times \text{LCM}}{\text{First number}}$

$= \dfrac{4 \times 48}{12} = 16$

15. The other number is

$= \dfrac{\text{HCF} \times \text{LCM}}{\text{First number}}$

$= \dfrac{96 \times 8}{32} = 24$

16. Other number $= \dfrac{\text{LCM} \times \text{HCF}}{\text{First number}}$

$= \dfrac{180 \times 3}{45} = 12$

17. LCM $= \dfrac{\text{Product of two numbers}}{\text{HCF}}$

$= \dfrac{216}{3} = 72$

18. Other number $= \dfrac{20 \times 120}{60} = 40$

19.

15) 30 (2
30
×

15) 45 (3
45
×

$\therefore$ HCF $= 15$

20. 36) 48 (1
36

12) 36 (3
36
×

$\therefore$ Greatest number is 12 .

21. Let the numbers be $3x$ and $4x$ respectively.

Then, their HCF $= x$ and their LCM $= 12x$

$\therefore 12x \times x = 10800$ or $x^2 = 900$ or $x = 30$

So, the numbers are 90 and 120.

The sum of the numbers $= 210$

22. One of the numbers is 130.

$\therefore$ Other number $= \dfrac{1820 \times 26}{130} = 364$

Self Practice

1. HCF of 160, 165 and 305 is
(1) 5 (2) 10 (3) 15 (4) 20

2. LCM of 28, 35, 56, 84 is
(1) 84 (2) 252 (3) 840 (4) 420

3. HCF of 48, 144 and 576 is
(1) 576 (2) 144 (3) 48 (4) 1

4. The least number such that, when it divided by 15, 25, 35 and 45, it leaves remainder 7, 17, 27 and 37 respectively, is
(1) 1575 (2) 1557 (3) 1576 (4) 1567

5. The LCM of $2^3 \times 3 \times 5$ and $2^4 \times 5 \times 7$ is
(1) 1680 (2) 840 (3) 210 (4) 630

6. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is
(1) 1197 (2) 2394 (3) 4932 (4) 2384

7. The greatest number that will divide 1375 and 4935 exactly is
(1) 5 (2) 1375 (3) 15 (4) 4935

8. The product of two numbers is 23625 and LCM is 315. The HCF of the number is
(1) 315 (2) 23625 (3) 75 (4) 15

9. The least number which is divided by 12, 15, 20 and 25 exactly, is
(1) 150 (2) 200 (3) 600 (4) 300

10. The greatest 4 digit number, such that when it divided by 15, 18, 21 and 24, it leaves remainder 5 in each case is
(1) 7565 (2) 7556 (3) 5756 (4) 6575

11. Five bells beginning together toll at interval 4s, 5s, 7s, 8s and 10s, respectively. After what interval of time will they toll again together?
(1) 2 m 20 s (2) 4 m 40 s (3) 6 m 40 s (4) 2 m 40 s

12. The LCM of two numbers is p and their HCF is q. The product of the two numbers is
(1) pq (2) p/q (3) q/p (4) None of these

13. The smallest 4 digit number such that, when it is divided by 12, 18, 21 and 28, it leaves remainder 3 in each case is
(1) 1008 (2) 1003 (3) 1011 (4) 1014

Answers

1. (1)	**2.** (3)	**3.** (3)	**4.** (4)	**5.** (1)	**6.** (2)	**7.** (1)	**8.** (3)	**9.** (4)	**10.** (1)
11. (2)	**12.** (1)	**13.** (3)							

CHAPTER

06

DECIMAL AND FUNDAMENTAL OPERATIONS ON THEM

Decimal Numbers

The numbers expressed in decimal form are called decimal numbers e.g. 0.71, 3.2, 0.10

A decimal has two parts, namely

(i) whole number part (ii) decimal part

These parts are separated by a dot (.) called the decimal point.

The part on the left side of the decimal point is the whole number part and that on its right side is the decimal part. e.g. In 62.64, whole number part = 62 and decimal part = 64.

Decimal Places The number of digits contained in the decimal part of a decimal gives the number of decimal places. e.g. 4.24 has two decimal places and 9.126 has three decimal places.

Decimal Fraction

A fraction in which the denominator is 10 or the power of 10 called decimal fraction. It may be represented as $\frac{1}{10}, \frac{3}{100}, \frac{6}{1000}$ etc. Hence, $\frac{3}{100}$ is the hundredth part of 3 and must be written as 0.03.

Thus every decimal fraction represents a fraction number.

Table for Decimal Place Value

Thousand	Hundred	Ten	Ones	Tenth	Hundredth	Thousandth
1000	100	0	1	$\left(\frac{1}{10}\right) = 0.1$	$\left(\frac{1}{100}\right) = 0.01$	$\left(\frac{1}{1000}\right) = 0.001$

Operations on Decimal Numbers (or Fractions)

1. Addition and Subtraction of Decimal Numbers

To add or subtract decimal numbers, the numbers are placed under each in such a way that the decimal point lie in a line. Then, the numbers can be added or subtracted as in usual manner.

e.g. Find the addition of 51.3, 7.078, 1.38 and 0.9.

Now,

$$\begin{array}{r} 51.300 \\ 7.078 \\ 1.380 \\ \underline{+\ 0.900} \\ \underline{60.658} \end{array}$$

Example **1.** Find the addition of 9 + 2.42 + 4.067 + 16.89.

(1) 32.737 (2) 32.377 (3) 32.773 (4) 32.320

Sol. **(2)**

$$\begin{array}{r} 9.000 \\ 2.420 \\ 4.067 \\ +\,16.890 \\ \hline 32.377 \\ \hline \end{array}$$

Example **2.** Subtract 27.85 – 14.34.

(1) 12.51 (2) 11.13 (3) 13.51 (4) 13.71

Sol. **(3)**

$$\begin{array}{r} 27.85 \\ -\,14.34 \\ \hline 13.51 \\ \hline \end{array}$$

2. Multiplication of Two or More Decimal Numbers

To multiply two decimal numbers, we follow the given steps:

Step I Multiply the two decimal numbers without the decimal point just like whole numbers.

Step II Now, count the number of digits starting from the rightmost digit and move towards left. Then, put the decimal there. Mark the decimal point in the product in such a way that the number of decimal places in the product is equal to the sum of the decimal places in the given decimal numbers.

To multiply a decimal number by 10 is equivalent to moving the decimal point one place to the right. To multiply by 100 is equivalent to moving the decimal point two places to the right and so on.

Example **3.** Find the product of 3.5413 × 2.1.

(1) 7.67343 (2) 7.14654 (3) 6.67345 (4) 7.43673

Sol. **(4)** For the product of 3.5413 × 2.1

Consider them without decimal,

i.e., 35413 × 21 = 743673

Total number of digits after decimal = 4 + 1 = 5

So, put decimal point at 5th place from right hand side in product.

∴ 3.5413 × 2.1 = 7.43673

3. Division of Decimal Numbers

To divide a decimal number by another decimal number, remove the decimal point in the divisor by multiplying both the dividend and divisor by the appropriate multiple of 10, then use the procedure of dividing a decimal number by a whole number.

e.g. $7.103 \div 2.01 = \frac{7.103}{2.01} = \frac{7.103 \times 100}{2.01 \times 100} = \frac{710.3}{201} = 3.53$

Example **4.** Divide 1.562 by 0.25.

(1) 6.248 (2) 6.240 (3) 5.284 (4) 6.482

Sol. **(1)** $\frac{1.562}{0.25} = \frac{1.562 \times 100}{0.25 \times 100} = \frac{156.2}{25}$

Now,

$$\begin{array}{r} 6.248 \\ 25\overline{)\,156.200} \\ \underline{150} \\ 62 \\ \underline{50} \\ 120 \\ \underline{100} \\ 200 \\ \underline{200} \\ \times \end{array}$$

∴ The quotient is 6.248.

4. Conversion of Simple Fraction into Decimal Number

To convert a fraction into a decimal, given steps are to be followed:

Step I Divide the numerator by the denominator till a non-zero remainder is obtained.

Step II Put a decimal point in the dividend as well as in the quotient.

Step III Put a zero on the right of the decimal point in the dividend as well as on the right of the remainder.

Step IV Divide again just as we do in wholenumbers.

Step V Repeat steps III and IV, till the remainder is zero.

Example **5.** Convert $\frac{11}{16}$ into decimal number.

(1) 0.6875 (2) 0.6785 (3) 0.6587 (4) 0.5687

Sol. **(1)**

$$\begin{array}{r} 0.6875 \\ 16\overline{)\,11.0000} \\ \underline{96} \\ 140 \\ \underline{128} \\ 120 \\ \underline{112} \\ 80 \\ \underline{80} \\ \times \end{array}$$

∴ $\frac{11}{16} = 0.6875$

5. Conversion of Decimal Number into Simple Fraction

To convert a decimal into a fraction, given steps are to be followed:

Step I Write the given decimal without decimalpoint as the numerator of the fraction.

Step II In the denominator, write 1 followed by as many zeroes as there are decimal places in the given decimal.

Step III Change the fraction obtained to the simplest form.

e.g., $0.025 = \frac{25}{1000}$

[$\because$ 3 digits after decimal, so we put 3 zeros]

Some Important Decimal Conversion

$\frac{1}{10} = 0.1$	$\frac{1}{9} = 0.\overline{1}$	$\frac{1}{12} = 0.08\overline{3}$	$\frac{1}{8} = 0.125$
$\frac{1}{15} = 0.06$	$\frac{1}{6} = 0.1\overline{6}$	$\frac{1}{16} = 0.0625$	$\frac{1}{5} = 0.2$
$\frac{1}{20} = 0.05$	$\frac{1}{4} = 0.25$	$\frac{1}{25} = 0.04$	$\frac{1}{3} = 0.\overline{3}$
$\frac{1}{40} = 0.025$	$\frac{1}{2} = 0.5$	$\frac{1}{50} = 0.02$	$\frac{3}{4} = 0.75$
$\frac{1}{100} = 0.01$	$\frac{2}{3} = 0.\overline{6}$	$\frac{2}{5} = 0.4$	$\frac{3}{2} = 1.5$
$\frac{5}{8} = 0.625$	$\frac{7}{8} = 0.875$	$\frac{3}{5} = 0.6$	$\frac{9}{11} = 0.\overline{81}$

Entrance Corner

1. Simplification of $2.75 - 1.25 + 4.75 - 3.80$ in fractional form is [JNV 2019]

(1) $2\frac{9}{20}$ (2) $2\frac{9}{10}$
(3) $1\frac{9}{10}$ (4) $5\frac{9}{20}$

2. Find the value of $3 \times 0.3 \times 0.003 \times 0 \times 30$. [JNV 2018]

(1) 81 (2) 8.1
(3) 0.81 (4) 0

3. If $23200 \div 145 = 160$, then $23.2 \div 1.45$ is equal to [JNV 2018]

(1) 160 (2) 16 (3) 1.60 (4) 0.16

4. Find the sum of $7.7 + 7.77 + 7.7777 + 7.777$. [JNV 2018]

(1) 28.2828 (2) 28.2847 (3) 30.0247 (4) 31.0247

5. The product of two decimals is 20.7326. If one decimal is 4.13, what is the other decimal? [JNV 2017]

(1) 5.12 (2) 4.82 (3) 5.23 (4) 5.02

6. If $4.75 \times 0.7 = 3.325$, then 475×0.7 is equal to [JNV 2016]

(1) 332.5 (2) 33.25 (3) 3.325 (4) 0

7. If $4854.3 \div 3.3 = 1471$, then $48.543 \div 33$ is equal to [JNV 2016]

(1) 1.471 (2) 14.71 (3) 147.1 (4) 0.1471

8. Ram bought a book for ₹ 178.50, some medicines for ₹ 248.25 and gave a ₹ 500 note to the shopkeeper. The remaining amount is [JNV 2016]

(1) ₹ 126.50 (2) ₹ 70.50 (3) ₹ 75.50 (4) ₹ 73.25

9. The decimal equivalent to $\left[\frac{3}{4} + \frac{4}{5} + \frac{8}{25}\right]$ is [JNV 2015]

(1) 1.870 (2) 18.70
(3) 187 (4) 1870

10. If $3.65 \times 0.5 = 1.825$, then the value of 365×0.5 is [JNV 2015]

(1) 182.5 (2) 18.25
(3) 1.825 (4) 365

11. $\frac{0.1}{0.01} + \frac{0.01}{0.1}$ is equals to [JNV 2014]

(1) $\frac{101}{10}$ (2) $\frac{1101}{100}$
(3) $\frac{11}{10}$ (4) $\frac{1001}{100}$

12. 00.0675 is divided by 15, quotient is [JNV 2014]

(1) 0.0045 (2) 0.0450
(3) 0.0450 (4) 0.6045

13. Which of the following is equivalent to 1.01? [JNV 2014]

(1) 101% (2) 10.1%
(3) 1.01% (4) 1010%

14. If $4015 \div 11 = 365$, $40.15 \div 1.1$ is equal to [JNV 2014]

(1) 36.5 (2) 3.65 (3) 0.365 (4) 0.0365

15. $17\frac{1}{16}$ decimal equivalent as [JNV 2013]

(1) 17.625 (2) 17.6025
(3) 17.0625 (4) 17.0525

16. Which number divided by 5.029 to obtain 50.29? [JNV 2013]

(1) 0.01 (2) 0.1
(3) 1.0 (4) 10.0

17. The sum of 7.7, 7.07, 7.007 and 77.0077 is [JNV 2013]

(1) 98.7777 (2) 98.7877
(3) 98.7807 (4) 98.7847

18. What is the decimal equivalent of (₹ 2200 of 4%) of 7.5 %? [JNV 2013]

(1) ₹ 13.2 (2) ₹ 6.6 (3) ₹ 3.3 (4) ₹ 26.4

19. What fraction of ₹ 4 is ₹ 1.50? [JNV 2012]

(1) $\frac{1}{8}$ (2) $\frac{3}{8}$ (3) $\frac{1}{4}$ (4) $\frac{2}{5}$

20. $\frac{61}{10000}$ can be changed into decimal as [JNV 2010]

(1) 610000 (2) 0.61000
(3) 0.000061 (4) 0.0061

21. The product of two decimals is 14.837. If one decimal is 4.01, what is the other decimal? [JNV 2010]

(1) 37 (2) 3.7 (3) 3.07 (4) 3.007

22. A drum is two-third full, if 50 L more required to fill it up , how much is the capacity of the drum? [JNV 2009]

(1) 150 L (2) 120 L (3) 100 L (4) 90 L

23. The value of $\frac{1}{125}$ is [JNV 2007]

(1) 0.8 (2) 0.08 (3) 0.008 (4) 0.0008

24. The value of 0.05% is [JNV 2007]

(1) 0.0005 (2) 0.005 (3) 0.05 (4) 0.5

25. What is the decimal equivalent of $1\frac{5}{8}$? [JNV 2005]

(1) 1.58 (2) 1.62
(3) 1.622 (4) 1.625

26. 4.4% is equivalent to which of the following? [JNV 2005]

(1) $\frac{4.4}{10}$ (2) $\frac{4.4}{100}$ (3) $\frac{44}{10}$ (4) $\frac{44}{100}$

27. In decimal 80% can be expressed as [JNV 2004]

(1) $\frac{8}{10}$ (2) $\frac{8}{100}$ (3) $\frac{100}{8}$ (4) $\frac{10}{8}$

28. 5.125 when changed into fraction, becomes [JNV 2003]

(1) $5\frac{1}{125}$ (2) $5\frac{1}{25}$ (3) $5\frac{1}{8}$ (4) $51\frac{1}{4}$

29. The fraction equivalent to 1.25 is [JNV 2002]

(1) $1\frac{1}{4}$ (2) $12\frac{1}{2}$ (3) $1\frac{1}{8}$ (4) $12\frac{1}{4}$

30. A bus left Delhi for Dehradun at 10 : 15 am. It took 6 h 30 min in journey. At what time did the bus reach at Dehradun? [JNV 2002]

(1) 4 : 15 pm (2) 4 : 30 pm
(3) 4 : 45 pm (4) 5 : 00 pm

31. The product of 2, 0.2, 0.02 and 0.002 is equal to [JNV 2000]

(1) 0.016 (2) 0.0016
(3) 0.00016 (4) 0.000016

32. Which of the following is equal to 1? [JNV 2000]

(1) $\frac{0.7 \times 6}{10 \times 4.2}$ (2) $\frac{0.7 \times 6}{1.0 \times 4.2}$
(3) $\frac{0.7 \times 0.6}{10 \times 4.2}$ (4) $\frac{7.0 \times 6.0}{1.0 \times 4.2}$

33. Which one of the following is equal to 9? [JNV 1999]

(1) 15×0.006 (2) 15×0.060
(3) 150×0.600 (4) 15×0.600

34. $0.231 - 0.02$ is equal to [JNV 1999]

(1) 0.233 (2) 0.229
(3) 0.211 (4) 0.031

35. $\frac{3 \times 12}{10}$ can be written as [JNV 1998]

(1) 0.36 (2) 3.12 (3) 3.60 (4) 31.2

36. $\frac{77}{5}$ may be written as [JNV 1998]

(1) 15.4 (2) 15.24 (3) 15.04 (4) 1.54

37. $0.3636 \div 0.06$ is equal to [JNV 1997]

(1) 6.600 (2) 6.060
(3) 0.660 (4) 0.606

38. How will you express fraction 2/25 in decimal fraction? [JNV 1997]

(1) 0.008 (2) 0.080
(3) 0.800 (4) 8.000

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (1)	**8.** (4)	**9.** (1)	**10.** (1)
11. (1)	**12.** (1)	**13.** (3)	**14.** (1)	**15.** (3)	**16.** (2)	**17.** (4)	**18.** (2)	**19.** (2)	**20.** (4)
21. (2)	**22.** (1)	**23.** (3)	**24.** (1)	**25.** (4)	**26.** (2)	**27.** (1)	**28.** (3)	**29.** (1)	**30.** (3)
31. (4)	**32.** (2)	**33.** (4)	**34.** (3)	**35.** (3)	**36.** (1)	**37.** (2)	**38.** (2)		

Hints and Solutions

1. According to the question

Given expression $= 2.75 - 1.25 + 4.75 - 3.80$

$= 2.75 + 4.75 - 1.25 - 3.80$

$= 7.5 - 5.05 = 2.45 = \frac{245}{100} = \frac{49}{20} = 2\frac{9}{20}$

2. Any number multiplied by zero we get zero as resultant.

$\therefore\ 3 \times 0.3 \times 0.003 \times 0 \times 30 = 0$

3. $23200 \div 145 = 160$ [given]

$\therefore 23.2 \div 1.45 = \frac{2320}{145} = 16$

4.
$$\begin{array}{r} 7.7000 \\ 7.7770 \\ +\ 7.7777 \\ \hline 31.0247 \end{array}$$

5. Suppose second decimal $= x$

Then, $x \times 4.13 = 20.7326$

$\Rightarrow x = \frac{20.7326}{4.13} = 5.02$

6. Since, $4.75 \times 0.7 = 3.325$

So, $475 \times 0.7 = 332.5$

7. Since, $48543 \div 33 = 1471$

So, $48.543 \div 33 = 1.471$

8. Here, Ram expenses for book and medicine

$= 178.50 + 248.25 =$ ₹ 426.75

Then, amount returned to Ram by shopkeeper

$= 500 - 426.75 =$ ₹ 73.25

9. Required decimal value $= \frac{3}{4} + \frac{4}{5} + \frac{8}{25}$

$= 0.75 + 0.80 + 0.32 = 1.87$

10. Given, $3.65 \times 0.5 = 1.825$

$\therefore\ 365 \times 0.5 = 1.825 \times 100 = 182.5$

11. $\frac{0.1}{0.01} + \frac{0.01}{0.1} = 10 + \frac{1}{10} = \frac{100+1}{10} = \frac{101}{10}$

12. $00.0675 \div 15$

$= \frac{0675}{1000 \times 15} = \frac{45}{1000} = 0.0045$

13. $101\% = \frac{101}{100} = 1.01$

14. As, $\frac{4015}{11} = 365$ then $\frac{40.15}{1.1} = 36.5$

15. Required decimal equivalent of $17\frac{1}{16}$

$= \frac{16 \times 17 + 1}{16} = \frac{272+1}{16} = \frac{273}{16} = 17.0625$

16. Suppose number $= x$

Then, $\frac{5.029}{x} = 50.29 \Rightarrow x = \frac{5.029}{50.29}$

$\therefore\ x = 0.1$

17. Required sum $= 7.7$
$$\begin{array}{r} 7.07 \\ 7.007 \\ 77.0077 \\ \hline 98.7847 \end{array}$$

18. Required decimal equivalent

$= 2200 \times \frac{4}{100} \times \frac{75}{100} =$ ₹ 6.6

19. $\frac{₹150}{₹4} = \frac{150}{400} = \frac{3}{8}$

20. $\frac{61}{10000} = 0.0061$

21. Suppose second decimal $= x$

Then, $x \times 4.01 = 14.837 \Rightarrow x = \frac{14.837}{4.01} = 3.7$

22. $\because$ Empty part of the drum $= 1 - \frac{2}{3} = \frac{1}{3}$

If $\frac{1}{3}$ part requires $= 50$ L

Then , 1 part requires $= 50 \div \frac{1}{3} = 50 \times 3 = 150$ L

23. Required value of $\frac{1}{125} = 0.008$

24. $0.05\% = \frac{0.05}{100} = 0.0005$

25. $1\frac{5}{8} = \frac{1 \times 8 + 5}{8} = \frac{13}{8} = 1.625$

26. $4.4\% = \frac{4.4}{100}$

27. $80\% = \frac{80}{100}$ or $\frac{8}{10}$

28. $5.125 = \frac{5125}{1000} = \frac{41}{8}$ or $5\frac{1}{8}$

29. $\because 1.25 = \frac{125}{100} = \frac{5}{4}$ or $1\frac{1}{4}$

30. Departure of bus from Delhi = 10 : 15 am

Time taken in the journey = 6 h 30 min

$\therefore$ Reach the bus at Dehradun

= 10 : 15 + 6 : 30 = 16 : 45 or 4 : 45 pm

31. $2 \times 0.2 \times 0.02 \times 0.002 = 0.000016$

32. $\because \frac{0.7 \times 6}{1.0 \times 4.2} = \frac{7 \times 6 \times 10}{10 \times 42} = 1$

33. $\because 15 \times 0.600 = 9.000 = 9$

34.
$$\begin{array}{r} 0.231 \\ -0.020 \\ \hline 0.211 \end{array}$$

35. $\frac{3 \times 12}{10} = \frac{36}{10} = 3.6$ or 3.60

36.
$$\begin{array}{r} 15.4 \\ 5\overline{)77.0} \\ \underline{5} \\ 27 \\ \underline{25} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Quotient = 15.4

37. $0.3636 \div 0.06 = \frac{3636 \times 100}{10000 \times 6} = \frac{606}{100} = 6.06$

38.
$$\begin{array}{l} 25)\ 2.00\ (0.08 \\ \quad\ \ \underline{2.00} \\ \quad\ \ \ \ \times \end{array}$$

Practice Exercise

1. The value of 4.44 – 0.330 is
(1) 4.00 (2) 3.99
(3) 4.11 (4) 0.429

2. The value of 1.1 – 1.01 is
(1) 0.9 (2) 0.09
(3) 1 (4) 0

3. 2.3 + 0.62 – 1.39 is equal to
(1) 3 (2) 1.53
(3) 3.34 (4) 5

4. The product of $1.2 \times 0.6 \times 3.12 \times 0.03$ is equal to
(1) 0.067392 (2) 0.063568
(3) 0.4812 (4) 0.00392

5. The product of $0.5 \times 0.05 \times 0.005$ is equal to
(1) 0.00125 (2) 0.000125
(3) 0.125 (4) 0.0125

6. The value of 2.5×0.01 is
(1) 25 (2) 0.251
(3) 0.025 (4) 2.5

7. Fill up the blank space with the correct number $4.5 \times 0.2 = \ldots$.
(1) 0.90 (2) 9.00
(3) 4.72 (4) 0.09

8. Simplify $0.2 \times 0.3 \times 0.7$.
(1) 0.237 (2) 4.2
(3) 0.042 (4) 0.420

9. The product of $0.3 \times 0.4 \times 0.7$ is
(1) 0.084 (2) 0.0084
(3) 0.84 (4) 84

10. The value of $6.75 \div 0.05$ is
(1) 120 (2) 135
(3) 130 (4) 139

11. The value of $\frac{1.298 - 0.1298}{0.04}$ is equal to
(1) 29 (2) 29.105
(3) 28.205 (4) 29.205

12. By what number should 4.3 be multiplied, so that the product is 0.43?
(1) 0.01 (2) 0.1
(3) 1.1 (4) 0.11

13. By multiplying a number by 0.6, result is 657.24. What is the result, if the number is multiplied by 0.06?
(1) 6.5724 (2) 6
(3) 65.724 (4) 657.24

14. The value of $\frac{0.5 + 0.7 + 0.3}{5}$ is equal to
(1) 0.3 (2) 3.1 (3) 0.03 (4) 1.3

15. The value of $\frac{0.037 - 0.028}{0.03}$ is equal to
(1) 3.0 (2) 0.3
(3) 0.03 (4) 0.003

16. In fraction 3.125 can be written as
(1) $3\frac{1}{25}$ (2) $3\frac{1}{8}$
(3) $3\frac{1}{125}$ (4) $31\frac{1}{4}$

17. $6 + \frac{9}{100} + \frac{1}{1000} + \frac{2}{10}$ is equal to
(1) 6.291 (2) 6.921 (3) 8.81 (4) 6.129

18. $\frac{8}{1000} + \frac{7}{100} + \frac{5}{10}$ is equal to
(1) 0.0578 (2) 0.875
(3) 0.578 (4) 0.0875

Answers

1. (3)	**2.** (2)	**3.** (2)	**4.** (1)	**5.** (2)	**6.** (3)	**7.** (1)	**8.** (3)	**9.** (1)	**10.** (2)
11. (4)	**12.** (2)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (2)	**17.** (1)	**18.** (3)		

Hints and Solutions

1. $4.44 - 0.330 = 4.11$

2.
$$\begin{array}{r} 1.10 \\ -1.01 \\ \hline 0.09 \end{array}$$

3. $2.30 + 0.62 - 1.39 = 2.92 - 1.39 = 1.53$

4. $1.2 \times 0.6 \times 3.12 \times 0.03 = 0.067392$

5. $0.5 \times 0.05 \times 0.005 = 0.000125$

6. $2.5 \times 0.01 = 0.025$

7. $\because 4.5 \times 0.2 = 0.90$

8. $0.2 \times 0.3 \times 0.7 = 0.042$

9. $0.3 \times 0.4 \times 0.7 = 0.084$

10. $\frac{6.75}{0.05} = 135$

11. $\frac{1.298 - 0.1298}{0.04} = \frac{1.1682}{0.04}$
$= \frac{11682}{10000} \times \frac{100}{4} = 29.205$

12. Let the number be x.
Then, $x \times 4.3 = 0.43$
$\Rightarrow x = \frac{0.43}{4.3} = \frac{43}{100} \times \frac{10}{43} = \frac{1}{10} = 0.1$

13. Let $x \times 0.6 = 657.24$
$\Rightarrow \quad x = \frac{657.24}{0.6}$
Hence, $\frac{657.24}{0.6} \times 0.06 = \frac{65724}{100} \times \frac{6}{100} \times \frac{10}{6}$
$= \frac{65724}{1000} = 65.724$

14. $\because \frac{0.5 + 0.7 + 0.3}{5} = \frac{1.5}{5} = 0.3$

15. $\frac{0.037 - 0.028}{0.03} = \frac{0.009}{0.03}$
$= \frac{9}{1000} \times \frac{100}{3}$
$= \frac{3}{10} = 0.3$

16. $3.125 = \frac{3125}{1000} = \frac{125}{40} = \frac{25}{8} = 3\frac{1}{8}$

17. $6 + 0.09 + 0.001 + 0.2 = 6.291$

18. $\frac{8}{1000} + \frac{7}{100} + \frac{5}{10} = 0.008 + 0.07 + 0.5$
$= 0.578$

Self Practice

1. The value of (6.97×0.093) will be

(1) 0.7 (2) 0.8 (3) 7.0 (4) 8.0

2. The product of 0.2, 0.02 and 0.002 is

(1) 0.016 (2) 0.0016 (3) 0.00016 (4) 0.000008

3. Which of the following simplification is equal to 1?

(1) $\frac{0.304 \times 20}{304 \times 2}$ (2) $\frac{0.304 \times 20}{3.04 \times 2}$ (3) $\frac{0.304 \times 20}{30.4 \times 2}$ (4) $\frac{0.304 \times 20}{304 \times 0.2}$

4. Subtract 82.68 from 97.836.

(1) 12.24 (2) 15.156 (3) 19.75 (4) 14.21

5. The addition of 4.23, 31.79, 5.006 and 7.5 is

(1) 49.5 (2) 35.27 (3) 48.341 (4) 48.526

6. Convert 8.125 into fraction.

(1) $\frac{5}{10}$ (2) $2\frac{3}{4}$ (3) $1\frac{1}{2}$ (4) $8\frac{1}{8}$

7. Raju deposited ₹ 23.25 in first week, ₹ 27.50 in second week and ₹ 30.75 in the third. He had deposited ₹ 250.60 earlier. Now, what is his total amount in that bank?

(1) ₹ 350 (2) ₹ 332.10 (3) ₹ 325.75 (4) ₹ 275.25

8. $1.32 \div 0.4$ is equal to

(1) 0.33 (2) 0.033 (3) 3.3 (4) 33

9. $0.5 \times 0.5 \times 0.5$ is equal to

(1) 0.125 (2) 0.0125 (3) 0.00125 (4) 1.25

10. $0.220 - 0.202$ is equal to

(1) 0.082 (2) 0.018 (3) 0.180 (4) 0.982

11. 2.05 when changed into a fraction becomes

(1) $2\frac{1}{20}$ (2) $3\frac{1}{8}$ (3) $3\frac{1}{25}$ (4) $3\frac{1}{20}$

12. The expression $\frac{7.2 + 4.8}{5.6 - 3.2}$ is equal to

(1) 8.0 (2) 5.0 (3) 2.8 (4) 1.4

13. If $187 \times 98 = 18326$, the value of $183.26 \div 18.7$ is

(1) 0.098 (2) 98 (3) 9.8 (4) 9.08

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (2)	**5.** (4)	**6.** (4)	**7.** (2)	**8.** (3)	**9.** (1)	**10.** (2)
11. (1)	**12.** (2)	**13.** (3)							

CHAPTER

07

SQUARE-SQUARE ROOT AND CUBE-CUBE ROOT

Square

When a number is multiplied by itself, the number thus obtained is called square of given number.

e.g. $2^2 = 2 \times 2 = 4$, $3^2 = 3 \times 3 = 9$,
$4^2 = 4 \times 4 = 16$; $n^2 = n \times n$

The numbers 4, 9 and 16 are the squares of 2, 3 and 4 and 4, 9, 16 are called perfect squares.

Properties of Square

- A number ending in 2, 3, 7 or 8 is never a perfect square.
- The number of zeros in the end of a perfect square is never odd.
- Squares of even numbers are always even.
- Squares of odd numbers are always odd.

Square and Square Root of Some Standard Numbers

Square	Square Root	Square	Square Root
$1^2 = 1$	$\sqrt{1} = 1$	$11^2 = 121$	$\sqrt{121} = 11$
$2^2 = 4$	$\sqrt{4} = 2$	$12^2 = 144$	$\sqrt{144} = 12$
$3^2 = 9$	$\sqrt{9} = 3$	$13^2 = 169$	$\sqrt{169} = 13$
$4^2 = 16$	$\sqrt{16} = 4$	$14^2 = 196$	$\sqrt{196} = 14$
$5^2 = 25$	$\sqrt{25} = 5$	$15^2 = 225$	$\sqrt{225} = 15$
$6^2 = 36$	$\sqrt{36} = 6$	$16^2 = 256$	$\sqrt{256} = 16$
$7^2 = 49$	$\sqrt{49} = 7$	$17^2 = 289$	$\sqrt{289} = 17$
$8^2 = 64$	$\sqrt{64} = 8$	$18^2 = 324$	$\sqrt{324} = 18$
$9^2 = 81$	$\sqrt{81} = 9$	$19^2 = 361$	$\sqrt{361} = 19$
$10^2 = 100$	$\sqrt{100} = 10$	$20^2 = 400$	$\sqrt{400} = 20$

Square Root

The square root of a number is that factor of the number which, when multiplied by itself, will give that number.

The square root of a number is indicated by the sign $\sqrt{\ }$.

e.g. The square root of 25 is written as $\sqrt{25}$.
Thus, $\sqrt{25} = \sqrt{5 \times 5} = 5$

Methods of Finding Square Root

Factorisation Method

Following steps are to be followed find the square root by factorization method

Step I Write the given number as product of prime factors. *e.g.* $\sqrt{144}$

Step II Make pairs of prime factor and take the product by choosing one digit from each paird
Eq. $\sqrt{144} = \sqrt{\underline{2 \times 2} \times \underline{2 \times 2} \times \underline{3 \times 3}} = 2 \times 2 \times 3 = 12$

Example **1.** The value of $\sqrt{1764}$ is equal to

(1) 40 (2) 32 (3) 52 (4) 42

Sol. **(4)** $1764 = \underbrace{2 \times 2} \times \underbrace{3 \times 3} \times \underbrace{7 \times 7}$

$\sqrt{1764} = 2 \times 3 \times 7 = 42$

Example **2.** The value of $\sqrt{48}$ is equal to

(1) 6.289 (2) 6.829 (3) 6.928 (4) 7.729

Sol. **(3)** $48 = \underbrace{2 \times 2} \times \underbrace{2 \times 2} \times 3$

$\sqrt{48} = 2 \times 2 \times \sqrt{3} = 4\sqrt{3}$ [We know that, $\sqrt{3} = 1.732$]

$= 4 \times 1.732 = 6.928$

Division Method

The steps of this method can be easily understood with the help of following example.

Example **3.** Find the square root of 18769.

(1) 133 (2) 137 (3) 135 (4) 134

Sol. **(2)**

Step I In the given number, mark off the digits in pairs starting from the unit digit. Each pair and the remaining one digit (if any) is called a period.

	$\overline{1}\,\overline{87}\,\overline{69}$

Step II Choose a number whose square is less than or equal to 1. Here, $1^2 = 1$, on subtracting, we get 0 (zero) as remainder.

	1
1	$\overline{1}\,\overline{87}\,\overline{69}$
	1

Step III Bring down the next period, i.e. 87. Now, the trial divisor is $1 \times 2 = 2$ and trial dividend is 87. So, we take 23 as divisor and put 3 as quotient. The remainder is 18 now.

	13
1	$\overline{1}\,\overline{87}\,\overline{69}$
	1
23	87
	69
	18

Step IV Bring down the next period, which is 69. Now, trial divisor is $13 \times 2 = 26$ and trial dividend is 1869. So, we take 267 as dividend and 7 as quotient. The remainder is 0.

	137
1	$\overline{1}\,\overline{87}\,\overline{69}$
	1
23	87
	69
267	1869
	1869
	×

Step V The process (processes like III and IV) goes on till all the periods (pairs) come to an end and we get remainder as 0 (zero) now.

Hence, the required square root = 137

Square Root of a Decimal Number

To make periods in decimal number, make pair near decimal point, number before decimal point will be paired starting from left of decimal and number after decimal will be paired starting from right of decimal.

Example **4.** Find the square root of 232.5625.

(1) 10.50 (2) 15.25 (3) 14.50 (4) 17.25

Sol. **(2)**

	15.25
1	2 32 . 56 25
	1
25	132
5	125
302	756
2	604
3045	15225
5	15225
	×

$\therefore \quad \sqrt{232.5625} = 15.25$

Square Root of Fractions

If denominator of the fraction is perfect square, then find the square root of numerator and denominator separately. If denominator of the fraction is not a perfect square, then make it a perfect square by multiply a number.

Example **5.** Find the square root of 7/5.

(1) 1.1832 (2) 1.2437 (3) 1.1932 (4) 1.2071

Sol. **(1)** Since, 5 is not a perfect square.

$\therefore \quad \frac{7 \times 5}{5 \times 5} = \frac{35}{25} = \sqrt{\frac{35}{25}}$

Now, $\sqrt{25} = 5$

Now we will calculate the square root of 35.

	5.916
5	35 . 00 00 00
	25
109	1000
9	981
1181	1900
1	1181
11826	71900
6	70956

$\therefore$ Square root of 35 at three places of decimal $= 5.916$

Now, $\sqrt{\frac{7}{5}} = \frac{5.916}{5} = 1.1832$

Square root of fraction can be find after convert it into decimal number.

Example **6.** Find the value of $\sqrt{\frac{0.081 \times 0.484}{0.0064 \times 6.25}}$.

(1) 7.64 (2) 1.84 (3) 0.99 (4) 2.46

Sol. **(3)** $\sqrt{\frac{0.081 \times 0.484}{0.0064 \times 6.25}} = \sqrt{\frac{81 \times 484}{64 \times 625}}$

$= \sqrt{\frac{9 \times 9 \times 22 \times 22}{8 \times 8 \times 25 \times 25}} = \frac{9 \times 22}{8 \times 25} = \frac{198}{200} = \frac{99}{100} = 0.99$

Cube

If a number is multiplied two times with itself, then the result of this multiplication is called the cube of that number. *e.g.*, cube of $6 = 6 \times 6 \times 6 = 216$

Cube Root

The cube root of a number is that number in which we multiply thricely, it gives the given number.
The cube root is denoted by the symbol '$\sqrt[3]{\ }$'.
e.g., $\sqrt[3]{8} = \sqrt[3]{2 \times 2 \times 2} = 2$

Method of Finding Cube Root

Prime Factorisation Method

This method has following steps

Step I Express the given number as the product of prime factors.

Step II Keep these factors in a group of three.

Step III Take the product of these prime factors picking one out of every group (group of three) of the same primes. This product gives us the cube root of given number.

Example **7.** Find the cube root of 9261.

(1) 22 (2) 21
(3) 23 (4) 24

Sol. **(2)** Prime factors of 9261

$= (3 \times 3 \times 3) \times (7 \times 7 \times 7)$

$\sqrt[3]{9261} = \sqrt[3]{3 \times 3 \times 3 \times 7 \times 7 \times 7}$

Now, taking one number from each group of three, we get $\sqrt[3]{9261} = 3 \times 7 = 21$

3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

Entrance Corner

1. The product of two numbers is 18.75. If one number is thrice of another. Find the larger number. [JNV 2018]
(1) 2.5 (2) 9.5 (3) 4.5 (4) 7.5

2. A school collected ₹ 2304 as fees from its students. If each student paid as many paise as there were students in the school, how many students were there in the school? [JNV 2017]
(1) 240 (2) 460 (3) 480 (4) 440

3. Square root of 4096 is [JNV 2016]
(1) 74 (2) 64 (3) 66 (4) 63

4. What is the square root of $\frac{1}{4}$? [JNV 2012]
(1) $\frac{1}{16}$ (2) $\frac{1}{2}$ (3) 1 (4) 0

5. Simplify $(256)^{3/4}$. [JNV 2012]
(1) 52 (2) 62 (3) 84 (4) 64

6. A man plants his orchard with 729 trees and arranges them 50 that there are as many rows as there are trees in a row. How many rows are there? [JNV 2000]
(1) 25 (2) 26 (3) 27 (4) 28

7. Square root of 25 is [JNV 2000]
(1) 2 (2) 3 (3) 4 (4) 5

8. Simplify $\sqrt{169} + \sqrt{144} - \sqrt{196}$. [JNV 1999]
(1) 11 (2) 12 (3) 13 (4) 14

9. $\sqrt{72}$ is equal to [JNV 1999]
(1) $6\sqrt{2}$ (2) $4\sqrt{6}$ (3) $9\sqrt{6}$ (4) $2\sqrt{6}$

10. $\frac{\sqrt{28} \times \sqrt{24}}{\sqrt{42} \times \sqrt{8}}$ is equal to [JNV 1998]
(1) 2 (2) 21 (3) $\sqrt{2}$ (4) $\frac{1}{\sqrt{2}}$

11. Square root of 289 is [JNV 1998]
(1) 15 (2) 16 (3) 17 (4) 18

12. Simplify $\sqrt{\frac{36}{?}} = \frac{6}{7}$. [JNV 1998]

(1) 49 (2) 64 (3) 81 (4) 121

13. By what least number, 720 be multiplied so that the resulting number is a perfect square? [JNV 1997]

(1) 3 (2) 4 (3) 5 (4) 6

14. Find the least number which must be subtracted to make 175 a perfect square. [JNV 1997]

(1) 2 (2) 3 (3) 6 (4) 7

15. Square root of 0.09 is [JNV 1997]

(1) 0.03 (2) 0.13
(3) 0.3 (4) 0.5

16. Simplify $\sqrt{8464} + \sqrt{?} = 102$. [JNV 1997]

(1) 100 (2) 225 (3) 400 (4) 625

17. Simplify $\sqrt{\frac{1694}{?}} + 14 = 25$. [JNV 1996]

(1) 11 (2) 12
(3) 14 (4) 22

18. A general wishing to draw up his 16160 soldiers in the form of a solid square, found that he had 31 soldiers over. Find the number of men in the front line. [JNV 1996]

(1) 127 (2) 133 (3) 160 (4) 172

19. A gardener plants 3600 trees in garden, he arranges them so that there are as many rows as there are trees in a row, how many rows are there? [JNV 1996]

(1) 45 (2) 55 (3) 57 (4) 60

20. The square root of $\frac{289}{225}$ is equal to [JNV 1995]

(1) $\frac{15}{17}$ (2) $\frac{16}{17}$ (3) $\frac{17}{15}$ (4) $\frac{15}{18}$

21. 27×243 is equal to [JNV 1995]

(1) 3^8 (2) 3^9 (3) 3^{10} (4) 3^{11}

Answers

1. (4)	**2.** (3)	**3.** (2)	**4.** (2)	**5.** (4)	**6.** (3)	**7.** (4)	**8.** (1)	**9.** (1)	**10.** (3)
11. (3)	**12.** (1)	**13.** (3)	**14.** (3)	**15.** (3)	**16.** (1)	**17.** (3)	**18.** (1)	**19.** (4)	**20.** (3)
21. (1)									

Hints and Solutions

1. Let smaller number $= x$
Larger number $= 3x$
According to the question

$$x \times 3x = 18.75 \Rightarrow 3x^2 = 18.75$$
$$x^2 = 6.25 \Rightarrow x = \sqrt{6.25} = 2.5$$

$\therefore$ Larger number $= 3x = 3 \times 2.5 = 7.5$

2. Total money collected $=$ ₹ $2304 = 230400$ paise
As number of students = Money paid by students
$\therefore$ Number of students in school $= \sqrt{230400} = 480$

3.

	64
6	$\overline{40}\ \overline{96}$
6	36
124	496
4	496
	x

$\therefore$ Square root of $4096 = 64$

4. Square root of $\frac{1}{4} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

5. $(256)^{3/4} = (4^4)^{3/4} = (4)^{4 \times \frac{3}{4}} = 4^3 = 64$

6. According to the given condition number of rows in the orchard is equal to the number of trees in each row. Therefore, number of rows will be equal to the square root of 729.

	27
2	$\underline{7}\underline{29}$
2	4
47	329
7	329
	×

$\therefore$ There are 27 rows in the orchard.

7.

	5
5	25
5	25
	×

8. $\sqrt{169}+\sqrt{144}-\sqrt{196}=13+12-14$

$=25-14=11$

9.

2	72
2	36
2	18
3	9
	3

$\sqrt{72}=2\times2\times2\times3\times3=6\sqrt{2}$

10. $\dfrac{\sqrt{28}\times\sqrt{24}}{\sqrt{42}\times\sqrt{8}}=\dfrac{2\sqrt{7}\times2\sqrt{6}}{\sqrt{2}\times\sqrt{3}\times\sqrt{7}\times2\sqrt{2}}$

$=\dfrac{4\times\sqrt{7}\times\sqrt{3}\times\sqrt{2}}{4\times\sqrt{3}\times\sqrt{7}}=\sqrt{2}$

11.

	17
1	289
1	1
27	189
7	189
	×

∴Square root of 289 is 17.

12. Let ? = $x \Rightarrow \sqrt{\dfrac{36}{x}}=\dfrac{6}{7}\Rightarrow\dfrac{6}{\sqrt{x}}=\dfrac{6}{7}\Rightarrow6\sqrt{x}=42$

$\Rightarrow\quad\sqrt{x}=7\Rightarrow x=49$

13. Prime factors of 720 are

$\underline{2\times2}\times\underline{2\times2}\times\underline{3\times3}\times5$

∴Required number = 5

14.

	13
1	175
1	1
23	75
3	69
	6

Extracting the square root we get a remainder 6. Hence, 6 is the least number which ought to be subtracted to make it a perfect square.

15. $0.09=\dfrac{9}{100}$

Now, $\sqrt{9}=3$

$\sqrt{100}=10$

$\therefore\quad\sqrt{\dfrac{9}{100}}=\dfrac{3}{10}=03$

16. Let ? = x; $\sqrt{8464}+\sqrt{x}=102\Rightarrow92+\sqrt{x}=102$

$\Rightarrow\sqrt{x}=102-92=10\therefore x=10\times10=100$

17. Let ? = x, then $\sqrt{\dfrac{1649}{x}}+14=25$

$\Rightarrow\sqrt{\dfrac{1694}{x}}=25-14=11$

$\Rightarrow\quad\dfrac{1694}{x}=121\Rightarrow x=\dfrac{1694}{121}=14$

18. $16160-31=16129$

	127
1	161 29
1	1
22	61
2	44
247	1729
7	1729
	×

∴ Number of men in the front line = 127

19.

	60
6	36 00
6	36
120	00
0	00
	×

∴Required rows = 60

20. Now,

	17
1	2 89
1	1
27	189
7	189
	×

and

	15
1	2 25
1	1
25	125
5	125
	×

$\therefore \quad \sqrt{\frac{289}{225}} = \frac{17}{15}$

21. $27 \times 243 = [3 \times 3 \times 3] \times [3 \times 3 \times 3 \times 3 \times 3]$
$= 3^3 \times 3^5 = 3^8$

Practice Exercise

1. Find the value of $\frac{112}{\sqrt{196}} \times \frac{\sqrt{576}}{12}$.
(1) 8 (2) 12 (3) 16 (4) 18

2. If $\sqrt{4096} = 64$, then the value of $\sqrt{4096} + \sqrt{0.4096} + \sqrt{0.004096} + \sqrt{0.00004096}$ is
(1) 7.09 (2) 7.1014
(3) 7.1104 (4) 7.12

3. Simplify $\sqrt{256\sqrt{16 \div ?}} = 16$.
(1) 8 (2) 16 (3) 4 (4) 256

4. What is the square root of 2^8?
(1) 64 (2) 48 (3) 32 (4) 16

5. The value of $\sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.0009}$ is
(1) 2.03 (2) 2.1 (3) 2.11 (4) 2.13

6. The square root of 6561 by means of factors is
(1) 81 (2) 64 (3) 96 (4) 24

7. The least number which must be subtracted to 4931 to make it a perfect square, is
(1) 100 (2) 31 (3) 140 (4) 110

8. The least number which must be subtracted from 2361 to make it a perfect square, is
(1) 48 (2) 88 (3) 57 (4) 40

9. The smallest number by which 9408 must be divided so that it becomes a perfect square. Also, the square root of the perfect square so obtained, is
(1) 3, 56 (2) 4, 56 (3) 21, 56 (4) 42, 56

10. 5929 students are sitting in an auditorium in such a manner that there are as many students in a row as there are rows in auditorium. How many rows are there in the auditorium?
(1) 66 (2) 7 (3) 11 (4) 77

11. A General arranges his soldiers in rows to form a perfect square. He find that in doing so 60 soldiers are leftout. If the total number of soldiers be 8160. The number of soldiers in each row, are
(1) 90 (2) 80 (3) 70 (4) 40

12. If $\sqrt[3]{185193} = 57$, then the value of $\sqrt[3]{185193} + \sqrt[3]{185.193} + \sqrt[3]{0.000185193}$ is
(1) 6.327 (2) 63.275
(3) 632.75 (4) 62.757

13. $\sqrt[3]{1 - \frac{127}{343}}$ is equal to
(1) $\frac{5}{9}$ (2) $1 - \frac{1}{7}$ (3) $\frac{4}{7}$ (4) $1 - \frac{2}{7}$

14. What is the smallest number by which 3600 must be divided to make it a perfect cube?
(1) 9 (2) 50 (3) 300 (4) 450

Answers

1. (3)	**2.** (3)	**3.** (2)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (2)	**8.** (3)	**9.** (1)	**10.** (4)
11. (1)	**12.** (4)	**13.** (2)	**14.** (4)						

Hints and Solutions

1. $\frac{112}{\sqrt{196}} \times \frac{\sqrt{576}}{12} = \frac{112}{14} \times \frac{24}{12} = 16$

2. $\sqrt{40.96} + \sqrt{0.4096} + \sqrt{0.004096} + \sqrt{0.00004096}$
$= \sqrt{\frac{4096}{100}} + \sqrt{\frac{4096}{10000}} + \sqrt{\frac{4096}{1000000}} + \sqrt{\frac{4096}{100000000}}$
$= \frac{64}{10} + \frac{64}{100} + \frac{64}{1000} + \frac{64}{10000}$
$= 6.4 + 0.64 + 0.064 + 0.0064 = 7.1104$

3. Let $? = x$

Then, $\sqrt{256\sqrt{16 \div x}} = 16$

$\Rightarrow \sqrt{16 \times 16 \sqrt{4 \times 4 \div x}} = 16$

$\Rightarrow \quad \sqrt{16 \times 16 \sqrt{\frac{4 \times 4}{x}}} = 16$

On squaring both sides, we get

$$16 \times 16 \sqrt{\frac{4 \times 4}{x}} = (16)^2$$

$\sqrt{\frac{4 \times 4}{x}} = 1 \Rightarrow \frac{4}{\sqrt{x}} = 1 \Rightarrow \sqrt{x} = 4 \quad \Rightarrow x = 16$

4. Required square root

$= \sqrt{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2} = \sqrt{256} = 16$

5. $\sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.009}$

$= \sqrt{0.1 \times 0.1} + \sqrt{0.9 \times 0.9} + \sqrt{1.1 \times 1.1}$

$+ \sqrt{0.03 \times 0.03} = 0.1 + 0.9 + 1.1 + 0.03 = 2.13$

6.

3	6561
3	2187
3	729
3	243
3	81
3	27
3	9
3	3
	1

Thus, $6561 = \underline{3 \times 3} \times \underline{3 \times 3} \times \underline{3 \times 3} \times \underline{3 \times 3}$

$\therefore \sqrt{6561} = 3 \times 3 \times 3 \times 3 = 81$

7.

	70	
7	49	31
	49	
		31

$\therefore$ Required number to be subtracted $= 31$

8.

	48
4	$\overline{23}\,\overline{61}$
	16
88	761
× 8	704
	57

Hence, the required number to be subtracted from 2361 to make it a perfect square $= 57$

9.

2	9408
2	4704
2	2352
2	1176
2	588
2	294
3	147
7	49
7	7
	1

Thus, $9408 = \underline{2 \times 2} \times \underline{2 \times 2} \times \underline{2 \times 2} \times 3 \times \underline{7 \times 7}$

Hence, required number $= 3$

$\therefore$ Required square root $= 2 \times 2 \times 2 \times 7 = 56$

10.

7	5929
7	847
11	121
11	11
	1

Thus, $\quad 5929 = 7 \times 7 \times 11 \times 11$

$\therefore \quad \sqrt{5929} = 7 \times 11 = 77$

Hence, the number of rows in the auditorium $= 77$

11. Number of soldiers arranged in rows

$= 8160 - 60 = 8100$

	90
9	$\overline{81}\ \overline{00}$
	81
180	00
	00
	×

$\therefore$ Number of soldiers in each row

$= \sqrt{8100} = 90$

12. $\therefore \sqrt[3]{185193} = 57$

$\therefore \sqrt[3]{185193} + \sqrt[3]{185.193} + \sqrt[3]{0.000185193}$

$= 57 + 5.7 + 0.057 = 62.757$

13. $\sqrt[3]{1 - \frac{127}{343}} = \sqrt[3]{\frac{343 - 127}{343}} = \sqrt[3]{\frac{216}{343}}$

$= \frac{6}{7} = 1 - \frac{1}{7}$

14.

2	3600
2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

$\therefore$ Prime factors of $3600 = 2^3 \times 2 \times 3^2 \times 5^2$

To make it a perfect cube, it must be divided by

$2 \times 3^2 \times 5^2 = 450$

Self Practice

1. The value of $\sqrt{1\frac{7}{9}}$ is

(1) 3 (2) 2 (3) 9 (4) $1\frac{1}{3}$

2. The square root of $1\frac{15}{49}$ is

(1) $\frac{1}{7}$ (2) $1\frac{1}{7}$ (3) $\frac{9}{7}$ (4) $\frac{4}{7}$

3. The square root of $\frac{400}{169}$ is

(1) $\frac{20}{23}$ (2) $1\frac{7}{13}$ (3) $\frac{10}{13}$ (4) $\frac{20}{7}$

4. What should be added to 79 to make it a perfect square?

(1) 3 (2) 5 (3) 2 (4) 4

5. By what least number must 21600 be multiplied to make it a perfect cube?

(1) 6 (2) 10 (3) 30 (4) 60

6. The number of trees is equal to number of their rows. Then, number of total trees is 5625. What is the number of the rows?

(1) 85 (2) 70 (3) 75 (4) 65

7. $\sqrt{144} \times \sqrt{81} \times \sqrt{9}$ is equal to

(1) 729 (2) 224 (3) 108 (4) 324

8. $(64)^2 \div \sqrt[3]{32768}$ is equal to

(1) 128 (2) 132 (3) 142 (4) 104

9. By which of the numbers 450 to be multiplied to make complete square.

(1) 2 (2) 5 (3) 4 (4) 3

10. $\sqrt{169} + \sqrt{100} - \sqrt{121}$ is equal to

(1) 12 (2) 11 (3) 13 (4) 34

11. What is the least number of 4 digits, which is perfect square ?

(1) 1024 (2) 1065 (3) 1000 (4) 1020

12. Find the least number by which 175760 be multiplied to make it a perfect cube.

(1) 125 (2) 150 (3) 100 (4) 200

Answers

1. (4)	**2.** (2)	**3.** (2)	**4.** (3)	**5.** (1)	**6.** (3)	**7.** (4)	**8.** (1)	**9.** (1)	**10.** (1)
11. (1)	**12.** (3)								

CHAPTER

08

MEASUREMENT

Measurement

A measurement is a result usually expressed in numbers, that can be obtain by measuring quantity, length, weight, etc. of an object.

Measures of Articles

12 articles = 1 dozen
12 dozen = 1 gross
1 gross = 144 articles

Measures of Length

10 millimetres (mm) = 1 centimetre (cm)
1 inch = 2.54 centimetre (cm)
10 centimetres = 1 decimetre (dm)
10 decimetres = 1 metre (m)
10 metres = 1 decametre (dam)
10 decametres = 1 hectometre (hm)
10 hectometres = 1 kilometre (km)

Example **1.** Convert 10 inches into centimetre.

(1) 24.4 cm
(2) 23.2 cm
(3) 25.4 cm
(4) 27.7 cm

Sol. **(3)** $\because$ 1 inch = 2.54 cm
$\therefore$ 10 inch = $2.54 \times 10 = 25.4$ cm

Example **2.** Convert 6825 m into kilometres and millimetres.

(1) 6.825 km, 6825000 mm
(2) 7.601 km, 2765000 mm
(3) 5.625 km, 135700 mm
(4) 4.625 km, 372140 mm

Sol. **(1)** Arrange the given number of metres in the place value chart as given below

Kilometres	1000	6
Hectometres	100	8
Deca metres	10	2
Metres	1	5
Decimetres	1/10 (0.1)	0
Centimetres	1/100 (0.01)	0
Millimetres	1/1000 (0.001)	0

From the chart it is clear that

$6825 \text{ m} = \frac{6825}{1000} = 6.825 \text{ km}$

$6825 \text{ m} = 6825 \times 1000 = 6825000 \text{ mm}$

Measures of Weight

10 milligrams (mg) = 1 centigram (cg)
10 centigrams = 1 decigram (dg)
10 decigrams = 1 gram (g)
10 grams = 1 decagram (dag)
10 decagrams = 1 hectogram (hg)
10 hectograms = 1 kilogram (kg)
100 kg = 1 quintal
10 quintals = 1 tonne
1000 kilograms = 1 tonne

Example **3.** Convert 7 quintals into kilograms.

(1) 600 kg (2) 700 kg
(3) 800 kg (4) 750 kg

Sol. **(2)** 1 quintal = 100 kg
$\therefore$ 7 quintals = $100 \times 7 = 700$ kg

Measures of Area

100 sq millimetres = 1 sq cm
100 sq centimetres = 1 sq dm
100 sq decimetres = 1 sq m
100 sq metres = 1 sq dam
100 sq decametres = 1 sq hm
100 sq hectometres = 1 sq km

Example **4.** Convert 10 sq cm into square millimetres.

(1) 900 sq mm (2) 920 sq mm
(3) 100 sq mm (4) 1000 s

Sol. **(4)** 1 sq cm = 100 sq mm
∴ 10 sq cm = 10 × 100 = 1000 sq mm

Measures of Volume

1000 cube cm = 1 litre
10 millilitres = 1 centilitre
10 centilitres = 1 decilitre
10 decilitres = 1 litre
10 litres = 1 decalitre
10 decalitres = 1 hectolitre
10 hectolitres = 1 kilolitre

Example **5.** Convert 5 L into decalitres.

(1) 45 dL (2) 51 dL (3) 50 dL (4) 60 dL

Sol. **(3)** ∵ 1 L = 10 dL
∴ 5 L = 5 × 10 = 50 dL

Measures of Time

60 seconds = 1 minute
60 minutes = 1 hour
24 hours = 1 day
7 days = 1 week
30 days = 1 month
12 months = 1 year
365 days = 1 year
366 days = 1 leap year

Example **6.** How many days are there in 8 months, 3 weeks?

(1) 165 (2) 240 (3) 261 (4) 321

Sol. **(3)** 8 months = 8 × 30 = 240 days
3 weeks = 3 × 7 = 21 days
∴ Required days = 261 days

Example **7.** A train started from Dehradun at 5 : 40 in the morning and reached Mumbai next day at 10 : 55. How much time was taken by the train in this journey?

(1) 15 h 16 min (2) 6 h 10 min
(3) 7 h 5 min (4) 17 h 15 min

Sol. **(4)** Time of departure from Dehradun = 5:40
Time of arrival at Mumbai = 10:55 (next day)
Time taken from 5:40 to 12:00 (midnight)
= 6 h 20 min
Time taken from 12 : 00 (midnight) to 10 : 55
= 10 h 55 min
Total time = 6 h 20 min + 10 h 55 min
= 17 h 15 min

Anti Meridian (AM)

The time between 12 midnight and 12 noon is known as Anti Meridian (AM).

Post Meridian (PM)

The time between 12 noon and 12 midnight is known as Post Meridian (PM).

Measurement of Days

A year is a unit of time defined as 365 days. These 365 days are distributed in couple of months and a month is also distributed in 30 days. A group of 7 days refers to a week.

Months	Number of days	Month	Number of days
January	31 days	July	31 days
February	28 days (29 days in leap year)	August	31 days
March	31 days	September	30 days
April	30 days	October	31 days
May	31 days	November	30 days
June	30 days	December	31 days

Unitary Method

In this method, we find the value of one article for reference and then determine the value of group. This method is also known as 'Method of one'.

$$\text{Value of 1 article} = \frac{\text{Value of given number of article}}{\text{Number of articles}}$$

and value of required number of article = (Value of one article) × (Required number of articles)

Example **8.** If 8 books cost ₹ 680. What will be the cost of such 15 books?

(1) ₹ 1275 (2) ₹ 1350 (3) ₹ 1005 (4) ₹ 905

Sol. **(1)** ∵ Cost of 8 books = ₹ 680
∴ Cost of 1 book = ₹ $\frac{680}{8}$
∴ Cost of 15 books = $\frac{680}{8} \times \frac{15}{1}$ = ₹ 1275

Work and Time

1. **Work and Person** Directly proportional (more work, more men and conversely more men, more work).
2. **Time and Person** Inversely proportional (more men, less time and conversely more time, less men).
3. **Work and Time** Directly proportional (more work, more time and conversely more time, more work).
   While solving these types of problems the work done is always supposed to be equal to 1.

Example **9.** If the wages of 12 men for 30 days be ₹ 4200, the wages of 18 men for 24 days is

(1) ₹ 5040 (2) ₹ 3200
(3) ₹ 4800 (4) ₹ 6400

Sol. **(1)** Let the required wages = ₹ x

$$\left.\begin{array}{ll}\text{Men} & 12:18\\ \text{Days} & 30:24\end{array}\right\} :: 4200 : x \text{ (Direct proportion)}$$

$$12 \times 30 \times x = 18 \times 24 \times 4200$$

$$\therefore \quad x = \frac{18 \times 24 \times 4200}{12 \times 30}$$

$$= ₹\ 5040$$

$\therefore$ Required wages = ₹ 5040

Entrance Corner

1. 5045 grams is equal to **[JNV 2019]**
(1) 50 kg 45 gm (2) 5 kg 45 gm
(3) 5 kg 450 gm (4) 50 kg 450 gm

2. 5 minutes past 3, in the afternoon, is written as **[JNV 2019]**
(1) 5 : 30 am (2) 5 : 30 pm
(3) 3 : 50 pm (4) 3 : 05 pm

3. Four pieces of 75 cm were cut from a piece of 14m 25cm of fabric. Find the length of remaining fabric. **[JNV 2018]**
(1) 13 m 50 cm (2) 11 m 25 cm
(3) 10 m 50 cm (4) 10 m 25 cm

4. 12 Men or 15 women can do a piece of work in 21 days. Find the number of days required to complete the same work by 6 men and 10 women. **[JNV 2018]**
(1) 15 (2) 18 (3) 21 (4) 24

5. A bus starts at 9 : 10 am from Delhi and reaches Chandigarh at 4 : 20 pm. The total time in this journey is **[JNV 2017, 2009, 2007]**
(1) 7 h 10 min (2) rightly 7 h
(3) 6 h 30 min (4) 7 h 20 min

6. A train leaves Delhi at 7 : 40 evening and reaches Mumbai next morning at 11:10. The total time taken by train during the journey is **[JNV 2016]**
(1) 15 h 26 min (2) 14 h 15 min
(3) 15 h 30 min (4) 16 h 20 min

7. 12 men or 15 women can finish a work in 10 days. How many days will 7 men and 10 women take to finish the same work together? **[JNV 2016]**
(1) 12 (2) 10
(3) 9 (4) 8

8. A man do a work in 12 days working 8 h/day. If he does 6 h/ day, what would be the number of days taken by him? **[JNV 2014]**
(1) 12 (2) 14 (3) 16 (4) 18

9. A work done by 12 men or 15 women in 20 days. What is the time taken by 4 men and 5 women to complete this work? **[JNV 2013]**
(1) 15 days (2) 25 days
(3) 30 days (4) 40 days

10. *A* can do a piece of work in 10 days and *B* can do the same work in 12 days. How long will they take to finish the work, if 60th work together? **[JNV 2012]**
(1) $5\frac{5}{11}$ days (2) $3\frac{1}{2}$ days
(3) 6 days (4) $4\frac{2}{3}$ days

11. Convert 4 m 2604 cm into centimetres.
(1) 3040 cm (2) 3400 cm **[JNV 2011]**
(3) 3004 cm (4) 6604 cm

12. How many days are there in 2 months, 5 weeks and 18 days? **[JNV 2011]**
(1) 113 (2) 115 (3) 116 (4) 114

13. Anita started a horse painting at 11:55 am and finished it at 12:05 pm. What time taken by him to complete the painting? **[JNV 2010]**
(1) 50 min (2) 1 h 50 min
(3) 10 min (4) 1 h 10 min

14. How many bottles filled 300 mL capacity from a pot which contains 2.85 m^3 oil?
(1) 950 (2) 9050 **[JNV 2010]**
(3) 9500 (4) 9550

15. The 31st May of a year is Thursday, then the day of the 30th June of the same year will be [JNV 2007]
(1) Sunday (2) Friday
(3) Saturday (4) Thursday

16. Sampurna Kranti Express departures from Patna at 5 : 50 pm and arrives New Delhi at 8:15 am of the next day. What is the total time of the journey? [JNV 2007]
(1) 12 h 25 min (2) 14 h 35 min
(3) 14 h 25 min (4) 12 h 35 min

17. If 1 cm = 10 mm, how much is 10 cu cm? [JNV 2005]
(1) 100 cu mm (2) 1000 cu mm
(3) 10000 cu mm (4) 100000 cu mm

18. At the start of a journey, the meter of a car reads 678.3 km. At the end of the journey, the meter reads 913.5 km. What was the distance covered by the car during the journey? [JNV 2005]
(1) 687.3 km (2) 931.5 km
(3) 1591.8 km (4) 235.2 km

19. A bus left Delhi for Amritsar at 5 : 30 pm and reached Amritsar at 7 : 36 am next day. How much time did it take to reach Amritsar? [JNV 2004, 1994]
(1) 2 h 6 min (2) 14 h 6 min
(3) 13 h 6 min (4) 12 h 6 min

20. 10 m is what per cent of 10 km? [JNV 2003]
(1) 0.1 (2) 1.0 (3) 10.0 (4) 40.0

21. On 1st April of a year, it is Monday. What day will it be on 18th April in the same year? [JNV 2003]
(1) Thursday (2) Friday
(3) Saturday (4) Wednesday

22. A boy slept at 9 : 45 pm and woke up the next morning at 5 : 30 am. He slept for [JNV 2003, 1995]
(1) 4 h 15 min (2) 7 h 15 min
(3) 7 h 45 min (4) 8 h 15 min

23. A bus left Delhi for Dehradun at 10 : 15 am. It took 6 h 30 min in journey. At what time did the bus reach at Dehradun? [JNV 2002, 1996]
(1) 4 : 15 pm (2) 4 : 30 pm
(3) 4 : 45 pm (4) 5 : 00 pm

24. A student went to sleep at 9 : 30 pm and got up at 4 : 15 am. For how much time did the student sleep? [JNV 2001, 1996]
(1) 5 h 45 min (2) 6 h 15 min
(3) 6 h 45 min (4) 7 h 45 min

25. A train leaves New Delhi railway station at 10 : 50 am. It travels at a speed of 80 km/h. The train covers a distance of 120 km by [JNV 2001]
(1) 11 : 50 am (2) 12 : 10 pm
(3) 12 : 20 pm (4) 12 : 50 pm

26. A train leaves Mumbai at 17:20 o'clock on Monday and reaches Hyderabad next day at 11:25 o'clock. What is the total time taken by the train during this journey? [JNV 2000]
(1) 5 h 35 min (2) 5 h 55 min
(3) 18 h 5 min (4) 28 h 45 min

27. A train leaves station *A* at 5:15 pm and reached station *B* next morning at 10:40 am, what is the total time taken by the train in the journey? [JNV 2000]
(1) 5 h 25 min (2) 15 h 55 min
(3) 17 h 25 min (4) 22 h 40 min

28. On a Sunday Ram slept at 9 : 30 pm at night and woke up the next morning at 5 : 50 am. For how many times did he sleep? [JNV 1999]
(1) 8 h 20 min (2) 8 h 10 min
(3) 7 h 40 min (4) 7 h 20 min

29. A train reached its destination at 9:00 pm after completing its 6 h 30 min journey. At what time the train had started its journey? [JNV 1999]
(1) 2 : 30 pm (2) 2 : 30 am
(3) 3 : 30 pm (4) 3 : 30 am

30. A train leaves Mumbai at 5:40 in the evening and reaches New Delhi next morning at 10:55. The total time taken by the train during the journey is [JNV 1998]
(1) 5 h 15 min (2) 6 h 45 min
(3) 17 h 15 min (4) 16 h 35 min

31. A fort had provisions for 1200 men for 20 days. If 400 men joined the fort on the first day, how long would the food last at the same rate? [JNV 1997]
(1) 12 days (2) 13 days
(3) 14 days (4) 15 days

32. 20 books are bought for ₹ 200. How much will 45 books cost? [JNV 1997]
(1) ₹ 250 (2) ₹ 450
(3) ₹ 400 (4) ₹ 350

33. Kumar Manglam's earns ₹ 1500 per month. He spends ₹ 800 on food, ₹ 200 on the house rent and ₹ 200 on the education of his son. Calculate his yearly savings.
(1) ₹ 3600 (2) ₹ 300 **[JNV 1997]**
(3) ₹ 3500 (4) ₹ 1000

34. Amit can do $\frac{1}{2}$ of a piece of work in 8 days, while Utpal can do $\frac{1}{3}$ of the same work in 8 days. In how many days can both do it together? **[JNV 1994]**
(1) 9.6 (2) 10.5
(3) 11.2 (4) 16.0

35. A child went to sleep at 8 : 30 pm and woke up at 7 : 45 am. For how much time did he sleep? **[JNV 1993]**
(1) 11 h 45 min (2) 11 h 15 min
(3) 10 h 10 min (4) 10 h 45 min

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (2)	**5.** (1)	**6.** (3)	**7.** (4)	**8.** (3)	**9.** (3)	**10.** (1)
11. (3)	**12.** (1)	**13.** (3)	**14.** (3)	**15.** (3)	**16.** (3)	**17.** (3)	**18.** (4)	**19.** (2)	**20.** (1)
21. (1)	**22.** (3)	**23.** (3)	**24.** (3)	**25.** (3)	**26.** (3)	**27.** (3)	**28.** (1)	**29.** (1)	**30.** (3)
31. (4)	**32.** (2)	**33.** (1)	**34.** (1)	**35.** (2)					

Hints and Solutions

1. 1 kg = 1000 gm
Given, 5045 gm = (5000 + 45) gm
This can be written as 5 × 1000 × 45 gm
i.e. 5 kg 45 gm

2. According to the question,
⇒ 5 min past 3 in the afternoon is written as 3 : 05 pm.

3. Total length of fabric = 14m 25cm
= 1400 + 25 = 1425cm
Length of 4 pieces of 75cm = 75 × 4 = 300cm
Remaining length = 1425 cm − 300cm
= 1125cm = 11m 25cm

4. 12 men = 15 women
1 man = $\frac{15}{12}$ women
1 man = $\frac{5}{4}$ women
∴ 6 men + 10 women
$$=\left(6\times\frac{5}{4}+10\right)=\left(\frac{15}{2}+10\right)=\frac{35}{2}\text{ women}$$
∴ $M_1 = 15,\ D_1 = 21,\ M_2 = \frac{35}{2}, D_2 = ?$
$W_1 = W_2 = 1$
Therefore by using formula
$M_1D_1W_2 = M_2D_2W_1$
$$15\times21\times1=\frac{35}{2}\times D_2\times1$$
$$D_2=\frac{15\times21\times2}{35}=18\text{ days}$$

5. Time of start from Delhi = 9 : 10 am
Reaching time at Chandigarh = 4 : 20 pm
Time from 9 : 10 to 12 : 00 = 2 h 50 min
From 12 : 00 to 4 : 20 = 4 h 20 min
Total time taken = 7 h 10 min

6. Time of departure from Dehli = 7 : 40 evening
Time arrival at Mumbai = 11 : 40 (Next morning)
∴Total time = 7 : 40 evening to 12 : 00 am
+ 12 : 00 am + 11 : 10 am
= 4 h 20 min + 11 h 10 min = 15 h 30 min

7. Since, 12 males = 15 females,
4 males = 5 females
10 females = 8 males
Now, according to the question,
Work done by 12 males = 10 Days
Work done by 1 males = 120 Days
So, work done by (7 + 8) males
$$=\frac{120}{7+8}=\frac{120}{15}=8\text{ Days}$$

8. Here, $H_1 = 8,\ D_1 = 12,\ M_1 = 1, W_1 = 1,$
$H_2 = 6,\ D_2 = ?,\ M_2 = 1, W_2 = 1$
Now, $\frac{M_1D_1H_1}{W_1}=\frac{M_2D_2H_2}{W_2}$
$$\therefore\quad D_2=\frac{96}{6}$$
$$=16\text{ days}$$

9. $\because$ 12 men = 15 women

$\therefore$ 1 Man = $\frac{15}{12}$ Women

$\therefore$ 4 Men = $\frac{15}{12} \times 4 = 5$ Women

Women	Days
15 ↑	20 ↓
10	x

$\Rightarrow \quad \frac{x}{20} = \frac{15}{10}$

$\Rightarrow \quad x = \frac{20 \times 15}{10}$

$\therefore \quad x = 30$ days

10. A's 1 day's work = $\frac{1}{10}$

B's 1 day's work = $\frac{1}{12}$

$(A + B)$'s 1 day's work $= \frac{1}{10} + \frac{1}{12}$

$= \frac{6+5}{60} = \frac{11}{60}$

$\therefore (A + B)$ complete the whole work in $\frac{60}{11}$ days

or $5\frac{5}{11}$ days.

11. $\because$ 1 m = 100 cm, 4 m = 400 cm

Now, 400 cm + 2604 cm = 3004 cm

12. 2 months, 5 weeks and 18 days

$= (2 \times 30 + 5 \times 7 + 18)$

$= 60 + 35 + 18 = 113$ days

13. Required time = 12:05 − 11:55 = 10 min

14. Required bottles $= \frac{2.85 \times 100 \times 100 \times 100}{300}$

$= \frac{285 \times 100}{3}$

$= 9500$

15. 31st May to 30th June = 30 days

$\therefore$ In 30 days, divided by 7, remainder is 2.

$\therefore$ Required day = Thursday + 2 = Saturday

16. Time taken in the journey

= 8 : 15 am of the next day − 5 : 50 pm

= 20 : 15 − 5 : 50 = 14 : 25

= 14 h 25 min

17. 1 cm = 10 mm

1 cu cm = 10 × 10 × 10 cu mm

10 cu cm = 10 × 10 × 10 × 10 = 10000 cu mm

18. Distance covered by car = 9135 − 6783

= 2352 km

19. $\because$ Bus left from Delhi = 5 : 30 pm

Reached Amritsor = 7 : 36 am

Time from 5 : 30 pm to 12 : 00 pm (midnight)

= 12 : 00 − 5 : 30 = 6 h 30 min

Time from 12 : 00 to 7 : 36 am = 7 h 36 min

$\therefore$ Total time = 6 h 30 min + 7 h 36 min

= 14 h 6 min

20. $\because$ 10 km = 10 × 1000 m = 10000 m

Let x% of 10 km = 10 m

$\therefore \quad \frac{x}{100} \times 10000 \text{ m} = 10 \text{ m}$

$x = \frac{10 \times 100}{10000} = \frac{1}{10} = 0.1\%$

21. $\because$ Monday is on 1st April.

Monday will be on 8th April and 15th April.

$\therefore$On 16th April it is Tuesday.

On 17th April it is Wednesday and 18th April it will be Thursday.

22. The boy slept at = 4 : 45 pm

The boy woke up at = 5 : 30 am (next morning)

Time taken in sleeping from 9 : 45 to 12 : 00 (midnight)

= 2 h 15 min

Time taken in sleeping from 12 : 00 to 5 : 30

= 5 h 30 min

Total time he slept = 2 h 15 min + 5 h 30 min

= 7 h 45 min

23. Departure of bus from Delhi = 10 : 15 am

Time taken in the journey = 6 h 30 min

$\therefore$ Arrival of bus at Dehradun = 10 : 15 + 6 : 30

= 16 : 45 = 4 : 45 pm

24. The student went to sleep at = 9 : 30 pm

The student got up at = 4 : 15 am

Time from 9 : 30 to 12 : 00 (midnight)

= 2 h 30 min

Time from 12 : 00 to 4 : 15 = 4 h 15 min

Total time = 6 h 45 min

$\therefore$ The student sleep for 6 h 45 min.

25. $\because$ Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{120}{80} = \frac{3}{2}$ h or 1 h 30 min

The train will cover the distance by

= 10 : 50 am + 1 h 30 min = 12 : 20 pm

26. Time of departure—Monday 17 : 20 pm

Time of arrival—Tuesday 11 : 25 am

Time taken in the journey from

17 : 20 to 24 : 00 = 6 h 40 min (on Monday)

From 24 : 00 to 11 : 25
= + 11 h 25 min (on Tuesday)
∴ Total time = 6 h 40 min + 11 h 25 min
= 18 h 05 min

27. Time of departure from station *A*, 5 : 15 pm
Time of arrival at station *B*, 10 : 40 am (Next day)
Time taken in the journey from
5 : 15 to 12 : 00 = 6 h 45 min
Next day from 12 : 00 to 10 : 40
= + 10 h 40 min
∴Total time = 17 h 25 min

28. Ram slept on Sunday at 9 : 30 pm.
He woke up on Monday at 5 : 50 am.
Time from 9 : 30 to 12:00 = 2 h 30 min
Time (Next day) = 12 : 00 to 5 : 50 = 5 h 50 min
∴ Total time = 8 h 20 min

29. The train reached destination at 9:00 pm.
Time taken during the journey = 6 h 30 min
∴ The time of departure = (9 : 00 − 6 : 30)
= 2 : 30 pm

30. Time of departure from Mumbai
= 5 : 40 in the evening
Time of arrival at New Delhi
= 10 : 55 (Next morning)
Total time = 5 : 40 evening to 5 : 40 next morning = 12 h
Next morning 5 : 40 to 10 : 55 = 5 h 15 min
∴ Total time = 17 h 15 min

31. 1200 + 400 = 1600
∵ 1200 men can eat the food in 20 days.
∴1 man can eat the food in 20 × 1200 days.
∴1600 men can eat the food = $\frac{20 \times 1200}{1600}$
= 15 days

32. 20 books are bought for ₹ 200.
∴1 book is bought for ₹ $\frac{200}{20}$.
∴45 books are bought for $\frac{200}{20} \times 45$ = ₹ 450

33. Kumar Manglam's earning = ₹ 1500
Total spends = 800 + 200 + 200 = ₹ 1200
Monthly savings = 1500 − 1200 = ₹ 300
Yearly savings = 300 × 12 = ₹ 3600

34. Amit alone can do the whole work in
8 × 2 = 16 days
∴Work done by Amit in 1 day = $\frac{1}{16}$
Utpal alone can do the whole work in
8 × 3 = 24 days
∴Work done by Utpal in 1 day = $\frac{1}{24}$
Work done by Amit and Utpal in 1 day
$= \frac{1}{16} + \frac{1}{24} = \frac{5}{48}$
∴Amit and Utpal will finish the work in
$\frac{48}{5}$ = 9.6 days.

35. Time from 8 : 30 pm to 12 : 00 = 3 h 30 min
Time from 12 : 00 to 7 : 45 am = 7 h 45 min
∴ Total time = 3 h 30 min + 7 h 45 min
= 10 h 75 min
= 11 h 15 min

Practice Exercise

1. What is the weight of 1 cu cm of a metal in gram if weight of 1 cu m of the same metal is 4060 kg?
(1) 406 g (2) 40.6 g (3) 4.06 g (4) 0.406 g

2. Value of 225 h in days.
(1) $8\frac{9}{24}$ (2) 9 (3) $9\frac{3}{8}$ (4) $9\frac{5}{24}$

3. Convert ₹ 25 into paise.
(1) 2450 paise (2) 2300 paise
(3) 2500 paise (4) 2400 paise

4. What is the value of ₹ 50.75 into paise?
(1) 5575 paise (2) 5750 paise
(3) 5075 paise (4) 5800 paise

5. 70 paise is equivalent to
(1) ₹ 0.70 (2) ₹ 0.90
(3) ₹ 0.07 (4) None of these

6. What time is 4 h 59 min before 2:58 pm?
(1) 9 : 59 am (2) 10: 01 am
(3) 9 : 59 pm (4) 9 : 57 am

7. 500 cm + 50 m + 5 km is equal to
(1) 500 m (2) 555 m (3) 5055 m (4) 55 m

8. Convert 6.5 quintals into kilograms.
(1) 65 kg (2) 6500 kg
(3) 650 kg (4) 65000 kg

9. A car travelled for 5 h 20 min. It reached its destination at 7 : 00 pm. When did the car start its journey?
(1) 1:40 pm (2) 1:40 am
(3) 12:20 am (4) 10:20 am

10. Convert 16 kg 9 hg and 90 g into grams
(1) 160990 g (2) 16909 g
(3) 16990 g (4) 16099 g

11. How will be shown 4h 3 min in the afternoon?
(1) 4:03 am (2) 4:03 pm (3) 4:03 am (4) 4:30 pm

12. A train was 1 h 45 min late by its time. It reached at a station at 12:30. What was its exact time of arrival at that station?
(1) 11:15 (2) 10:45
(3) 12:15 (4) 2:15

13. A school started at 7:40 in the morning and closed at 1:30 in the noon. For how long did the school open?
(1) 4 h 50 min (2) 6 h 50 min
(3) 6 h (4) 5 h 50 min

14. How many articles are there in 15 gross, 8 dozen and 10 units?
(1) 2256 (2) 2266
(3) 2276 (4) 2286

15. A girl slept at 8:45 pm and woke up the next morning at 6:30 am. She slept for
(1) 9 h 15 min (2) 2 h 15 min
(3) 9 h 45 min (4) 8 h 45 min

16. How many days are there in 6 months, 7 weeks and 16 days?
(1) 255 (2) 257 (3) 235 (4) 245

17. A bus left Meerut for Lucknow at 7:45 pm and reached there at 7:15 am next day. How much time was taken by the bus in this journey?
(1) 11 h 30 min (2) 10 h 15 min
(3) 11 h 45 min (4) 12 h

18. The cost of 7 rings and 6 bangles is ₹ 148600. What is the cost of 21 rings and 18 bangles?
(1) ₹ 325400
(2) ₹ 297200
(3) ₹ 445800
(4) Cannot be determined

19. 20 persons can make 15 toys in 12h. How many toys can 10 persons make in 8 h?
(1) 20 (2) 15 (3) 5 (4) 2

20. 28 men can complete a piece of work in 21 days. How many more men must be hired to complete the work in 14 days?
(1) 18 (2) 10 (3) 8 (4) 14

21. A canteen requires 28 dozen bananas for a week. How many dozen bananas will it require for 47 days?
(1) 2256 (2) 322
(3) 196 (4) 2352

Answers

1. (3)	**2.** (3)	**3.** (3)	**4.** (3)	**5.** (1)	**6.** (1)	**7.** (3)	**8.** (3)	**9.** (1)	**10.** (3)
11. (2)	**12.** (2)	**13.** (4)	**14.** (2)	**15.** (3)	**16.** (4)	**17.** (1)	**18.** (3)	**19.** (3)	**20.** (4)
21. (1)									

Hints and **Solutions**

1. We know that,

$$1 \text{ cu m} = 1000000 \text{ cu cm}$$

$\because$ Weight of 1 cu m

$= $ Weight of 1000000 cu cm

$= 4060 \text{ kg} = 4060 \times 1000 \text{ g}$

$\therefore$ Weight of 1 cu cm $= \dfrac{4060 \times 1000}{1000000} = 4.06 \text{ g}$

2. $\because 24 \text{ h} = 1 \text{ day}$

$\therefore \quad 1 \text{ h} = \dfrac{1}{24} \text{ day}$

$\therefore \quad 225 \text{ h} = \dfrac{225}{24} = 9\dfrac{9}{24} = 9\dfrac{3}{8}$ days

3. ₹ $25 = 258 \times 100$ paise $= 2500$ paise

4. ₹ $50 + 75$ paise $= (50 \times 100 + 75)$ p

$= 5000 + 75 = 5075$ paise

5. 70 paise $=$ ₹ $\dfrac{70}{100} =$ ₹ 0.70

6. Required time $= 2{:}58$ pm $- 4$ h 59 min

$= 14{:}58 - 4{:}59 = 9{:}59$ am

7. 500 cm + 50 m + 5 km

$= 5$ m + 50 m + 5000 m $= 5055$ m

8. 1 quintal $= 100$ kg

$\therefore$ 6.5 quintals $= 6.5 \times 100 = 650$ kg

9. Car start its journey $= 7{:}00$ pm $-$ 5 h 20 min

$= 1{:}40$ pm

10. $\because 1 \text{ kg} = 1000 \text{ g}$

$\therefore 16 \text{ kg} = 16 \times 1000 = 16000 \text{ g}$

$9 \text{ hg} = 9 \times 100 \text{ g} = 900 \text{ g}$

Now, 16 kg + 9 hg + 90 g

$= 16000 \text{ g} + 900 \text{ g} + 90 \text{ g} = 16990 \text{ g}$

11. $\therefore$ Required answer $= 4{:}03$ pm

12. Exact time of arrival $= 12 : 30 -$ 1 h 45 min

$= 10{:}45$

13. Closing time $= 1{:}30$ pm or 13 h 30 min

Starting time $= 7{:}40$ am or 7 h 40 min

$\therefore$ The school opened for

$=$ 13h 30 min $-$ 7 h 40 min

$=$ 5 h 50 min

14. 15 gross $= 15 \times 144$ articles

$= 2160$ articles

8 dozen $= 8 \times 12 = 96$ articles

10 units or articles $= 10 \times 1 = 10$ articles

$\therefore$ Total articles $= 2160 + 96 + 10 = 2266$ articles

15. Time from 8:45 pm to 12:00 $=$ 3 h 15 min

Time from 12:00 to 6:30 am $=$ 6 h 30 min

$\therefore$ Total time $=$ 3 h 15 min $+$ 6 h 30 min

$=$ 9 h 45 min

16. 6 months $= 6 \times 30 = 180$ days

7 weeks $= 7 \times 7 = 49$ days

$\therefore$ Total days $= 180 + 49 + 16 = 245$

17. Time from 7:45 pm to 12:00

$=$ 4 h 15 min

Time from 12:00 to 7:15 am

$=$ 7 h 15 min

$\therefore$ Total time $=$ 4 h 15 min $+$ 7 h 15 min

$=$ 11 h 30 min

18. Cost of 7 rings and 6 bangles $=$ ₹ 148600

$\therefore$ Cost of 21 rings and 18 bangles $= 3 \times 148600$

$=$ ₹ 445800

19. 20 persons can make in 12 h $= 15$ toys

$\therefore$ 20 persons can make in 1 h $= \dfrac{15}{12}$ toys

$\therefore$ 1 person can make in 1 h $= \dfrac{15}{12 \times 20}$ toys

$\therefore$ 10 persons can make in 8h

$= \dfrac{15 \times 10 \times 8}{12 \times 20} = 5$ toys

20. In 21 days, the work is completed by 28 men.

$\therefore$ In 1 day, the work is completed by

$= 28 \times 21$ men

$\therefore$ In 14 days, the work is completed by

$= \dfrac{28 \times 21}{14} = 42$ men

$\therefore (42 - 28) = 14$ more men must be hired.

21. A canteen required for 7 days $= 28 \times 12$ bananas

$\therefore$ The canteen requires for 1 day

$= \dfrac{28 \times 12}{7}$ bananas

$\therefore$ The canteen requires for 47 days

$= \dfrac{28 \times 12}{7} \times 47$

$= 2256$ bananas

Self Practice

1. 1000 cm is equivalent of
(1) 100 m (2) 10 m (3) 110 m (4) 1 m

2. On a certain day, the Sun rises at 6:15 am and sets at 6:52 pm. What is the length of the day?
(1) 12 h (2) 12 h 17 min (3) 12 h 27 min (4) 12 h 37 min

3. A girl goes to sleep at 9:15 pm and gets up 6:10 next morning. For how much time she slept?
(1) 7 h 45 min (2) 8 h 45 min (3) 8 h 55 min (4) 9 h 15 min

4. How many days are there in 2 months, 5 weeks and 18 days?
(1) 113 days (2) 115 days (3) 116 days (4) 114 days

5. A train started from Howrah at 5:40 in the evening and reached Delhi next day at 9:55. For how much time was taken by the train in this journey?
(1) 17 h 15 min (2) 16 h 15 min (3) 15 h 15 min (4) 18 h 15 min

6. 182 cg can be expressed into milligram as
(1) 1820 mg (2) 182 mg (3) 18200 mg (4) 182000 mg

7. How many seconds are there in 3 min and 25 s?
(1) 28 (2) 325 (3) 205 (4) 175

8. An aeroplane takes off Delhi at 6:50 am and lands Mumbai airport at 9:30 am. For how much time it takes to reach Mumbai?
(1) 2 h 30 min (2) 2 h (3) 3 h (4) 2 h 40 min

9. A boy started for his school by a cycle at 7:30 am from his house and he returned at 3:50 pm from his school. For how much time he has been out from his house?
(1) 7 h 20 min (2) 8 h 20 min (3) 9 h 20 min (4) 7 h 30 min

10. Convert 100 cm^2 into metre square.
(1) 0.1 m^2 (2) 0.01 m^2 (3) 1 m^2 (4) 10 m^2

11. Convert 5000 paise into rupees.
(1) ₹ 500 (2) ₹ 5 (3) ₹ 50 (4) ₹ 0.5

Answers

1. (2)	**2.** (4)	**3.** (3)	**4.** (1)	**5.** (2)	**6.** (1)	**7.** (3)	**8.** (4)	**9.** (2)	**10.** (2)
11. (3)									

CHAPTER

09

APPROXIMATION OF EXPRESSIONS

Approximation

An approximation means the most nearest value of a term. The term can be applied to various properties (e.g. value, quantity, image, description) that are nearly but not exactly same.

e.g. if we ask age of someone, he does not say 10 yr, 4 months, 20 days. He simply says, I am approximately 10 yr old.

Thus, conversion of exact numbers into approximate numbers is called approximation or rounding off. The numbers are rounded to the nearest tens, hundreds, thousands etc. depending upon the requirement.

Rules for Approximation

To round or approximate a number to a required place, we look at the digit just right to the required place. If the digit is less than 5, we leave it and if it is 5 or more than 5 we add 1 to the digit at the required place. In each case we put zeros in place of all digits to the right of the required place.

In case of decimal we check the digit after decimal.

e.g. Rounded off to the nearest hundred.

(i) 1878

(ii) 31238

(iii) 16.73

Sol.

(i) In 1878, the digit at the hundreds place is 8 and the digit to the right of it is 7 which is more than 5. So we add 1 at hundreds place and remaining ten and unit digit consider as 0.

$\therefore$ 1878 rounded to the nearest hundred = 1900

(ii) In 31238, the digit at the hundreds place is 2 and the digit to the right of it is 3. Which is less than 5. So, we keep the face value of hundred will remain same and the remaining then and unit digit consider as 0.

$\therefore$ 31238 rounded to the nearest hundred = 31200

(iii) In 16.73, the digit after decimal is 7. So, we add 1 to the digit before the decimal and leave out the digit after decimal place.

$\therefore$ 16.73 rounded to the whole number = 17

Example **1.** Find the sum of 425, 998, 789, 869 and 954 to its nearest thousand.

(1) 4030 (2) 4035 (3) 4000 (4) 4040

Sol. **(3)** The sum = (425 + 998 + 789 + 869 + 954) = 4035

In 4035, the digit at the thousands place is 4 and the digit just right to it is 0 (less than 5) leave it.

So, 4035 rounded to the nearest thousand = 4000

Example **2.** Round 83.486 to the nearest hundredth.

(1) 83.490 (2) 83490 (3) 84 (4) 83.480

Sol. **(1)** The digit at hundredths place is 6. So, the digit at tenth place, i.e. 8 will change to 9 and 6 will change to zero. Hence, the number will be 83.490.

Entrance Corner

1. The sum of 975, 983, 923, 913 and 985 to its nearest hundred will be [JNV 2011, 1997]
(1) 4500 (2) 4600 (3) 4700 (4) 4800

2. What is the approximate value of 275.0003×3.005? [JNV 2010]
(1) 825 (2) 830 (3) 810 (4) 835

3. What is the approx value of 16268? [JNV 2007]
(1) 16200 (2) 16300 (3) 16260 (4) 16270

4. On dividing 93.45 by 0.015, what is the approximate answer? [JNV 2005]
(1) 0.6 (2) 60 (3) 600 (4) 6000

5. The number 66.0684, correct to the nearest ten is [JNV 2001]
(1) 66.068 (2) 66.07 (3) 66.1 (4) 70

6. The nearest thousands of 29789 will be written as [JNV 2000]
(1) 29000 (2) 29700
(3) 29800 (4) 30000

7. Value of 725 to the nearest hundred is [JNV 1999]
(1) 700 (2) 900 (3) 600 (4) 800

8. The number which is nearest thousand of 5555 will be [JNV 1998]
(1) 5000 (2) 5500 (3) 5550 (4) 6000

9. When rounded the nearest thousand, the number 8320 will be [JNV 1996]
(1) 8000 (2) 8300 (3) 8400 (4) 9000

10. The number 37504 when rounded off to the nearest hundred is [JNV 1995]
(1) 37000 (2) 37500 (3) 40000 (4) 30000

11. 18.24 when multiplied by 20.2, we get the approximate result is [JNV 1994]
(1) 365 (2) 368 (3) 364 (4) 362

12. The number 76.0684, when rounded to the nearest ten is [JNV 1993]
(1) 76.068 (2) 76.07
(3) 76.1 (4) 80

Answers

1. (4)	**2.** (1)	**3.** (4)	**4.** (4)	**5.** (4)	**6.** (4)	**7.** (1)	**8.** (4)	**9.** (1)	**10.** (2)
11. (2)	**12.** (4)								

Hints and Solutions

1. $\because$ The sum $= 975 + 983 + 923 + 913 + 985$
$= 4779$
$\therefore$ In nearest hundred, it will be written as 4800.

2. $275.0003 \times 3.005 = 826.3759 \approx 825$

3. Approx value of 16268 = 16270

4. $93.45 \div 0.015 = \frac{93450}{15} = 6230$
$= 6000$ (approx.)

5. The number, correct to the nearest ten is 70.

6. The digit at the thousands place is 9 and the digit just right to it is 7.
So, 29789 rounded to the nearest thousands
$= 30000$

7. The digit just right to 7 is 2. Therefore, in nearest hundred it will be written as 700.

8. $\because$ The digit at the thousand place is 5 and the digit just right to it is 5.
$\therefore$ In nearest thousand it will be written as 6000.

9. $\because$ The number 8320 is less than 8500.
Therefore, in nearest thousand it will be written as 8000.

10. $\because$ The digit just right to 5 is 0.
$\therefore$ In nearest hundred it will be written as 37500.

11. $18.24 \times 20.2 = 368.448$
The digit at hundredth place is 4 which is < 5. So, making all the digits after decimal 0, the result is 368.000 or 368.

12. In 76.0684, 6 is greater than 5, so we add 1 to 7. Then, value of 76.0684, rounded to the nearest ten = 80

Practice Exercise

1. Rounded off to whole number 135.78.
(1) 135 (2) 136 (3) 13.5 (4) 13578

2. What approximate value should come in place of question mark (?)?
$840.0003 \div 23.999 = ?$
(1) 47 (2) 8 (3) 35 (4) 18

3. Calculate the approximate value of expression
$6885.009 - 419.999 - 94.989$
(1) 6370 (2) 6830 (3) 6200 (4) 6450

4. What is the approximate value of
$11111 \div 111 \div 11$?
(1) 20 (2) 5 (3) 10 (4) 9

5. What is the approximate value of
$(8531 + 6307 + 1093) \div (501 + 724 + 396)$?
(1) 10 (2) 7 (3) 16 (4) 13

6. The sum of 865, 795, 491, 639 and 367 to its nearest hundred will be
(1) 3300 (2) 3400 (3) 3200 (4) 3100

7. Calculate the value
$(897 + 635 + 468 - 120 - 721)$ to its nearest hundred.
(1) 1100 (2) 1200 (3) 1300 (4) 1000

8. The number which is nearest thousand of 4444 will be
(1) 4000 (2) 5000 (3) 4400 (4) 4500

9. When rounded the nearest hundred 2871 will be
(1) 2000 (2) 2900 (3) 2800 (4) 3000

10. Approximation value of (6.97×0.093) is
(1) 0.7 (2) 0.8 (3) 7.0 (4) 8.0

11. Approximation value of 15.38×0.98
(1) 14 (2) 18 (3) 13 (4) 15

12. Approximation value of (1.09×5.908) is
(1) 5 (2) 6 (3) 10 (4) 12

13. Round 14.444 to the nearest hundredth place
(1) 14.45 (2) 14.44 (3) 14 (4) 14.5

14. The number 14656152 when rounded off to the nearest lakh is
(1) 1500000 (2) 1400000 (3) 1000000 (4) 2000000

15. 1320.82 when rounded to the nearest tenth (whole number) is
(1) 1320 (2) 1320.1 (3) 1321 (4) 1322

16. Calculate the value 1524.79 $\times$ 19.92 + 495.26 to its nearest thousand
(1) 33000 (2) 34000 (3) 31000 (4) 26000

17. Calculate the approximation value of
$328 + 437 + 189 - 286$.
(1) 960 (2) 670 (3) 950 (4) 780

18. Sum of 111, 222, 333, 444 and 555 to its nearest hundred
(1) 1700 (2) 1600 (3) 1800 (4) 1400

19. Approximation value of (3.28×1.25) is
(1) 5 (2) 6 (3) 3 (4) 7

20. Approximation value of (7.89×3.90) is
(1) 32 (2) 21 (3) 24 (4) 28

21. Approximation value of
$8.34 + 4.97 + 1.89 + 7.19 - 6.90$
(1) 14 (2) 16 (3) 18 (4) 15

Answers

1. (2)	**2.** (3)	**3.** (1)	**4.** (4)	**5.** (1)	**6.** (3)	**7.** (2)	**8.** (1)	**9.** (2)	**10.** (1)
11. (4)	**12.** (2)	**13.** (2)	**14.** (1)	**15.** (3)	**16.** (3)	**17.** (2)	**18.** (1)	**19.** (3)	**20.** (1)
21. (4)									

Hints and Solutions

1. In numeral 135.78, digit after decimal is 7 (more than 5), so we add 1 to the digit before the decimal and leave out the all decimal value.

$\therefore$ 135.78 rounded to the whole number = 136

2. Approximate value of 840.0003 = 840 and 23.999 = 24

So, $840 \div 24 = 35$

3. Given, 6885.009 − 419.999 − 94.989

Approximate value = 6885 − 420 − 95 = 6370

4. $\frac{11111 \times 1 \times 1}{111 \times 11} \approx \frac{10000}{110 \times 10} = 9.09$

$\therefore$ Digit after decimal is 0 (less than 5), So we leave it and rounded 9.09 to the whole number 9.

5. Given,

$(8531 + 6307 + 1093) \div (501 + 724 + 396)$

Approximate value

$= (8530 + 6300 + 1090) \div (500 + 720 + 400)$

$= 15920 \div 1620 = 9.82$

$\therefore$ Digit after decimal is 8 (more than 5), so we add 1 to digit before the decimal and leave out the remaining decimal value.

$\therefore$ 9.82 rounded to the whole number 10.

6. $\because$ Sum = 865 + 795 + 491 + 639 + 367 = 3157

$\therefore$ Digit just after 1 is 5

Therefore , in nearest hundred it will be written as 3200.

7. Value = (897 + 635 + 468 − 120 − 721) = 1159

$\therefore$ Digit after 1 is 5 (equal to 5), so we add 1 to the digit before 5, hence 1159 is rounded off to 1200.

8. In 4444, the digit at the thousands place is 4 and the digit just right to it is 4, which is less than 5. So, we leave it.

$\therefore$ 4444 rounded to the nearest thousand

= 4000

9. In 2871, the digit at the hundred place is 8 and the digit just right to it is 7.

So, 2871 rounded to the nearest hundred

= 2900

10. Approximation of 6.97 = 7

Approximation of 0.093 = 0.1

$\therefore$ $6.97 \times 0.093 \approx 7 \times 0.1 = 0.7$

11. Approximation of 15.38 = 15

Approximation of 0.98 = 1

$\therefore 15.38 \times 0.98 \approx 15 \times 1 = 15$

12. Approximation value of 1.09 = 1

and 5.908 = 6

$\therefore$ $1.09 \times 5.908 \approx 1 \times 6 = 6$

13. In 14.444, the digit at the hundredth place is 4 and the digit just right to it is 4, which is less than 5. So, leave it.

$\therefore$ Required number = 14.44

14. In 14656152, the digit at the lakh place is 6 and the digit just right to it is 5.

$\therefore$ Required number = 1500000

15. In 1320.8, the digit at the tenth place is 8.

$\therefore$ Required number = 1321

16. Calculating the value

$= 1524.79 \times 19.92 + 495.26$

$= 1525 \times 20 + 495 = 30995$

Digit to the right of thousand is 9, so we will add 1 to the thousand place and would rounded 30995 to 31000.

17. Calculating the value

$= 328 + 437 + 189 - 286$

$= 668$

$\therefore$ Approximate value = 668 = 670

18. Sum = 111 + 222 + 333 + 444 + 555 = 1665

Digit just after 6 is 6 (more than 5).

Hence, nearest hundred of 1665 = 1700

19. Approximation of 3.28 = 3

Approximation of 1.25 = 1

$\therefore$ $3.28 \times 1.25 \approx 3 \times 1 = 3$

20. Approximation of 7.89 = 8

Approximation of 3.90 = 4

$\therefore 7.89 \times 3.90 \approx 8 \times 4 = 32$

21. Approximation of 8.34 = 8

Approximation of 4.97 = 5

Approximation of 1.89 = 2

Approximation of 7.19 = 7

Approximation of 6.90 = 7

$\therefore 8.34 + 4.97 + 1.89 + 7.19 - 6.90$

$\approx 8 + 5 + 2 + 7 - 7 = 15$

Self Practice

1. The number which is nearest thousand of 5550 will be
(1) 5500 (2) 5000 (3) 6000 (4) 5600

2. The number 39969 when rounded off to the nearest hundred is
(1) 3900 (2) 40000 (3) 39900 (4) 39800

3. Round 18.35 to the tenth place
(1) 18 (2) 18.3 (3) 19 (4) 18.4

4. Round 40.438 to the nearest hundredth place
(1) 40.43 (2) 40.44 (3) 40.4 (4) 41

5. 84.6 when rounded to the nearest one is
(1) 84 (2) 90 (3) 85 (4) 84.1

6. When 22.54 is rounded to the nearest one, we get
(1) 23 (2) 22 (3) 22.6 (4) 22.5

7. Rounded of 18768 to the nearest hundred
(1) 18800 (2) 18700 (3) 18750 (4) 16000

8. Rounded 193.76 to the hundred place
(1) 194.90 (2) 194.00 (3) 193.00 (4) 192.00

9. Rounded of 121.79×10.11
(1) 1120 (2) 1342 (3) 1220 (4) 1210

10. Approximation of $(491 + 831 + 410) \div (11 + 28 + 34)$
(1) 24 (2) 23 (3) 25 (4) 46

11. Approximation of $(31 \times 14 \times 7) - (26 + 12)$
(1) 3500 (2) 3000 (3) 2400 (4) 2800

12. Approximation of $11.003 \times 19.998 \times 9.010$
(1) 1970 (2) 1980 (3) 1710 (4) 1680

13. Approximation of $1088.88 + 1800.08 + 1880.80$
(1) 3950 (2) 4620 (3) 6810 (4) 4770

14. Approximation of $16.007 \times 14.995 \times 6.080$
(1) 1440 (2) 1350 (3) 1510 (4) 1250

15. Approximation of $7000.001 \div 699.983 \times 4.020$
(1) 25 (2) 32 (3) 40 (4) 60

Answers

1. (3)	**2.** (2)	**3.** (4)	**4.** (2)	**5.** (3)	**6.** (1)	**7.** (1)	**8.** (2)	**9.** (3)	**10.** (1)
11. (2)	**12.** (2)	**13.** (4)	**14.** (1)	**15.** (3)					

CHAPTER

10

SIMPLIFICATION OF NUMERICAL EXPRESSIONS

Simplification

Many times different operations like addition, subtraction, multiplication and division are involved simultaneously in the expression. The process of simplify these expressions is known as simplification. In order to simplify an arithmetic expression we must follow the rule of VBODMAS.

VBODMAS Rule

The operation have to be carried out in the order in which they appear in the word 'VBODMAS', where

V → Vinculum (a horizontal line drawn over a group of term or bar '¯')
B → Bracket [], {},()
O → Of (×)
D → Division (÷)
M → Multiplication (×)
A → Addition (+)
S → Subtraction (–)

- 'Of ' means multiplication but is operated even before division.
- If there is no sign between a number and bracket, it indicates multiplication.
  e.g. $5(4+2) = 5 \times 6 = 30$

Example **1.** Simplify $(27-25)(12+1)$.

(1) 24 (2) 21
(3) 23 (4) 26

Sol. **(4)** $(27-25)(12+1) = 2 \times 13 = 26$

Example **2.** Simplify $\frac{4}{9} \times \frac{18}{5} \div \frac{24}{5}$.

(1) $\frac{1}{4}$ (2) $\frac{2}{3}$
(3) $\frac{1}{3}$ (4) $\frac{7}{6}$

Sol. **(3)** $\frac{4}{9} \times \frac{18}{5} \times \frac{5}{24} = \frac{1}{3}$

Example **3.** Simplify $\left[\frac{2}{5}+\frac{1}{7}\right] \div \left[\frac{1}{5}-\frac{1}{8}\right] - \frac{5}{21}$.

(1) 8 (2) 7 (3) 9 (4) 10

Sol. **(2)** $\left[\frac{14+5}{35}\right] \div \left[\frac{8-5}{40}\right] - \frac{5}{21} = \frac{19}{35} \div \frac{3}{40} - \frac{5}{21}$

$= \frac{19}{35} \times \frac{40}{3} - \frac{5}{21} = \frac{152}{21} - \frac{5}{21} = \frac{147}{21} = 7$

Example **4.** Simplify $\left(\frac{5+5\times5}{5\times5+5}\right) \times \left(\frac{\frac{1}{5} \div \frac{1}{5} \text{ of } \frac{1}{5}}{\frac{1}{5} \text{ of } \frac{1}{5} \div \frac{1}{5}}\right)$

(1) 25 (2) 26 (3) 22 (4) 28

Sol. **(1)** $\left(\frac{5+25}{25+5}\right) \times \left(\frac{\frac{1}{5} \div \frac{1}{5} \times \frac{1}{5}}{\frac{1}{5} \times \frac{1}{5} \div \frac{1}{5}}\right) = \left(\frac{30}{30}\right) \times \left(\frac{\frac{1}{5} \div \frac{1}{25}}{\frac{1}{25} \div \frac{1}{5}}\right)$

$= 1 \times \frac{\frac{1}{5} \times \frac{25}{1}}{\frac{1}{25} \times \frac{5}{1}}$

$= \frac{5}{\frac{1}{5}} = 5 \times \frac{5}{1} = 25$

Entrance Corner

1. Simplification of the following gives
$15\frac{1}{2}-\left[\frac{12}{5}\times\frac{5}{8}+\left(7\div1\frac{3}{4}\right)\right]\times2$ [JNV 2019]

(1) $\frac{2}{9}$ (2) $\frac{7}{2}$ (3) $\frac{9}{2}$ (4) $\frac{11}{2}$

2. Simplify $\dfrac{\frac{7}{3}\times\frac{2}{3}\div\frac{3}{5}}{2+1\frac{2}{3}}$. [JNV 2017]

(1) 99/70 (2) 70/99 (3) 33/30 (4) 70/27

3. What is the product of
$9680\times10\times14\times0\times8$? [JNV 2016]

(1) 561260 (2) 642976
(3) 912040 (4) 0

4. The simplification of $641664\div16$ will be

(1) 4104 (2) 40104 [JNV 2015]
(3) 41404 (4) 41004

5. The simplification of
$24+[6-\{5-2(4-3)\}]$ gives the result

(1) 22 (2) 23 [JNV 2015]
(3) 24 (4) 27

6. Karan obtains 10 more marks than Bhavana. Isha obtain 5 less marks than Bhavana. What is the marks of Karan if all three obtain total 140 marks? [JNV 2013]

(1) 40 (2) 45 (3) 50 (4) 55

7. Solve $12\times10\div\frac{120}{240}=?\times120$. [JNV 2012]

(1) 12 (2) 10 (3) 2 (4) 240

8. Simplify $10\frac{2}{5}\times8\frac{4}{5}\div4\frac{2}{5}$. [JNV 2011]

(1) $20\frac{4}{5}$ (2) $\frac{5}{104}$ (3) 64 (4) 21

9. $[\{(6\div2)\times3\}\times2]$ is equal to [JNV 2011]

(1) 11 (2) 18 (3) 13 (4) 27

10. $1\frac{1}{24}-1+\frac{7}{36}$ is equal to [JNV 2010]

(1) $\frac{17}{72}$ (2) $1\frac{17}{72}$
(3) $\frac{7}{60}$ (4) $2\frac{7}{60}$

11. $20.08+20.008+20.0008+20$ is equal to [JNV 2010]

(1) 80.0642 (2) 80.8000 (3) 81.0888 (4) 80.0888

12. Simplify $(0.50+0.15\div0.05)\times\frac{2}{7}$. [JNV 2007]

(1) 1 (2) 0 (3) 3 (4) 5

13. What is the result of simplification of the expression $2.5\div0.5\times0.1-0.05$? [JNV 2005]

(1) 0.45 (2) 49.95 (3) 0.25 (4) 100

14. The simplification of $1+\frac{1}{10}+\frac{1}{100}+\frac{1}{1000}$ in decimal form gives [JNV 2004, 1996]

(1) 1.0001 (2) 1.111 (3) 1.001 (4) 0.111

15. The simplification of
$10+4\div2-3\times2+4\div2\times2-4$ gives [JNV 2004, 1995]

(1) 0 (2) 1 (3) 6 (4) 8

16. The simplification of $6\div6+6\times6-6$ gives [JNV 2003]

(1) 1 (2) 7 (3) 31 (4) 36

17. If $178\times34=6052$, what is $60.52\div17.8$? [JNV 2002, 1996]

(1) 34 (2) 3.4 (3) 0.34 (4) 0.034

18. On simplifying $15\times4-10\div5$, we get [JNV 2002]

(1) 10 (2) 30 (3) 58 (4) 120

19. The simplification of
$98-[65+\{32-(12+5)\}]$ gives the result

(1) 8 (2) 18 [JNV 2001]
(3) 178 (4) 212

20. The value of $50\times5\times0.05$ is [JNV 2001]

(1) 1.25 (2) 12.50
(3) 125 (4) 1250

21. Which of the following is equal to
$\frac{3}{2}\div\frac{3}{2}\times2+\frac{3}{2}$? [JNV 2000]

(1) 2 (2) 6 (3) $\frac{7}{2}$ (4) $\frac{2}{7}$

22. The value of $\{2(18-3)\}+5(12-7)$ is [JNV 2000]

(1) 5 (2) 25 (3) 30 (4) 55

23. Value of $2-3+4+3-3-2$ is equal to [JNV 1999]

(1) 1 (2) 2 (3) 3 (4) 4

24. Value of $\frac{3}{4}+1\frac{1}{4}-\frac{1}{4}$ is equal to [JNV 1999]

(1) $\frac{3}{10}$ (2) $\frac{3}{5}$ (3) $1\frac{1}{3}$ (4) $1\frac{3}{4}$

25. Value of $12\times8-4\div4$ is equal to [JNV 1999]

(1) 12 (2) 23 (3) 84 (4) 95

26. $60 \times 7 + 3 \times 60$ is equal to [JNV 1998]
(1) 130 (2) 600 (3) 25380 (4) 3600

27. Value of $2(12 - 3) + 4(10 - 7)$ is [JNV 1998]
(1) 18 (2) 30 (3) 54 (4) 66

Answers

1. (3)	**2.** (2)	**3.** (4)	**4.** (2)	**5.** (4)	**6.** (4)	**7.** (3)	**8.** (1)	**9.** (2)	**10.** (1)
11. (4)	**12.** (1)	**13.** (1)	**14.** (2)	**15.** (3)	**16.** (3)	**17.** (2)	**18.** (3)	**19** (2)	**20.** (2)
21. (3)	**22.** (4)	**23.** (1)	**24.** (4)	**25.** (4)	**26.** (2)	**27.** (2)			

Hints and Solutions

1. Given expression, $15\frac{1}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div 1\frac{3}{4}\right)\right] \times 2$

By applying VBODMAS,

$= \frac{31}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \left(7 \div \frac{7}{4}\right)\right] \times 2$

$= \frac{31}{2} - \left[\frac{12}{5} \times \frac{5}{8} + \frac{7 \times 4}{7}\right] \times 2 = \frac{31}{2} - \left[\frac{3}{2} + 4\right] \times 2$

$= \frac{31}{2} - \left[\frac{11}{2}\right] \times 2 = \frac{31}{2} - 11 = \frac{31 - 22}{2} = \frac{9}{2}$

2. $\dfrac{\frac{7}{3} \times \frac{2}{3} \div \frac{3}{5}}{2 + 1\frac{2}{3}} = \dfrac{\frac{7}{3} \times \frac{2}{3} \times \frac{3}{5}}{2 + \frac{5}{3}} = \dfrac{\frac{70}{27}}{\frac{11}{3}} = \dfrac{70 \times 3}{27 \times 11} = \dfrac{70}{99}$

3. We know that if we multiply by zero in any number, resultant will be zero.

$\therefore 9680 \times 10 \times 14 \times 0 \times 8 = 0$

4. $\therefore$ Required value $= 641664 \div 16 = 40104$

5. $24 + [6 - \{5 - 2(4 - 3)\}] = 24 + [6 - \{5 - 2 \times 1\}]$

$= 24 + [6 - 3] = 24 + 3 = 27$

6. Suppose Bhavana's marks $= x$

$\therefore$ Isha's marks $= x - 5$

and Karan's marks $= x + 10$

Then, $x + x - 5 + x + 10 = 140$

$\Rightarrow \quad 3x + 5 = 140$

$\Rightarrow \quad 3x = 135$

$\Rightarrow \quad x = 45$

Hence, Karan's marks $= 45 + 10 = 55$

7. $? \times 120 = 12 \times 10 \div \frac{120}{240}$

$\Rightarrow \quad ? \times 120 = 120 \div \frac{1}{2}$

$\Rightarrow \quad ? \times 120 = 120 \times 2$

$\therefore \quad ? = \frac{120 \times 2}{120} = 2$

8. $10\frac{2}{5} \times 8\frac{4}{5} \div 4\frac{2}{5} = \frac{52}{5} \times \frac{44}{5} \div \frac{22}{5}$

$= \frac{52}{5} \times \frac{44}{5} \times \frac{5}{22} = \frac{52}{5} \times 2 = \frac{104}{5} = 20\frac{4}{5}$

9. $[\{(6 \div 2) \times 3\} \times 2] = [\{3 \times 3\} \times 2] = [9 \times 2] = 18$

10. $1\frac{1}{24} - 1 + \frac{7}{36} = \frac{25}{24} - 1 + \frac{7}{36}$

$= \frac{1}{24} + \frac{7}{36} = \frac{3 + 14}{72} = \frac{17}{72}$

11. $20.08 + 20.008 + 20.0008 + 20 = 80.0888$

12. $(0.50 + 0.15 + 0.05) \times \frac{2}{7}$

$= \left(0.50 + 0.15 \times \frac{1}{0.05}\right) \times \frac{2}{7}$

$= (0.50 + 3) \times \frac{2}{7} = 3.5 \times \frac{2}{7} = \frac{7}{7} = 1$

13. Expression $= 2.5 \div 0.5 \times 0.1 - 0.05$

$= \frac{2.5}{0.5} \times 0.1 - 0.05$

$= 5 \times 0.1 - 0.05 = 0.5 - 0.05 = 0.45$

14. $1 + \frac{1}{10} + \frac{1}{100} + \frac{1}{1000}$

$= 1 + 0.1 + 0.01 + 0.001 = 1.111$

15. $10 + 4 \div 2 - 3 \times 2 + 4 \div 2 \times 2 - 4$

$= 10 + 2 - 3 \times 2 + 2 \times 2 - 4$

$= 10 + 2 - 6 + 4 - 4$

$= 10 + 2 + 4 - 6 - 4 = 16 - 10 = 6$

16. $6 \div 6 + 6 \times 6 - 6 = 1 + 6 \times 6 - 6$

$= 1 + 36 - 6 = 37 - 6 = 31$

17. $\because 178 \times 34 = 6052$

$\Rightarrow \quad 34 = \frac{6052}{178} \Rightarrow \frac{34}{10} = \frac{6052}{178 \times 10}$

$\therefore \quad 60.52 \div 17.8 = 3.4$

18. $15 \times 4 - 10 \div 5 = 15 \times 4 - 2 = 60 - 2 = 58$

19. $98 - [65 + \{32 - (12 + 5)\}]$
$= 98 - [65 + \{32 - 17\}] = 98 - [65 + 15]$
$= 98 - 80 = 18$

20. $50 \times 5 \times 0.05 = 250 \times \frac{5}{100}$
$= \frac{25}{2}$ or $12\frac{1}{2}$ or 12.50

21. $\frac{3}{2} \div \frac{3}{2} \times 2 + \frac{3}{2} = \frac{3}{2} \times \frac{2}{3} \times 2 + \frac{3}{2} = 2 + \frac{3}{2} = \frac{7}{2}$

22. $\{2(18 - 3)\} + 5(12 - 7) = \{2 \times 15\} + 5 \times 5$
$= 30 + 25 = 55$

23. $2 - 3 + 4 + 3 - 3 - 2$
$= 2 + 4 + 3 - 3 - 3 - 2 = 9 - 8 = 1$

24. $\frac{3}{4} + 1\frac{1}{4} - \frac{1}{4} = \frac{3}{4} + \frac{5}{4} - \frac{1}{4}$
$= \frac{3 + 5 - 1}{4} = \frac{7}{4} = 1\frac{3}{4}$

25. $12 \times 8 - 4 \div 4 = 12 \times 8 - 1 = 96 - 1 = 95$

26. $60 \times 7 + 3 \times 60 = 420 + 180 = 600$

27. $2(12 - 3) + 4(10 - 7) = 2 \times 9 + 4 \times 3$
$= 18 + 12 = 30$

Practice Exercise

1. $16 \div 4$ of $2 - 2[2 - \{2 - 2(2 - 2 - 2)\}]$ is equal to
(1) 5 (2) – 2 (3) 6 (4) 8

2. $55 \div 5.5 \div 0.5$ is equal to
(1) 20 (2) 10 (3) 8.5 (4) 10.5

3. Simplify $8059 - 7263 = ? \times 40$.
(1) 19.9 (2) 18.7
(3) 15.9 (4) 17.7

4. Simplify $5437 - 3153 + 2284 = ? \times 50$.
(1) 96.66 (2) 91.36
(3) 96.13 (4) 93.16

5. Simplify $3 \div \left[(8 - 5) \div \left\{(4 - 2) \div \left(2 + \frac{8}{13}\right)\right\}\right]$.
(1) $\frac{13}{17}$ (2) $\frac{17}{13}$
(3) $\frac{68}{13}$ (4) $\frac{13}{68}$

6. Shown here are expressions given to Sangita, Anandi, Abha and Tulsi with their answers.
Sangita $4 \times 1 + 8 \div 2 = 8$
Anandi $6 + 4 \div 2 - 1 = 4$
Abha $9 + 3 \times 2 - 4 \div 2 = 10$
Tulsi $27 \div 3 - 2 \times 3 = 21$
Who has got the correct answer?
(1) Abha (2) Tulsi
(3) Sangita (4) Anandi

7. If $A = \frac{3}{4} \div \frac{5}{6}$, $B = 3 \div [(4 \div 5) \div 6]$,
$C = [3 \div (4 \div 5)] \div 6$ and
$D = 3 \div 4(5 \div 6)$, then
(1) *A* and *D* are equal (2) *A* and *C* are equal
(3) *A* and *B* are equal (4) All are equal

8. The value of the expression
$6 - \left[\frac{5}{6} + \left(3\frac{7}{8} - 2\frac{1}{3} + 1\frac{7}{9}\right)\right]$ is
(1) $\frac{135}{72}$ (2) $1\frac{61}{72}$ (3) 1 (4) 0

9. The value of $\left[\left(\frac{5}{6} \times 1\frac{6}{13}\right) \div \left(2\frac{5}{7} \div 3\frac{1}{4}\right)\right]$ is
(1) 24/35 (2) 1 (3) 35/24 (4) 91/76

10. Simplify $1 \div \left[\frac{1}{2} + \frac{1}{3} + \frac{1}{6} \div \left(\frac{3}{4} - \frac{1}{3}\right)\right]$.
(1) 30/37 (2) 37/30 (3) 1 (4) 7/37

11. The value of the expression $2 + 2 \div 2 + 2 \times 2 + 2 - 2$ is
(1) 7 (2) 14 (3) 21 (4) 28

12. Simplify $7 \div 7 + 9 \times 7 - 45$.
(1) 20 (2) 21 (3) 22 (4) 19

13. Simplify $21 \times 7 + 25 \div 5 - 24 \times \frac{1}{8}$.
(1) 150 (2) 147 (3) 148 (4) 149

14. The value of expression $\frac{7}{36} \div \frac{5}{12} \times \frac{25}{14}$ is
(1) 7/5 (2) 6/5 (3) 5/6 (4) 7/6

15. Simplify $162 \div 18 + 9 \times 6$.
(1) 64 (2) 21 (3) 42 (4) 63

16. The value of $4\frac{1}{6} \div 2\frac{1}{8}$ of $\frac{1}{6} - 4\frac{1}{6}$ of $\frac{2}{17}$ is
(1) $11\frac{14}{51}$ (2) 0 (3) 1 (4) 51/14

17. The value of expression
$60 + [7 \div \{6 \div (1 \div \overline{5 - 3})\}]$ of $\frac{12}{7}$ is

(1) 12 (2) 60 (3) 62 (4) 61

18. Simplify
$\left[\frac{2}{5}-\left(2\frac{2}{5}-2\right) \text{ of } \left\{1\frac{1}{5}-\frac{2}{5}\div\left(1\frac{1}{3}-\frac{5}{6}\right)\right\}\right]$

(1) 25/6 (2) 6/25 (3) 4/25 (4) 25/4

19. Simplify $5\frac{1}{3}-\left[4\frac{1}{3}-\left(\overline{2\frac{1}{3}-\frac{1}{3}}\right)\right]$

(1) 3 (2) 2 (3) 1 (4) 0

Answers

1. (2)	**2.** (1)	**3.** (1)	**4.** (2)	**5.** (1)	**6.** (3)	**7.** (1)	**8.** (2)	**9.** (3)	**10.** (1)
11. (1)	**12.** (4)	**13.** (4)	**14.** (3)	**15.** (4)	**16.** (1)	**17.** (4)	**18.** (2)	**19.** (1)	

Hints and Solutions

1. $[16\div 4 \text{ of } 2-2[2-\{2-2(2-2-2)\}]$
$=16\div(4\times 2)-2[2-\{2-2(-2)\}]$
$=16\div 8-2[2-\{2+4\}]$
$=2-2[2-\{6\}]=2-2[2-4]=2-2[-2]$
$=2-4=-2$

2. $?=55\div 5.5\div 0.5 \Rightarrow ?=\frac{55}{5.5\times 0.5}=20$

3. $?\times 40=8059-7263$
$\Rightarrow \quad ?=\frac{796}{40}=19.9$

4. $?\times 50=5437-3153+2284$
$\therefore \quad ?=\frac{4568}{50}=91.36$

5. $3\div\left[(8-5)\div\left\{(4-2)\div\left(2+\frac{8}{13}\right)\right\}\right]$
$=3\div\left[3\div\left\{2\div\left(\frac{34}{13}\right)\right\}\right]$
$=3\div\left\{3\div\left(2\times\frac{13}{34}\right)\right\}=3\div\left[3\div\frac{13}{17}\right]=3\div\left[3\times\frac{17}{13}\right]$
$=3\div\frac{51}{13}=3\times\frac{13}{51}=\frac{13}{17}$

6. Sangita $4\times 1+8\div 2=4+4=8$
Anandi $6+4\div 2-1=6+2-1$
$=8-1=7\neq 4$
Abha $9+3\times 2-4\div 2=9+6-2$
$=14-2=12\neq 10$
Tulsi $27\div 3-2\times 3=9-6=3\neq 21$
Hence, answer of Sangita is correct.

7. $A=\frac{3}{4}\div\frac{5}{6}=\frac{3}{4}\times\frac{6}{5}=\frac{9}{10}$
$B=3\div[(4\div 5)\div 6]$
$=3\div\left[\frac{4}{5}\div 6\right]=3\div\left[\frac{4}{30}\right]=3\times\frac{30}{4}=\frac{45}{2}$
$C=[3\div(4\div 5)]\div 6]$
$=\left[3\div\frac{4}{5}\right]\div 6=\left(3\times\frac{5}{4}\right)\div 6$
$=\frac{15}{4}\div 6=\frac{15}{24}=\frac{5}{8}$
$D=3\div 4(5\div 6)$
$=3\div 4\times\frac{5}{6}=3\div\frac{20}{6}=3\times\frac{6}{20}=\frac{18}{20}=\frac{9}{10}$
Hence, A and D are equal.

8. $6-\left[\frac{5}{6}+\left\{\frac{31}{8}-\frac{7}{3}+\frac{16}{9}\right\}\right]$
$=6-\left[\frac{5}{6}+\left(\frac{279-168+128}{72}\right)\right]$
$=6-\left[\frac{5}{6}+\frac{239}{72}\right]=6-\left[\frac{60+239}{72}\right]$
$=6-\left[\frac{299}{72}\right]=\frac{432-299}{72}=\frac{133}{72}=1\frac{61}{72}$

9. $\left(\frac{5}{6}\times\frac{19}{13}\right)\div\left(\frac{19}{7}\div\frac{13}{4}\right)=\left(\frac{95}{78}\right)\div\left(\frac{19}{7}\times\frac{4}{13}\right)$
$=\left(\frac{95}{78}\right)\div\left(\frac{76}{91}\right)$
$=\frac{95}{78}\times\frac{91}{76}=\frac{35}{24}$

10. $1\div\left[\frac{1}{2}+\frac{1}{3}+\frac{1}{6}\div\left(\frac{9-4}{12}\right)\right]$
$=1\div\left[\frac{1}{2}+\frac{1}{3}+\frac{1}{6}\div\frac{5}{12}\right]$
$=1\div\left[\frac{1}{2}+\frac{1}{3}+\frac{1}{6}\times\frac{12}{5}\right]$
$=1\div\left[\frac{1}{2}+\frac{1}{3}+\frac{2}{5}\right]$
$=1\div\left[\frac{15+10+12}{30}\right]$

$$= 1 \div \frac{37}{30} = 1 \times \frac{30}{37} = \frac{30}{37}$$

11. $2 + 2 \div 2 + 2 \times 2 + 2 - 2$

$$= 2 + 2 \times \frac{1}{2} + 4 + 2 - 2$$

$$= 2 + 1 + 4 + 2 - 2 = 9 - 2 = 7$$

12. $7 \div 7 + 9 \times 7 - 45 = 7 \times \frac{1}{7} + 63 - 45$

$$= 1 + 63 - 45 = 64 - 45 = 19$$

13. $21 \times 7 + 25 \div 5 - 24 \times \frac{1}{8}$

$$= 147 + 25 \times \frac{1}{5} - 3$$

$$= 147 + 5 - 3 = 149$$

14. $\frac{7}{36} \div \frac{5}{12} \times \frac{25}{14} = \frac{7}{36} \times \frac{12}{5} \times \frac{25}{14} = \frac{5}{6}$

15. $162 \div 18 + 9 \times 6 = 162 \times \frac{1}{18} + 54$

$$= 9 + 54 = 63$$

16. $4\frac{1}{6} \div 2\frac{1}{8} \text{ of } \frac{1}{6} - 4\frac{1}{6} \text{ of } \frac{2}{17}$

$$= \frac{25}{6} \div \frac{17}{8} \times \frac{1}{6} - \frac{25}{6} \times \frac{2}{17}$$

$$= \frac{25}{6} \div \frac{17}{48} - \frac{25}{51} = \frac{25}{6} \times \frac{48}{17} - \frac{25}{51}$$

$$= \frac{200}{17} - \frac{25}{51} = \frac{600 - 25}{51}$$

$$= \frac{575}{51} = 11\frac{14}{51}$$

17. $60 + [7 \div \{6 \div (1 \div \overline{5 - 3})\}] \text{ of } \frac{12}{7}$

$$= 60 + \left[7 \div \left(6 \div \frac{1}{2}\right)\right] \text{ of } \frac{12}{7}$$

$$= 60 + [7 \div \{6 \times 2\}] \text{ of } \frac{12}{7}$$

$$= 60 + [7 \div 12] \text{ of } \frac{12}{7}$$

$$= 60 + \frac{7}{12} \text{ of } \frac{12}{7}$$

$$= 60 + \frac{7}{12} \times \frac{12}{7} = 60 + 1 = 61$$

18. $\left[\frac{2}{5} - \left(2\frac{2}{5} - 2\right) \text{ of } \left\{1\frac{1}{5} - \frac{2}{5} \div \left(1\frac{1}{3} - \frac{5}{6}\right)\right\}\right]$

$$= \left[\frac{2}{5} - \left(\frac{12}{5} - 2\right) \text{ of } \left\{\frac{6}{5} - \frac{2}{5} \div \left(\frac{4}{3} - \frac{5}{6}\right)\right\}\right]$$

$$= \left[\frac{2}{5} - \left(\frac{12 - 10}{5}\right) \text{ of } \left\{\frac{6}{5} - \frac{2}{5} \div \left(\frac{8 - 5}{6}\right)\right\}\right]$$

$$= \left[\frac{2}{5} - \frac{2}{5} \text{ of } \left\{\frac{6}{5} - \frac{2}{5} \times \frac{6}{3}\right\}\right]$$

$$= \left[\frac{2}{5} - \frac{2}{5} \text{ of } \left\{\frac{6}{5} - \frac{4}{5}\right\}\right]$$

$$= \left[\frac{2}{5} - \frac{2}{5} \text{ of } \frac{2}{5}\right] = \left[\frac{2}{5} - \frac{4}{25}\right] = \frac{10 - 4}{25} = \frac{6}{25}$$

19. $5\frac{1}{3} - \left[4\frac{1}{3} - \left(\overline{2\frac{1}{3} - \frac{1}{3}}\right)\right]$

$$= \frac{16}{3} - \left[\frac{13}{3} - \left(\overline{\frac{7}{3} - \frac{1}{3}}\right)\right]$$

$$= \frac{16}{3} - \left(\frac{13}{3} - \frac{6}{3}\right)$$

$$= \frac{16}{3} - \frac{7}{3} = \frac{9}{3} = 3$$

Self Practice

1. Simplify $5.75 \times 8.08 + 5.75 \times 4.13 - 9.18 \times 5.75$.

(1) 17.4225 (2) 18.4225 (3) 1 (4) 16.4

2. Simplify $\left(\frac{7}{9}\right)^2 \div \left(\frac{7}{9}\right) \times \left(\frac{7}{9}\right)$.

(1) 0 (2) 2 (3) 3 (4) 1

3. Simplify $\frac{1}{1 \times 2} + \frac{1}{2 \times 4} + \frac{1}{2 \times 4 \times 6}$.

(1) 0.645 (2) 0.640 (3) 0.646 (4) 0.647

4. Simplify $7 + 5 - \left(3 \div 2 \times \frac{1}{4}\right)$ of $\frac{2}{7} + \frac{7}{2} \times \frac{1}{16}$.

(1) 2713 (2) 224/2713 (3) 2713/224 (4) 224

5. Simplify $5\frac{2}{3} + 16\frac{1}{5} - 12\frac{1}{3}$.

(1) $\frac{9}{15}$ (2) $9\frac{8}{15}$ (3) $\frac{15}{8}$ (4) $\frac{17}{15}$

6. The value of expression $8\frac{1}{2} - \left[3\frac{1}{5} \div 4\frac{1}{2} \text{ of } 5\frac{1}{3} + \left\{11 - \left(3 - 1\frac{1}{4} - \frac{5}{8}\right)\right\}\right]$ is

(1) $-\frac{31}{120}$ (2) $-\frac{120}{31}$ (3) $\frac{120}{31}$ (4) $\frac{31}{120}$

7. Simplify $165 \div 15 + 5 \times 10$.

(1) 51 (2) 71 (3) 61 (4) 52

8. Simplify $4\frac{1}{2}$ of $\left(1\frac{1}{3} + \frac{1}{3} - 1\right) + (25 \div 5 - 2 \times 1) \div (0.03 \times 0.06 \div 0.03)$.

(1) 53 (2) 54 (3) 1 (4) 0

9. Simplify $3034 - (1002 - 20.04)$.

(1) 3034 (2) 2052.04 (3) 2032 (4) 2052

10. Simplify $\frac{20.16 \div 14}{14.4 \div 2}$.

(1) 0.2 (2) 0.1 (3) 2 (4) 0.002

11. Mohan spends 2/5 of his money on clothes and 3/4 of the remainder for milk and food. He is now left with ₹ 450 only. How much money he had in the beginning?

(1) ₹ 2000 (2) ₹ 300 (3) ₹ 4000 (4) ₹ 3000

12. If $a = 3$, $b = 4$, $c = 5$. Then, value of $\frac{1}{a} + \frac{2}{b} - \frac{3}{c}$ is

(1) 30/7 (2) 7/30 (3) 28 (4) 30

Answers

1. (1)	**2.** (4)	**3.** (3)	**4.** (3)	**5.** (2)	**6.** (1)	**7.** (3)	**8.** (1)	**9.** (2)	**10.** (1)
11. (4)	**12.** (2)								

CHAPTER

11

AVERAGE

Average

The average (or mean) of a given observation or data is a number which is found on dividing the sum of observations or data by the number of observations or data given.

$$\text{Average} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

If $x_1, x_2, x_3, \ldots, x_n$ are n numbers, then the average of these numbers is $\bar{x} = \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n}$

Example **1.** The marks obtained by a student are 40, 50, 60, 70, 80. Find his average marks.

(1) 60 (2) 50
(3) 40 (4) 30

Sol. **(1)** Average marks

$$= \frac{40 + 50 + 60 + 70 + 80}{5}$$

$$= \frac{300}{5} = 60$$

Example **2.** Rahul Dravid in his 12th inning makes a score of 63 runs and thereby increase his average score by 2. What is his average after the 12th inning?

(1) 50 (2) 41 (3) 25 (4) 30

Sol. **(2)** Let the average of Dravid's 11 innings be x.

Then, the average of 12 innings $= x + 2$

$\therefore \frac{11x + 63}{12} = x + 2 \Rightarrow 12x + 24 = 11x + 63 \Rightarrow x = 39$

Hence, the average of 12 innings $= 39 + 2 = 41$

Example **3.** The average of 5 numbers is 496. If two of them are 117 and 140, find the average of remaining three numbers.

(1) 239 (2) 717
(3) 741 (4) 637

Sol. **(3)** Sum of 5 numbers $= 496 \times 5 = 2480$

Sum of two given numbers $= 117 + 140 = 257$

Sum of remaining 3 numbers $= 2480 - 257 = 2223$

$\therefore$ Average of these 3 numbers $= \frac{2223}{3} = 741$

Entrance Corner

1. The mean of 20 observations was found to be 65 but later on it was found that 69 was misread as 96. Find the correct mean. [JNV 2017]

(1) 63.65 (2) 12.37
(3) 69.50 (4) 65.95

2. Find the average of the following set of scores 567, 434, 323, 290, 401 [JNV 2017]

(1) 398 (2) 412
(3) 407 (4) 403

3. The average of 20 values is 18. If 3 is subtracted from each of the values, then the new average will be [JNV 2017]

(1) 21 (2) 15
(3) 16 (4) 17

4. The average of 4 numbers is 7. If the sum of first 3 numbers is 20, find the fourth number. [JNV 2012]

(1) 7 (2) 10
(3) 9 (4) 8

5. Find the average of the following numbers.
06, 0, 12, 14, 13 [JNV 2012]
(1) 9 (2) 7 (3) 12 (4) 11

6. The average of the height of 5 students having height 30, 40, 50, 60, 70 is [JNV 2011]
(1) 40 (2) 50 (3) 55 (4) 45

7. The average score of a cricketer in 2 matches is 27 and in 3 other matches is 32. Then, his average score in all the 5 matches is [JNV 2011]
(1) 28 (2) 29 (3) 30 (4) 31

8. The average of 20 values is 18. If 3 is subtracted from each of the values, then the new average will be [JNV 2009]
(1) 21 (2) 15 (3) 16 (4) 17

9. The average age of 4 children is 11yr. If the ages of 3 children are 9 yr, 12 yr and 10 yr, find the age of the fourth child. [JNV 2001]
(1) 12 yr (2) 24 yr
(3) 13 yr (4) None of these

10. The average of the first 5 even-numbers is [JNV 2001]
(1) 4 (2) 5 (3) 6 (4) 7

11. Find the average of 3, 5, 7, 8, 9. [JNV 2000]
(1) 6 (2) 6.4 (3) 7.4 (4) 8.4

12. The average of 3 numbers is 10. If the average of first 2 numbers is 9, find the third number. [JNV 2000]
(1) 12 (2) 13 (3) 14 (4) 15

13. Find the average of 10, 9, 8, 7 and 6. [JNV 1999]
(1) 6 (2) 7 (3) 8 (4) 9

14. Average of 2 numbers is 17. If 1 number is 21, find the other number. [JNV 1999]
(1) 7 (2) 8 (3) 12 (4) 13

15. The average age of a group of 5 boys is 15 yr. If an other boy of 15 yr joins them, find the average of the whole group. [JNV 1998]
(1) 14 yr (2) 16 yr (3) 17 yr (4) 15 yr

16. The heights of 5 students are 140, 135, 142, 138, 140. Their average height is [JNV 1998]
(1) 136 (2) 138 (3) 139 (4) 140

17. The average of 4, 5, 3.5, 7.5, 9.5 and 6.5 is [JNV 1997]
(1) 6.0 (2) 5.2 (3) 5.5 (4) 5.0

18. The average of 3 numbers is 24. If one of the numbers is 18 and the other is 29, find the third number. [JNV 1996]
(1) 24 (2) 25 (3) 26 (4) 27

19. In a family consisting of 10 persons father, mother and the eldest son earn ₹ 4000, ₹ 3000 and ₹ 4400 per month. What is the average monthly income of a family member? [JNV 1996]
(1) ₹ 1260 (2) ₹ 1600
(3) ₹ 1140 (4) ₹ 3800

20. Average score in 10 matches of a cricket player was 45.6 runs. If the average score in first 6 matches was 48 runs, find the average score in last 4 matches. [JNV 1995]
(1) 42 runs (2) 44 runs
(3) 46 runs (4) 48 runs

21. The average of 5 consecutive even numbers, starting with 2 is [JNV 1995]
(1) 4 (2) 6 (3) 7 (4) 5

22. The lengths (in m) of 5 pieces of a string are 5, 5.2, 6.3, 7.2, 6.3. The average length (in m) of a piece is [JNV 1995]
(1) 5.8 (2) 6.0 (3) 6.1 (4) 6.2

23. The average expenditure of a man for first 7 months is ₹ 800 and for the next 5 months is ₹ 900. Find his average monthly expenditure. [JNV 1994]
(1) ₹ 600 (2) ₹ 700 (3) ₹ 800 (4) ₹ $841\frac{2}{3}$

24. Find the average of $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}$. [JNV 1994]
(1) 0.26 (2) 4.17 (3) 4.18 (4) 4.19

25. Average of 8, 6, 0, 9 and 7 is [JNV 1994]
(1) 6 (2) 8 (3) 3 (4) 5

26. Average of class I to class V is 29. Average of class I to class III is 31. Average of class IV to class V is [JNV 1993]
(1) 25 (2) 26
(3) 27 (4) 28

27. Marks obtained by 10 students are 23, 25, 37, 36, 27, 28, 29, 34, 36, 38. The average marks are [JNV 1993]
(1) 30 (2) 30.3 (3) 31 (4) 31.3

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (4)	**5.** (1)	**6.** (2)	**7.** (3)	**8.** (2)	**9.** (3)	**10.** (3)
11. (2)	**12.** (1)	**13.** (3)	**14.** (4)	**15.** (4)	**16.** (3)	**17.** (1)	**18.** (2)	**19.** (4)	**20.** (1)
21. (2)	**22.** (2)	**23.** (4)	**24.** (1)	**25.** (1)	**26.** (2)	**27.** (4)			

Hints and Solutions

1. Sum of 20 observation $= 20 \times 65 = 1300$
after subtract 96 and add 69, we get
sum of correct 20 observation
$= 1300 - 96 + 63 = 1273$
Hence, mean of correct 20 observation
$= \frac{1273}{20} = 63.65$

2. Average $= \frac{567 + 434 + 323 + 290 + 401}{5}$
$= \frac{2015}{5} = 403$

3. Now, total values $= 20 \times 18 = 360$
New total $= 360 - 3 \times 20 = 360 - 60 = 300$
$\therefore$ New average $= \frac{300}{20} = 15$

4. $\because$ Average of 4 numbers $= 7$
$\therefore$ Sum of 4 numbers $= 4 \times 7 = 28$
Sum of first 3 numbers $= 20$
Hence, fourth number $= 28 - 20 = 8$

5. Required average
$= \frac{6 + 0 + 12 + 14 + 13}{5} = \frac{45}{5} = 9$

6. Average height of the students
$= \frac{30 + 40 + 50 + 60 + 70}{5} = \frac{250}{5} = 50$

7. Total score in first two matches $= 2 \times 27 = 54$
Total score in other 3 matches $= 3 \times 32 = 96$
$\therefore$ Average of 5 matches $= \frac{54 + 96}{5} = \frac{150}{5} = 30$

8. Sum of 20 values $= 18 \times 20 = 360$
after subtract 3 from each, value, we get
Sum of new 20 values $= 360 - 3 \times 20$
$= 360 - 60 = 300$
Therefore, new averagee $= \frac{300}{20} = 15$

9. Total Ages of 3 children $= 9 + 12 + 10 = 31$ yr
Total age of 4 children $= 11 \times 4 = 44$ yr
$\therefore$ Age of 1 child $= 44 - 31 = 13$ yr

10. $\because$ First five even numbers are $= 2, 4, 6, 8, 10$
Their average $= \frac{2 + 4 + 6 + 8 + 10}{5}$
$= \frac{30}{5} = 6$

11. Average $= \frac{3 + 5 + 7 + 8 + 9}{5} = \frac{32}{5} = 6.4$

12. Average of 3 numbers $= 10$
$\therefore$ Sum of 3 numbers $= 10 \times 3 = 30$
$\therefore$ Average of first 2 numbers $= 9$
$\therefore$ Sum of first 2 numbers $= 9 \times 2 = 18$
$\therefore$ Third number $= 30 - 18 = 12$

13. Average $= \frac{10 + 9 + 8 + 7 + 6}{5} = \frac{40}{5} = 8$

14. Average of two numbers $= 17$
$\therefore$ Sum of two numbers $= 17 \times 2 = 34$
One number $= 21$
Then, other number $= 34 - 21 = 13$

15. Sum of the age of 5 boys $= 15 \times 5 = 75$ yr
Other boy join, whose age $= 75 + 15 = 90$ yr
$\therefore$ Average age of the whole group
$= \frac{90}{6} = 15$ yr

16. Required average
$\frac{140 + 135 + 142 + 138 + 140}{5} = \frac{695}{5} = 139$

17. Average $= \frac{4 + 5 + 3.5 + 7.5 + 9.5 + 6.5}{6}$
$= \frac{36}{6} = 6$

18. Average of 3 numbers $= 24$
$\therefore$ Sum of 3 numbers $= 24 \times 3 = 72$
$\therefore$ Third number $= 72 - (18 + 29)$
$= 72 - 47 = 25$

19. Average income of family member
$= \frac{4000 + 3000 + 4400}{3} = \frac{11400}{3}$
$=$ ₹ 3800

20. ∵ Average score in 10 matches = 45.6 runs

∴ Total score in 10 matches

$= 45.6 \times 10 = 456$ runs

∵ Average score in 6 matches = 48 runs

∴ Total score in 6 matches $= 48 \times 6 = 288$ runs

∴ Sum of the runs scored in last 4 matches

$= 456 - 288 = 168$ runs

∴ Average score in last 4 matches

$= \frac{168}{4} = 42$ runs

21. Sum of 5 consecutive even numbers starting with 2

$= 2 + 4 + 6 + 8 + 10 = 30$

Average $= \frac{30}{5} = 6$

22. Average length $= \frac{5 + 5.2 + 6.3 + 7.2 + 6.3}{5}$

$= \frac{30}{5} = 6$

23. Total sum of 7 months expenditure

$= 7 \times 800 =$ ₹ 5600

Total sum of 5 months expenditure

$= 5 \times 900 =$ ₹ 4500

∴ Average expenditure $= \frac{5600 + 4500}{12}$

$= \frac{10100}{12} = \frac{2525}{3} =$ ₹ $841\frac{2}{3}$

24. Average $= \frac{\frac{1}{2} + \frac{1}{4} + \frac{1}{6} + \frac{1}{8}}{4} = \frac{\frac{12 + 6 + 4 + 3}{24}}{4}$

$= \frac{\frac{25}{24}}{4} = \frac{25}{24 \times 4} = \frac{25}{96} = 0.26$

25. Average $= \frac{8 + 6 + 0 + 9 + 7}{5} = \frac{30}{5} = 6$

26. Total students in class I to V $= 29 \times 5 = 145$

Total students in class I to III $= 31 \times 3 = 93$

Total students in class IV to V $= 145 - 93 = 52$

∴ Average of class IV and V $= \frac{52}{2} = 26$

27. Average marks

$= \frac{\left[23 + 25 + 37 + 36 + 27 + 28 + 29 + 34 + 36 + 38\right]}{10}$

$= \frac{313}{10} = 31.3$

Practice Exercise

1. The average of all natural numbers from 521 and 525, is

(1) 525 (2) 251 (3) 526 (4) 523

2. The average of first 9 prime numbers is

(1) 9 (2) 11 (3) $11\frac{2}{9}$ (4) $11\frac{1}{9}$

3. The average of first 6 even numbers is

(1) 7 (2) 6 (3) 8 (4) 5

4. Find the average of first 10 natural numbers.

(1) 5 (2) 5.5
(3) 4.5 (4) 6

5. Find the average of first 5 multiples of 3.

(1) 45 (2) 9
(3) 10 (4) 15

6. The average age of 25 boys in a class decreases by 6 months when a new boy takes the place of a 20 yr old boy. Find the age of new boy.

(1) 7 yr (2) 7.5 yr
(3) 8 yr (4) 8.5 yr

7. The average age of 30 boys of a class is equal to 14 yr. When the age of the class teacher is included the average becomes 15 yr. The age of the class teacher is

(1) 40 yr (2) 42 yr
(3) 48 yr (4) 45 yr

8. The average marks of 4 men is increased by 3 when one of them whose marks are 120 is replaced by another man. What is the marks of new man?

(1) 123 (2) 124
(3) 132 (4) 133

9. The average of 11 results is 30 that of the first 5 is 25 and that of the last 5 is 28. The value of the 6th number is

(1) 64 (2) 65 (3) 66 (4) 45

10. Sachin Tendulkar in his 17th inning makes a score of 85 and thereby increase his average by 3. What is his average after the 17th inning?

(1) 37 (2) 35 (3) 33 (4) 39

11. The average of 67 values is 35. If in each of these values 4 is added, the average of the new values will be
(1) 37 (2) 39
(3) 40 (4) 35

12. The average of 25 observations was found to be 78.4. But later on it was detected that 96 was misread as 69. The new correct average is
(1) 79.48
(2) 79
(3) 78.48
(4) 80

13. The average temperature from Monday to Thursday was 48°. The average temperature from Tuesday to Friday was 52°. If temperature of Monday was 42°, what is the temperature of Friday?
(1) 56° (2) 54°
(3) 58° (4) 60°

14. The body weight of 6 boys is recorded as 42 kg, 72 kg, 85 kg, 64 kg, 54 kg and 73 kg. What is the average body weight of all 6 boys?
(1) 64 kg (2) 67 kg (3) 62 kg (4) 65 kg

15. The average age of 5 officers in a department is 32 yr. If the age of their supervisor is added the average increased by 1. What is the supervisor's age?
(1) 32 yr (2) 48 yr (3) 38 yr (4) 42 yr

16. The average age of a brother and sister was 35 yr, 5 yr ago. What will be their average age (in yr) at present?
(1) 37.5 (2) 42 (3) 40 (4) 40.5

17. In a cricket team, the average age of 11 players and the coach is 18 yr. If the age of the coach is not considered, the average decreases by 1 yr. Find out the age of coach.
(1) 27 yr (2) 28 yr (3) 29 yr (4) 31 yr

Answers

1. (4)	**2.** (4)	**3.** (1)	**4.** (2)	**5.** (2)	**6.** (2)	**7.** (4)	**8.** (3)	**9.** (2)	**10.** (1)
11. (2)	**12.** (1)	**13.** (3)	**14.** (4)	**15.** (3)	**16.** (3)	**17.** (3)			

Hints and Solutions

1. ∵ Sum of all natural number from 521 to 525
$= 521 + 522 + 523 + 524 + 525 = 2615$
Therfore, average of all natural number from 521 to 525 $= \frac{2615}{5} = 523$

2. The average of first 9 prime number
$= \frac{2+3+5+7+11+13+17+19+23}{9}$
$= \frac{100}{9} = 11\frac{1}{9}$

3. ∵ Sum of first 6 even number
$= 2 + 4 + 6 + 8 + 10 + 12 = 42$
Therefore, average of first 6 even number
$= \frac{42}{6} = 7$

4. ∵ Sum of first 10 natural number
$= 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55$
Therfore, Average of first 10 natural number
$= \frac{55}{10} = 5.5$

5. Required average $= \frac{3+6+9+12+15}{5}$
$= \frac{45}{5} = 9$

6. Total age decreased
= (Average age × Average decrement)
$= 25 \times \frac{1}{2} = 12.5$
Thus, age of new boy $= 20 - 12.5 = 7.5$ yr

7. Total age of the boys of a class
$= 14 \times 30 = 420$ yr
Total age when class teacher's age is included
$= 15 \times 31 = 465$ yr
∴ Age of class teacher $= 465 - 420 = 45$ yr

8. Marks of new man $= 120 + 3 \times 4$

$= 120 + 12 = 132$

9. Total of 11 results $= 11 \times 30 = 330$

Total of first 5 results $= 25 \times 5 = 125$

Total of last 5 results $= 28 \times 5 = 140$

6th value $= 330 - (125 + 140)$

$= 330 - 265 = 65$

10. Let the average of Sachin's of the 16th inning be x.

Then, the sum of 17 innings $= 16x + 85$

and $(16x + 85) = 17(x + 3)$

$\therefore$ $x = 85 - 51 = 34$

$\therefore$ Average after 17 innings $= 34 + 3 = 37$

11. Total of 67 values $= 67 \times 35 = 2345$

Value to be added in all $= 4 \times 67 = 268$

$\therefore$ Total value now $= 2345 + 268 = 2613$

$\therefore$ Average $= \frac{2613}{67} = 39$

12. Previous total $= 25 \times 78.4 = 1960$

$\therefore$ New total $= 1960 + 96 - 69 = 1987$

$\therefore$ New average $= \frac{1987}{25} = 79.48$

13. Average temperature from Monday to Thursday

$= 48°$

$\therefore$ Total temperature $= 48° \times 4 = 192°$

Temperature of Monday $= 42°$

$\therefore$ Temperature of Tuesday to Thursday

$= 192° - 42° = 150°$

Now, total temperature from Tuesday to Friday

$= 52° \times 4 = 208°$

$\therefore$ Temperature of Friday $= 208° - 150° = 58°$

14. Average weight $= \frac{42 + 72 + 85 + 64 + 54 + 73}{6}$

$= \frac{390}{6} = 65$ kg

15. Total age of 5 officers $= 32 \times 5 = 160$

Let the age of their supervisor be x. Then

$160 + x = 6 \times 33 \Rightarrow x = 198 - 160 = 38$ yr

16. In present situation, their average age

$= (35 + 5) = 40$ yr

17. Total age of 11 players + 1 coach

$= 12 \times 18 = 216$ yr

Total age of 11 players $= 11 \times 17 = 187$ yr

$\therefore$ Age of coach $= 216 - 187 = 29$ yr

Self Practice

1. The average of 3 numbers is 9. If the average of first 2 numbers is 12, what is the third number?
(1) 5 (2) 4 (3) 3 (4) 8

2. Average age of 5 boys is 13 yr. One more boy joins them and the average age becomes 12 yr. The age of the boy who joins last is
(1) 12 yr (2) 13 yr (3) 14 yr (4) 7 yr

3. The average of three numbers is 12. The 2 numbers are 15 and 10, respectively. What is the third number?
(1) 11 (2) 12 (3) 13 (4) 14

4. The rainfall of 4 cities is 52.96 cm, 62.56 cm, 53.91 cm and 35.93 cm, respectively. What is the average rainfall?
(1) 50.25 cm (2) 60.05 cm (3) 55.80 cm (4) 51.34 cm

5. Rohit got marks in different subjects as 46, 55, 65, 34 and 40, respectively. What is the average of his marks?
(1) 52 (2) 50 (3) 47 (4) 48

6. A cricket team scored 212, 170, 210, 260 and 398 runs respectively, in 5 cricket matches. What was the average number of runs in the 5 matches?
(1) 250 (2) 240 (3) 245 (4) 260

7. The average of first 10 even numbers is
(1) 5 (2) 12 (3) 10 (4) 11

8. The average of first 6 multiple of 15 is
(1) 52.5 (2) 50 (3) 53.5 (4) 67.5

9. The average of the first 5 even numbers is
(1) 4 (2) 5 (3) 6 (4) 7

10. The average of 4 numbers is 30. If the sum of first 3 numbers is 85, the fourth number is
(1) 30 (2) 35 (3) 45 (4) 55

Answers

1. (3)	**2.** (4)	**3.** (1)	**4.** (4)	**5.** (4)	**6.** (1)	**7.** (4)	**8.** (1)	**9.** (3)	**10.** (2)

CHAPTER

12

PERCENTAGE AND ITS APPLICATIONS

Percentage

Percentage means per hundred or for every hundred.

Or

The value which is considered for every hundred is termed as percentage and the numerator of such fraction (having denominator 100) is called as the rate of percentage. Percentage is represented by % sign.

Basic Rules Related to Percentage

Per cent as a Fraction

To convert a per cent into a fraction, we divide it by 100 and remove the per cent sign %.

e.g. $5\% = \frac{5}{100} = \frac{1}{20}$

$0.3\% = \frac{0.3}{100} = \frac{3}{1000}$

$0.006\% = \frac{0.006}{100} = \frac{6}{100000} = \frac{3}{50000}$

Fraction as a Per cent

To convert a fraction into a per cent, we multiply it by 100 and apply the per cent sign %.

e.g. $\frac{3}{4} = \left[\frac{3}{4} \times 100\right]\% = 75\%$

$0.4 = [0.4 \times 100]\% = 40\%$

$0.08 = [0.08 \times 100]\% = 8\%$

Conversion of Per cent into Fraction

$1\% = \frac{1}{100}$	$20\% = \frac{1}{5}$
$2\% = \frac{1}{50}$	$25\% = \frac{1}{4}$
$4\% = \frac{1}{25}$	$50\% = \frac{1}{2}$
$5\% = \frac{1}{20}$	$100\% = \frac{1}{1}$
$10\% = \frac{1}{10}$	

Finding a Percentage of a Number

To find a per cent of a given number, we proceed as follows

- Obtain the number, say x.
- Obtain the required per cent, say $p\%$.
- Multiply x by p and divide by 100 to obtain the required $p\%$ of x. *i.e.* $p\%$ of $x = \frac{p}{100} \times x$

Important Formulae

- Rate percentage $= \frac{\text{Result}}{\text{Original number}} \times 100$
- Increased percentage $= \left(\frac{\text{Increment}}{\text{Original number}} \times 100\right)\%$
- Decreased percentage $= \left(\frac{\text{Decrement}}{\text{Original number}} \times 100\right)\%$

Example **1.** 25% is equal to

(1) 1/2 (2) 1/4 (3) 1/8 (4) 1/16

Sol. **(2)** $25\% = \frac{25}{100} = \frac{1}{4}$

Example **2.** Find the value of x, if 3% of x is 9.

(1) 300 (2) 400 (3) 310 (4) 305

Sol. **(1)** As, 3% of x is 9

$\Rightarrow \frac{3 \times x}{100} = 9 \Rightarrow x = \frac{9 \times 100}{3} \Rightarrow x = 300$

Example **3.** Reena deposits 60 per month in her post office saving bank account. If this is 10% of her monthly income, find her monthly income.

(1) ₹ 600 (2) ₹ 650 (3) ₹ 630 (4) ₹ 720

Sol. **(1)** Let Reena's monthly salary = ₹ x

Now, 10% of x = ₹ 60

$\Rightarrow \frac{10}{100} \times x = 60 \Rightarrow x = \frac{60 \times 100}{10} \Rightarrow x =$ ₹ 600

Example **4.** Kareena went to school for 216 days in a full year. If her attendance is 90%. Find the number of days on which the school opened.

(1) 220 (2) 200 (3) 240 (4) 260

Sol. **(3)** Let the number of days on which the school opened is x.

Now, 90% of $x = 216 \Rightarrow \frac{90}{100} \times x = 216$

$\Rightarrow x = \frac{216 \times 100}{90}$

$\Rightarrow x = 240$

Thus, the school opened for 240 days.

Example **5.** 40% of (100 – 20% of 300) is equal to

(1) 16 (2) 20 (3) 64 (4) 140

Sol. **(1)** $\left(100 - 300 \times \frac{20}{100}\right) \times \frac{40}{100} = (100 - 60) \times \frac{40}{100}$

$= \frac{40 \times 40}{100} = 16$

Entrance Corner

1. 150% is equal to [JNV 2019]

(1) 1.5 (2) 5.1 (3) 0.15 (4) 15.0

2. 84% is equal to [JNV 2018]

(1) $\frac{42}{100}$ (2) $\frac{42}{50}$ (3) $\frac{84}{225}$ (4) 8.4

3. A student scored 18 marks out of 25 marks in the first test of Math. In the second test he scored 22 marks in the second test exceeds his first test by [JNV 2017]

(1) 4% (2) 8%
(3) 16% (4) 80%

4. 90% of 300 + 30% of 90 is equal to [JNV 2017]

(1) 287 (2) 297 (3) 237 (4) 277

5. In an annual examination, Hardik got 500 marks out of 725. What is his approximate per cent in the examination? [JNV 2017]

(1) 88 (2) 79 (3) 54 (4) 70

6. There are 3450 employees in an organisation. Out of which 42% got promoted. How many such employees are there who got promoted? [JNV 2017]

(1) 1449 (2) 1518
(3) 1587 (4) 1656

7. 26.2% is equal to [JNV 2016]

(1) 2.62 (2) 0.262 (3) 0.0262 (4) 262.0

8. $\frac{17}{25}$ can be expressed in percentage is [JNV 2015]

(1) 34% (2) 68% (3) 17% (4) 25%

9. In a musical concert, 15% of the total is reserve for first class. If all the tickets were sold except 171 ticket of first class, then how many tickets were sold? [JNV 2014]

(1) 1710 (2) 1600 (3) 1140 (4) 180

10. Which of the following is equivalent to 1.01? [JNV 2014]

(1) 101% (2) 10.1% (3) 1.01% (4) 1010%

11. Weight of tomato comprises 90% of water. Weight of water in 25 kg of tomato is [JNV 2014]

(1) 24 kg (2) 22.5 kg (3) 21 kg (4) 19.5 kg

12. What is the percentage of 500 g of 4 kg? [JNV 2013]

(1) 12.5 (2) 25 (3) 50 (4) 125

13. A man bought a bicycle for ₹ 1200. He sold it for ₹ 1500. Find the profit per cent. [JNV 2012]

(1) 30 (2) 20 (3) 25 (4) 28

14. A boy gets ₹ 20 per month and spends 50% of it. How much does he save in 1 yr? [JNV 2012]
(1) ₹ 100 (2) ₹ 50
(3) ₹ 120 (4) ₹ 40

15. Rajesh purchased a watch for ₹ 300. He sold it for ₹ 330. Find the profit per cent. [JNV 2012]
(1) 5 (2) 13 (3) 14 (4) 10

16. The original price of a car is ₹ 500000. What is the new price if the original price is reduced by 10%? [JNV 2012]
(1) ₹ 540000 (2) ₹ 460000
(3) ₹ 450000 (4) ₹ 480000

17. Which one of the following is equivalent of 6/20? [JNV 2011]
(1) 6% (2) 20%
(3) 26% (4) 30%

18. Out of 600 students 240 are girls. What is the percentage of girls? [JNV 2011]
(1) 250 (2) 60 (3) 40 (4) 24

19. The population of a district is 20 lakh. It increases by 1.1% every year. What is the population after 1 yr? [JNV 2010]
(1) 21.1 lakh (2) 22 lakh
(3) 22.2 lakh (4) 20.22 lakh

20. 200 students appeared in an examination. If 75% of student passed the examination, find the number of students who passed the examination. [JNV 2008]
(1) 150 (2) 100 (3) 275 (4) 175

21. In per cent, what is 10.01 written as? [JNV 2005]
(1) 10.01% (2) 10%
(3) 1001% (4) 100100%

22. 80% of ₹ 240 is more than 35% of ₹ 400 by [JNV 2004]
(1) ₹ 52 (2) ₹ 42 (3) ₹ 192 (4) ₹ 140

23. 0.075 when expressed as per cent, is [JNV 2002]
(1) 75% (2) 7.5% (3) 0.75% (4) 0.075%

24. Out of a total of 250 marks, a student got 30% marks and failed by 25 marks. The marks necessary for passing is [JNV 2001]
(1) 50 (2) 75 (3) 100 (4) 125

25. 30% of ₹ 40 is equal to [JNV 2000]
(1) ₹ 10 (2) ₹ 11 (3) ₹ 12 (4) ₹ 13

26. $\frac{5}{8}$ may be expressed as [JNV 2000]
(1) $\frac{50}{80}$% (2) 62.5% (3) 55.5% (4) 70.5%

27. 20% of ₹ 70 is equal to [JNV 2000]
(1) ₹ 14 (2) ₹ 15 (3) ₹ 16 (4) ₹ 17

28. 25% of 10 m is [JNV 2000]
(1) 50 cm (2) 100 cm (3) 200 cm (4) 250 cm

29. A person spends 50% of his salary and saves ₹ 200 per month. His monthly salary is [JNV 1999]
(1) ₹ 300 (2) ₹ 400 (3) ₹ 500 (4) ₹ 600

30. 50% is equal to [JNV 1998]
(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{5}$

31. The catalogue price of an article is ₹ 200. A reduction of 15% in made for each purchase. The cash price is [JNV 1998]
(1) ₹ 150 (2) ₹ 170 (3) ₹ 180 (4) ₹ 200

32. 20% of ₹ 10 is [JNV 1997]
(1) ₹ 2 (2) ₹ 1 (3) ₹ 3 (4) ₹ 4

33. Find the sum whose 20% is ₹ 240. [JNV 1997]
(1) ₹ 1200 (2) ₹ 1000 (3) ₹ 6000 (4) ₹ 2000

34. John had ₹ 300. He spent ₹ 100 on books. Find his per cent expenditure. [JNV 1997]
(1) 20 (2) 30 (3) $33\frac{1}{3}$ (4) $16\frac{2}{3}$

Answers

1. (1)	**2.** (2)	**3.** (3)	**4.** (2)	**5.** (4)	**6.** (1)	**7.** (2)	**8.** (2)	**9.** (3)	**10.** (1)
11. (2)	**12.** (1)	**13.** (3)	**14.** (3)	**15.** (4)	**16.** (3)	**17.** (4)	**18.** (3)	**19.** (4)	**20.** (1)
21. (3)	**22.** (1)	**23.** (2)	**24.** (3)	**25.** (3)	**26.** (2)	**27.** (1)	**28.** (4)	**29.** (2)	**30.** (1)
31. (2)	**32.** (1)	**33.** (1)	**34.** (3)						

Hints and Solutions

1. Given, 150%

150% is written as $\frac{150}{100} = \frac{15}{10} = 1.5$

2. $84\% = \frac{84}{100} = \frac{42}{50}$

3. More marks $= 22 - 18 = 4$

Required percentage $= \frac{4 \times 100}{25} = 16\%$

4. 90% of 300 + 30% of 90

$= \frac{90 \times 300}{100} + \frac{30 \times 90}{100}$

$= 90 \times 3 + 3 \times 9 = 270 + 27 = 297$

5. Required percentage $= \frac{500}{725} \times 100 = 68.9 = 70$

6. $3450 \times \frac{42}{100} = \frac{144900}{100} = 1449$ got promotion

7. $26.2\% = \frac{26.2}{100} = 0.262$

8. Percentage value of $\frac{17}{25} = \frac{17}{25} \times 100 = 68\%$

9. According to the question,

$15\% = 171$

$1\% = \frac{171}{15}$

$\therefore\ 100\% = \frac{171 \times 100}{15} = 1140$

Hence, total number of ticket sold $= 1140$

10. $1.01 = \frac{101}{100} = 101\%$

11. Weight of water in 25 kg of tomato = 90% of 25 kg

$= 22.5$ kg

12. $\because$ 1 kg = 1000 g

$\therefore$ 4 kg = 4 × 1000 g = 4000 g

Hence, required percentage $= \frac{500}{4000} \times 100$

$= 12.5\%$

13. Given, cost price of the bicycle = ₹ 1200

and selling price of the bicycle = ₹ 1500

Hence, required profit percentage

$= \frac{1500 - 1200}{1200} \times 100 = \frac{300}{1200} \times 100 = 25\%$

14. Monthly saving amount by the boy

$= 20 \times \frac{50}{100} =$ ₹ 10

$\therefore$ Annually saving amount $= 10 \times 12 =$ ₹ 120

15. Required profit per cent $= \frac{330 - 300}{300} \times 100$

$= \frac{30}{300} \times 100 = 10\%$

16. New price of the car $= 500000 \times \frac{(100 - 10)}{100}$

$= 500000 \times \frac{90}{100} =$ ₹ 450000

17. $\frac{6}{20}$ in percentage $= \frac{6}{20} \times \frac{100}{1} = 30\%$

18. Percentage of girls $= \frac{240}{600} \times 100 = 40\%$

19. District population after one year

$= 2000000 + 2000000 \times 1.1\%$

$= 2000000 + 2000000 \times \frac{1.1}{100}$

$= 2000000 + 22000$

$= 2022000$

20. Required number $= 200 \times \frac{75}{100} = 150$

21. $10.01 = \frac{1001}{100} = 1001\%$

22. 80% of ₹ 240 $= \frac{240 \times 80}{100} =$ ₹ 192

35% of ₹ 400 $= \frac{400 \times 35}{100} =$ ₹ 140

$\therefore$ Difference = (192 – 140) = ₹ 52

23. $0.075 = 0.075 \times 100 = 7.5\%$ (To express number into per cent it is multiplied by 100)

24. $\because$ Total marks = 250

Student got = 30%

i.e., $250 \times \frac{30}{100} = 75$ marks

Failed by = 25 marks

$\therefore$ Pass marks $= 75 + 25 = 100$

25. $\because$ Out of 100 = 30

$\therefore$ Out of 1 $= \frac{30}{100}$

$\therefore$ Out of 40 $= \frac{30}{100} \times 40 =$ ₹ 12

26. $\frac{5}{8} = \frac{5}{8} \times 100\% = \frac{500}{8}\% = 62.5\%$

27. 20% of ₹ 70 $= \frac{20}{100} \times 70 =$ ₹ 14

28. 25% of 10 m = 25% of 1000 cm

$= \frac{25}{100} \times 1000 = 250$ cm

29. Savings = 100% − 50% = 50% = ₹ 200

$\therefore$ Total salary $= \frac{100}{50} \times 200 =$ ₹ 400

30. $50\% = \frac{50}{100} = \frac{1}{2}$

31. Reduction at 15% on ₹ 200

$= \frac{15}{100} \times 200 =$ ₹ 30

$\therefore$ Cash price = Catalogue price − Reduction

= 200 − 30 = ₹ 170

32. 20% of ₹ 10 $= \frac{20}{100} \times 10 =$ ₹ 2

33. Let the sum be ₹ x.

Then, 20% of $x =$ ₹ 240

$\Rightarrow \quad x \times \frac{20}{100} = 240$

$\therefore \quad x = \frac{240 \times 100}{20} =$ ₹ 1200

34. $\because$ Out of ₹ 300 expenditure = ₹ 100

$\therefore$ Out of ₹ 1 expenditure = ₹ $\frac{100}{300}$

$\therefore$ ₹ 100 expenditure $= \frac{100}{300} \times 100 = 33\frac{1}{3}\%$

Practice Exercise

1. Which one of the following is equal to 6.25%?
(1) 0.00625 (2) 0.0625
(3) 0.625 (4) 6.25

2. 40% of 20% is equal to
(1) 16% (2) 20% (3) 8% (4) 80%

3. Express 45% in fraction.
(1) $\frac{9}{20}$ (2) $\frac{9}{10}$
(3) $\frac{3}{20}$ (4) $\frac{5}{20}$

4. Express $10\frac{1}{10}$ into percentage.
(1) 1010% (2) 10.10%
(3) 0.101% (4) 101%

5. 50 is what per cent of 75?
(1) $\frac{100}{3}\%$ (2) $\frac{50}{3}\%$
(3) $\frac{200}{3}\%$ (4) None of these

6. 25 g is what per cent of 1 kg?
(1) 25% (2) 2.5%
(3) 0.25% (4) 0.025%

7. 25% of 75 is equal to
(1) 16 (2) 16.35 (3) 17.45 (4) 18.75

8. How many per cent of 72 is 18?
(1) 25% (2) $33\frac{1}{3}\%$
(3) 42% (4) 50%

9. (100% of 5) + (5% of 100) is equal to
(1) 10 (2) 15
(3) 55 (4) 105

10. 12% of 12 + 12 is equal to
(1) 12.36 (2) 12.44 (3) 13.44 (4) 26.40

11. If 5% of X + 16% of 75 = 16. Find the value of X.
(1) 75 (2) 80 (3) 90 (4) 100

12. After spending 30% of her money, a lady has ₹ 70 left. How much had she first?
(1) ₹ 80 (2) ₹ 100
(3) ₹ 120 (4) ₹ 140

13. Ram's monthly salary was ₹ 3000. Find his salary now after an increase of 20%.
(1) ₹ 2400 (2) ₹ 3200
(3) ₹ 3400 (4) ₹ 3600

14. In a class of 50 students, 40% are girls. How many boys are there?
(1) 20 (2) 10 (3) 25 (4) 30

15. Out of 30 students 40% are boys and the remaining are girls. The number of girls in the class
(1) 12 (2) 15 (3) 18 (4) 20

16. A person earns ₹ 1800 per month and saves 10% of it. How much does he save?
(1) ₹ 180 (2) ₹ 1620
(3) ₹ 1790 (4) ₹ 1810

17. A person saves 25% of his income. If he saves ₹ 3000 per month, his monthly income is
(1) ₹ 15000 (2) ₹ 12000
(3) ₹ 9000 (4) ₹ 7500

18. In March, 1994 the price of a car was ₹ 67000. In April, 1994 its price was raised by 10%. The price of the car in April, 1994 was
(1) ₹ 60300 (2) ₹ 66330
(3) ₹ 67670 (4) ₹ 73700

19. If the population of a city recorded in year 2001 and 2011, 560400 and 700500 respectively, then the per cent increase in the population is
(1) 20 (2) 30 (3) 35 (4) 25

20. The total number of students in a school is 5600 out of which 60% are boys, what is the total number of girls in this school?
(1) 2240 (2) 3360
(3) 2860 (4) None of these

21. If a man after spending 85% of the income he saves ₹ 4560 per month, his monthly income is
(1) ₹ 32800 (2) ₹ 31600
(3) ₹ 30400 (4) None of these

22. It is known that 6% of the mangoes are rotten. If the number of rotten mangoes is 54, then the total number of mangoes is
(1) 900 (2) 950
(3) 1010 (4) 1040

23. A total of 20000 votes were polled in an election contested by two candidates. The winning candidate got 60% of the total votes polled. How many votes did the defeated candidate got?
(1) 800 (2) 1200
(3) 8000 (4) 12000

24. A boy gets 25 marks out of 80 and fails by 15 marks. Find the percentage of pass marks.
(1) 40 (2) 30 (3) 33 (4) 50

25. A student has to secure 40% marks to pass. If he gets 20 marks and fails by 20 marks, the maximum marks are
(1) 20 (2) 40
(3) 80 (4) 100

Answers

1. (2)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (3)	**6.** (2)	**7.** (4)	**8.** (1)	**9.** (1)	**10.** (3)
11. (2)	**12.** (2)	**13.** (4)	**14.** (4)	**15.** (3)	**16.** (1)	**17.** (2)	**18.** (4)	**19.** (4)	**20.** (1)
21. (3)	**22.** (1)	**23.** (3)	**24.** (4)	**25.** (4)					

Hints and Solutions

1. $6.25\% = \frac{6.25}{100} = \frac{625}{10000} = 0.0625$

2. $20\% = \frac{20}{100}$ and $40\% = \frac{40}{100}$

$\therefore$ 40% of 20% $= \frac{40}{100} \times \frac{20}{100} = \frac{8}{100}$ or 8%

3. $45\% = \frac{45}{100} = \frac{9}{20}$

4. $10\frac{1}{10} = \frac{101}{10} = \frac{101}{10} \times 100 = 1010\%$

5. Required percentage $= \frac{50}{75} \times 100 = \frac{200}{3}\%$

6. Required percentage $= \frac{25\text{ g}}{1\text{ kg}} \times 100$

$= \frac{25\text{ g}}{1000\text{g}} \times 100 = 2.5\%$

7. 25% of 75 $= \frac{25}{100} \times 75 = \frac{75}{4} = 18.75$

8. Required percentage $= \frac{18}{72} \times 100 = 25\%$

9. (100% of 5) + (5% of 100)

$= \left(\frac{100}{100} \times 5\right) + \left(\frac{5}{100} \times 100\right) = 5 + 5 = 10$

10. 12% of 12 + 12 $= \frac{12}{100} \times 12 + 12$

$= 1.44 + 12 = 13.44$

11. $\because$ 5% of X + 16% of 75 = 16

$\therefore$ 5% of $X + \frac{16}{100} \times 75 = 16$

$\Rightarrow$ 5% of $X + 12 = 16$

$\Rightarrow$ 5% of $X = 16 - 12 = 4$

$\Rightarrow \frac{5}{100} \times X = 4 \Rightarrow X = \frac{4 \times 100}{5} = 80$

12. Let the total amount be ₹ x.

Then, $x - 30\%$ of $x = ₹\,70$

$\Rightarrow \quad x - \frac{30x}{100} = 70$

$\Rightarrow \quad \frac{100x - 30x}{100} = 70 \Rightarrow 70x = 70 \times 100$

$\therefore \quad x = \frac{70 \times 100}{70} = ₹100$

13. $\therefore$ Required salary $= 3000 + 20\%$ of 3000

$= 3000 + 3000 \times \frac{20}{100}$

$= 3000 + 600 = ₹\,3600$

14. Total students = 50

Percentage of girl = 40%

Number of boys $= 50 \times 60\%$

$= \frac{50 \times 60}{100} = 30$

15. Total students = 30

$\because$ Percentage of boys = 40%

$\therefore$ Percentage of girls $= 100 - 40 = 60\%$

$\therefore$ Number of girls $= \frac{60}{100} \times \frac{30}{1} = 18$

16. His saving $= \frac{1800 \times 10}{100} = ₹\,180$

17. Let the monthly income of man is ₹ x.

$\therefore \quad x \times \frac{25}{100} = 3000$

$\therefore \quad x = \frac{3000 \times 100}{25}$

$= ₹\,12000$

18. 10% of $67000 = \frac{10}{100} \times 67000 = ₹\,6700$

$\therefore$ Price of the car in April, 1994

$= (67000 + 6700)$

$= ₹\,73700$

19. Required per cent $= \left[\frac{700500 - 560400}{560400}\right] \times 100$

$= \left[\frac{140100}{560400} \times 100\right] = 25\%$

20. Number of boys = 60% of 5600

$= \frac{60}{100} \times 5600 = 3360$

Hence, number of girls $= 5600 - 3360 = 2240$

21. Savings of the man $= (100 - 85)\% = 15\%$

Let the monthly income = ₹ x

Then, 15% of $x = 4560$

$\Rightarrow \quad \frac{15}{100} \times x = 4560$

$\therefore \quad x = \frac{4560 \times 100}{15} = ₹\,30400$

Hence, monthly income of man = ₹ 30400

22. Let the total number of mangoes = x

Then, 6% of $x = 54$

$\Rightarrow \quad \frac{6}{100} \times x = 54 \Rightarrow x = \frac{54}{6} \times 100 = 900$

Hence, total number of mangoes = 900

23. Total votes polled = 20000

The winning candidate got 60% of the total votes polled.

$\therefore \quad \frac{20000 \times 60}{100} = 12000$ votes

$\therefore$ The defeated candidate got

$= 20000 - 12000 = 8000$ votes

24. Pass marks $= 25 + 15 = 40$

Percentage of pass marks $= \frac{40}{80} \times 100 = 50\%$

25. Marks required to pass $= 40\% = 20 + 20$

$\therefore$ Maximum marks $= \frac{100 \times 40}{40} = 100$

Self Practice

1. Which one of the following is equivalent to $16\frac{2}{3}\%$?

(1) $\frac{50}{3}$ (2) $\frac{1}{6}$ (3) $\frac{16}{3}$ (4) $\frac{2}{3}$

2. Which one of the following equivalent to 28%?

(1) 2.8 (2) 0.28 (3) 28 (4) 280

3. Convert $1\frac{1}{4}$ into a percentage.

(1) 80% (2) 125% (3) 1.25% (4) 12.5%

4. What percentage is 40 paise of ₹ 2.50?

(1) 16% (2) 100% (3) 10% (4) 8%

5. If 36% of pupils in a school are girls and the number of boys in the school is 816, how many girls are there in the school?

(1) 459 (2) 357 (3) 457 (4) 359

6. A man get a 10% increase in his salary. His new salary is ₹ 10285, what was his original salary?

(1) ₹ 11313 (2) ₹ 9350 (3) ₹ 8350 (4) ₹ 10350

7. A football team won 40% of the total number of matches it played during a year. If it lost 6 matches in all and no match was drawn, find the total number of matches played by the team during the year.

(1) 20 (2) 8 (3) 12 (4) 10

8. Chalk contains 10% calcium, 3% carbon and 12% oxygen. The amount of each of these in 1 kg of chalk are

(1) 30 g, 20 g, 10 g (2) 30 g, 100 g, 120 g (3) 100 g, 30 g, 120 g (4) 120 g, 30 g, 100 g

9. 1/8 is equal to

(1) 25% (2) 16% (3) $12\frac{1}{2}\%$ (4) 0.12%

10. 600% can be expressed in decimal as

(1) 60.0 (2) 6.0 (3) 6000 (4) 3/5

11. Sachin got 60% marks in Maths and 3 marks less than Maths in Science. If the total marks are 150, how many marks he scored in Science?

(1) 90 (2) 95 (3) 87 (4) 63

12. 20% of 60 is equal to

(1) 12 (2) 1200 (3) 3 (4) 30

13. What per cent of 90 is 27?

(1) 30% (2) 10% (3) 9% (4) 3%

14. What rate per cent is 1 min 12 s to 1h?

(1) 2% (2) 3% (3) 4% (4) 5%

15. A person spends 75% of his salary and saves ₹ 150 per month. His monthly salary is

(1) ₹ 750 (2) ₹ 600 (3) ₹ 400 (4) ₹ 300

Answers

1. (2)	**2.** (2)	**3.** (2)	**4.** (1)	**5.** (1)	**6.** (2)	**7.** (4)	**8.** (3)	**9.** (3)	**10.** (2)
11. (3)	**12.** (1)	**13.** (1)	**14.** (1)	**15.** (2)					

CHAPTER

13

PROFIT, LOSS AND DISCOUNT

To understand the concept of profit and loss, students must be aware about the following terms and formulae.

Cost Price (CP) The price at which a person buys an article is called the Cost Price (CP) of the article.

Selling Price (SP) The price at which an article is sold, is called the Selling Price (SP) of the article.

Marked Price (MP) The list price of an article is the price at which the article is sold.

Profit or Gain

Whenever a person sells an article at price greater than the cost price he is said to have made a profit or gain.

(i) Profit or Gain = SP – CP [here, SP > CP]

(ii) Profit per cent $= \frac{\text{Profit}}{\text{CP}} \times 100$

(iii) $\text{SP} = \text{CP} \times \frac{100 + \text{Profit\%}}{100}$

Loss

When SP of an article is less than, then there is a net loss.

(i) Loss = CP – SP [here, CP > SP]

(ii) Loss % $= \frac{\text{Loss}}{\text{CP}} \times 100\,\%$

(iii) $\text{SP} = \text{CP} \times \frac{100 - \text{Loss\%}}{100}$

Example **1.** Find the SP, When CP is ₹80 and loss is 20%.

(1) ₹ 74 (2) ₹ 64
(3) ₹ 80 (4) ₹ 90

Sol. **(2)** Given, CP = ₹ 80 and loss = 20%

$\therefore \quad \text{SP} = \left(\frac{100 - \text{Loss\%}}{100}\right) \times \text{CP}$

$= \left(\frac{100 - 20}{100}\right) \times 80 = 8 \times 8 = ₹\,64$

Example **2.** Find the CP, when SP is ₹40 and gain is 15%.

(1) ₹ 35 (2) ₹ 36.5
(3) ₹ 34.78 (4) ₹ 40.00

Sol. **(3)** Given, SP = ₹ 40 and gain = 15%

$\therefore \quad 40 = \text{CP} \times \frac{100 + 15}{100}$

$\Rightarrow \quad 40 = \text{CP} \times \frac{115}{100} \Rightarrow 40 = \text{CP} \times \frac{23}{20}$

$\Rightarrow \quad \text{CP} = \frac{40 \times 20}{23} = ₹\,34.78$

Example **3.** Rajendra sells a radio in ₹ 510 and bears a loss of 15%. At what price should radio be sold to gain a profit of 15%?

(1) ₹ 600 (2) ₹ 660
(3) ₹ 620 (4) ₹ 690

Sol. **(4)** $\because \text{CP} \times \frac{100 - \text{Loss\%}}{100} = \text{SP}$

$\text{CP} \times \frac{100 - 15}{100} = 510$

$\text{CP} \times \frac{510 \times 100}{85} = ₹\,600$

Required selling price $= \text{CP} \times \frac{100 + \text{Profit\%}}{100}$

$\therefore \quad = 600 \times \frac{100 + 115}{100}$

$= 600 \times \frac{115}{100} = ₹\,690$

Example **4.** Ranu buys a toy for ₹150 and sells it for ₹165. Find her profit per cent.

(1) 10 (2) 20
(3) 30 (4) 40

Sol. **(1)** Cost price = ₹ 150
Selling price = ₹ 165

As, SP > CP so a net profit

Profit amount = 165 – 150 = ₹ 15

$\therefore$ Profit per cent $= \frac{\text{Profit}}{\text{CP}} \times 100$

$= \frac{15}{150} \times 100 = 10\%$

Example **5.** Yash purchased a saree for ₹2000 and sells it for ₹1500. Find his loss per cent.

(1) 5 (2) 10
(3) 20 (4) 25

Sol. **(4)** Cost price (CP) = ₹ 2000
Selling price (SP) = ₹ 1500

As, CP > SP

Loss amount = 2000 – 1500 = ₹ 500

$\therefore$ Loss per cent $= \frac{\text{Loss}}{\text{CP}} \times 100$

$= \frac{500}{2000} \times 100$

$= 25\%$

Example 6. A shopkeeper sold a radio in ₹ 810 and bear 10% loss. If he sells the same radio in ₹ 1035, then how much per cent profit he gains?

(1) 20 (2) 18
(3) 25 (4) 15

Sol. **(4)** Here, SP = ₹ 810, Loss = 10 %

we know that, $\text{SP} \times \frac{100 - \text{Loss }\%}{100} = \text{SP}$

$\Rightarrow \quad \text{CP} \times \frac{100-10}{100} = 810$

$\Rightarrow \quad \text{CP} \times \frac{90}{100} = 810$

$\Rightarrow \quad \text{CP} = 810 \times \frac{100}{90}$

$= ₹\ 900$

Now, SP = 1035

So, profit = SP – CP = 1035–900 = ₹ 135

$\therefore$ Profit per cent $= \frac{\text{Profit}}{\text{CP}} \times 100$

$= \frac{135}{900} \times 100$

$= 15\%$

Discount

It is an offer made by the seller to buyer for reduction in price to be paid.

(i) Discount = MP – SP

(ii) Selling price

$= \text{Marked price} \times \left(\frac{100 - \text{Rate of discount}}{100}\right)$

(iii) Marked price $= \frac{100 \times \text{Selling price}}{100 - \text{Rate of discount}}$

Example **7.** A dealer offers 20% discount. If the selling price of the article is 216 then what is the marked price of the article?

(1) ₹ 270 (2) ₹ 340
(3) ₹ 280 (4) ₹ 310

Sol. **(1)** Here, SP = 216

Discount = 20%

we knon that, $\text{MP} \times \frac{100 - \text{Discount}\%}{100} = \text{SP}$

$\Rightarrow \quad \text{MP} \times \frac{100-20}{100} = 216$

$\Rightarrow \quad \text{MP} \times \frac{80}{100} = 216$

$\Rightarrow \quad \text{MP} = \frac{216 \times 100}{80} = ₹\ 270$

Entrance Corner

1. An article is sold for ₹ 500 and hence a loss is incurred. Had the article been sold for ₹ 700, the shopkeeper would have gained three times the former loss. What is the cost price of the article? [JNV 2019]
(1) ₹ 525 (2) ₹ 550
(3) ₹ 600 (4) ₹ 650

2. A fruit seller buys lemons at 2 for a rupee and sells them at 5 for three rupees. What is his profit percent? [JNV 2019]
(1) 8% (2) 10%
(3) 15% (4) 20%

3. A man buys a TV at ₹ 18,200. He spends ₹ 1,800 on repairing of TV. If he want ₹ 3,000 as profit. What is the selling price of TV? [JNV 2018]
(1) ₹ 20430 (2) ₹ 21200
(3) ₹ 23000 (4) ₹ 25200

4. By selling a dozen pencil at the cost of ₹ 30, the shopkeeper gains ₹ 10. His percentage of profit was [JNV 2009, 2017]
(1) 20 (2) 35
(3) 50 (4) 66

5. After allowing a discount of 18%, a washing machine is available for ₹ 13489. What is the market price of the washing machine? [JNV 2009, 2017]
(1) ₹ 16540 (2) ₹ 15450
(3) ₹ 16450 (4) ₹ 15540

6. A cellphone was bought for ₹ 1500 and then it was sold for ₹ 1650. What is the percent profit? [JNV 2016]
(1) 10 (2) 15
(3) 20 (4) 16

7. If a book purchase in ₹ 150 and sell it ₹ 180. Then, the profit percentage is [JNV 2015]
(1) 20 (2) 25
(3) 30 (4) 33

8. A radio was sold for ₹ 680 at a loss of ₹120. At what price should it be sold to earn a profit of ₹120. [JNV 2010]
(1) ₹ 720 (2) ₹ 800
(3) ₹ 820 (4) ₹ 920

9. A man sold a watch at a profit of 5%. If cost price of the watch was ₹ 200, what was its selling price? [JNV 2008]
(1) ₹ 205 (2) ₹ 210
(3) ₹ 250 (4) ₹ 300

10. After bought a ceilling fan on ₹ 750, one sells it with a profit of 18%, then find the selling price. [JNV 2007]
(1) ₹ 850 (2) ₹ 885
(3) ₹ 860 (4) ₹ 855

11. A shopkeeper bought 15 tables at the rate of ₹ 500 each and 20 chairs at the rate of ₹ 300 each. He spent ₹ 40 on transportation. He sold the tables and chairs at a flat rate of ₹ 380 each. What is gain or loss? [JNV 2005]
(1) ₹ 240, loss (2) ₹ 240, gain
(3) ₹ 250, loss (4) ₹ 250, gain

12. A man buys a radio for ₹ 900 and sells it for ₹ 1200. Find his gain per cent. [JNV 2003]
(1) 20 (2) 25
(3) 30 (4) $33\frac{1}{3}$

13. A shopkeeper bought 2 dozen of brushes at the rate of ₹10 per dozen. If he sells them at ₹ 1 per brush, what profit will he earn? [JNV 2002]
(1) ₹ 9 (2) ₹ 7 (3) ₹ 6 (4) ₹ 4

14. A person buys 60 oranges at the rate of ₹ 21 per dozen and sells them at the rate of ₹ 24 per dozen. He makes a [JNV 2001]
(1) profit of ₹ 3 (2) profit of ₹ 15
(3) loss of ₹ 5 (4) profit of ₹ 180

15. An old table was purchased for ₹ 180 and ₹ 20 were spent on its repairs. If it was sold at a profit of 20%, the selling price of the table was [JNV 2001]
(1) ₹ 200 (2) ₹ 216
(3) ₹ 240 (4) ₹ 250

16. 1kg of sugar was bought for ₹ 80 and sold for ₹ 100. Find profit per cent. [JNV 2000]
(1) 20 (2) 10
(3) 25 (4) 30

17. Find the loss per cent, if CP = ₹ 300, SP = ₹ 250. [JNV 2000]

(1) $16\frac{2}{3}$ (2) 50
(3) 33 (4) $33\frac{1}{3}$

18. Calculate the gain per cent, if a watch bought for ₹ 450 was sold for ₹ 500. [JNV 1999]

(1) 5 (2) $11\frac{1}{9}$ (3) $10\frac{2}{3}$ (4) 15

19. By selling the bicycle for ₹ 1200, David gets 20% profit. Find the cost price of the bicycle. [JNV 1999]

(1) ₹ 900 (2) ₹ 1000
(3) ₹ 800 (4) ₹ 700

20. A man bought a bicycle for ₹ 550 for how much should be sell the bicycle so as to gain 10%? [JNV 1998]

(1) ₹ 605 (2) ₹ 610 (3) ₹ 615 (4) ₹ 620

21. Find the profit per cent, if CP = ₹ 500, SP = ₹ 550. [JNV 1998]

(1) 8 (2) 9 (3) 10 (4) 11

22. A man loses 10% by selling an article for ₹ 270. Find the cost price of the article. [JNV 1998]

(1) ₹ 400 (2) ₹ 350 (3) ₹ 420 (4) ₹ 300

23. A man loses 10% by selling his watch for ₹ 450. Find the cost price of the watch. [JNV 1997]

(1) ₹ 400 (2) ₹ 140
(3) ₹ 500 (4) ₹ 600

24. A article is sold for ₹ 10 which is a 10% profit of CP, find the CP. [JNV 1997]

(1) ₹ 9.09 (2) ₹ 10
(3) ₹ 11 (4) ₹ 10.09

25. The selling price of a fountain pen costing ₹ 6.20 sold at a loss of 10% is [JNV 1997]

(1) ₹ 6.92 (2) ₹ 5.58
(3) ₹ 6 (4) ₹ 5.92

26. A merchant lost ₹ 51 by selling 17 bags of the rice for ₹ 1020. What was the cost price per bag? [JNV 1997]

(1) ₹ 61 (2) ₹ 62
(3) ₹ 63 (4) ₹ 64

27. A person buys a book for ₹ 27 and sell it at a profit of 10% of SP. Find the SP. [JNV 1996]

(1) ₹ 29.70 (2) ₹ 30
(3) ₹ 33 (4) ₹ 39

28. An article is bought for ₹ 180 and sold at a gain of 20%. The selling price of the article is [JNV 1996]

(1) ₹ 108 (2) ₹ 110
(3) ₹ 112 (4) ₹ 216

29. If an article is sold at loss of 50%, find the cost price in terms of selling price. [JNV 1995]

(1) 1/2 (2) 2
(3) 2.5 (4) None of these

30. The selling price of a fountain pen costing ₹ 10 sold at a loss of 10% is [JNV 1995]

(1) ₹ 7 (2) ₹ 7.50
(3) ₹ 8 (4) ₹ 9

Answers

1. (2)	**2.** (4)	**3.** (3)	**4.** (3)	**5.** (3)	**6.** (1)	**7.** (1)	**8.** (4)	**9.** (2)	**10.** (2)
11. (1)	**12.** (4)	**13.** (4)	**14.** (2)	**15.** (3)	**16.** (3)	**17.** (1)	**18.** (2)	**19.** (2)	**20.** (1)
21. (3)	**22.** (4)	**23.** (3)	**24.** (1)	**25.** (2)	**26.** (3)	**27.** (1)	**28.** (4)	**29.** (2)	**30.** (4)

Hints and Solutions

1. We know that Loos = CP – SP

= CP – 500 (SP = 500 given)

When, SP = 700 then, Gain = SP – CP

= 700 – CP (SP = 700 given)

According to question, Gain = 3 × Loss

$700 - CP = 3[CP - 500]$

$\Rightarrow \quad 700 - CP = 3 \times CP - 1500$

$\Rightarrow \quad 700 + 1500 = 3 \times CP + CP$

$\Rightarrow \quad 2200 = 4(CP)$

$\Rightarrow \quad CP = \frac{2200}{4} = ₹\,550$

2. Seller buys 2 lemons in = ₹ 1

Cost price of 1 lemon (CP) $= \frac{1}{2}$ ...(i)

Seller sells 5 lemon = ₹ 3

Selling price of 1 lemon (SP) $= \frac{3}{5}$ ...(ii)

But, profit % $= \frac{SP - CP}{CP} \times 100 = \frac{\frac{3}{5} - \frac{1}{2}}{\frac{1}{2}} \times 100$

$= \frac{\frac{6-5}{10}}{\frac{1}{2}} \times 100 = \frac{2}{10} \times 100 = 20\%$

3. Total cost price of TV = ₹ (18200 + 1800)

= ₹ 20000 Profit = ₹3000 [given]

We know that,

Selling price = Cost price + Profit

= 20000 + 3000

= ₹ 23000

4. Cost price = 30 – 10 = ₹ 20

Percentage profit $= \frac{\text{Profit} \times 100}{\text{Cost price}}$

$= \frac{10 \times 100}{20} = 50\,\%$

5. Selling price of washing machine = ₹ 13489

Discount allowed = 18%

Let marked price of washing machine be ₹ x.

$\therefore x - \frac{18x}{100} = 13489$

$\frac{82x}{100} = 13489$

$\Rightarrow \quad x = \frac{13489 \times 100}{82} = 16450$

∴Marked price of washing machine is ₹ 16450.

6. The profit on cell phone = SP – CP

= 1650 – 1500 = ₹ 150

Then, required per cent profit $= \frac{\text{Profit} \times 100}{CP}$

$= \frac{150 \times 100}{1500} = 10\%$

7. Cost price of the book = ₹ 150

Selling price of the book = ₹ 180

Profit = 180 – 150 = ₹ 30

∴ Profit percentage $= \frac{30}{150} \times 100 = 20\%$

8. Cost price of radio = 680 + 120 = ₹ 800

∴ Selling price = 800 + 120 = ₹ 920

9. Cost price is ₹ 200.

Profit = 5 %

SP $= 200 + 200 \times \frac{5}{100} =$ ₹ 210

10. Let the cost price = 100% = ₹ 750

Then, profit percentage = (100 + 18) = 118%

The selling price $= \frac{118 \times 750}{100} =$ ₹ 885

11. Cost price of 15 tables = 500 × 15 = ₹ 7500

Cost price of 20 chairs = 300 × 20 = ₹ 6000

Expenditure on transportation = ₹ 40

Total cost price = 7500 + 6000 + 40

(Including expenditure on transportation)

= ₹ 13540

Selling price = 380 × 35 = ₹ 13300

Loss = 13540 – 13300 = ₹ 240

12. ∵ CP of radio = ₹ 900, SP of radio = ₹ 1200

∴ Profit = 1200 – 900 = ₹ 300

∴Profit percentage $= \frac{\text{Profit} \times 100}{CP}$

$= \frac{300 \times 100}{900} = \frac{100}{3} = 33\frac{1}{3}\%$

13. ∵ The CP of 2 dozen brushes = 2 × 10 = ₹ 20

SP of 1 brush = ₹ 1

SP of 2 dozen or 24 brushes = 1 × 24 = ₹ 24

∴ Profit = 24 – 20 = ₹ 4

14. CP of 1 dozen oranges = ₹ 21

CP of 60 oranges or 5 dozen oranges

= 21 × 5 = ₹ 105 [∵ 1 dozen = 12]

SP of 1 dozen oranges = ₹ 24

SP of 5 dozen oranges = 24 × 5 = ₹ 120

∴ Profit = SP – CP = 120 – 105 = ₹ 15

15. Total CP of the table $= 180 + 20 = ₹200$

Profit $= 20\%$

$\therefore$ SP of the table $= \dfrac{\text{CP} \times (100 + \text{Profit per cent})}{100}$

$= \dfrac{200 \times 120}{100} = ₹240$

16. Profit $= 100 - 80 = ₹20$

Profit percentage $= \dfrac{20}{80} \times 100 = 25\%$

17. Loss $= 300 - 250 = ₹50$

Loss percentage $= \dfrac{50}{300} \times 100 = \dfrac{50}{3} = 16\dfrac{2}{3}\%$

18. Gain $= 500 - 450 = ₹50$

Gain percentage $= \dfrac{50}{450} \times 100 = \dfrac{100}{9} = 11\dfrac{1}{9}\%$

19. Let the cost price of bicycle be ₹ x. Then,

$x + 20\%$ of $x = 1200$

$\Rightarrow \quad x + \dfrac{20x}{100} = 1200$

$\Rightarrow \quad 120x = 1200 \times 100$

$\Rightarrow \quad x = \dfrac{1200 \times 100}{120} = ₹\ 1000$

20. CP $= ₹\ 550$

Gain $= 10\%$

$= 100 + 10 = 110\%$

$\because$ When CP is ₹ 100, SP $= ₹\ 110$

$\therefore$ When CP is ₹ 1, SP $= ₹\ \dfrac{110}{100}$

$\therefore$ When CP is ₹ 550, SP $= \dfrac{110 \times 550}{100} = ₹\ 605$

21. Profit $= 550 - 500 = ₹\ 50$

Profit percentage $= \dfrac{50}{500} \times 100 = 10\%$

22. Loss $= 10\%$

SP $= ₹\ 270$

Let the cost price is ₹ x.

Then

$x - 10\%$ of $x = 270$

$\Rightarrow \quad x - \dfrac{10x}{100} = 270$

$\Rightarrow \quad 90x = 270 \times 100$

$\Rightarrow \quad x = \dfrac{270 \times 100}{90} = ₹\ 300$

23. Loss $= 10\%$

SP $= ₹\ 450$

Let be the cost price is ₹ x.

$x - 10\%$ of $x = 450$

$\Rightarrow \quad x - \dfrac{10x}{100} = 450$

$\Rightarrow \quad 90x = 450 \times 100$

$\Rightarrow \quad x = \dfrac{450 \times 100}{90} = ₹\ 500$

24. SP $= ₹\ 10 =$ CP + 10% of CP $= 110\%$ of CP

CP $= \dfrac{100 \times 10}{110} = ₹\ 9.09$

25. CP $= ₹\ 6.20$

Loss $= 10\%$

SP $= 6.20 \times \dfrac{90}{100} = ₹\ 5.58$

26. Per bag loss $= \dfrac{51}{17} = ₹\ 3$

SP of per bag price $= \dfrac{1020}{17} = ₹\ 60$

Cost price $= 60 + 3 = ₹\ 63$ per bag

27. Profit $= 10\%$

CP $= ₹\ 27$

SP $= 27 \times \dfrac{110}{100} = 27 \times 1.1 = ₹\ 29.70$

28. SP $= 120\%$ of $180 = \dfrac{120}{100} \times 180 = ₹\ 216$

29. Let CP $= 100$

Loss $= 50\%$

SP $= 100 - 50 = 50\%$

$\Rightarrow$ SP $= 50\%$ of CP

$\Rightarrow$ CP $= 200\%$ of SP

$\Rightarrow$ CP $= 2 \times$ SP

30. CP $= ₹\ 10$

Loss $= 10\%$

SP $= 10 \times \dfrac{90}{100} = ₹\ 9$

Practice Exercise

1. A person buys 10 dozen pens at the rate of ₹ 24 per dozen and sells them at the rate of ₹ 36 a dozen. What is his profit or loss?
(1) ₹ 100, profit (2) ₹ 100, loss
(3) ₹ 120, loss (4) ₹ 120, profit

2. A man purchased a machine for ₹ 7500 and later sold it at a profit of ₹ 750. How much additional profit he would got if he had sold the machine for ₹ 8500?
(1) ₹ 250 (2) ₹ 500
(3) ₹ 750 (4) ₹ 1000

3. A basket of oranges was purchased for ₹ 250. At what price should it be sold to earn a profit of ₹ 25?
(1) ₹ 225 (2) ₹ 240
(3) ₹ 260 (4) ₹ 275

4. A person buys a book for ₹ 85 and sells it for ₹ 98.60. Find his profit per cent.
(1) 8 (2) 12
(3) 16 (4) 18

5. A farmer buys a tractor for ₹ 65000 and sells it for ₹ 58500. Find his loss per cent.
(1) 10 (2) 10.25
(3) 10.5 (4) 10.75

6. A person buys a radio for ₹ 1030 and he spent ₹ 50 on its repairs. If he sold it for ₹ 1200, find the profit per cent.
(1) $10\frac{1}{3}$ (2) $11\frac{1}{9}$
(3) $12\frac{1}{2}$ (4) None of these

7. By selling an article for ₹ 285 a man loses 5%. For how much should he sell to gain 5%?
(1) ₹ 315 (2) ₹ 308 (3) ₹ 305 (4) ₹ 302

8. By selling an article for ₹ 3375 a person loses 10%. Find his profit for loss per cent, if he sell it for ₹ 4500.
(1) 18 (2) 24
(3) 28 (4) None of these

9. A pen was purchased for ₹ 20. At what price should it be sold to get a profit of 20%?
(1) ₹ 16 (2) ₹ 18
(3) ₹ 24 (4) ₹ 40

10. A table was sold for ₹ 180 at a loss of ₹ 20. What was the cost price of that table?
(1) ₹ 144 (2) ₹ 160
(3) ₹ 200 (4) ₹ 216

11. A person earns 15% profit on the sale of an article. If the sale price of that article is ₹ 23. Then, its cost price is
(1) ₹ 8 (2) ₹ 15
(3) ₹ 20 (4) ₹ 22

12. A man purchases 2 dozen of oranges at the rate of ₹ 24 a dozen sells them at the rate of ₹ 3 per oranges what is profit or loss?
(1) ₹ 12, profit (2) ₹ 12, loss
(3) ₹ 24, profit (4) ₹ 24, loss

13. A person sells 20 books for ₹ 1300 and gets a profit of ₹ 180. What is the cost price of all the books?
(1) ₹ 56 (2) ₹ 180
(3) ₹ 1120 (4) ₹ 1480

14. A man earns 10% profit by selling an article. If the sale price of the article is ₹ 385, then its cost price will be
(1) ₹ 350 (2) ₹ 375
(3) ₹ 395 (4) ₹ 423.50

15. A person purchases 60 oranges at the cost of ₹ 21 each dozen and sells them at the cost of ₹ 24 each dozen. He gets
(1) ₹ 3, profit (2) ₹ 15, profit
(3) ₹ 15, loss (4) ₹ 180, profit

16. By selling a dozen pencil at the cost of ₹ 30, the shopkeeper gains ₹ 10. His percentage of profit was
(1) 20 (2) 35
(3) 50 (4) 66

17. A watch maker purchased an old watch for ₹ 87. He spends ₹ 10 on its repairing and again he sold the watch for ₹ 105. The profit or loss is
(1) ₹ 8, profit (2) ₹ 8, loss
(3) ₹ 13, profit (4) ₹ 13, loss

18. A shopkeeper bought 2 dozen of brushes at the rate of ₹ 10 per dozen. If he sells them at ₹1 per brush, what profit he will earn?
(1) ₹ 9 (2) ₹ 7 (3) ₹ 6 (4) ₹ 4

19. There is a loss on selling an item in ₹ 500. If this item was sold in ₹ 800, then the shopkeeper would get three times the profit from the loss earlier. What is the price of this item?
(1) ₹ 650 (2) ₹ 550 (3) ₹ 750 (4) ₹ 725

20. If 11 pencils are bought for ₹ 10 and are sold at the rate of 10 pencils for ₹ 11, then profit per cent is
(1) 11 (2) 17
(3) 21 (4) 24

Answers

1. (4)	**2.** (1)	**3.** (4)	**4.** (3)	**5.** (1)	**6.** (2)	**7.** (1)	**8.** (4)	**9.** (3)	**10.** (3)
11. (3)	**12.** (3)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (3)	**17.** (1)	**18.** (4)	**19.** (4)	**20.** (3)

Hints and Solutions

1. Cost price = 24 × 10 = ₹ 240
Sale price = 36 × 10 = ₹ 360
Profit = 360 − 240 = ₹ 120

2. Sale price of the machine = 7500 + 750 = ₹ 8250
∴ The additional profit if he had sold the machine for ₹ 8500 = 8500 − 8250 = ₹ 250

3. Cost price of oranges = ₹ 250
Profit = ₹ 25
Sale price = Cost price + Profit
= 250 + 25 = ₹ 275

4. Profit per cent $= \left(\frac{\text{Profit}}{\text{CP}} \times 100\right)$
$= \left(\frac{98.60 - 85}{85} \times 100\right) = 16\%$

5. CP = ₹ 65000, SP = ₹ 58500
Loss = CP − SP = 65000 − 58500 = ₹ 6500
∴ Loss per cent
$= \frac{\text{Loss}}{\text{CP}} \times 100 = \frac{6500}{65000} \times 100 = 10\%$

6. Total cost = 1030 + 50 = ₹ 1080
SP = ₹ 1200
∴ Profit per cent $= \frac{1200 - 1080}{1080} \times 100$
$= \frac{120}{1080} \times 100 = 11\frac{1}{9}\%$

7. Given, SP = ₹ 285 and loss = 5%, let CP = ₹ x
$\Rightarrow 285 = \frac{95x}{100} \Rightarrow x = \left(\frac{285 \times 100}{95}\right) =$ ₹ 300
Now, CP = ₹ 300 and profit = 5%
$\text{SP} = \left(\frac{105}{100} \times 300\right) =$ ₹ 315

8. SP = ₹ 3375, loss = 10%
Then, $3375 = \frac{90}{100} \times \text{CP}$
$\Rightarrow \text{CP} = \left(\frac{3375 \times 100}{90}\right) =$ ₹ 3750
Now, CP = ₹ 3750, SP = ₹ 4500
Profit = SP − CP
4500 − 3750 = ₹ 750
Profit per cent $= \left(\frac{\text{Profit}}{\text{CP}} \times 100\right)$
$= \frac{750}{3750} \times 100 = 20\%$

9. CP of the pen = ₹ 20
Profit = 20%
SP of the pen $= \frac{(100 + 20)}{100} \times 20$
$= \frac{120}{100} \times \frac{20}{1}$
= ₹ 24

10. SP of the table = ₹ 180, Loss = ₹ 20
CP of the table = SP + Loss
= 180 + 20 = ₹ 200

11. SP of the article = ₹ 23, Profit = 15%
Cost price $= \frac{\text{SP} \times 100}{100 + \text{Profit per cent}}$
$= \frac{23 \times 100}{(100 + 15)}$
$= \frac{23 \times 100}{115} =$ ₹ 20

12. CP of 2 dozen or 24 oranges = 24 × 2 = ₹ 48
SP of 24 oranges at the rate of ₹ 3 per orange
= 24 × 3 = ₹ 72
∴ Profit = 72 − 48 = ₹ 24

13. Sale price = ₹ 1300

Profit = ₹ 180

∴ Cost price = 1300 − 180 = ₹ 1120

14. SP of the article = ₹ 385

Profit = 10%

$$\Rightarrow \text{CP} = \frac{\text{SP} \times 100}{100 + \text{Profit per cent}}$$

$$= \frac{385 \times 100}{(100 + 10)} = \frac{385 \times 100}{110} = ₹\,350$$

15. 60 oranges $= \frac{60}{12} = 5$ dozen oranges

∵ Cost price of 1 dozen orange = ₹ 21

∴ Cost price of 5 dozen oranges = 21 × 5 = ₹ 105

and the sale price of 5 dozen oranges

= 24 × 5 = ₹ 120

∴ Profit = 120 − 105 = ₹ 15

16. Cost price = (30 − 10) = ₹ 20

$$\text{Profit percent} = \frac{\text{Profit} \times 100}{\text{CP}}$$

$$= \frac{10 \times 100}{20} = 50\%$$

17. Cost price of watch = ₹ 87

Expense on repairing = ₹ 10

Total CP = 87 + 10 = ₹ 97

The sale price = ₹ 105

∵ SP > CP

∴ Profit = Sale price − Cost price

= 105 − 97 = ₹ 8

18. Cost price of 2 dozen brushes at the rate of ₹ 10 per dozen = 2 × 10 = ₹ 20

As, 24 brushes cost price = ₹ 20

1 brush sale price = ₹ 1

∴ 24 brushes sale price = 1 × 24 = ₹ 24

∴ Profit = 24 − 20 = ₹ 4

19. Let the cost price be ₹ x. Then,

loss = CP − SP = $x - 500$

Again,

∵ Profit = SP − CP = $800 - x$

According to the question,

3 × Profit = Loss

$3 \times (800 - x) = x - 500$

$\Rightarrow 2400 - 3x = x - 500$

$\Rightarrow 2400 + 500 = 4x$

$\Rightarrow x = \frac{2900}{4} = ₹\,725$

20. Cost price of 1 pencil = ₹ $\frac{10}{11}$

and selling price of 1 pencil = ₹ $\frac{11}{10}$

∴ Profit on 1 pencil $= \frac{11}{10} - \frac{10}{11} = \frac{21}{110}$

∴ Percentage of profit $= \frac{21/110}{10/11} \times 100$

$$= \frac{21}{110} \times \frac{11}{10} \times 100 = 21\%$$

Self Practice

1. The cost price of a machine is ₹ 180. It was sold at the loss of 10%. It sale price is
(1) ₹ 162 (2) ₹ 168 (3) ₹ 170 (4) ₹ 156

2. A person purchased 10 eggs for ₹ 4 and sold 8 eggs for ₹ 4. The profit or loss in the bargain will be
(1) 25%, profit (2) 25%, loss (3) 20% ,loss (4) 10%, profit

3. A pen was bought for ₹ 20. At what price it must be sold to get the profit of 20%?
(1) ₹ 16 (2) ₹ 18 (3) ₹ 24 (4) ₹ 40

4. A fruitseller purchased 60 oranges at the rate of 12 for ₹ 10. He sold them at the rate of 10 for ₹ 12. What is his profit or loss?
(1) ₹ 22.00, profit (2) ₹ 22.00, loss (3) ₹ 2.00, profit (4) ₹ 2.00, loss

5. A shopkeeper bought a watch for ₹ 280 and sold it for ₹ 315. What is his percentage of profit?
(1) 15 (2) $10\frac{1}{2}$ (3) $12\frac{1}{2}$ (4) 20

6. A man bought 75 m of cloth at ₹ 20 per m. At what rate per metre should he sell the cloth so as to gain ₹ 200?
(1) ₹ 85 (2) ₹ 75 (3) ₹ 65 (4) None of these

7. Ajay purchased an old scooter for ₹ 10000. He paid ₹ 150 for road tax and ₹ 100 as licence fee. What price must he sell it to gain 20%?
(1) ₹ 12300 (2) ₹ 10300 (3) ₹ 12000 (4) ₹ 13000

8. 4 dozen of bananas were bought at the rate of ₹ 15 per dozen and sold at the rate of ₹ 2 per banana. Profit or loss is
(1) ₹ 60, loss (2) ₹ 96, profit (3) ₹ 156, loss (4) ₹ 36, profit

9. A man bought a radio of ₹ 195 and got it repaired at a cost of ₹ 45. For how much should he sell it in order to gain ₹ 50?
(1) ₹ 290 (2) ₹ 200 (3) ₹ 100 (4) ₹ 240

10. A chair was sold for ₹ 60 at a profit of 20%. What was the cost price of the chair?
(1) ₹ 72 (2) ₹ 50 (3) ₹ 48 (4) ₹ 40

11. A shopkeeper bought 60 eggs for ₹ 90, 10 eggs were found to be broken. He sold the remaining eggs at the rate of ₹ 2 per egg. What is profit per cent?
(1) 10 (2) 9 (3) $11\frac{1}{9}$ (4) 11

12. A table was sold at 15% loss for ₹ 1700. CP is
(1) ₹ 1,685 (2) ₹ 1,715 (3) ₹ 2,000 (4) ₹ 2,100

13. 25 pens were bought for ₹ 300 and sold at 25% profit. The selling price of a pen is
(1) ₹ 15 (2) ₹ 375 (3) ₹ 315 (4) ₹ 20

Answers

1. (1)	**2.** (1)	**3.** (3)	**4.** (1)	**5.** (3)	**6.** (4)	**7.** (1)	**8.** (4)	**9.** (1)	**10.** (2)
11. (3)	**12.** (3)	**13.** (1)							

CHAPTER

14

SIMPLE INTEREST

Interest

A borrower borrow money from a bank or some other person. Then the borrower pays a certain amount for the use of this money. This certain money or amount paid is known as interest.

Simple Interest

If the interest on a certain sum borrowed for a certain period is calculated uniformly, then it is called simple interest and it is denoted by SI. The interest is always calculated only on the principal borrowed money.

Principal

The amount of loan or borrowing involved in the transaction is called the principal and it is denoted by P.

Amount

The sum of principal and interest is called amount and it is denoted by A.

$\therefore$ Amount (A) = Principal + Simple interest

Rate of Interest

It is the rate at which the interest is charged on principal. It is always specified in percentage term.

Time Period

The time or interval for which principal is borrowed is known as time period and it is denoted by T.

Important Formulae

$$\text{Simple interest (SI)} = \frac{P \times R \times T}{100}$$

$$\text{Principal } (P) = \frac{\text{SI} \times 100}{R \times T}$$

$$\text{Rate } (R) = \frac{\text{SI} \times 100}{P \times T}$$

$$\text{Time } (T) = \frac{\text{SI} \times 100}{P \times R}$$

Example **1.** What would be the simple interest obtained on an amount of ₹ 6535 at the rate of 10% per annum after 6yr?

(1) ₹ 3912 (2) ₹ 3921 (3) ₹ 4040 (4) ₹ 3900

Sol. **(2)** Simple interest $= \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$$= \frac{6535 \times 10 \times 6}{100} = ₹\ 3921$$

Example **2.** Veena obtained an amount of ₹ 8376 as simple interest on a certain amount at 8% per annum after 6 yr. What is the amount invested by Veena?

(1) ₹ 17450 (2) ₹ 17540 (3) ₹ 17550 (4) ₹ 17000

Sol. **(1)** Let the amount invested by Veena be ₹ x.

$$\therefore \text{Principal} = \frac{\text{SI} \times 100}{\text{Times} \times \text{Rate}} = \frac{8376 \times 100}{6 \times 8} = ₹\ 17450$$

Example **3.** The interest earned on ₹ 15000 in 3 yr at simple interest is ₹ 5400. Find the rate per cent per annum.

(1) 10% (2) 15% (3) 12% (4) 13%

Sol. **(3)** Required rate $= \frac{5400 \times 100}{15000 \times 3} = 12\%$

Entrance Corner

1. What sum will amount to ₹ 6600 in 4 yrs at 8% per annum simple interest? **[JNV 2019]**
(1) ₹ 6000 (2) ₹ 5000 (3) ₹ 4000 (4) ₹ 6200

2. In what time ₹ 3500 will become ₹ 4130 when annual rate of interest is 6%. **[JNV 2018]**
(1) 4 yr (2) 3 yr (3) 6 yr (4) 5 yr

3. A person borrowed a sum of ₹ 20000 for 2 yr on simple interest. He had to repay ₹ 24800 including interest after 2 yr. The rate of interest per annum was? **[JNV 2017, 2009]**
(1) 48% (2) 24% (3) 12% (4) 6%

4. What will be the rate of simple interest, at which ₹ 17500 will become ₹ 19250 in 2 yr? **[JNV 2016]**
(1) $12\frac{1}{2}$% (2) 10% (3) $7\frac{1}{2}$% (4) 5%

5. At 25% per annum interest in how many years the simple interest on a sum of money triple itself? **[JNV 2015]**
(1) 4 (2) 6 (3) 8 (4) 10

6. In what time ₹ 4250 amounts to ₹ 5610 at the rate 8 % per annum? **[JNV 2014]**
(1) 8 yr (2) 5 yr (3) 6 yr (4) 4 yr

7. What is the rate of interest for ₹ 2500 at simple interest to become ₹ 3300 in 4 yr? **[JNV 2013]**
(1) 5% (2) 6% (3) 8% (4) 10%

8. What is the simple interest on ₹ 500 at 2% per annum for 4 yr? **[JNV 2012]**
(1) ₹ 60 (2) ₹ 40 (3) ₹ 75 (4) ₹ 80

9. What is simple interest on ₹ 1800 for 10 yr at the rate of 10% per annum? **[JNV 2011]**
(1) ₹ 3600 (2) ₹ 1000
(3) ₹ 360 (4) ₹ 1800

10. A man borrow ₹ 20000 for the house maintenance which is given by him in 2 yr at 10% per annum. What is the total amount paid by him after 2 yr? **[JNV 2010]**
(1) ₹ 21000 (2) ₹ 22000
(3) ₹ 24000 (4) ₹ 4000

11. Find the simple interest of ₹ 700 at 4% per year for 3 yr. **[JNV 2008]**
(1) ₹ 15 (2) ₹ 36
(3) ₹ 54 (4) ₹ 84

12. A sum amounted to ₹ 2486 with the interest of 13% per annum, then what is the sum? **[JNV 2007]**
(1) ₹ 2300 (2) ₹ 2150
(3) ₹ 2000 (4) ₹ 2200

13. A man borrows ₹ 600 from his friend. He agrees to pay it back after 8 months together with simple interest at 8% per annum. What amount will he pay back? **[JNV 2005]**
(1) ₹ 32 (2) ₹ 384
(3) ₹ 984 (4) ₹ 632

14. The simple interest on ₹ 300 at the rate of 6% fer annum in $2\frac{1}{2}$ yr will be **[JNV 2004]**
(1) ₹ 18 (2) ₹ 36 (3) ₹ 40 (4) ₹ 45

15. In how many years will ₹ 500 amount to ₹ 600 at the rate of 5% per annum at simple interest? **[JNV 2003]**
(1) 3 yr (2) 4 yr
(3) 5 yr (4) 6 yr

16. A person lends ₹ 1500 from a bank. If the bank fixes the rate of interest at 11% per annum, then the amount he has to pay back after 2 yr will be? **[JNV 2001]**
(1) ₹ 330 (2) ₹ 1830 (3) ₹ 1860 (4) ₹ 1900

17. In how many years will interest on ₹ 3000 at 5% per annum be ₹ 600? **[JNV 2000]**
(1) 1.5 yr (2) 4 yr (3) 6 yr (4) $4\frac{1}{2}$ yr

18. What sum of money will amount ₹ 1800 in 4 yr at 10%? **[JNV 2000]**
(1) ₹ 1285.71 (2) ₹ 1300 (3) ₹ 1500 (4) ₹ 1600

19. What sum of money lent for 3 yr at 4% per year will amount to ₹ 392 ? **[JNV 1999]**
(1) ₹ 400 (2) ₹ 300 (3) ₹ 325 (4) ₹ 350

20. Find the simple interest on ₹ 600 for 6 yr at 10% per annum. **[JNV 1999]**
(1) ₹ 300 (2) ₹ 350 (3) ₹ 360 (4) ₹ 380

21. Find the amount on ₹ 500 for 4 yr at 4% per year **[JNV 1999]**
(1) ₹ 600 (2) ₹ 580 (3) ₹ 700 (4) ₹ 800

22. The sum which produce ₹ 143 interest in $3\frac{1}{4}$ yr at $2\frac{1}{2}$ is **[JNV 1998]**
(1) ₹ 1760 (2) ₹ 1360
(3) ₹ 1860 (4) ₹ 1960

Entrance Corner

1. What sum will amount to ₹ 6600 in 4 yrs at 8% per annum simple interest? **[JNV 2019]**
(1) ₹ 6000 (2) ₹ 5000 (3) ₹ 4000 (4) ₹ 6200

2. In what time ₹ 3500 will become ₹ 4130 when annual rate of interest is 6%. **[JNV 2018]**
(1) 4 yr (2) 3 yr (3) 6 yr (4) 5 yr

3. A person borrowed a sum of ₹ 20000 for 2 yr on simple interest. He had to repay ₹ 24800 including interest after 2 yr. The rate of interest per annum was? **[JNV 2017, 2009]**
(1) 48% (2) 24% (3) 12% (4) 6%

4. What will be the rate of simple interest, at which ₹ 17500 will become ₹ 19250 in 2 yr? **[JNV 2016]**
(1) $12\frac{1}{2}$% (2) 10% (3) $7\frac{1}{2}$% (4) 5%

5. At 25% per annum interest in how many years the simple interest on a sum of money triple itself? **[JNV 2015]**
(1) 4 (2) 6 (3) 8 (4) 10

6. In what time ₹ 4250 amounts to ₹ 5610 at the rate 8 % per annum? **[JNV 2014]**
(1) 8 yr (2) 5 yr (3) 6 yr (4) 4 yr

7. What is the rate of interest for ₹ 2500 at simple interest to become ₹ 3300 in 4 yr? **[JNV 2013]**
(1) 5% (2) 6% (3) 8% (4) 10%

8. What is the simple interest on ₹ 500 at 2% per annum for 4 yr? **[JNV 2012]**
(1) ₹ 60 (2) ₹ 40 (3) ₹ 75 (4) ₹ 80

9. What is simple interest on ₹ 1800 for 10 yr at the rate of 10% per annum? **[JNV 2011]**
(1) ₹ 3600 (2) ₹ 1000
(3) ₹ 360 (4) ₹ 1800

10. A man borrow ₹ 20000 for the house maintenance which is given by him in 2 yr at 10% per annum. What is the total amount paid by him after 2 yr? **[JNV 2010]**
(1) ₹ 21000 (2) ₹ 22000
(3) ₹ 24000 (4) ₹ 4000

11. Find the simple interest of ₹ 700 at 4% per year for 3 yr. **[JNV 2008]**
(1) ₹ 15 (2) ₹ 36
(3) ₹ 54 (4) ₹ 84

12. A sum amounted to ₹ 2486 with the interest of 13% per annum, then what is the sum? **[JNV 2007]**
(1) ₹ 2300 (2) ₹ 2150
(3) ₹ 2000 (4) ₹ 2200

13. A man borrows ₹ 600 from his friend. He agrees to pay it back after 8 months together with simple interest at 8% per annum. What amount will he pay back? **[JNV 2005]**
(1) ₹ 32 (2) ₹ 384
(3) ₹ 984 (4) ₹ 632

14. The simple interest on ₹ 300 at the rate of 6% fer annum in $2\frac{1}{2}$ yr will be **[JNV 2004]**
(1) ₹ 18 (2) ₹ 36 (3) ₹ 40 (4) ₹ 45

15. In how many years will ₹ 500 amount to ₹ 600 at the rate of 5% per annum at simple interest? **[JNV 2003]**
(1) 3 yr (2) 4 yr
(3) 5 yr (4) 6 yr

16. A person lends ₹ 1500 from a bank. If the bank fixes the rate of interest at 11% per annum, then the amount he has to pay back after 2 yr will be? **[JNV 2001]**
(1) ₹ 330 (2) ₹ 1830 (3) ₹ 1860 (4) ₹ 1900

17. In how many years will interest on ₹ 3000 at 5% per annum be ₹ 600? **[JNV 2000]**
(1) 1.5 yr (2) 4 yr (3) 6 yr (4) $4\frac{1}{2}$ yr

18. What sum of money will amount ₹ 1800 in 4 yr at 10%? **[JNV 2000]**
(1) ₹ 1285.71 (2) ₹ 1300 (3) ₹ 1500 (4) ₹ 1600

19. What sum of money lent for 3 yr at 4% per year will amount to ₹ 392 ? **[JNV 1999]**
(1) ₹ 400 (2) ₹ 300 (3) ₹ 325 (4) ₹ 350

20. Find the simple interest on ₹ 600 for 6 yr at 10% per annum. **[JNV 1999]**
(1) ₹ 300 (2) ₹ 350 (3) ₹ 360 (4) ₹ 380

21. Find the amount on ₹ 500 for 4 yr at 4% per year **[JNV 1999]**
(1) ₹ 600 (2) ₹ 580 (3) ₹ 700 (4) ₹ 800

22. The sum which produce ₹ 143 interest in $3\frac{1}{4}$ yr at $2\frac{1}{2}$ is **[JNV 1998]**
(1) ₹ 1760 (2) ₹ 1360
(3) ₹ 1860 (4) ₹ 1960

23. SI on ₹ 5000 for 5 yr at 10% per annum is equal to **[JNV 1998]**
(1) ₹ 250 (2) ₹ 2000 (3) ₹ 2500 (4) ₹ 2800

24. What is the simple interest on ₹ 8000 for 7 yr at the rate of 8% per annum? **[JNV 1998]**
(1) ₹ 5000 (2) ₹ 5200 (3) ₹ 5600 (4) ₹ 4480

25. What principal will yeild ₹ 120 as SI at 6% per annum in 10 yr? **[JNV 1997]**
(1) ₹ 100 (2) ₹ 125 (3) ₹ 150 (4) ₹ 200

26. SI on ₹ 10000 for 5 yr at 20% per annum is equal to **[JNV 1997]**
(1) ₹ 10000 (2) ₹ 8000
(3) ₹ 7000 (4) ₹ 6000

27. If SI on ₹ 5000 in 2 yr is ₹ 500, the amount is **[JNV 1997]**
(1) ₹ 4500 (2) ₹ 5500 (3) ₹ 5575 (4) ₹ 6000

28. In what time will the interest on ₹ 5000 amount to ₹ 800 at 5% per annum ? **[JNV 1997]**
(1) 4 yr (2) $3\frac{1}{2}$ yr (3) $3\frac{1}{5}$ yr (4) 5 yr

29. Gita deposited ₹ 400 in a bank and at the end of 5 yr received ₹ 80 an interest. What is the rate? **[JNV 1996]**
(1) 2% (2) 3% (3) 4% (4) 5%

30. If in 10 yr, ₹ 200 amounts ₹ 300, find the rate of interest. **[JNV 1996]**
(1) 10% (2) 11% (3) 15% (4) 18%

Answers

1. (2)	**2.** (2)	**3.** (3)	**4.** (4)	**5.** (3)	**6.** (4)	**7.** (3)	**8.** (2)	**9.** (4)	**10.** (3)
11. (4)	**12.** (4)	**13.** (4)	**14.** (4)	**15.** (2)	**16.** (2)	**17.** (2)	**18.** (1)	**19.** (4)	**20.** (3)
21. (2)	**22.** (1)	**23.** (3)	**24.** (4)	**25.** (4)	**26.** (1)	**27.** (2)	**28.** (3)	**29.** (3)	**30.** (1)

Hints and Solutions

1. Given,
Amount (A) = ₹ 6600
Time (T) = 4yr
Rate (R) = 8%
By using, Simple Interest

$$= \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

$$\text{SI} = \frac{P \times R \times T}{100}$$

$$\Rightarrow \text{SI} = \frac{P \times 4 \times 8}{100} \quad \ldots\text{(i)}$$

But, Amount $(A) = P + \text{SI}$
From Eq. (i),

$$A = P + \frac{P \times 4 \times 8}{100}$$

$$\Rightarrow \quad 6600 = P + \frac{8P}{25}$$

$$\Rightarrow \quad 6600 = \frac{33P}{25}$$

$$\Rightarrow \quad P = 200 \times 25$$

$$\therefore \quad P = ₹\,5000$$

2. Simple interest = 4130 − 3500 = 630
We know that, $\text{SI} = \frac{P \times R \times T}{100}$
where, P = Principal, R = Rate, T = Time

$$630 = \frac{3500 \times 6 \times T}{100}$$

$$T = \frac{630}{35 \times 6} = \frac{630}{210} = 3 \text{ Yr}$$

3. ∵ Amount = ₹ 24800
Principal = ₹ 20000
∴ SI = Amount − Principal
= 24800 − 20000 = ₹ 4800

$$\text{Rate of interest} = \frac{\text{SI} \times 100}{P \times T} = \frac{4800 \times 100}{20000 \times 2} = 12\%$$

4. Let the rate of simple interest = R%

$$\because \quad \text{SI} = \frac{PTR}{100}$$

$$19250 - 17500 = \frac{17500 \times r \times 2}{100}$$

(Here, SI = Compound amount − Principal amount)

$$\Rightarrow 1750 = \frac{17500 \times R \times 2}{100}$$

$$\Rightarrow \quad R = \frac{1750 \times 100}{17500 \times 2}$$

$$R = 5\%$$

5. Suppose principal amount = ₹ P, then amount = ₹ 3 P

$\therefore$ Simple interest $= 3P - P =$ ₹ $2P$

$\because$ Simple interest $= \dfrac{P \times R \times T}{100}$

$\Rightarrow 2P = \dfrac{P \times 25 \times T}{100} \Rightarrow T = \dfrac{100 \times 2}{25} = 8$ yr

6. Time $= T$ yr, Principal = ₹ 4250

$R = 8\%$; Amount = ₹ 5610

Amount = Principal + Interest

5610 = 4250 + Interest

Interest = 5610 − 4250 = ₹ 1360

Simple Interest

$= \dfrac{\text{Time} \times \text{Principal} \times \text{Rate of interest}}{100}$

$\Rightarrow 1360 = \dfrac{T \times 4250 \times 8}{100} \Rightarrow T = \dfrac{1360 \times 100}{4250 \times 8}$

$\therefore$ Time = 4 yr

7. Given, principal amount (P) = ₹ 2500

Time $(T) = 4$ yr

Amount (A) = ₹ 3300

We know that, simple interest $= \dfrac{P \times R \times T}{100}$

$\Rightarrow 3300 - 2500 = \dfrac{2500 \times R \times 4}{100}$ [$\because$ SI = A − P]

$\Rightarrow 800 = \dfrac{2500 \times R \times 4}{100} \Rightarrow R = \dfrac{800 \times 100}{2500 \times 4}$

$\therefore R = 8\%$

8. Simple interest $= \dfrac{P \times R \times T}{100} = \dfrac{500 \times 2 \times 4}{100} =$ ₹ 40

9. $\text{SI} = \dfrac{P \times R \times T}{100} = \dfrac{1800 \times 10 \times 10}{100} =$ ₹ 1800

10. Simple interest $= \dfrac{P \times R \times T}{100}$

$= \dfrac{20000 \times 10 \times 2}{100} =$ ₹ 4000

$\therefore$ Amount after 2 yr = 20000 + 4000 = ₹ 24000

11. $\text{SI} = \dfrac{700 \times 4 \times 3}{100} =$ ₹ 84

12. Let the sum is 100%, then sum amounted with 13% per annum interest = (100 + 13)% = 113%

$\because$ 113% = 2486

$\therefore$ $100\% = \dfrac{100 \times 2486}{113} =$ ₹ 2200

13. Principal = ₹ 600, Time $= \dfrac{8}{12}$ yr, Rate = 8%

Simple interest $= \dfrac{600 \times 8 \times 8}{12 \times 100} =$ ₹ 32

Total amount paid = 600 + 32 = ₹ 632

14. Interest $= \dfrac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$= \dfrac{300 \times 6 \times 5}{100 \times 2} =$ ₹ 45

15. Given, $P =$ ₹ 500; $A =$ ₹ 600; $R = 5\%$

SI = (Amount − Principal)

= 600 − 500 = ₹ 100

Time $(T) = \dfrac{\text{SI} \times 100}{P \times R} = \dfrac{100 \times 100}{500 \times 5} = 4$ yr

16. Given, $P =$ ₹ 1500, $R = 11\%$, $T = 2$ yr

$\text{SI} = \dfrac{P \times R \times T}{100} = \dfrac{1500 \times 11 \times 2}{100} =$ ₹ 330

Amount, $A = P + \text{SI} = 1500 + 330 =$ ₹ 1830

17. Time $= \dfrac{\text{SI} \times 100}{P \times R} = \dfrac{600 \times 100}{5 \times 3000} = 4$ yr

18. Time = 4 yr, Rate = 10%

Let principal be ₹ 100.

Then, $\text{SI} = \dfrac{P \times R \times T}{100}$

$\text{SI} = \dfrac{100 \times 4 \times 10}{100} =$ ₹ 40

Amount = 100 + 40 = ₹ 140

$\because$ When amount is ₹ 140, principal = ₹ 100

$\therefore$ When amount is ₹ 1800,

Principal $= \dfrac{100}{140} \times 1800 =$ ₹ 1285.71

19. Time = 3 yr, Rate = 4%

Let principal be ₹ 100. Then

$\text{SI} = \dfrac{100 \times 4 \times 3}{100} =$ ₹ 12

Amount = 100 + 12 = ₹ 112

$\because$ When amount is ₹ 112, principal = ₹ 100

$\therefore$ When amount is ₹ 392,

Principal $= \dfrac{100 \times 392}{112} =$ ₹ 350

20. $\text{SI} = \dfrac{P \times R \times T}{100} = \dfrac{600 \times 10 \times 6}{100} =$ ₹ 360

21. $\text{SI} = \dfrac{500 \times 4 \times 4}{100} =$ ₹ 80

Amount = 500 + 80 = ₹ 580

22. $P = \dfrac{100 \times \text{SI}}{R \times T} = \dfrac{100 \times 143}{\frac{5}{2} \times \frac{13}{4}}$

$= \dfrac{100 \times 143 \times 4 \times 2}{13 \times 5} =$ ₹ 1760

23. $\text{SI} = \dfrac{\text{Principal} \times \text{Time} \times \text{Rate}}{100}$

$= \dfrac{5000 \times 5 \times 10}{100} =$ ₹ 2500

24. $\text{SI} = \dfrac{8000 \times 8 \times 7}{100} =$ ₹ 4480

25. Principal $= \frac{\text{SI} \times 100}{\text{Time} \times \text{Rate}} = \frac{120 \times 100}{10 \times 6} =$ ₹ 200

26. $\frac{10000 \times 5 \times 20}{100} =$ ₹ 10000

27. Amount = 5000 + 500 = ₹ 5500

28. $P =$ ₹ 5000, $R = 5\%$, SI = ₹ 800

$T = \frac{100 \times 800}{5000 \times 5} = \frac{16}{5} = 3\frac{1}{5}$ yr

29. $P =$ ₹ 400, $T = 5$ yr, SI = ₹ 80

$R = \frac{100 \times \text{SI}}{P \times T}$

$\Rightarrow \quad R = \frac{100 \times 80}{400 \times 5} = 4\%$

30. Interest = 300 − 200 = ₹ 100

Time = 10 yr, $P =$ ₹ 200

$R = \frac{\text{SI} \times 100}{T \times P} = \frac{100 \times 100}{10 \times 200} = 10\%$

Practice Exercise

1. Find the SI on ₹ 16000 for 3 yr 3 months at $4\frac{1}{2}\%$ per annum.
(1) ₹ 5200 (2) ₹ 1800
(3) ₹ 2340 (4) None of these

2. Find the SI on ₹ 12000 for 8 yr 4 months at 3% per annum?
(1) ₹ 2000 (2) ₹ 15000
(3) ₹ 3000 (4) None of these

3. On what sum of money will the SI for 7 yr 6 months at 5% per annum be ₹ 450?
(1) ₹ 11000 (2) ₹ 1200
(3) ₹ 13000 (4) ₹ 12000

4. The SI on the certain sum of money for 2 yr at 8% per annum is ₹ 2560. What is the sum?
(1) ₹ 16000 (2) ₹ 15000
(3) ₹ 13000 (4) None of these

5. In what time will the SI on ₹ 4000 at 7.5% be ₹ 1050?
(1) $2\frac{1}{2}$ yr (2) $5\frac{1}{2}$ yr
(3) $3\frac{1}{2}$ yr (4) None of these

6. If the simple interest on ₹ 500 for 2 yr at a certain rate is ₹ 100, then what is the interest for 5 yr on the same amount at the same rate?
(1) ₹ 110 (2) ₹ 150 (3) ₹ 250 (4) ₹ 300

7. An amount becomes double in 10 yr when it is given on simple interest. The rate of interest per annum is
(1) 10% (2) 20% (3) 50% (4) 100%

8. The monthly simple interest on ₹ 1000 is ₹ 15. What is the rate of interest per annum?
(1) 12% (2) 15% (3) 18% (4) 30%

9. An amount of ₹ 10000 is given on simple interest at rate of 18% per annum. What is its interest per month?
(1) ₹ 100 (2) ₹ 120 (3) ₹ 150 (4) ₹ 180

10. What is simple interest on ₹ 1800 for 10 yr at the rate of 10% per annum is
(1) ₹ 3600 (2) ₹ 1800
(3) ₹ 360 (4) ₹ 180

11. Simple interest on ₹ 500 for 4 yr at the rate of 8% per annum is
(1) ₹ 10 (2) ₹ 32
(3) ₹ 40 (4) ₹ 160

12. A woman borrows a sum of ₹ 3000 from a friend. She promises to return the amount after 1 yr with simple interest of 8% per annum. The total amount required to return will be
(1) ₹ 3008 (2) ₹ 3024
(3) ₹ 3240 (4) ₹ 3420

13. A person borrowed a sum of ₹ 20000 for 2 yr on simple interest. He had to repay ₹ 24800 including interest after 2 yr. The rate of interest per annum was
(1) 48% (2) 24%
(3) 12% (4) 6%

14. Simple interest on ₹ 650.00 for 6 months is ₹ 32.50. The percentage rate of interest per annum is
(1) 5 (2) 10
(3) 15 (4) 20

15. A person took a loan of ₹ 4000 for 2 yr on the simple interest at 16% per annum. What amount he had to pay back at the end of 2 yr?
(1) ₹ 4080 (2) ₹ 4600
(3) ₹ 4640 (4) ₹ 5280

16. At what rate per cent per annum will the SI on ₹ 2500 be ₹ 750 for 3 yr?
(1) 15 (2) 10
(3) 20 (4) None of these

17. What sum will amount to ₹ 3300 in 2 yr 6 months at 15% per annum SI?
(1) ₹ 2000 (2) ₹ 2400
(3) ₹ 2800 (4) ₹ 2500

18. In how many years will a sum of money becomes double at 5% per annum SI?
(1) 18 (2) 20
(3) 15 (4) None of these

19. At what rate per cent per annum sum of money becomes 4 times of itself in 15 yr?
(1) 8% (2) 10%
(3) 15% (4) 20%

20. Mr. Sharma takes loan of ₹ 25000 and repays an amount of ₹ 31000 at the end of 2 yr. What is the rate of simple interest at which he repays the loan?
(1) 8% per annum (2) 6% per annum
(3) 12% per annum (4) 9% per annum

Answers

1. (3)	**2.** (3)	**3.** (2)	**4.** (1)	**5.** (3)	**6.** (3)	**7.** (1)	**8.** (3)	**9.** (3)	**10.** (2)
11. (4)	**12.** (3)	**13.** (3)	**14.** (2)	**15.** (4)	**16.** (2)	**17.** (2)	**18.** (2)	**19.** (4)	**20.** (3)

Hints and Solutions

1. Given, $P = ₹\,16000$,

$T = 3$ yr 3 months $= 3\frac{1}{4}$ yr $= \frac{13}{4}$ yr, $R = 4\frac{1}{2}\% = \frac{9}{2}\%$

$\therefore$ Simple interest $= \frac{PRT}{100} = \frac{16000 \times 9 \times 13}{100 \times 2 \times 4}$

$= ₹\,2340$

2. Here, $P = ₹\,12000$, $R = 3\%$ per annum,

$T = 8$ yr 4 months $= 8\frac{1}{3}$ yr $= \frac{25}{3}$ yr

$\therefore \text{SI} = \frac{PRT}{100} = \frac{12000 \times 3 \times 25}{100 \times 3} = ₹\,3000$

3. Given, SI $= ₹\,450$, $R = 5\%$ per annum,

$T = 7$ yr 6 months $= 7\frac{1}{2}$ yr $= \frac{15}{2}$ yr

According to the formula,

$$\text{SI} = \frac{PRT}{100}$$

$$P = \frac{\text{SI} \times 100}{RT} = \frac{450 \times 100 \times 2}{5 \times 15} = ₹\,1200$$

4. Given, $T = 2$ yr, $R = 8\%$ per annum,

SI $= ₹\,2560$, $P = ?$

$$\text{SI} = \frac{PRT}{100} \Rightarrow P = \frac{\text{SI} \times 100}{RT}$$

$$= \frac{2560 \times 100}{8 \times 2} = ₹\,16000$$

5. SI $= ₹\,1050$, $P = ₹\,4000$, $R = 7.5\%$, $T = ?$

$\because \text{SI} = \frac{PRT}{100}$

$\therefore T = \frac{\text{SI} \times 100}{PR} = \frac{1050 \times 100}{4000 \times 7.5} = 3\frac{1}{2}$ yr

6. $\because$ SI $= ₹\,100$, $T = 2$ yr, $P = ₹\,500$, $R = ?$

$$\text{Rate} = \frac{\text{SI} \times 100}{P \times T} = \frac{100 \times 100}{500 \times 2} = 10\%$$

Principal $= ₹\,500$, Time $= 5$ yr,

Rate $= 10\%$

$$\text{SI} = \frac{P \times R \times T}{100} = \frac{500 \times 10 \times 5}{100} = ₹\,250$$

7. Let principal $= ₹\,100$

Amount $= ₹\,200$

SI $= 200 - 100 = ₹\,100$

Time $= 10$ yr

$$\text{Rate} = \frac{\text{SI} \times 100}{P \times T} = \frac{100 \times 100}{100 \times 10} = 10\%$$

8. Principal $= ₹\,1000$

SI per month $= ₹\,15$

SI per year $= (15 \times 12) = ₹\,180$

$$\text{Rate per cent} = \frac{\text{SI} \times 100}{T \times P} = \frac{180 \times 100}{1 \times 1000}$$

$= 18\%$

9. Principal $= ₹\,10000$

Rate $= 18\%$ per annum

Time $= 1$ yr

$$SI = \frac{10000 \times 18 \times 1}{100} = ₹\ 1800$$

SI per month $= \frac{1800}{12} = ₹\ 150$

10. $SI = \frac{P \times R \times T}{100} = \frac{1800 \times 10 \times 10}{100} = ₹\ 1800$

11. $SI = \frac{P \times R \times T}{100} = \frac{500 \times 4 \times 8}{100} = ₹\ 160$

12. Principal = ₹ 3000, Time = 1 yr, Rate = 8%

$SI = \frac{P \times R \times T}{100} = \frac{3000 \times 1 \times 8}{100} = ₹\ 240$

Amount $= (P + SI) = 3000 + 240 = ₹\ 3240$

13. $\because$ Amount = ₹ 24800

Principal = ₹ 20000

$\therefore$ SI = Amount − Principal

$= 24800 - 20000 = ₹\ 4800$

Rate of interest $= \frac{SI \times 100}{P \times T} = \frac{4800}{20000} \times \frac{100}{2} = 12\%$

14. Time = 6 months or $\frac{6}{12}$ yr

Rate $= \frac{SI \times 100}{P \times T} = \frac{32.50 \times 100 \times 12}{650 \times 6} = 10\%$

15. $SI = \frac{P \times R \times T}{100} = \frac{4000 \times 16 \times 2}{100} = ₹\ 1280$

Amount = (P + SI) = 4000 + 1280 = ₹ 5280

16. SI = ₹ 750, P = ₹ 2500, $T = 3$ yr, $R = ?$

$\because SI = \frac{PRT}{100}$

$\therefore R = \frac{SI \times 100}{PT} = \frac{750 \times 100}{2500 \times 3} = 10\%$

17. Amount $= P + SI =$ ₹ 3300

$T = 2$ yr 6 months $= 2\frac{1}{2}$ yr

$R = 15\%$ per annum

Now,

$A = P + SI$

$3300 = P + \frac{P \times 15 \times 5}{100 \times 2}$

$\Rightarrow 3300 = P + \frac{3}{8}P \Rightarrow 3300 = \frac{11}{8}P$

$\Rightarrow \quad P = \frac{3300 \times 8}{11} =$ ₹ 2400

18. Here, $A = 2P$

$\therefore \quad SI = A - P = 2P - P = P$

$R = 5\%, T = ?$

Now, $SI = \frac{PRT}{100}$

$P = \frac{P \times 5 \times T}{100}$

$\Rightarrow \quad T = \frac{100}{5} = 20$ yr

19. $\because \quad A = 4P$

$\therefore \quad SI = A - P = 4P - P = 3P$

$T = 15$ yr, $R = ?$

Now, $SI = \frac{PRT}{100}$

$3P = \frac{P \times R \times 15}{100}$

$\Rightarrow \quad R = \frac{3 \times 100}{15} = 20\%$

20. Interest = 31000 − 25000 = ₹ 6000

Rate $= \frac{\text{Interest} \times 100}{\text{Principal} \times \text{Time}} = \frac{6000 \times 100}{25000 \times 2} = 12\%$

Self Practice

1. 1800 amounts to ₹ 2250 in $2\frac{1}{2}$ yr. The rate per cent is

(1) 10 (2) 5 (3) 20 (4) 15

2. The difference of 13% per annum and 12% of a sum in 1 yr is ₹ 110. Then, the sum is

(1) ₹ 12000 (2) ₹ 13000 (3) ₹ 11000 (4) ₹ 16000

3. What sum of money lent for 3 yr at 4% per year will amount to ₹ 392?

(1) ₹ 250 (2) ₹ 350 (3) ₹ 300 (4) ₹ 340

4. On what sum of money, the interest amounts to ₹ 75 for 3 yr at the rate of 5% per annum?

(1) ₹ 450 (2) ₹ 500 (3) ₹ 375 (4) ₹ 400

5. The simple interest on ₹ 450 for 3 yr at the rate of 5% per annum is

(1) ₹ 50 (2) ₹ 67.50 (3) ₹ 62.50 (4) ₹ 45

6. At what rate per cent per annum simple interest will 400 amount to ₹ 460 in 3 yr?

(1) 4 (2) 5 (3) $6\frac{1}{2}$ (4) 10

7. Akhtar borrowed ₹ 1200 from his friend at 8% per annum of interest. He returned the money after 8 months. What interest did he pay to his friend?

(1) ₹ 64 (2) ₹ 32 (3) ₹ 128 (4) None of these

8. At what rate per cent per annum will a sum of money double in 8 yr?

(1) $12\frac{1}{2}$ (2) 25 (3) 20 (4) 10

9. In what time will the simple interest on ₹ 400 at 10% per annum be the same as the simple interest on ₹ 10000 for 4 yr at 4% per annum?

(1) 3 yr (2) 4 yr (3) 5 yr (4) 6 yr

10. The simple interest on ₹ 1500 for 2 yr at 8% per annum is

(1) ₹ 120 (2) ₹ 360 (3) ₹ 240 (4) ₹ 480

11. The rate per cent per annum if ₹ 100 interest is paid on ₹ 500 for 2 yr, is

(1) 5 (2) 10 (3) 15 (4) 20

12. A man borrows ₹ 2000 and pays back after 3 yr at 10% simple interest. The amount paid by the man will be

(1) ₹ 2400 (2) ₹ 2500 (3) ₹ 2700 (4) ₹ 2600

13. In how many years will ₹ 7500 double at 8% simple interest?

(1) 12.5 (2) 10 (3) 12 (4) 11

14. In how many years will ₹ 1450 amount to ₹ 2146 at 8% per annum simple interest?

(1) 5 (2) 6 (3) 4 (4) 8

15. The simple interest on a sum of money at 5% is ₹ 48 for 4 yr Then, the simple interest on same sum for 5 yr at 4% is

(1) ₹ 72 (2) ₹ 24 (3) ₹ 48 (4) ₹ 40

Answers

1. (1)	**2.** (3)	**3.** (2)	**4.** (2)	**5.** (2)	**6.** (2)	**7.** (1)	**8.** (1)	**9.** (2)	**10.** (3)
11. (2)	**12.** (4)	**13.** (1)	**14.** (2)	**15.** (3)					

CHAPTER

15

RATIO AND PROPORTION

Ratio

The ratio of two quantities in the same units is the fractions that one quantity is of the other.

Or

It is a tool to compare two or more numbers of same quantities. Thus, the ratio a to b is the fraction $\frac{a}{b}$ written as $a : b$.

Note In the ratio $a : b$, the first term a is antecedent and second term b is consequent.

Properties of Ratio

(i) The value of a ratio remains unchanged, if each one of its term is multiplied or divided by a same non-zero number.

(ii) $a^2 : b^2$ is the duplicate ratio of $a : b$.

(iii) $a^3 : b^3$ is the triplicate ratio of $a : b$.

Example **1.** If $p : q = 3 : 4$ and $q : r = 8 : 9$. Find the ratio of $p : q : r$ is

(1) 2:4:3 (2) 9:6:8 (3) 6:8:9 (4) 9:8:6

Sol. **(3)** $\frac{p}{q} = \frac{3}{4}$ and $\frac{q}{r} = \frac{8}{9}$

$\Rightarrow \quad \frac{p}{q} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$ and $\frac{q}{r} = \frac{8}{9}$

$\therefore p : q : r = 6 : 8 : 9$

Example **2.** If $A : B = 3 : 4, B : C = 5 : 6$ and $C : D = 11 : 9$, then find the ratio of $A : D$ is

(1) 55:72 (2) 73:55 (3) 11:9 (4) 55:73

Sol. **(1)** $\frac{A}{D} = \left(\frac{A}{B} \times \frac{B}{C} \times \frac{C}{D}\right) = \left(\frac{3}{4} \times \frac{5}{6} \times \frac{11}{9}\right) = \frac{55}{72}$

$\Rightarrow \quad A : D = 55 : 72$

Proportion

The equality of two ratios is called proportion.

Let a, b, c and d are four quantities, then the proportional are $a : b :: c : d$ or $\frac{a}{b} = \frac{c}{a}$.

Properties of Proportion

(i) Third proportional of a and b; $\frac{b^2}{a}$

(ii) Mean proportional between a and b is $\sqrt{ab}$.

(iii) Fourth proportional of a, b and $c = \frac{bc}{a}$.

Example **3.** $x : 75 :: 15 : 45$. Find the value of x.

(1) 52 (2) 25
(3) 16 (4) 9

Sol. **(2)** $\frac{x}{75} = \frac{15}{45} \Rightarrow x = \frac{15 \times 75}{45} \Rightarrow x = 25$

Example **4.** Find the ratio in between 20 paise and ₹ 3.

(1) 2:3 (2) 15:1
(3) 1:15 (4) 3:2

Sol. **(3)** ₹ 3 = 300 paise

$\therefore$ Required ratio $= \frac{20}{300} = \frac{1}{15} = 1 : 15$

Example **5.** Salaries of Vivek and Vimal are ₹ 1400 and ₹ 1600. Find out the ratio of their salaries.

(1) 7:8 (2) 15:16
(3) 4:5 (4) 3:4

Sol. **(1)** Ratio $= \frac{\text{Vivek's salary}}{\text{Vimal's salary}} = \frac{1400}{1600} = \frac{14}{16} = \frac{7}{8}$

$\therefore$ Ratio $= 7 : 8$

Entrance Corner

1. Two numbers are in the ratio 2 : 3. If 9 is added to each, they will be in the ratio 3 : 4 the numbers are [JNV 2017, 2009]
(1) 12, 28 (2) 18, 27 (3) 8, 12 (4) 10, 15

2. A, B and C divide an amount of ₹ 9861 amongst themselves in the ratio of 3 : 11 : 5, respectively. What is the B's share in the amount?
(1) ₹ 4671 (2) ₹ 5709 (3) ₹ 6228 (4) ₹ 7266

3. If $a : b = 5 : 14$ and $b : c = 7 : 3$, then find $a : b : c$. [JNV 2012]
(1) 7 : 3 : 6 (2) 5 : 14 : 6
(3) 8 : 3 : 5 (4) 5 : 6 : 9

4. What must be added to each term of the ratio 49 : 68, so that it becomes 3 : 4? [JNV 2000]
(1) 8 (2) 9 (3) 10 (4) 11

5. 2 : 5 :: 8 : x. Find the value of x. [JNV 2000]
(1) 15 (2) 17 (3) 20 (4) 11

6. If $a : b = 2 : 3$ and $b : c = 4 : 5$, the ratio $a : b : c$ is equal to [JNV 1999]
(1) 8 : 13 : 17 (2) 8 : 14 : 16
(3) 8 : 13 : 18 (4) 8 : 12 : 15

7. Divide ₹ 4000 among A, B and C, so that their shares may be in the ratio of 5 : 7 : 8 [JNV 1999]
(1) ₹ 1000, ₹ 1400, ₹ 1600
(2) ₹ 3000, ₹ 6000, ₹ 9000
(3) ₹ 2000, ₹ 4000, ₹ 6000
(4) ₹ 1000, ₹ 2000, ₹ 3000

8. If $A : B = 6 : 7$ and $B : C = 8 : 9$, then find $A : C$. [JNV 1998]
(1) 13 : 15 (2) 16 : 21 (3) 13 : 14 (4) 18 : 21

9. 1 : 9 :: 9 : x. Find the value of x. [JNV 1998]
(1) 80 (2) 81 (3) 84 (4) 85

10. 3 : 5 :: 60 : x, find the value of x. [JNV 1997]
(1) 100 (2) 120 (3) 140 (4) 160

11. If 0.75 : x :: 5 : 8, then find x. [JNV 1997]
(1) 1.5 (2) 1.8 (3) 1.2 (4) 1.4

12. The ratio of number of boys and girls in a school is 4 : 3. If there are 480 boys in the school, find the number of girls in the school. [JNV 1996]
(1) 300 (2) 320 (3) 340 (4) 360

13. What is the mean proportional of 9 and 16?
(1) 12 (2) 16 (3) 25 (4) 7

14. In a ratio which is equal to 3 : 7, if the antecedent is 33, what is the consequent? [JNV 1995]
(1) 75 (2) 76 (3) 80 (4) 77

15. Speed of one bus is 80 km/h and other is 60 km/h. What is the ratio of the speeds of two buses? [JNV 1995]
(1) 3 : 4 (2) 4 : 3 (3) 5 : 6 (4) 6 : 5

16. The prices of a cycle and a scooter are the ratio of 9 : 5. If a cycle costs ₹ 4200 more than a scooter, what is the price of scooter? [JNV 1995]
(1) ₹ 5160 (2) ₹ 5250 (3) ₹ 6000 (4) ₹ 6230

17. The ratio of two numbers is 3 : 8 and their difference is 116. What is the largest number? [JNV 1994]
(1) 181 (2) 182 (3) 183 (4) 184

18. What is ratio in between 7 months and 7 yr? [JNV 1994]
(1) 1 : 12 (2) 1 : 13 (3) 1 : 14 (4) 1 : 15

19. What must be subtracted from each term of the ratio 3 : 2. So, that the ratio becomes 2 : 5? [JNV 1993]
(1) $\frac{1}{2}$ (2) $\frac{1}{3}$ (3) $\frac{1}{4}$ (4) $\frac{1}{5}$

20. If $A : B = 3 : 4$, $B : C = 5 : 6$ and $C : D = 11 : 9$, then $A : D$ is [JNV 1993]
(1) 55 : 72 (2) 55 : 74 (3) 55 : 84 (4) 55 : 71

21. If $p : q = 3 : 4$ and $q : r = 8 : 9$. Find $p : q : r$. [JNV 1993]
(1) 6 : 7 : 8 (2) 6 : 8 : 9
(3) 6 : 9 : 10 (4) 7 : 9 : 11

Answers

1. (2)	**2.** (2)	**3.** (2)	**4.** (1)	**5.** (3)	**6.** (4)	**7.** (1)	**8.** (2)	**9.** (2)	**10.** (1)
11. (3)	**12.** (4)	**13.** (1)	**14.** (4)	**15.** (2)	**16.** (2)	**17.** (4)	**18.** (1)	**19.** (2)	**20.** (1)
21. (2)									

Hints and Solutions

1. Let numbers be $2x$ and $3x$.

Then, $\frac{2x+9}{3x+9}=\frac{3}{4}$

$\Rightarrow \quad 4(2x+9)=3(3x+9)$

$\Rightarrow \quad 8x+36=9x+27$

$\Rightarrow \quad 9x-8x=36-27$

$\Rightarrow \quad x=9$

$\therefore$ Numbers $=2x=2\times 9=18$

and $\quad 3x=3\times 9=27$

2. B's share in the amount

$=\frac{\text{Ratio term for } B}{\text{Total sum of ratios}}\times \text{Total amount}$

$=\frac{9861\times 11}{(3+11+5)}$

$=\frac{9861\times 11}{19}=₹\,5709$

3. $a:b=5:14$

$b:c=7:3$ or $b:c=7\times 2:3\times 2$

$\therefore a:b:c=5:14:3\times 2$

$=5:14:6$

4. Let x is to added. Then

$\frac{49+x}{68+x}=\frac{3}{4}$

$\Rightarrow 196+4x=204+3x$

$\Rightarrow 4x-3x=204-196$

$\Rightarrow x=8$

$\therefore$ The number is 8.

5. $\frac{2}{5}=\frac{8}{x}$

$\therefore x=\frac{8\times 5}{2}=20$

6. $\frac{a}{b}=\frac{2}{3}$ and $\frac{b}{c}=\frac{4}{5}$

or $\frac{a}{b}=\frac{2\times 4}{3\times 4}=\frac{8}{12}$ and $\frac{b}{c}=\frac{4\times 3}{5\times 3}=\frac{12}{15}$

$\therefore a:b:c=8:12:15$

7. Total money $=₹\,4000$

Ratio of A, B and $C=5:7:8$

Total $=5+7+8=20$

$\therefore$ Share of $A=\frac{5}{20}\times\frac{4000}{1}=₹\,1000$

$\therefore$ Share of $B=\frac{7}{20}\times 4000=₹\,1400$

$\therefore$ Share of $C=\frac{8}{20}\times 4000=₹\,1600$

8. $\frac{A}{C}=\left(\frac{A}{B}\times\frac{B}{C}\right)=\frac{6}{7}\times\frac{8}{9}=\frac{16}{21}=16:21$

9. $\frac{1}{9}=\frac{9}{x} \Rightarrow x=\frac{9\times 9}{1}=81$

10. $3:5::60:x$

$\Rightarrow \frac{3}{5}=\frac{60}{x}$

$\Rightarrow x=\frac{60\times 5}{3}=100$

11. $0.75:x::5:8$

$\Rightarrow \frac{0.75}{x}=\frac{5}{8}$

$\Rightarrow x=\frac{0.75\times 8}{5}=12$

12. Let the number of girls is x. Then

$4:3=480:x$

$\Rightarrow \frac{4}{3}=\frac{480}{x}$

$\Rightarrow x=\frac{480\times 3}{4}=360$ girls

13. Here, $a=9$, $b=16$

we know that, the mean proportional of a and b

$=\sqrt{ab}$

$=\sqrt{9\times 16}=3\times 4=12$

14. $\frac{3}{7}=\frac{33}{x}$, where x is the consequent.

$\therefore \quad x=\frac{7\times 33}{3}=77$

15. Ratio $=\frac{80}{60}=\frac{4}{3}=4:3$

16. The cost of cycle $=₹\,9x$

The cost of scooter $=₹\,5x$

According to the question,

$\Rightarrow 9x-5x=4200$

$\Rightarrow 4x=4200$

$\Rightarrow x=\frac{4200}{4}=1050$

$\therefore$ Cost of scooter $=5\times 1050=₹\,5250$

17. Let numbers be $3x$ and $8x$.

According to the question,

$8x-3x=115$

$\Rightarrow 5x=115$

$\Rightarrow x=\frac{115}{5}=23$

$\therefore$ Largest number $=8\times 23=184$

18. 7 yr = 7 × 12 months = 84 months

$\therefore$ Ratio $= \frac{7}{84} = \frac{1}{12} = 1:12$

19. Let x is to be subtracted. Then

$$\frac{3-x}{7-x} = \frac{2}{5}$$

$\Rightarrow 15 - 5x = 14 - 2x \Rightarrow 15 - 14 = 5x - 2x$

$\Rightarrow 1 = 3x \Rightarrow x = \frac{1}{3}$

$\therefore$ The number is $\frac{1}{3}$.

20. $\frac{A}{D} = \left(\frac{A}{B} \times \frac{B}{C} \times \frac{C}{D}\right) = \left(\frac{3}{4} \times \frac{5}{6} \times \frac{11}{9}\right) = \frac{55}{72}$

21. $\frac{p}{q} = \frac{3}{4}$ and $\frac{q}{r} = \frac{8}{9}$

$\frac{p}{q} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$ and $\frac{q}{r} = \frac{8}{9}$

$\therefore \quad p : q : r = 6 : 8 : 9$

Practice Exercise

1. Write the ratio in the simplest form 25 : 35.
(1) 5 : 7 (2) 7 : 5
(3) 25 : 35 (4) None of these

2. The ratio between the 1h to 1 day
(1) 1 : 6 (2) 1 : 1
(3) 1 : 24 (4) 24 : 1

3. If A, B, C and D are four numbers such that $A : B = 2 : 3$, $B : C = 4 : 5$, $C : D = 5 : 8$. Then, $A : D$ is equal to
(1) 1 : 3 (2) 3 : 1
(3) 2 : 3 (4) 3 : 2

4. The sum of the squares of three numbers is 116 and their ratio is 2 : 3 : 4. The numbers are
(1) 2, 3, 4 (2) 4, 9, 16
(3) 4, 6, 8 (4) 8, 12, 6

5. If $\frac{a}{b} = \frac{7}{9}$ and $\frac{b}{c} = \frac{3}{5}$. Then, the value of $a : b : c$ is
(1) 7 : 9 : 15 (2) 7 : 9 : 5
(3) 21 : 35 : 45 (4) 7 : 3 : 15

6. What must be added to each term of the ratio 7 : 13. So, that the ratio becomes 2 : 3?
(1) 5 (2) 1
(3) 2 (4) 3

7. A sum of money is to be distributed between Ajay and Sanjay in the proportion of 7 : 11, respectively. Sanjay gets ₹ 6000 more than Ajay. How much did Ajay get?
(1) ₹ 3818.18
(2) ₹ 8400
(3) ₹ 10500
(4) Cannot be determined

8. The ratio between boys and girls in a school is 4 : 6, respectively. If the number of boys is increased by 200 the ratio becomes 5 : 6, respectively. How many girls are there in the school?
(1) 1200 (2) 800
(3) 1000 (4) Cannot be determined

9. The total number of students in a school is 1224. If the number of girls in the school is 600, then what is the respective ratio of the total number of boys to the total number of girls in the school?
(1) 26 : 25 (2) 21 : 17
(3) 18 : 13 (4) 5 : 4

10. A bag contains ₹ 102 in the form of rupee, 50 paise and 10 paise coins in the ratio 3 : 4 : 10. The number of 10 paise coins is
(1) 340 (2) 60
(3) 80 (4) 170

11. I have ₹ 1 coins, 50 paise coins and 25 paise coins. The number of coins are in the ratio of 2.5 : 3 : 4. If the total amount is ₹ 210. The number of ₹1 coin is
(1) 90 (2) 85 (3) 100 (4) 105

12. What is the fourth proportional of 3, 4 and 6?
(1) 8 (2) 9 (3) 12 (4) 2

13. If $x : 3 :: 12 : 4$, then value of x is
(1) 9 (2) 16
(3) 12 (4) 18

14. $A : B = 5 : 7$ and $B : C = 6 : 1$. So, $A : B : C$ is
(1) 5 : 7 : 6 (2) 5 : 7 : 1
(3) 30 : 7 : 42 (4) 30 : 42 : 7

15. An amount of ₹ 450 is shared by A and B in the ratio 4 : 5. The shares of A and B will be
(1) ₹ 400, ₹ 50 (2) ₹ 50, ₹ 400
(3) ₹ 250, ₹ 200 (4) ₹ 200, ₹ 250

16. The two numbers are in ratio 11 : 9. If sum of these two numbers is 40, then product of these two numbers is
(1) 396 (2) 432
(3) 440 (4) 384

17. The ratio of copper and zinc is 11: 6. How much zinc is there in 850 kg of brass?
(1) 510 kg
(2) 200 kg
(3) 300 kg
(4) 550 kg

18. Which of the following is smallest?
(1) 1 : 3 (2) 3 : 5
(3) 7 : 9 (4) 10 : 12

Answers

1. (1)	**2.** (3)	**3.** (1)	**4.** (3)	**5.** (1)	**6.** (1)	**7.** (3)	**8.** (1)	**9.** (1)	**10.** (4)
11. (4)	**12.** (1)	**13.** (1)	**14.** (4)	**15.** (4)	**16.** (1)	**17.** (3)	**18.** (1)		

Hints and Solutions

1. $\because 25:35 = \frac{25}{35} = \frac{5}{7}$ or 5 : 7

2. $\because$ One day = 24 h

$\therefore$ 1 h : 24 h = 1 : 24

3. Given, $\frac{A}{B} = \frac{2}{3}, \frac{B}{C} = \frac{4}{5}, \frac{C}{D} = \frac{5}{8}$

$\therefore \frac{A}{D} = \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} = \frac{2 \times 4 \times 5}{3 \times 5 \times 8} = \frac{1}{3}$

4. Let the numbers be $2x$, $3x$ and $4x$.

$\therefore (2x)^2 + (3x)^2 + (4x)^2 = 116$

$\Rightarrow 4x^2 + 9x^2 + 16x^2 = 116$

$\Rightarrow 29x^2 = 116 \Rightarrow x^2 = 4$

$\Rightarrow x = 2$

($\because x$ cannot be negative)

Hence, required numbers are 4, 6 and 8.

5. $a : b = 7 : 9$

$b : c = 3 : 5 = 9 : 15$

$\therefore a : b : c = 7 : 9 : 15$

6. Let the number to be added to each term be x. Then

$$\frac{7+x}{13+x} = \frac{2}{3}$$

$\Rightarrow 3(7+x) = 2(13+x)$

$\Rightarrow 21 + 3x = 26 + 2x$

$\Rightarrow 3x - 2x = 26 - 21$

$\therefore x = 5$

7. Let Ajay and Sanjay get ₹ $7x$ and ₹ $11x$, respectively. Then

$11x - 7x = 6000$

$\Rightarrow 4x = 6000$

$\therefore x = 1500$

$\therefore$ Ajay's share $= 7x = 1500 \times 7 =$ ₹ 10500

8. Let the number of boys and girls be $4x$ and $6x$, respectively.

According to the question, $\frac{4x + 200}{6x} = \frac{5}{6}$

$\Rightarrow 5x = 4x + 200$

$\Rightarrow x = 200$

Therefore, number of girls

$= 6x = 6 \times 200 = 1200$

9. Total number of students in the school = 1224

Number of girls = 600

$\therefore$ Number of boys $= 1224 - 600 = 624$

$\therefore$ Required ratio $= 624 : 600 = 26 : 25$

10. Ratio of the number of coins = ₹ 1 : 50 paise : 10 paise = 3 : 4 : 10

$\therefore$ Ratio of total values of coins of ₹ 1 : 50 paise : 10 paise $= (100 \times 3) : (50 \times 4) : (10 \times 10)$

$= 300 : 200 : 100 = 3 : 2 : 1$

Total value of 10 paise coins in ₹ 102

$= \frac{1}{3+2+1} \times 102 = \frac{102}{6} =$ ₹ 17 = 1700 paise

$\therefore$ Number of 10 paise coins $= \frac{1700}{10} = 170$

11. Let number of ₹ 1, 50 paise and 25 paise coins be $2.5x$, $3x$ and $4x$, respectively.

Value of ₹ 1 coins $= 1 \times 2.5x = 2.5x$

Value of 50 paise coins $= 0.50 \times 3x = 1.5\,x$

Value of 25 paise coins $= 0.25 \times 4x = 1\,x$

Total value = ₹210

$\therefore \quad 2.5x + 1.5x + 1x = 210$

$5x = 210 \Rightarrow x = 42$

Thus, number of ₹1 coins $= 2.5x$

$= 2.5 \times 42 = 105$

12. Here, $a = 3$, $b = 4$, $c = 6$

$\because$ Fourth proportional of a, b and c

$$= \frac{bc}{a} = \frac{4 \times 6}{3} = 8$$

13. $\because$ First $\times$ Fourth = Second $\times$ Third

$$\Rightarrow \quad x = \frac{3 \times 12}{4} = 9$$

14. $A : B = 5 : 7$ or $\frac{A}{B} = \frac{5}{7}$

and $\quad B : C = 6 : 1$ or $\frac{B}{C} = \frac{6}{1}$

Now, $\quad \frac{A}{B} = \frac{5 \times 6}{7 \times 6} = \frac{30}{42}$

and $\quad \frac{B}{C} = \frac{6 \times 7}{1 \times 7} = \frac{42}{7}$

So, $\quad A : B : C = 30 : 42 : 7$

[$\because B = 42$ in both ratios]

15. A's share $= \frac{\text{Ratios terms of } A}{\text{Total sum of Ratios}} \times \text{Total amount}$

$$= \frac{4}{5+4} \times 450 = \frac{4}{9} \times 450 = ₹\,200$$

Similarly, B's share

$$= \frac{5}{5+4} \times 450 = \frac{5}{9} \times 450 = ₹\,250$$

16. Let the two numbers are $11x$ and $9x$.

According to the question,

$11x + 9x = 40$

$\Rightarrow \quad 20x = 40$

$\therefore \quad x = \frac{40}{20} = 2$

Product of numbers $= 11x \times 9x = 99x^2$

$= 99 \times (2)^2 = 99 \times 4 = 396$

17. Zinc $= \frac{6}{17} \times 850 = 300$ kg

18. Given ratios can be written as

$1 : 3 = \frac{1}{3}$, $3 : 5 = \frac{3}{5}$, $7 : 9 = \frac{7}{9}$

and $\quad 10 : 12 = \frac{10}{12}$

Now, $\frac{1}{3} = 0.33\ldots$; $\frac{3}{5} = 0.6$

$\frac{7}{9} = 0.77\ldots$; $\frac{10}{12} = 0.83\ldots$

So, $\frac{1}{3}$ or 1 : 3 is smallest ratio.

Self Practice

1. The ratio of the length and breadth of a rectangle is 5 : 4. If the length is 25 m, the breadth is
(1) 15 m (2) 20 m (3) 10 m (4) 12 m

2. If 10, 20, x and 40 are in proportion, the value of x will be
(1) 5 (2) 20 (3) 30 (4) 80

3. Distribute ₹ 800 between Mohan and Sohan in the ratio of 5 : 3. How much amount will Mohan get?
(1) ₹ 400 (2) ₹ 500 (3) ₹ 350 (4) ₹ 250

4. The ratio between men and women working in a garden is 3 : 2. If total number of men and women is 165, the number of men working in the garden is
(1) 105 (2) 100 (3) 99 (4) 150

5. The ratio between water and alcohol in a mixture is 2 : 3. If water content is 4 L, how much is the alcohol in the mixture?
(1) 10 L (2) 6 L (3) 8 L (4) 2 L

6. Which of the following is greatest?
(1) 3 : 4 (2) 4 : 5 (3) 5 : 6 (4) 6 : 7

7. The third proportional to 12 and 30 is
(1) 40 (2) 45 (3) 50 (4) 75

8. What is the ratio of 15 and 25?
(1) 2 : 5 (2) 3 : 5 (3) 4 : 5 (4) 15 : 50

9. Two numbes are in the ratio of 2:3. If 15 added to both the number, then the ratio between two numbers becomes the numbers becomes $\frac{11}{14}$. Find the greater number.
(1) 29 (2) 27 (3) 29 (4) 30

10. If $x : y = 7 : 5$, then the value of $(5x - 2y) : (3x + 2y)$ is
(1) $\frac{24}{13}$ (2) $\frac{25}{31}$ (3) $\frac{23}{25}$ (4) $\frac{26}{31}$

Answers

1. (2)	**2.** (2)	**3.** (2)	**4.** (3)	**5.** (2)	**6.** (4)	**7.** (4)	**8.** (2)	**9.** (2)	**10.** (2)

CHAPTER

16

SPEED, DISTANCE AND TIME

Speed

Speed is defined as the distance covered per unit time. It is the rate at which the distance is covered Generally, we measured the speed in km/h.

(i) To convert speed from km/h to m/s multiply the speed by $\frac{5}{18}$.

(ii) To convert speed from m/s to km/h multiply the speed by $\frac{18}{5}$.

Example **1.** Convert 18 km/h into m/s.

(1) 6 m/s (2) 18 m/s
(3) 5 m/s (4) 8 m/s

Sol. **(3)** $18 \text{ km/h} = 18 \times \frac{5}{18} \text{ m/s} = 5 \text{ m/s}$

Example **2.** Convert 10 m/s into km/h.

(1) 36 km/h (2) 33 km/h (3) 13 km/h (4) 8 km/h

Sol. **(1)** $10 \text{ m/s} = 10 \times \frac{18}{5} \text{ km/h} = 36 \text{ km/h}$

Time

The duration in hours, minutes or seconds spent to cover a certain distance is called the **time**.

Distance

The length of the path travelled by any object or a person between two places is known as **distance**.

Relation between Speed, Time and Distance

The speed of a moving body is the distance travelled by it in unit time.

$$\therefore \quad \text{Speed} = \frac{\text{Distance}}{\text{Time}} \quad \text{or} \quad \text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

or Distance = Speed × Time

- Units of speed, time and distance should be in the same metric system.

Example **3.** A car travels at the speed of 85 km/h and reaches its destination in 5 h. What is distance covered by the car?

(1) 425 km (2) 550 km (3) 452 km (4) 450 km

Sol. **(1)** Required distance = Speed × time
$= 85 \times 5 = 425 \text{ km}$

Example **4.** A car covers a distance of 816 km in 12 h. What is the speed of the car?

(1) 78 km/h (2) 68 km/h (3) 62 km/h (4) 75 km/h

Sol. **(2)** Speed of the car

$$= \frac{\text{Distance covered}}{\text{Time taken}} = \frac{816}{12} = 68 \text{km/h}$$

Average Speed

The ratio of total distance covered to the total time of journey is said to be average speed.

$$\text{Average speed} = \frac{\text{Total distance covered}}{\text{Total time of journey}}$$

(i) If a person covers a same ditance at a speed of a km/h and comes back same distance at a speed of b km/h, then average speed

$$= \frac{2ab}{a+b}$$

Example **5.** Deepak covers a certain distance by car driving at 25 km/h and he returns back to the starting point riding on a scooter by 15 km/h. Find the average speed for the whole journey.

(1) 16 km/h (2) 18.75 km/h
(3) 20 km/h (4) 24.75 km/h

Sol. **(2)** Here,

$a = 25$ km/h, $b = 15$ km/h

$$= \frac{2\times25\times15}{25+15} = \frac{50\times15}{40} = 18.75 \text{ km/h}$$

$\therefore$ Average speed $= \frac{2ab}{a+b}$

Alternate Method

Let the distance covered from one side = x km

The time taken with 25 km/h $= \frac{x}{25}$

The time taken with 15 km/h $= \frac{x}{15}$

Average speed $= \frac{\text{Total distance}}{\text{Total time taken}}$

$$= \frac{x+x}{\frac{x}{25}+\frac{x}{15}} = \frac{2x}{\frac{3x+5x}{75}}$$

$$= \frac{2x\times75}{8x} = 18.75 \text{ km/h}$$

Problems Related to Train

- If a train of length 'l' passes a pole, it travels a distance equal to its own length, *i.e.*, l.
- If a train passes a stationary object (bridge, platform etc.) having some length, then the distance covered by train is equal to the sum of the lenght of train and that particular stationary object which it is passing.

Relative Speed

- If two bodies are moving in the same direction at x km/h and y km/h, where $(x > y)$, then their relative speed is given by $(x - y)$ km /h.
- If two bodies are moving in opposite direction at x km/h and y km/h, then their relative speed is given by $(x + y)$ km /h.
- If the ratio of speed of A and B is $x:y$, then the ratio of time taken by them to cover the same distance is given by $\frac{1}{x}:\frac{1}{y}$ *i.e.* $y:x$.

Example **6.** A 360 m long train crosses a signal post in 18 s. What is the speed (in km/h) of the train?

(1) 26 (2) 66 (3) 27 (4) 72

Sol. **(4)** When a train crosses a signal post it travels its own length.

$\therefore$ Speed $= \frac{360}{18} = 20$ m/s

$$= \left(20\times\frac{18}{5}\right) = 72 \text{ km/h}$$

Entrance Corner

1. If a man travels at a speed of 30 km/h, he reaches his destination 10 min late and if he travels at a speed of 42 km/h, he reaches his destination 10min early. The distance travelled is **[JNV 2019]**

(1) 36 km (2) 35 km
(3) 40 km (4) 42 km

2. A passenger train, running at a speed of 80 km/h leaves a railway station 6h after a goods train leaves and overtakes it in 4 h. What is the speed of the goods train? **[JNV 2019]**

(1) 32 km/h (2) 48 km/h
(3) 60 km/h (4) 50 km/h

3. A person covered $47\frac{1}{2}$ km in one day. If the covered $29\frac{1}{3}$ km by scooter, $8\frac{5}{6}$,km by bicycle and rest of the distance on foot. Find the distance covered on foot? **[JNV 2018]**

(1) $8\frac{1}{3}$ (2) $10\frac{1}{3}$
(3) $9\frac{1}{3}$ (4) $12\frac{2}{3}$

4. A train is running at a uniform speed of 75 km/h. How much time does it take to cover a distance of 350 km? **[JNV 2017, 2009]**

(1) 4 h (2) 5 h
(3) 4 h 30 min (4) 4 h 40 min

5. $\frac{1}{3}$ of a certain journey is covered at the rate of 25 km/h, $\frac{1}{4}$ at the rate of 30 km/h and the rest of 50 km/h. What is the average speed for the whole journey? [JNV 2017, 2009]
(1) 30 km/h (2) 33 km/h
(3) $33\frac{1}{3}$ km/h (4) 32 km/h

6. In a race of 1 km, *A* defeats *B* by 36 m or 18 s. How much time (in sec) did *A* take to complete the full distance? [JNV 2016]
(1) 500 (2) 582 (3) 460 (4) 482

7. Two persons walk each other 7:30 am. If their speed are 4 km/h and 6 km/h and initially their distance is 25 km, then in what time they will meet to each other? [JNV 2015]
(1) 8:30 am (2) 9:30 am
(3) 10:00 am (4) 10:30 am

8. A bus covers 400 km in 8 h, the average speed of bus is [JNV 2015]
(1) 30 km/h (2) 50 km/h
(3) $50\frac{1}{2}$ km/h (4) 60 km/h

9. A man crosses a 600 m long bridge in 5 min speed of man (in km/h) will be [JNV 2014]
(1) 3.6 (2) 7.2
(3) 8.4 (4) 9.6

10. A train running with 54 km/h. What is the time taken by train to cross the 90 m platfrom? [JNV 2013]
(1) 10 s (2) 8 s (3) 6 s (4) 5 s

11. A man takes 3 days to walk 45 km, in how many days will be walk 75 km? [JNV 2012]
(1) 20 (2) 25 (3) 5 (4) 15

12. Convert 360 km/h into m/s. [JNV 2012]
(1) 120 m/s (2) 100 m/s (3) 96 m/s (4) 110 m/s

13. Convert 36 km/h into m/s. [JNV 2000]
(1) 8 m/s (2) 9 m/s (3) 10 m/s (4) 11 m/s

14. Change 60 m/s into km/h. [JNV 2000]
(1) 216 km/h (2) 218 km/h
(3) 219 km/h (4) 220 km/h

15. Find the distance covered by a man walking for 12 min of a speed of 3.5 km/h. [JNV 1999]
(1) 850 m (2) 800 m (3) 750 m (4) 700 m

16. Find the time taken to cover a distance of 124 km by a train moving at 45 km/h. [JNV 1999]
(1) 2 h 45 min (2) 2 h 50 min
(3) 2 h 55 min (4) 2 h 57 min

17. A 270 m long goods train is running at 40.5 km/h. How much time will it take to cross a tree? [JNV 1999]
(1) 10 s (2) 11 s (3) 24 s (4) 13 s

18. Find the distance covered by a car moving at 20 m/s for 3 h. [JNV 1998]
(1) 220 km (2) 218 km (3) 216 km (4) 230 km

19. Find the time taken to cover a distance 0.9 km by a bullock cart moving at 0.25 m/s. [JNV 1998]
(1) 1 h (2) 2 h
(3) 3 h (4) 4 h

20. A trains runs at 45 km/h. How far does it go in 6s? [JNV 1997]
(1) 50 m (2) 55 m (3) 56 m (4) 75 m

21. Change 72 km/h into m/s. [JNV 1997]
(1) 20 m/s (2) 22 m/s (3) 24 m/s (4) 26 m/s

22. Change 15 m/s into km/h. [JNV 1997]
(1) 52 km/h (2) 54 km/h
(3) 56 km/h (4) 58 km/h

23. A train 315 long is running at 54 km/h. How much time will it takes to cross a pole? [JNV 1996]
(1) 21 s (2) 22 s (3) 24 s (4) 26 s

24. The speed of a train is 5 m/s. What is its speed (in km/h)? [JNV 1996]
(1) 16 (2) 17 (3) 18 (4) 20

25. A bullet is fired at a distance of 3.32 km away from Ajay. He hears the sound 10 s later. Find the speed of the sound. [JNV 1995]
(1) 330 m/s (2) 332 m/s
(3) 334 m/s (4) 335 m/s

Answers

1. (2)	**2.** (1)	**3.** (3)	**4.** (4)	**5.** (3)	**6.** (4)	**7.** (3)	**8.** (2)	**9.** (2)	**10.** (3)
11. (3)	**12.** (2)	**13.** (3)	**14.** (1)	**15.** (4)	**16.** (1)	**17.** (3)	**18.** (3)	**19.** (1)	**20.** (4)
21. (1)	**22.** (2)	**23.** (1)	**24.** (3)	**25.** (2)					

Hints and Solutions

1. According to the question, speed = 30 km/h,

time $= \left(t + \frac{10}{60}\right)$ h $= \left(t + \frac{1}{6}\right)$ h

By using, Speed $= \frac{\text{Distance}}{\text{Time}}$

Distance $(S) = 30 \times \left(t + \frac{1}{6}\right)$ ...(i)

According to the question,

Speed = 42 km/h

Time $= \left(t - \frac{10}{60}\right)$ h $= \left(t - \frac{1}{6}\right)$ h

$\Rightarrow$ Distance $(S) = 42 \times \left(t - \frac{1}{6}\right)$ ...(ii)

From Eqs. (i) and (ii),

Distance $(S) = 30\left(t + \frac{1}{6}\right) = 42 \times \left(t - \frac{1}{6}\right)$

$\Rightarrow \quad 5\left(t + \frac{1}{6}\right) = 7\left(t - \frac{1}{6}\right)$

$\Rightarrow \quad 5t + \frac{5}{6} = 7t - \frac{7}{6}$

$\Rightarrow \quad 2t = \frac{12}{6}$

$\therefore \quad t = 1$ h

Hence, distance $(S) = 30\left(t + \frac{1}{6}\right)$

$= 30\left(1 + \frac{1}{6}\right) = 30 \times \frac{7}{6} = 35$ km

2. According to the question,

Speed of passenger train = 80 km/h

Time taken by passenger train = 4 h

Let, speed of goods train = v

Time taken by goods train = 6 + 4 = 10 h

$\because$ Distance covered by both the trains is same.

Now, by using, Speed $= \frac{\text{Distance}}{\text{Time}}$

Distance = Speed × Time

Distance $= 80 \times 4 = v \times 10 \Rightarrow v = 32$ km/h

3. Total distance $= 47\frac{1}{2}$ km $= \frac{95}{2}$ km

Distance covered by scooter $= 29\frac{1}{3}$ km $= \frac{88}{3}$ km

Distance covered by bicycle $= 8\frac{5}{6} = \frac{53}{6}$ km

Now, distance covered on foot $= \frac{95}{2} - \frac{88}{3} - \frac{53}{6}$

$= \frac{95}{2} - \frac{88}{3} - \frac{53}{6} = \frac{285 - 176 - 53}{6} = \frac{56}{6}$

$= \frac{28}{3}$ km $= 9\frac{1}{3}$ km

4. $\because$ Time $= \frac{\text{Distance}}{\text{Speed}}$

$\therefore$ Time $= \frac{350}{75} = \frac{14}{3} = 4\frac{2}{3}$ h = 4 h 40 min

5. Let the total journey be x km.

Then, $\frac{x}{3}$ is covered at 25 km/h, $\frac{x}{4}$ is at 30 km/h.

Rest of the distance $= x - \frac{x}{3} - \frac{x}{4}$

$= \frac{12x - 4x - 3x}{12} = \frac{5x}{12}$

which cover in the speed of 50 km/h.

$\therefore$ Total time of journey $= \frac{x}{75} + \frac{x}{120} + \frac{5x}{12 \times 50}$

$= \frac{8x + 5x + 5x}{600}$

$= \frac{18x}{600} = \frac{3x}{100}$ h

$\therefore$ Average speed $= \frac{x}{\frac{3x}{100}} = \frac{100}{3} = 33\frac{1}{3}$ km/h

6. B, runs 36 m in 18 s

B will run 1000 m in $= \frac{18}{36} \times 1000$ s = 500 s

So, taken time by A for complete the race

= 500 − 18 = 482 s.

7. Relative speed = 4 + 6 = 10 km/h

$\therefore$ Time taken to cover 25 km distance $= \frac{25}{10}$

= 2 h 30 min

$\therefore$ Required time = 7 : 30 + 2 : 30 = 10 : 00 am

8. Average speed of the bus $= \frac{400}{8}$ = 50 km/h

9. Total distance = 600 m = 0.6 km

Time = 5 min $= \frac{5}{60}$ h

$\therefore$ Required speed $= \frac{\text{Distance}}{\text{Time}} = \frac{0.6}{\frac{5}{60}} = 7.2$ km/h

10. Speed of the train = 54 km/h $= 54 \times \frac{5}{18}$ m/s

= 15 m/s

Length of the platform = 90 m

Hence, required time $= \frac{90}{15} = 6$ s

11. Man's per day walk $= \frac{45}{3} = 15$ km

$\therefore$ Required number of days to walk 75 km

$= \frac{75}{15} = 5$ days

12. 360 km/h $= 360 \times \frac{5}{18}$ m/s $= 100$ m/s

13. 36 km/h $= 36 \times 1000$ m/ 60×60 s

$= \frac{36 \times 1000}{60 \times 60} = 36 \times \frac{5}{18}$ m/s $= 10$ m/s

14. 60 m/s $= 60 \times \frac{18}{5}$ km/h $= 12 \times 18 = 216$ km/h

15. Distance = Speed × Time

$= 3.5 \times \frac{12}{60} = \frac{7}{10}$ km $= \frac{7}{10} \times 1000$ m

$= 700$ m [12 min $= \frac{12}{60}$ h]

16. Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{124}{45}$ h $= 2$ h 45 min (approx.)

17. Speed of the train = 40.5 km/h

$= \left(40.5 \times \frac{5}{18}\right)$ m/s $= \frac{45}{4}$ m/s

Length of the train = 270 m

$\therefore$ Time taken by the train $= \frac{\text{Distance}}{\text{Speed}}$

$= \left(\frac{270}{45/4}\right) = 24$s

18. Speed = 20 m/s $= \left(20 \times \frac{18}{5}\right)$ km/h = 72 km/h

Time = 3 h

Distance = Speed × Time = $72 \times 3 = 216$ km

19. Speed = 0.25 m/s $= \left(0.25 \times \frac{18}{5}\right)$ km/h

= 0.9 km/h and distance = 0.9 km

Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{0.9}{0.9} = 1$ h

20. Speed = 45 km/h $= \left(45 \times \frac{5}{18}\right)$ m/s

$= \frac{25}{2}$ m/s

Time = 6 s

$\therefore$ Distance = Speed × Time

$= \frac{25}{2} \times 6 = 75$ m

21. 72 km/h $= \left(72 \times \frac{5}{18}\right)$ m/s = 20 m/s

22. 15 m/s $= \left(15 \times \frac{18}{5}\right)$ km/h = 54 km/h

23. Speed = 54 km/h $= \left(54 \times \frac{5}{18}\right)$ m/s = 15 m/s

Length of the train = 315 m

$\therefore$ Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{315}{15} = 21$ s

24. Speed = 5 m/s $= \left(5 \times \frac{18}{5}\right)$ km/h = 18 km/h

25. Distance covered = 3.32 km

$= (3.32 \times 1000)$ m

$= 3320$ m

Time taken = 10 s

Now, Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{3320}{10}$ m/s = 332 m/s

Practice Exercise

1. Speed of 1 km/h is equal to

(1) $\frac{60}{1000}$ m/s (2) $\frac{3600}{1000}$ m/s

(3) $\frac{1000}{3600}$ m/s (4) $\frac{1000}{60}$ m/s

2. A train covers a distance of 300 km in 5 h, then the speed of train is

(1) 10 km/h (2) 20 km/h

(3) 60 km/h (4) 70 km/h

3. Ram covers the distance of 154 km in 2 h by car, then the speed of car is

(1) 77 km/h (2) 72 km/h

(3) 74 km/h (4) 70 km/h

4. A car covers the first 35 km of its journey in 45 min and covers the remaining 69 km in 75 min. What is the average speed of the car?

(1) 42 km/h (2) 50 km/h (3) 52 km/h (4) 60 km/h

5. A student rides on bicycle at 8 km/h and reaches his school 2.5 min late. The next day he increases his speed to 10 km/h and reaches school 5 min early. How far is the school from his house?

(1) $\frac{5}{8}$ km (2) 8 km

(3) 5 km (4) 10 km

6. With a uniform speed, a car covers the distance in 8 h. Had the speed been increased by 4 km/h, the same distance could have been covered in $7\frac{1}{2}$ h. What is the distance covered?
(1) 640 km
(2) 480 km
(3) 420 km
(4) Cannot be determined

7. A car is running from *A* to *B* at a speed of 40 km/h. It covered half of the total distance in 2 h. Then, distance between *A* and *B* is
(1) 40 km (2) 80 km
(3) 120 km (4) 160 km

8. A person covered a distance of 180 km in 3 h by a car. How much additional time will he require to cover a further distance of 120 km at the same speed?
(1) $1\frac{1}{2}$ h (2) 2 h
(3) $2\frac{1}{2}$ h (4) $2\frac{1}{4}$ h

9. If a cyclist covers a distance of 50 km in 5 h. Then, his average speed is
(1) 250 km/h (2) 50 km/h
(3) 10 km/h (4) 5 km/h

10. A bus is running at a speed of 60 km/h. The distance covered by that bus in 4 h and 30 min will be
(1) 30 km (2) 240 km
(3) 270 km (4) 200 km

11. A bus started from town *A* to town *B* at a speed of 50 km/h. It covered one-third of the total distance in 6 h. The distance between *A* and *B* is
(1) 150 km (2) 300 km
(3) 600 km (4) 900 km

12. A bus covers 60 km in 2 h. In 30 min it will cover
(1) 2 km (2) 7.5 km (3) 15 km (4) 30 km

13. A cyclist covers the distance of 1.2 km in 3 min,the speed of the cyclist is
(1) 24 km/h (2) 24 m/h
(3) 24 m/s (4) 26 km/h

14. A train covers a distance of 3 km in 2 min. How much distance will it cover in 6 h?
(1) 180 km (2) 240 km
(3) 540 km (4) 1080 km

15. A train starts at 10:50 am from New Delhi at a speed of 80 km/h, then at what time will it cover the distance of 120 km?
(1) 11 : 50 am (2) 12 : 50 pm
(3) 12 : 20 pm (4) 1 : 50 pm

16. A train is 200 m long. If it cross an electric pole in 10 s, then its speed is
(1) 72 km/h (2) 27 km/h
(3) 35 km/h (4) 52 km/h

17. A train is 125 m long. If the train takes 30 s to cross a tree by the railway line, then the speed of the train is
(1) 14 km/h (2) 15 km/h
(3) 16 km/h (4) 12 km/h

18. A 250 m long train crosses a pole in 15 s. What is its speed (in km/h)?
(1) 90 (2) 45
(3) 70 (4) 60

19. A train running at the speed of 90 km/h crosses a 250 m long platform in 22 s. What is the length of the train?
(1) 280 m (2) 260 m
(3) 250 m (4) 300 m

20. A train travelling with a speed 60 km/h catches another train travelling in the same direction and then leavers it 120 m behind in 18s. The speed of the second train is
(1) 26 km/h
(2) 35 km/h
(3) 36 km/h
(4) 63 km/h

Answers

1. (3)	**2.** (3)	**3.** (1)	**4.** (3)	**5.** (3)	**6.** (2)	**7.** (4)	**8.** (2)	**9.** (3)	**10.** (3)
11. (4)	**12.** (3)	**13.** (2)	**14.** (3)	**15.** (3)	**16.** (1)	**17.** (2)	**18.** (4)	**19.** (4)	**20.** (3)

Hints and Solutions

1. $1 \text{ km/h} = \frac{1000 \text{ m}}{60 \times 60 \text{ s}} = \frac{1000}{3600} \text{ m/s}$

2. $\text{Speed} = \frac{300}{5} \text{ km/h} = 60 \text{ km/h}$

3. $\text{Speed of car} = \frac{\text{Distance}}{\text{Time}} = \frac{154}{2} \text{ km/h} = 77 \text{ km/h}$

4. Total distance $= 35 + 69 = 104$ km

Total time $= 45 + 75 = 120$ min $= 2$ h

$\therefore$ Average speed $= \frac{104}{2} = 52$ km/h

5. Let x km be the required distance.

Difference in time $= 2.5 + 5 = 7.5$ min

$= \frac{7.5}{60} \text{ h} = \frac{1}{8} \text{ h}$

Now, $\frac{5x - 4x}{40} = \frac{1}{8} \Rightarrow x = \frac{40}{8} = 5$ km

6. Let the distance be x km and original speed of the car be y km/h.

Case I $\frac{x}{y} = 8 \Rightarrow x = 8y$ ...(i)

Case II $\frac{x}{y+4} = \frac{15}{2}$

$\Rightarrow \frac{8y}{y+4} = \frac{15}{2}$ [From Eq. (i)]

$\Rightarrow 16y = 15y + 60 \Rightarrow y = 60$

$\therefore$ From Eq. (i), we get

$x = 8 \times 60 = 480$

$\therefore$ Required distance $= 480$ km

7. Speed of the car $= 40$ km/h

In 2 h it will cover $= 40 \times 2 = 80$ km

Given, 80 km $= \frac{1}{2}$ of the total distance

$\therefore$ Total distance between A to $B = 80 \times \frac{2}{1}$

$= 160$ km

8. In 3 h, he covers $= 180$ km

$\therefore$ Speed $= \frac{180}{3} = 60$ km/h

New distance (additional) $= 120$ km

$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{120}{60} = 2$ h

9. $\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{50 \text{ km}}{5 \text{ h}} = 10$ km/h

10. $\because \text{Speed} = \frac{\text{Distance}}{\text{Time}}$

Speed $= 60$ km/h

Time $= 4$ h 30 min $= 4.5$ h

$\therefore$ Distance $=$ Speed $\times$ Time

$= 60 \times 4.5 = 270$ km

11. Speed $= 50$ km / h

It covered in 6 h $= 50 \times 6 = 300$ km

Total distance $= x$

Now, $\frac{x}{3} = 300$

$\therefore x = 300 \times 3 = 900$ km

12. $\because \text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$\therefore \text{Speed} = \frac{60}{2} = 30$ km/h

$\therefore$ Distance covered in 30 min or $\frac{1}{2}$ h

$=$ Speed $\times$ Time $= 30 \times \frac{1}{2} = 15$ km

14. In 2 min it covers $= 3$ km

In 1 h or 60 min it covers $= \frac{3}{2} \times 60 = 90$ km

In 6 h it covers $= 90 \times 6 = 540$ km

16. Distance travel by the train $= 200$ m

Time $= 10$ s

$\therefore \text{Speed} = \frac{200}{10} = 20 \text{ m/s} = 20 \times \frac{18}{5} = 72$ km/h

17. $\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{125}{30} = 4.17$

$= 4.16 \text{ m/s} = 4.17 \times \frac{18}{5} = 15$ km/h (approx.)

18. $\text{Speed of train} = \frac{250}{15} = \frac{50}{3}$ m/s

$= \frac{50}{3} \times \frac{18}{5}$ km/h $= 60$km/h

19. $90 \text{ km/h} = 90 \times \frac{5}{18} = 25$ m/s

Distance travelled by train in 22 s

$= 22 \times 25 = 550$ m

$\therefore$ Length of the train

$= 550 - 250 = 300$ m

20. Let speed of another train $= x$ km/h

$\therefore (60 - x) = \frac{120}{18} \times \frac{18}{5}$

$\Rightarrow 60 - x = 24$

$\therefore x = 60 - 24 = 36$ km/h

Self Practice

1. 72 km/h can be written as
(1) 20 m/s (2) 36 m/s (3) 10 m/s (4) 24 m/s

2. 63 km/h can be expressed into m/s as
(1) 17.5 m/s (2) 16.5 m/s (3) 16 m/s (4) 17 m/s

3. 12.5 m/s can be expressed into km/h as
(1) 40 km/h (2) 45 km/h (3) 50 km/h (4) 55 km/h

4. A car completes a journey in 6 h with a speed of 50 km/h. At what speed must it travel to complete the journey in 5 h?
(1) 60 km/h (2) 55 km/h (3) 45 km/h (4) 61 km/h

5. A train passes a telegraph post in 40 s moving at a rate of 36 km/h. Then, the length of the train is
(1) 400 m (2) 500 m (3) 450 m (4) 395 m

6. A cyclist covers 12 km in 1h . What is his speed?
(1) 100 m/min (2) 2000 m/min (3) 200 m/min (4) 300 m/min

7. An autorickshaw goes with a speed of 14 km/h. How much distance will it go in 2 h 15 min?
(1) 31.5 km (2) 30.5 km (3) 32.5 km (4) 32 km

8. Manu runs at a speed of 2 m/s in a 5 km race. How much time will she take to complete the race?
(1) 41 min 40 s (2) 40 min (3) 41 min (4) 42 min 40 s

9. An aircraft flies 8 km/min. What is its speed?
(1) 408 km/h (2) 480 km/h (3) 460 km/h (4) 406 km/h

10. A train is running at 36 km/h. If it crosses a pole in 25 s. Its length is
(1) 240 m (2) 250 m (3) 200 m (4) 300 m

11. How much time will a train 60 m long, take to cross a bridge 40 m long, if it is running at a speed of 20 m/s?
(1) 10 s (2) 8 s (3) 4 s (4) 5 s

12. A car is travelling at a speed of 50 km/h. How much distance will it cover in 12 min?
(1) 12 km (2) 6 km (3) 10 km (4) 8 km

13. A train is 180 m long. If it runs at a speed of 90 km/h, how long will it take to pass an electric pole?
(1) 0.002 h (2) 0.003 h (3) 0.004 h (4) 0.02 h

14. A train 100 m in length is running at a speed of 72 km/h. What is the time taken by the train to cross a bridge of length 525 m?
(1) 0.087 h (2) 0.0087 h (3) 0.75 h (4) 0.075 h

Answers

1. (1)	**2.** (1)	**3.** (2)	**4.** (1)	**5.** (1)	**6.** (3)	**7.** (1)	**8.** (1)	**9.** (2)	**10.** (2)
11. (4)	**12.** (3)	**13.** (1)	**14.** (2)						

CHAPTER

17

AREA, PERIMETER AND VOLUME

Area

It is the space enclosed by the boundary of a plane figure. It is measured in square unit *i.e.* the area of a room is equal to its floor.

Perimeter

The sum of all the sides of any enclosed plane figure is called the perimeter of that figure.

Area and Perimeter of Different Plane Figures

It is the measurement of shapes having length and breadth in nature *i.e.* rectangle, square, parallelogram etc.

Rectangle

The figure formed by joining four points, in which opposite sides are equal and parallel and each angle is a right angle *i.e.* 90°, is called rectangle.

In figure, $ABCD$ is a rectangle, in which

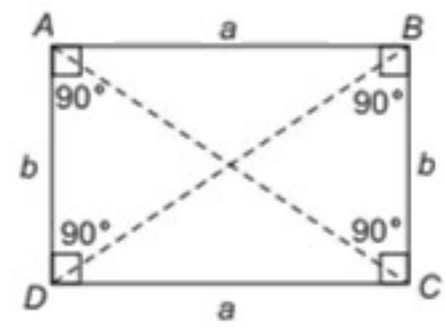
$AB = CD = a$ (say)

and $AD = BC = b$ (say)

and $\angle A = \angle B = \angle C = \angle D = 90°$

$AC = BD$,

where, AC and BD are diagonals.



(i) Area of rectangle = Length × Breadth = $a \times b$

(ii) Perimeter of rectanle

$= 2 \times (\text{Length} + \text{Breadth}) = 2 \times (a + b)$

(iii) Diagonal

$= \sqrt{(\text{Length})^2 + (\text{Breadth})^2} = \sqrt{a^2 + b^2}$

Example **1.** The length of a rectangular plot of land is twice the breadth. If the perimeter of the plot be 210 m. Find its area.

(1) 2450 m^2 (2) 2110 m^2

(3) 1520 m^2 (4) 1620 m^2

Sol. **(1)** Let the breadth of the plot be x m.

Then, its length = $2x$ m

$\because$ Its perimeter = 2 (Length + Breadth)

$= 2(2x + x) = 6x$ m

Given, Perimeter of the plot = 210

$\therefore \quad 6x = 210 \Rightarrow x = \frac{210}{6} = 35$ m

$\therefore$ Breadth = 35 m

and length = $2 \times 35 = 70$ m

$\therefore$ Area of the plot = $(70 \times 35) = 2450$ m^2

Example **2.** Find the area of a rectangle whose length is 8 m and diagonal 10 m.

(1) 24 m^2 (2) 48 m^2
(3) 56 m^2 (4) 36 m^2

Sol. **(2)** Breadth $= \sqrt{(\text{Diagonal})^2 - (\text{Length})^2}$

$= \sqrt{(10)^2 - (8)^2}$

$= \sqrt{36} = 6$ m

Area $= lb = 8 \times 6$

$= 48$ m^2

Square

The figure formed by joining four points, in which all four sides are equal and each angle is a right angle, *i.e.*, 90°, is called square.

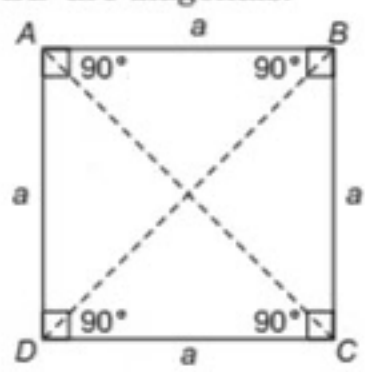
In figure, $ABCD$ is a square in which

$AB = BC = CD = AD = a$ (say)

and $\angle A = \angle B = \angle C = \angle D = 90°$

and $AC = BD$

where, AC and BD are diagonals.



(i) Perimeter of square $= 4 \times$ Side $= 4a$

Area of square $= (\text{Side})^2 = a^2$

Diagonal $= \sqrt{2} \times \text{Side} = \sqrt{2}a$

Example **3.** Find the least number of square tiles and their size needed for flooring a hall 20 m long and 16 m wide.

(1) 25 (2) 16
(3) 13 (4) 20

Sol. **(4)** For the number of tiles to be the least, their size must be largest square in shape.

Side of the largest possible square tile

= HCF of length and width of the hall

= HCF of 20 and 16 = 4 m

Area of each square tile $= 4 \times 4 = 16$ m^2

Area of the floor of the hall $= 20 \times 16 = 320$ m^2

$\therefore$ Number of tiles needed $= \frac{320}{16} = 20$

Volume and Surface Area

It is the study of three dimensional (3D) figures (solid figures). The main characteristic of three dimensional figure is that it have length, breadth and depth or height or thickness. The object in three dimension (3D) may be solid or hollow.

Volume

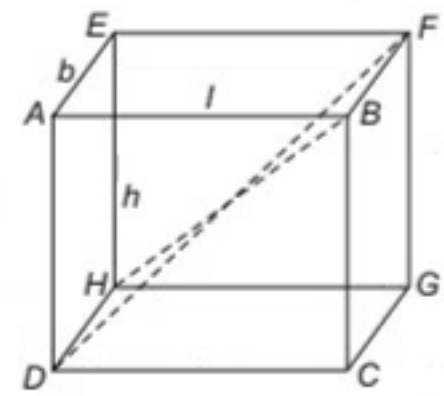
The amount of space occupied by the three dimensional object is called its volume. Its unit of measurement is m^3, cm^3, $inches^3$ etc.

It is the measurement of solid shapes having length, breadth and depth or height. Hence, these figures are known as three dimensional figures. Some of the popular three dimensional figures are as cube, cuboid, room and box etc.

Cuboid

The figure formed by joining 6 faces, in which each face is a rectangle and opposite faces are equal and parallel, is called cuboid.

In figure, AB is length, AE is breadth and AD is height of the cuboid and face $ABCD = EFGH$, $AEHD = BFGC$ and $AEFB = DHGC$, face $DHGC$ is called base and other faces are called lateral face. BH, DF, AG and EC are called diagonals.



If l is length, b is breadth and h is height, then

Volume of cuboid = Length × Breadth × Height

$V = l \times b \times h$

Example **4.** Find the volume of cuboid whose length is 15 cm, breadth 10 cm and height 8 cm.

(1) 1100 cm^3 (2) 1500 cm^3
(3) 1200 cm^3 (4) 1100 cm^3

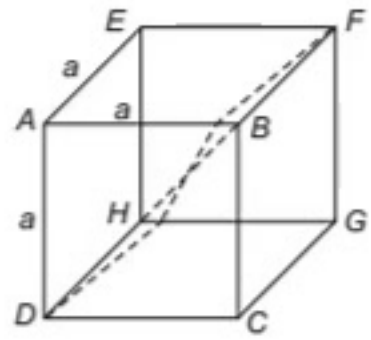
Sol. **(3)** Here, $l = 15$ cm, $b = 10$ cm, $h = 8$ cm

$\therefore$ Volume of cuboid $= l \times b \times h$

$= 15 \times 10 \times 8 = 1200$ cm^3

Cube

A cuboid, in which each face is a square and length, breadth and height are equal, is called cube.
In figure, all sides are equal, *i.e.*,



$AB = BC = CD = AD = EF = FG = GH = EH = AE$
$= BF = CG = DH$

and all faces are equal, *i.e.*,
$ABCD = EFGH = AEHD = BFGC = AEFB = DHGC$
AG, EC, BH and DF are called diagonals.
If 'a' is a side of cube, then
Volume of cube = $(\text{Side})^3 = a^3$

Example **5.** The volume of cube is 1000 cm^3. Find its total surface area.

(1) 500 cm^2 (2) 600 cm^2
(3) 200 cm^2 (4) 300 cm^2

Sol. **(2)** Volume of cube = 1000 cm^3
$\therefore$ Edge = $\sqrt[3]{1000}$ = 10 cm
Total surface area = 6 $(\text{Edge})^2$
$= 6\,(10)^2 = 6 \times 100 = 600\ cm^2$

Entrance Corner

1. Two solid cubes of side 10 cm each are joined end to end. What is the volume of the resulting cuboid? **[JNV 2019]**
(1) 500 cm^3 (2) 2000 cm^3
(3) 1000 cm^3 (4) 10000 cm^3

2. The length of a rectangular plot of land is twice its breadth. A square swimming pool of side 8 m, occupies one-eighth part of the plot. The length of the plot is **[JNV 2019]**
(1) 64 m (2) 32 m
(3) 16 m (4) 12 m

3. How many rectangular slabs of 10 cm × 8 cm are required to cover the floor of a hall of 12 m × 10 m? **[JNV 2019]**
(1) 12000 (2) 15000
(3) 10000 (4) 18000

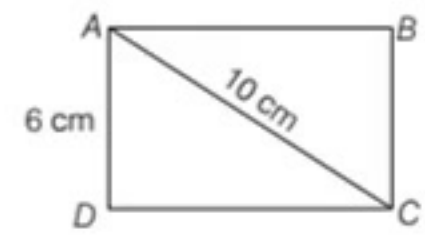
4. A rectangular plot has sides 100 m × 80 m. Find the length of wire to surround it three times. **[JNV 2018]**
(1) 180 m (2) 1080 m
(3) 360 m (4) 720 m

5. A fish tank length, breadth and height is 40cm , 60cm and 50cm, respectively. It contains 50 litre of water, How much water is needed to fill it completely. **[JNV 2018]**
(1) 50 L (2) 60 L
(3) 70 L (4) 120 L

6. The area of square, whose perimeter is 48 m, is **[JNV 2017, 2009, 2004]**
(1) 48 m^2 (2) 144 m^2
(3) 1152 m^2 (4) 2304 m^2

7. What is the volume of a box whose each edge measures 3 m in length? **[JNV 2017, 2009]**
(1) 54 cu m (2) 27 cu m (3) 18 cu m (4) 9 cu m

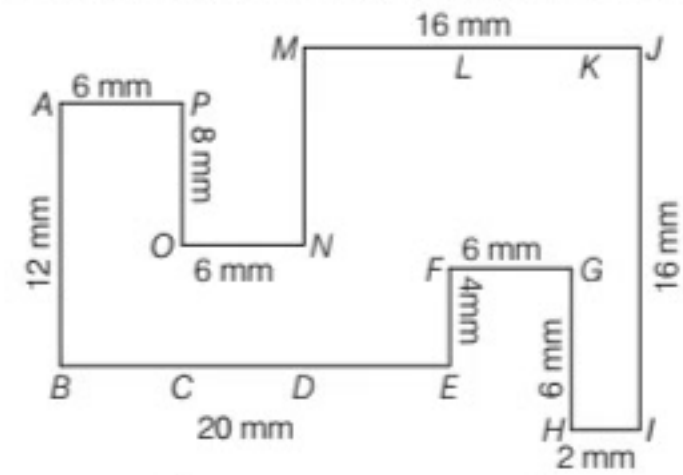
8. Find the length of AB in the given figure of a rectangle $ABCD$. **[JNV 2016]**



(1) 8 cm (2) 10 cm (3) 12 cm (4) 16 cm

9. The dimensions of a wall are 20 m × 12 m. How many square shaped tiles, with 4m side, will be required to cover the floor? **[JNV 2016]**
(1) 10 (2) 15 (3) 24 (4) 12

10. Find the area of the given figure. **[JNV 2016]**



(1) 240 mm^2 (2) 280 mm^2
(3) 300 mm^2 (4) 440 mm^2

11. The dimensions of a wall is 4.8 m × 3.6 m, what is the number of tiles required to cover with size of 1.2 m^2 tiles? **[JNV 2015]**
(1) 26 (2) 12
(3) 40 (4) 20

12. The dimensions of a rectangular park is 100 m × 60 m. A 2 m width path made around the rectangular park. The area (in m^2) of the path is **[JNV 2015]**
(1) 324 (2) 656
(3) 675 (4) 780

13. The side of a square park is 100 m. The perimeter of the park is **[JNV 2015]**
(1) 1000 m (2) 400 m
(3) 200 m (4) 800 m

14. If each side of square will be doubled, then its perimeter will be **[JNV 2014]**
(1) 2 times (2) 3 times
(3) 4 times (4) 8 times

15. The perimeter of a square park is 72 m, then the area of the square is **[JNV 2013]**
(1) 144 sq m (2) 2376 sq m
(3) 1296 sq m (4) 324 sq m

16. Find the breadth of a room whose floor area is 363 sq m and length is 33 m. **[JNV 2012]**
(1) 33 m (2) 24 m
(3) 11 m (4) 15 m

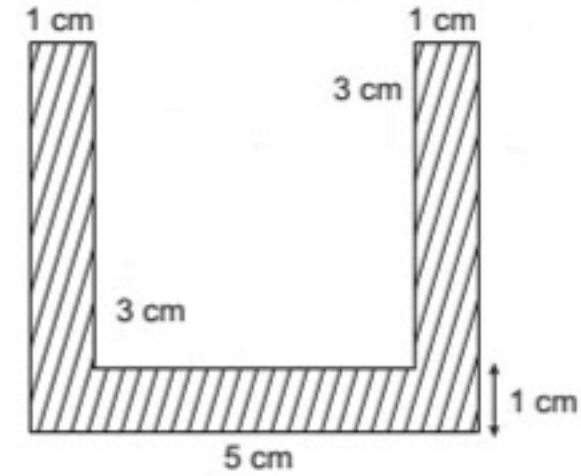
17. The breadth of a rectangle is 3/5 of the length. If length of the rectangle is 25 m, then find the perimeter of the rectangle. **[JNV 2012]**
(1) 100 m (2) 80 m
(3) 75 m (4) 150 m

18. Find the area of a rectangle whose length is 12 cm and breadth is 6.5 cm. **[JNV 2010]**
(1) 78 sq cm (2) 78 cu cm
(3) 37 sq cm (4) 38 cu cm

19. A rectangle is formed by 100 cm wire. Find out the maximum area of this rectangle. **[JNV 2010]**
(1) 100 sq cm (2) 400 sq cm
(3) 625 sq cm (4) 10000 sq cm

20. 60 cubes of 1 cm side Arun formed a cuboid. What is the volume of cuboid? **[JNV 2010]**
(1) 30 cu cm (2) 60 cu cm
(3) 75 cu cm (4) 90 cu cm

21. How much is the area of the shaded portion in the following figure? **[JNV 2005]**



(1) 11 sq cm (2) 9 sq cm
(3) 11 cu cm (4) 9 cu cm

22. A room floor is 192 sq m in area. If its length is 16 m. Then, its perimeter is **[JNV 1993]**
(1) 12 m (2) 28 m (3) 56 m (4) 64 m

23. The number of 15 cm square tiles required to lay a floor of size 3.6 m × 4.5 m is **[JNV 2004]**
(1) 720 (2) 360
(3) 10800 (4) 5400

24. How many rectangular plots of dimensions 40 m multiply 60 m can be made from a rectangular field of dimensions 120 m multiply 160 m? **[JNV 2003]**
(1) 2 (2) 3
(3) 4 (4) 8

25. The perimeter of a square courtyard is 200 m, its area will be **[JNV 2001]**
(1) 800 m (2) 2500 m
(3) 800 sq m (4) 2500 sq m

26. The volumes of a cube and a cuboid are equal. If the dimensions of the cuboid are 18 cm, 12 cm and 8 cm the edge of the cube is **[JNV 2001]**
(1) 8 cm (2) 10 cm
(3) 12 cm (4) 16 cm

27. Area of a square kitchen garden is 729 sq m. Find its perimeter. **[JNV 2000]**
(1) 64 m (2) 27 m
(3) 108 m (4) 100 m

28. Perimeter of a square field is 36 m. Find its area. **[JNV 2000]**
(1) 81 sq m (2) 16 sq m
(3) 36 sq m (4) 100 sq m

29. Each side of a square is 26 m. Its area is **[JNV 2000]**
(1) 26 m (2) 26 m^2
(3) 676 m (4) 676 m^2

30. Area of a ground is 12500 m^2. Its length is 125 m. Its perimeter is **[JNV 1999]**
(1) 450 m (2) 100 m
(3) 900 m (4) 1250 m

31. The length of a rectangle is 1 cm more than its breadth and its perimeter is 14 cm. Area of the rectangle is **[JNV 1998]**
(1) 16 cm^2 (2) 14 cm^2 (3) 12 cm^2 (4) 10 cm^2

32. The floor of a room is rectangular in shape. Its length is 6 m and breadth 5 m. Height of the room is 4 m. Find the area of the 4 walls of the room. **[JNV 1998]**
(1) 87 m^2 (2) 88 m^2 (3) 89 m^2 (4) 90 m^2

33. The area of a rectangular region is 1053 m^2, its length is 39 m . Find its breadth. **[JNV 1997]**
(1) 26 m (2) 27 m (3) 28 m (4) 29 m

34. Length of a room is twice its width. If the length of the room is 40 m, find its area. **[JNV 1997]**
(1) 800 m^2 (2) 900 m^2 (3) 1000 m^2 (4) 1200 m^2

35. Find the area of a rectangular plot 20 m long and 16 m wide. **[JNV 1997]**
(1) 160 m^2 (2) 200 m^2 (3) 220 m^2 (4) 320 m^2

Answers

1. (2)	**2.** (3)	**3.** (2)	**4.** (2)	**5.** (3)	**6.** (2)	**7.** (2)	**8.** (1)	**9.** (2)	**10.** (3)
11. (2)	**12.** (1)	**13.** (2)	**14.** (1)	**15.** (4)	**16.** (3)	**17.** (2)	**18.** (1)	**19.** (3)	**20.** (2)
21. (1)	**22.** (3)	**23.** (1)	**24.** (4)	**25.** (4)	**26.** (3)	**27.** (3)	**28.** (1)	**29.** (4)	**30.** (1)
31. (3)	**32.** (2)	**33.** (2)	**34.** (1)	**35.** (4)					

Hints and Solutions

1. According to the question,
Side of a cube = 10 cm
When, two cubes are joined end to end
Length of a cuboid (l) = 20 cm, breadth (b) = 10 cm,
height (h) = 10 cm
By using, volume of a cuboid = $l \times b \times h$
$= 20 \times 10 \times 10 = 2000\ cm^3$

2. According to the question,
Let breadth of a rectangular plot = B
Length of a rectangular plot (l) = $2B$
∴A square swimming pool of side 8 m occupies one-eighth part of the plot.
∴Area of swimming pool
$= \frac{1}{8} \times$ area of a rectangular plot
or $(\text{Side})^2 = \frac{1}{8} \times l \times b$
$(8)^2 = \frac{1}{8} \times 2B \times B$
$64 = \frac{1}{4} \times B^2$
$B^2 = 64 \times 4 = 256$
$B = 16$ m
Hence, length of the plot = $2 \times 16 = 32$ m

3. According to the question,
Size of a rectangular slab = Length × Breadth
= 10 cm × 8 cm
Size of a hall = Length × Breadth = 12 m × 10 m
= 1200 cm × 1000 cm [∵ 1 m = 100 cm]
Total number of slabs
$= \frac{\text{Size of a hall}}{\text{Size of a rectangular slab}}$
$= \frac{1200 \times 1000}{10 \times 8} = 15000$
∴Total number of rectangular slabs = 15000

4. Given,
length of rectangular plot = 100m
Breadth of rectangular plot = 80 m
As we know that,
perimeter of plot = 2 (length+ Breadth)

Perimeter = 2(100+80)

$= 2 \times 180 = 360$ m

length of wire to surround it three times

$= 3 \times 360 = 1080$ m

5. Amount of water stored in the tank = Volume of the tank

∴ Volume of tank

= length × breadth × Height

∴ $V = 40 \times 60 \times 50$

$V = 120000 \text{ cm}^3$

As 1000 cm^3 1 is equal to litre

∴ $V = 120$L

As tank already stored 50 liters of water.

∴Amount of water to fill the tank completely

$= 120 - 50 = 70$ L

6. Side of the square $= \frac{\text{Perimeter}}{4} = \frac{48}{4} = 12$ m

∴ Area of the square = Side × Side

$= 12 \times 12 = 144 \text{ m}^2$

7. Volume of the box $= 3 \times 3 \times 3 = 27$ cu m

8. Here, $AD = BC = 6$ cm

Now In ΔABC, AC(Diagonal) = 10 cm,

BC (Breadth) = 6 cm

So, by Pythagoras Theorem,

$(\text{Length})^2 = \sqrt{(\text{Diagonal})^2 - (\text{Breadth})^2}$

$\Rightarrow \quad AB^2 = AC^2 - BC^2$

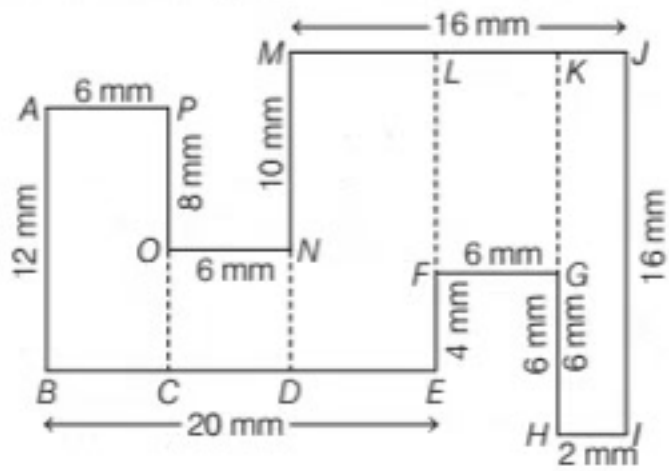
$AB = \sqrt{10^2 - 6^2} = \sqrt{100 - 36}$

$= \sqrt{64} = 8$ cm

9. The required number of tiles

$= \frac{\text{Area of Hall}}{\text{Area of one Tile}} = \frac{20 \times 12}{4 \times 4} = 15$

10. According to the condition and direction of question the diagram will be as follows



Area of figure = Area of ($ABCP + OCDN + DMLE + FLKG + KHIJ$)

$= AB \times AP + OC \times ON + DE \times DM + FG \times GK + HI \times JI$

$= 12 \times 6 + (12 - 8) \times 6 + (20 - 12) \times (10 + 12 - 8) + 6 \times (16 - 6) + 2 \times 16$

$\left\{ \begin{array}{c} \because OC = AB - PO, \\ DE = BE - (AP + ON) \\ \text{and } GK = JI - HG \end{array} \right\}$

$= 72 + 4 \times 6 + 8 \times 14 + 6 \times 10 + 32$

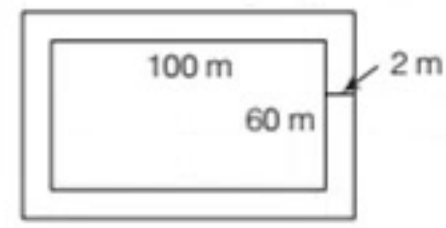
$= 72 + 24 + 112 + 60 + 32 = 300 \text{ mm}^2$

11. Area of the hall $= (4.8 \times 3.6) \text{ m}^2$

Area of the square tiles $= (1.2 \times 1.2) \text{ m}^2$

∴ Required number of tiles $= \frac{4.8 \times 3.6}{1.2 \times 1.2} = 12$

12.



∵ Area of the rectangular park

$= 100 \times 60 = 6000 \text{ m}^2$

Area of the rectangular park with path width

$= (100 + 2 \times 2) \times (60 + 2 \times 2)$

$= 104 \times 64 = 6656 \text{ m}^2$

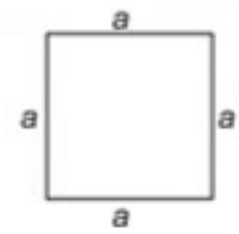
∴ Area of the path $= 6656 - 6000 = 656 \text{ m}^2$

13. Given, side of the square park = 100 m

∴ Perimeter of the square park = 4 × Side

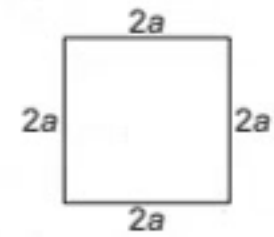
$= 4 \times 100 = 400$ m

14.



Perimeter = $4a$

After doubled the side,



Perimeter $= 4 \times 2a = 8a$

Hence, resultant perimeter $8a = 2 \times (4a)$

= 2 times × Original perimeter

Thus, the perimeter will be doubled.

15. Given, perimeter of the square park = 72 m

Suppose, side of the square park = x m

Then, $4x = 72 \Rightarrow x = 18$ m

Hence, area of the square park $= (18)^2 = 324$ m^2

16. Area of room = Length × Breadth

$363 = 33 \times$ Breadth

$\therefore$ Breadth $= \frac{363}{33} = 11$ m

17. Given, length of the rectangle = 25 m

$\therefore$ Breadth of the rectangle $= 25 \times \frac{3}{5} = 15$ m

$\therefore$ Perimeter of the rectangle $= 2(l + b)$

$= 2(25 + 15) = 80$ m

18. Area of rectangle = Length × Breadth

$= 12 \times 6.5 = 78$ cm^2

19. Maximum a square is formed in a rectangle.

$\therefore$ Perimeter of square = 100 cm

$4 \times a = 100 (a = \text{Side}) \Rightarrow a = \frac{100}{4} = 25$ cm

$\therefore$ Area of rectangle = Area of square

$= 25 \times 25 = 625$ cm^2

20. When, 60 cubes in each row, then

Length of 60 cubes of 1 cm (l) = 20 cm

Breadth of 60 cubes of 1 cm (b) = 1 cm

Height of 60 cubes of 1 cm (h) = 3 cm

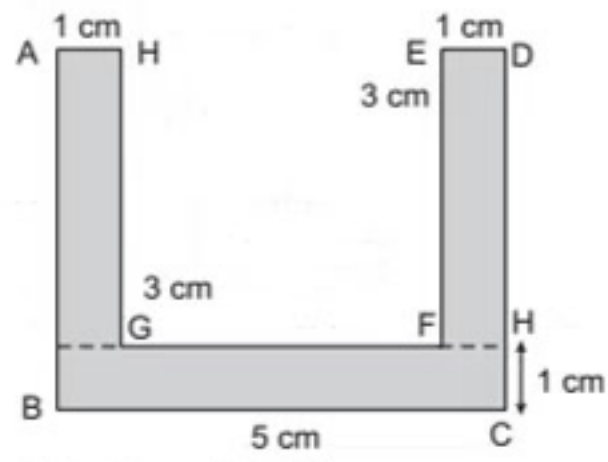
$\therefore$ Volume of cuboid $= l \times b \times h = 20 \times 1 \times 3$

$= 60$ cm^3

21. Area of the shaded portion

$= FE \times ED + BC \times CH + GH \times AH$

$= 3 \times 1 + 5 \times 1 + 3 \times 1 = 3 + 5 + 3 = 11$ cm^2



22. Area of the floor = 192 m^2

Length = 16 m

Breadth $= \frac{192}{16} = 12$ m

$\therefore$ Perimeter $= 2(l + b) = 2(16 + 12)$

$= 2(28) = 56$ m

23. Number of tiles required $= \frac{\text{Area of floor}}{\text{Area of 1 tile}}$

$= \frac{3.6 \times 4.5}{0.15 \times 0.15} = \frac{36}{10} \times \frac{45}{10} \times \frac{100}{15} \times \frac{100}{15} = 720$

24. The area of rectangular field $= 120 \times 160$

$= 19200$ sq m

The area of 1 rectangular plot $= 40 \times 60$

$= 2400$ sq m

$\therefore$ Number of rectangular plots $= \frac{19200}{2400} = 8$

25. The side of square $= \frac{\text{Perimeter}}{4}$

$\therefore$ The side of the given square $= \frac{200}{4} = 50$ m

$\therefore$ Area = Side × Side

$= 50 \times 50 = 2500$ sq m

26. Volume of cuboid $= l \times b \times h$

$= 18 \times 12 \times 8$ cu cm

Volume of cube = Volume of cuboid

Given, $= 18 \times 12 \times 8$

$\therefore$ Edge of cube $= \sqrt[3]{18 \times 12 \times 8} = 12$ cm

27. Side of a square $= \sqrt{\text{Area of the square}}$

$\therefore$ Side of the square $= \sqrt{729} = 27$ m

$\because$ Perimeter of a square = 4 × Side

$\therefore$ Perimeter of a square $= 4 \times 27 = 108$ m

28. Perimeter of square = 4 × Side

$36 = 4 \times x \Rightarrow x = 9$

$\therefore$ Area $= (9)^2 = 81$ sq m

29. Area $= (26)^2 = 676$ m^2

30. Area of the ground = 12500 m^2

Length = 125 m

Breadth $= \frac{\text{Area}}{\text{Length}} = \frac{12500}{125} = 100$ m

$\therefore$ Perimeter $= 2(l + b) = 2(125 + 100)$

$= 2(225) = 450$ m

31. Let length and breadth be $(x + 1)$cm and x cm.

Perimeter $= 2(l + b) = 2(x + 1 + x) = 4x + 2$

$4x + 2 = 14 \Rightarrow 4x = 12 \Rightarrow x = 3$

Length $= 3 + 1 = 4$ cm, Breadth = 3 cm

$\therefore$ Area of the rectangle $= l \times b = 4 \times 3 = 12$ cm^2

32. Area of 4 walls $= 2(l + b) \times h = 2(6 + 5) \times 4$

$= 2(11) \times 4$

$= 22 \times 4 = 88$ m^2

33. Breadth $= \frac{\text{Area}}{\text{Length}} = \frac{1053}{39} = 27$ m

34. According to the question, Length = 40 m

Breadth = 20 m

Then, area $= 40 \times 20 = 800$ m^2

35. Area of a rectangular = Long × Wide

$= 20 \times 16 = 320$ m^2

Practice Exercise

1. If side of a square is doubled, how many times its area will be increased?
(1) 5 (2) 2 (3) 4 (4) 3

2. The total cost of flooring a room at ₹ 12.50 per sq m is ₹ 400. If the length of the room is 8 m, its breadth is
(1) 6 m (2) 8 m
(3) 4 m (4) 9 m

3. The perimeter of the floor of a room is 18 m. What is the area of the walls of the room, if the height of the room is 3 m?
(1) 21 m^2 (2) 42 m^2 (3) 54 m^2 (4) 108 m^2

4. Find the number of bricks each of dimensions 25 cm × 12.5 cm × 7.5 cm to make a wall of dimensions 5 m × 3 m × 20 m.
(1) 1200 (2) 1350 (3) 128000 (4) 1400

5. What would be the diagonal of a square whose area is 25 sq cm?
(1) 7 cm (2) $\sqrt{60}$ cm
(3) 9 cm (4) 5 cm

6. The ratio between length and breadth of a rectangular plot is 5 : 3, respectively and its perimeter is 48 m. What will be its area (in sq m)?
(1) 120 (2) 116 (3) 115 (4) 135

7. A table measures 2 m long and 1.5 m broad. What is the length of tape required once to engirdle the table?
(1) 3.0 m (2) 3.5 m
(3) 6.0 m (4) 7.0 m

8. The perimeter of a square is 144 m. Its area is
(1) 12 sq m (2) 72 sq m (3) 1296 sq m (4) 1728 sq m

9. What is the area of a rectangle whose breadth is 5 m and its length is double to its breadth?
(1) 10 m^2 (2) 15 m^2
(3) 30 m^2 (4) 50 m^2

10. Area of a rectangle measuring 6 m long is 30 m^2. Its width is
(1) 5 m (2) 6 m (3) 24 m (4) 180 m

11. The area of a square is equal to the area of rectangle measuring 16 cm length and 9 cm breadth. The perimeter of the square will be
(1) 24 cm (2) 25 cm (3) 48 cm (4) 50 cm

12. A floor of room measures (5 m × 4 m). How many tiles will be required to cover the floor if each tiles measures 80 cm × 50 cm?
(1) 20 (2) 40
(3) 50 (4) 200

13. What is the volume of a box whose length is 3 m, breadth is 2 m and height is 2 m?
(1) 12 m^2 (2) 10 m^3 (3) 12 m^3 (4) 10 m^2

14. A 20 m long and 10 m wide rectangular tank contains water upto the depth of 2 m. The water was transferred to another rectangular tank measuring 10 m long and 5 m wide. In the new tank the water will measure upto a depth of
(1) 8 m (2) 6 m
(3) 4 m (4) 2 m

15. A tank is 6 m long, 4 m wide and $1\frac{1}{2}$ m high. The volume of water in the tank is
(1) 24 cu m (2) 36 cu m
(3) $11\frac{1}{2}$ cu m (4) 16 cu m

16. If the volume of a cube is 729 cm^3, what is the length of its diagonal?
(1) $9\sqrt{2}$ cm (2) $9\sqrt{3}$ cm
(3) 18 cm (4) $18\sqrt{3}$ cm

17. The capacity of a cuboid tank of water is 50000 L. Find the breadth of the tank, if its length and depth are 2.5 m and 10 m, respectively.
(1) 2 m (2) 4 m (3) 9 m (4) 6 m

Answers

1. (3)	**2.** (3)	**3.** (3)	**4.** (3)	**5.** (4)	**6.** (4)	**7.** (4)	**8.** (3)	**9.** (4)	**10.** (1)
11. (3)	**12.** (3)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (2)	**17.** (1)			

Hints and Solutions

1. Let original side of the square be a.

Then, original area $= a^2$

New side $= 2a$

New area $= (2a)^2 = 4a^2$

Thus, area will be 4 times the original area.

2. Area $= \dfrac{\text{Total cost}}{\text{Rate}} = \left(\dfrac{400}{12.50}\right) = 32 \text{ m}^2$

Area $= 32 \text{ m}^2$, Length $= 8$ m

$\therefore$ Breadth $= \dfrac{\text{Area}}{\text{Length}} = \left(\dfrac{32}{8}\right) = 4$ m

3. Area of 4 walls of a room

$= 2$ (Length + Breadth) $\times$ Height

$=$ Perimeter of floor $\times$ Height $= 18 \times 3 = 54 \text{ m}^2$

4. Number of bricks $= \dfrac{\text{Volume of wall}}{\text{Volume of a brick}}$

$= \dfrac{500 \times 300 \times 2000}{2.5 \times 12.5 \times 7.5} = 128000$

5. Diagonal of square $= \sqrt{\text{Area}} = \sqrt{25} = 5$ cm

6. Perimeter $= 2$(Length + Breadth)

$48 = 2(5x + 3x) \Rightarrow x = \dfrac{48}{16} = 3$

$\therefore$ Area $= (5 \times 3) \times (3 \times 3) = 15 \times 9 = 135 \text{ m}^2$

7. Length of the table $= 2$ m

Breadth of the table $= 1.5$ m

Length of the tape required to engirdle the table

$= 2\,(2 + 1.5) = 2 \times 3.5 = 7$ m

8. Perimeter of square $= 144$ m

$\therefore$ One side of the square $= \dfrac{144}{4} = 36$ m

$\therefore$ Area of the square $= 36 \times 36 = 1296$ sq m

9. $\because$ Breadth of rectangle $= 5$ m

Length (double the breadth) $= 2 \times 5 = 10$ m

$\therefore$ Area $=$ Length $\times$ Breadth $= 10 \times 5 = 50 \text{ m}^2$

10. Width $= \dfrac{\text{Area}}{\text{Length}} = \dfrac{30}{6} = 5$ m

11. Area of the rectangle $= 16 \times 9$ sq cm

Area of the square $= 16 \times 9$ sq cm

$\therefore$ One side of the square $= \sqrt{16 \times 9}$

$= 4 \times 3 = 12$ cm

$\therefore$ Perimeter of the square $= 4 \times 12 = 48$ cm

12. Area of the floor $= 5 \times 4$ sq m

$= 500 \times 400$ sq cm $= 200000$ sq cm

Area of 1 tile $= 80 \times 50 = 4000$ sq cm

$\therefore$ The number of tiles required

$= \dfrac{\text{Area of the floor}}{\text{Area of 1 tile}}$

$= \dfrac{200000}{4000} = 50$ tiles

13. Volume of the box $=$ Length $\times$ Breadth $\times$ Height

$= 3 \times 2 \times 2 = 12 \text{ m}^3$

14. $\because$ Volume of water in the first tank

$= 20 \times 10 \times 2 = 400$ m

Given, volume of water in the first tank

$=$ Volume of water in the second tank

$\therefore$ $400 =$ Length $\times$ Width $\times$ Depth

$\therefore$ Depth of other tank $= \dfrac{400}{\text{Length} \times \text{Width}}$

$= \dfrac{400}{10 \times 5} = 8$ m

15. Volume of water in the tank

$=$ Length $\times$ Breadth $\times$ Height

$= 6 \times 4 \times \dfrac{3}{2} = 36$ cu m

16. Volume of cube $=$ (Side)^3

$\therefore$ $729 = a^3$

$\Rightarrow$ $a = 9$ cm

$\therefore$ Diagonal of cube $=$ Side $\times \sqrt{3}$

$= 9 \times \sqrt{3} = 9\sqrt{3}$ cm

17. Capacity of tank $= 50000$ L $= 50 \text{ m}^3$

$\left[\because 1 \text{ L} = \dfrac{1}{1000} \text{ m}^3\right]$

$\therefore$ Breadth $= \dfrac{50}{2.5 \times 10} = 2$ m

Self Practice

1. Area of rectangular ground is 12500 m^2. Its length is 125 m. Its perimeter is
   (1) 450 m (2) 100 m (3) 900 m (4) 1250 m
2. The ratio of length and breadth of a room is 3 : 2. If the sum of length and breadth is 40 m, then its breadth is
   (1) 24 m (2) 18 m (3) 16 m (4) 14 m
3. A rectangular solid measuring 8 cm × 4 cm × 2 cm is melted and cast in the form of a cube. The side of the cube formed is
   (1) 64 m (2) 32 m (3) 8 cm (4) 4 cm
4. How many 5 cm cubes can be cut from a cube whose edge is 20 cm?
   (1) 100 (2) 64 (3) 32 (4) 4
5. The perimeter of a square is 48 m. Its area is
   (1) 121 sq m (2) 148 sq m (3) 144 sq m (4) 192 sq m
6. The ratio of length and breadth of a rectangle is 5 : 4. If the length is 25 m, the breadth is
   (1) 15 m (2) 20 m (3) 10 m (4) 12 m
7. The length of a room is 11 m, breadth is 8 m and height is 2 m. What will be the area of the walls of the room?
   (1) 88 sq m (2) 176 sq m (3) 38 sq m (4) 76 sq m
8. The length and breadth of a rectangle is 80 m and 40 m, respectively. If the length increases by 5% and the breadth decreases by 5%. What will be the difference in perimeter?
   (1) 20 m (2) 12 m (3) 15 m (4) 4 m
9. The perimeter of a rectangle is equal to the perimeter of a square. If the length and breadth of rectangle is 20 m and 10 m, respectively. Find the area of the squar.
   (1) 300 sq m (2) 225 sq m (3) 250 sq m (4) 325 sq m
10. The area of a square is 100 sq m. Its perimeter is
    (1) 40 m (2) 100 m (3) 140 m (4) 400 m
11. The length of a rectangular field is double its width. If the width is 100 m, what will be its area?
    (1) 200 sq m (2) 20000 sq m (3) 200000 sq m (4) 2000 sq m
12. The area of a square court is 196 sq m. The perimeter is
    (1) 40 m (2) 60 m (3) 50 m (4) 56 m
13. What will be the cost of fencing a square park of side 210 m, if the cost of fencing is ₹ 5.50 per m?
    (1) ₹ 4620 (2) ₹ 4000 (3) ₹ 4680 (4) ₹ 840
14. The height of a cuboid is 2 m. Its breadth and length are 2 times and 3 times its height, respectively. The volume of the cuboid is
    (1) 48 m^3 (2) 7 m^3 (3) 12 m^3 (4) 24 m^3

Answers

1. (2)	**2.** (3)	**3.** (4)	**4.** (2)	**5.** (3)	**6.** (2)	**7.** (4)	**8.** (4)	**9.** (2)	**10.** (1)
11. (2)	**12.** (4)	**13.** (1)	**14.** (1)						

CHAPTER

18

PATTERN

A **pattern** is a set of rule within the numeral and number series, hence refers to certain mathematical operations likewise addition, subtraction, division and multiplication from one term to another term.
It can be classified in two ways :

Grid Pattern

It contains more than one numeral within the square rectangle applying certain rule.

e.g.,

6	11	16
9	14	19
13	18	23

Second and third term in each row is exceeding by 5 and 10 of the first term of each row

i.e. Ist row, $6+5=11$ and $6+10=16$

IInd row, $9+5=14$ and $9+10=19$

IIIrd row, $13+5=18$ and $13+10=23$

Example **1.** Identify the value of question mark (?).

18	21	24
28	31	34
38	41	44
?	?	?

(1) 48, 51, 53
(2) 48, 51, 54
(3) 46, 49, 52
(4) 51, 54, 57

Sol. **(2)** Required pattern,

$$\begin{array}{lll} 18 & 18+3=21 & 21+3=24 \\ \downarrow +10 & & \\ 28 & 28+3=31 & 31+3=34 \\ \downarrow +10 & & \\ 38 & 38+3=41 & 41+3=44 \\ \downarrow +10 & & \\ \boxed{48} & \boxed{48}+3=\boxed{51} & 51+3=\boxed{54} \end{array}$$

Example **2.** If sum of each row, column and diagonals are equal, then the value of *P*, *Q* and *R* respectively is

P	15	22
21	19	*Q*
R	23	18

(1) 20, 16, 17 (2) 20, 17, 16
(3) 17, 20, 16 (4) 16, 20, 17

Sol. **(2)** $\because$ Sum of all column are equal.

$\therefore \quad 15+19+23=22+Q+18$

$\Rightarrow \quad 57=40+Q \Rightarrow Q=\boxed{17}$

Again, sum of all row are equal.

$\therefore P+15+22=21+19+Q=R+23+18$

$\Rightarrow \quad P+37=40+Q=R+41$

$\Rightarrow \quad P+37=40+17 \Rightarrow P=\boxed{20}$

and $\quad R+41=40+17 \quad R=\boxed{16}$

Series Based Pattern

Such type of questions mainly deals with the pattern of increasing or decreasing of numerals, hence may be operated by the mathematical operations such as addition, subtraction, multiplication and division.

- If the next term is increasing in constant manner, then pattern of addition must take place.
- If the next term is decreasing in constant manner, then patter of subtraction must take place.
- If the next term is increasing rapidally, then pattern of multiplication must take place.
- If the next term is decreasing rapidally, then pattern of division must take place.

e.g., (i)

6 11 16 21 26 31 [36]

+5 +5 +5 +5 +5 +5

Here, next term is increasing in constant manner.

(ii)

16 14 12 10 [8]

−2 −2 −2 −2

(iii) 2 4 8 16 32

×2 ×2 ×2 ×2

Here, next term is obtained by multiplying the previous number by 2.

(iv)

54 18 6 2

÷3 ÷3 ÷3

Here, next term is obtained by dividing the previous number by 3.

Example **3.** Find the next term of the given series

8, 11, 15, 20, 26, ?

(1) 30
(2) 32
(3) 33
(4) 34

Sol. **(3)**

8 11 15 20 26 [33]

+3 +4 +5 +6 +7

The series is increasing by ascending series by 1.

Example **4.** Identify the pattern of the question and determine the next term.

$$\begin{array}{cccc} 2 & 5 & 8 & 11 \\ \times 2 & \times 5 & \times 8 & \times 11 \quad ? \\ \hline 4 & 25 & 64 & 121 \end{array}$$

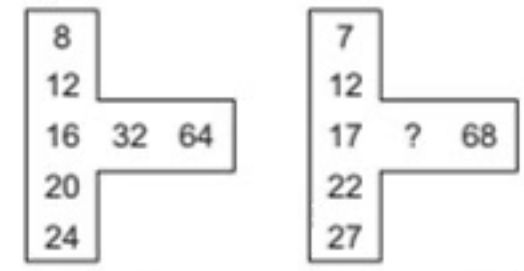
(1) $\begin{array}{r} 15 \\ \times\ 15 \\ \hline 225 \end{array}$ (2) $\begin{array}{r} 14 \\ \times\ 14 \\ \hline 196 \end{array}$

(3) $\begin{array}{r} 16 \\ \times\ 16 \\ \hline 256 \end{array}$ (4) $\begin{array}{r} 18 \\ \times\ 18 \\ \hline 324 \end{array}$

Sol. **(2)** Every next term is increasing by 3 from the previous one, so the next term will be 14 (11 + 3).

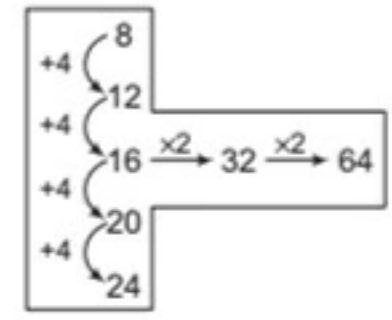
$$\begin{array}{r} 14 \\ \times 14 \\ \hline 196 \end{array}$$

Example **5.** Identify the pattern and find the value of question mark (?).

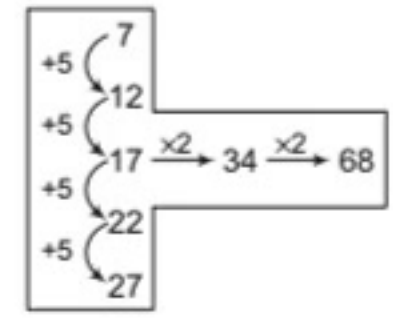


(1) 35 (2) 40 (3) 34 (4) 45

Sol. **(3)** As,



Similarly,



∴ ? = 34

Entrance Corner

1. What is the next term in the given series?
9, 13, 17, 21, 25, ? **[JNV 2018]**
(1) 26 (2) 27 (3) 29 (4) 33

2. Next term of 258, 130, 66, 34, 18, ... is **[JNV 2017]**
(1) 12 (2) 10 (3) 8 (4) 13

3. Find the next term of the series
3, 4, 6, 9, 13, ... **[JNV 2016]**
(1) 18 (2) 17 (3) 14 (4) 19

4. The next term of the series 1, 2, 4, 8, ... is **[JNV 2015]**
(1) 12 (2) 16 (3) 10 (4) 11

5. Next term of 80, 10, 70, 15, 60, ... is **[JNV 2014]**
(1) 20 (2) 25 (3) 30 (4) 50

6. If sum of each row, column and diagonals are equal, then the value of x, y, z and w respectively, is **[JNV 2014]**

8	x	z
y	5	w
4	9	2

(1) 4, 6, 8, 7 (2) 1, 3, 6, 7
(3) 1, 6, 3, 7 (4) 3, 6, 7, 1

7. Numbers in the next line is **[JNV 2013]**

40	45	50
55	60	65
70	75	80
-	-	-

(1) 75, 80, 85 (2) 85, 90, 95
(3) 90, 95, 100 (4) 70, 75, 85

8. If the sum of each row, column and diagonals are same, then the value of x, y, t and z is **[JNV 2013]**

x	1	y
3	5	z
t	9	2

(1) 8, 6, 4, 7 (2) 6, 8, 4, 7
(3) 7, 8, 6, 4 (4) 4, 6, 7, 8

9. The next number in the series 2, 5, 8, 11, ... is **[JNV 2012]**
(1) 12 (2) 10
(3) 14 (4) 15

10. 11, 13, 17, 19, 23, 29, 31, 37, 41, ...is **[JNV 2011]**
(1) 42 (2) 43
(3) 44 (4) 45

11. Study the following pattern find out the next term. **[JNV 2010]**

$$\begin{array}{r} 5 \\ \times\ 5 \\ \hline 25 \end{array} \quad \begin{array}{r} 15 \\ \times\ 15 \\ \hline 225 \end{array} \quad \begin{array}{r} 25 \\ \times\ 25 \\ \hline 625 \end{array} \quad \begin{array}{r} 35 \\ \times\ 35 \\ \hline 1225 \end{array} \quad \begin{array}{r} 45 \\ \times\ 45 \\ \hline 2025 \end{array}$$

(1) $\begin{array}{r} 55 \\ \times\ 55 \\ \hline 2825 \end{array}$ (2) $\begin{array}{r} 55 \\ \times\ 55 \\ \hline 3225 \end{array}$

(3) $\begin{array}{r} 55 \\ \times\ 55 \\ \hline 3025 \end{array}$ (4) $\begin{array}{r} 55 \\ \times\ 55 \\ \hline 3225 \end{array}$

12. Which group of number will come in the next row? **[JNV 2007]**

6	24	624
7	28	728
8	32	832
?	?	?

(1) 9, 36, 936, (2) 9, 36, 972
(3) 9, 81, 981, (4) 9, 63, 963

13. What will be the next row of numbers in the following pattern? **[JNV 2005]**

4	16	64
6	36	216
8	64	512
?	?	?

(1) 8, 68, 518 (2) 10, 100, 1000
(3) 10, 200, 2000 (4) 10, 500, 5000

14. The next two terms in the series 123, 234, 345, ..., are **[JNV 2004]**
(1) 456, 457 (2) 346, 347
(3) 456, 567 (4) 456, 678

Answers

1. (3)	**2.** (2)	**3.** (1)	**4.** (2)	**5.** (1)	**6.** (2)	**7.** (2)	**8.** (1)	**9.** (3)	**10.** (2)
11. (3)	**12.** (1)	**13.** (2)	**14.** (3)						

Hints and **Solutions**

1. The series follows the pattern as

$$9+4=13$$
$$13+4=17$$
$$17+4=21$$
$$21+4=25$$
$$25+4=\boxed{29}$$

Therefore, 29 is the next term in the given series.

2. 258 130 66 34 18 $\boxed{10}$

÷2+1 ÷2+1 ÷2+1 ÷2+1 ÷2+1

3. 3 4 6 9 13 $\boxed{18}$

+1 +2 +3 +4 +5

It is clear that next term of series is 18.

4. 1 2 4 8 $\boxed{16}$

×2 ×2 ×2 ×2

5. 80 10 70 15 60 $\boxed{20}$

+5 +5

−10 −10

Hence, 20 is the missing term.

6. Since, the sum of last row

$$=4+9+2=15$$

Now, sum of diagonal

$$4+5+z=15$$
$$z=15-9$$
$$=6$$

Now, sum of first column

$$8+y+4=15$$
$$y=15-12$$
$$=3$$

Also, $y+5+w=15$

$$3+5+w=15$$
$$w=15-8$$
$$=7$$

Now, $8+x+z=15$

$$8+x+6=15$$
$$x=15-14=1$$

Hence, x, y, z and w are 1, 3, 6 and 7.

7. $40 \xrightarrow{+15} 55 \xrightarrow{+15} 70 \xrightarrow{+15} \boxed{85}$

(in first column)

$45 \xrightarrow{+15} 60 \xrightarrow{+15} 75 \xrightarrow{+15} \boxed{90}$

(in second column)

$50 \xrightarrow{+15} 65 \xrightarrow{+15} 80 \xrightarrow{+15} \boxed{95}$

(in third column)

8.

x	1	y
3	5	z
t	9	2

If we put $x=8$, $y=6$, $t=4$, $z=7$

Then,

8	1	6	= 15
3	5	7	= 15
4	9	2	= 15
15	15	15	

9. The pattern of series is

2 5 8 11 $\boxed{14}$

+3 +3 +3 +3

10. The series consists of prime numbers.

∴The missing number is the next prime number which is 43.

11. $55\times55=3025$

12. 6 and 24 becomes 624.

Where, $6\times4=24$

Hence, 9 and $9\times4=36$ becomes 936

∴Next group will be 9, 36, 936.

13. Second and third columns are square and cube of the first column.

Hence, 10

$$(10)^2=100$$
$$(10)^3=1000$$

14.

1	2	3				
×	2	3	4			
	×	3	4	5		
		×	4	5	6	
			×	5	6	7

In the series, left most digit in each term is omitting and the succeeding of the right most digit is appearing.

Practice Exercise

1. Identify the pattern and find the value of question mark?

4	9	14	
+ 8	+ 13	+ 18	?
12	22	32	

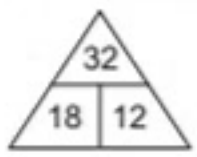
(1) 19 + 23 = 42

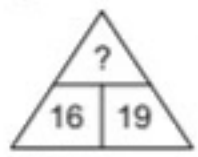
(2) 18 + 22 = 40

(3) 17 + 21 = 38

(4) 20 + 24 = 44

2. In the following figures, identify the pattern and find the value of question mark(?).





(1) 34 (2) 37
(3) 35 (4) 38

3. Identify the pattern and find the value of question mark(?).

6 × 6 + 2	
14	15
8 × 8 + 2	
18	19
+ 2	
12	13

(1) 4 × 4 (2) 7 × 7
(3) 5 × 5 (4) 9 × 9

4. If sum of each row, column and diagonals are equal, then the value of *a*, *b*, *c* and *d* respectively, is

a	7	14
b	11	*d*
8	15	*c*

(1) 12, 13, 10, 9 (2) 13, 12, 9, 10
(3) 12, 9, 13, 10 (4) 12, 13, 9, 10

5. If the sum of each row, column and diagonals are equal, then the value of *p*, *q*, *r* and *s* respectively, is

19	*q*	21
p	18	16
15	*s*	*r*

(1) 20, 17, 14, 22 (2) 17, 20, 14, 22
(3) 14, 17, 20, 22 (4) 20, 14, 17, 22

Directions (Q. Nos. 6-12) *Find the value of question mark(?).*

6. 2, 3, 5, 8, 13, 21, ?
(1) 30 (2) 34
(3) 35 (4) 39

7. 8, 20, 32, 44, 56, ?
(1) 65 (2) 68
(3) 60 (4) 69

8. 4, 5, 9, 18, 34, ?
(1) 50 (2) 58
(3) 57 (4) 59

9. 2, 3, 5, 7, ?
(1) 9 (2) 13
(3) 11 (4) 10

10. 122, 248, 326, 414, ?
(1) 177 (2) 521
(3) 817 (4) 432

11.

8	4	9
2	8	4
3	7	8
14	60	?

(1) 40 (2) 41 (3) 38 (4) 49

12.

3	6	1	18
7	2	4	56
8	4	3	96
?	4	3	48

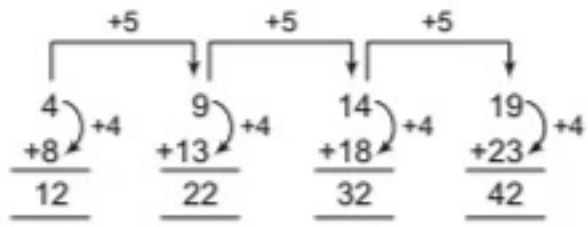
(1) 5 (2) 8 (3) 18 (4) 4

Answers

1. (1)	**2.** (2)	**3.** (3)	**4.** (1)	**5.** (4)	**6.** (2)	**7.** (2)	**8.** (4)	**9.** (3)	**10.** (1)
11. (2)	**12.** (4)								

Hints and Solutions

1.



2. As, $18 + 12 + 2 = 32$

Same as, $16 + 19 + 2 = 37$

3. As, $6 \times 6 + 2 \Rightarrow 6 + 6 + 2 = 14 \xrightarrow{+1} 15$

and $8 \times 8 + 2 \Rightarrow 8 + 8 + 2 = 18 \xrightarrow{+1} 19$

Same as, $5 \times 5 + 2 \Rightarrow 5 + 5 + 2 = 12 \xrightarrow{+1} 13$

4. Now, sum of second column $= 7 + 11 + 15 = 33$

Then,

$$a = 33 - (7 + 14) = 12$$
$$b = 33 - (8 + a) = 33 - (8 + 12) = 13$$
$$c = 33 - (8 + 15) = 10$$
$$d = 33 - (14 + c)$$
$$\Rightarrow \quad 33 - (14 + 10) = 9$$
$$\therefore \quad a = 12,\ b = 13,\ c = 10 \text{ and } d = 9$$

5. Now, sum of diagonal $= 15 + 18 + 21 = 54$

then, $p = 54 - (18 + 16) = 20$

$q = 54 - (19 + 21) = 14$

$r = 54 - (21 + 16) = 17$

and $s = 54 - (15 + r) = 54 - (15 + 17) = 22$

6. Pattern of the series is as follow :

$2 + 3 = 5$

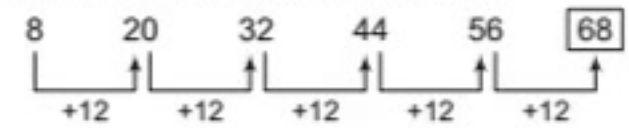
$5 + 3 = 8$

$8 + 5 = 13$

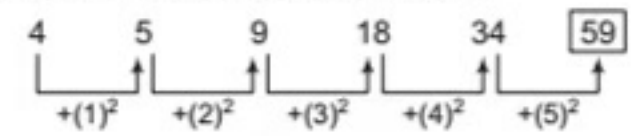
$13 + 8 = 21$

$21 + 13 = \boxed{34}$

7. Pattern of the series is as follow :



8. Pattern of the series is as follow :



9. Pattern of the series is as follow :

$$2, 3, 5, 7, \boxed{11}$$

Series is containing the prime numbers. Hence, next value after 7 is 11.

10. Pattern of the series is as follow :

As $\quad 122 \Rightarrow 1 \times 2 = 2$

$248 \Rightarrow 2 \times 4 = 8$

$326 \Rightarrow 3 \times 2 = 6$

and $\quad 414 \Rightarrow 4 \times 1 = 4$

Same as, $\quad 177 \Rightarrow 1 \times 7 = 7$

11. Pattern of the series is as follow :

As, $\quad 8 + (2 \times 3) = 14$

$4 + (8 \times 7) = 60$

Similarly,

$9 + (4 \times 8) = 41$

12. Pattern of the series is as follow :

As, $\quad 3 \times 6 \times 1 = 18$

$7 \times 2 \times 4 = 56$

$8 \times 4 \times 3 = 96$

Similarly, $\quad x \times 4 \times 3 = 48$

$$x = \frac{48}{4 \times 3} = 4$$

Self Practice

1. If sum of each row, column and diagonals are equal, then the sum of A and B is

A	3	10
9	7	B
4	11	6

(1) 12 (2) 13 (3) 14 (4) 18

2. Find the value of question mark (?).

8	11	6
15	10	13
12	15	10
19	14	?

(1) 17 (2) 15 (3) 14 (4) 21

3. If the sum of each row, column and diagonal is 24, then find the multiple of x and y.

9	y	11
10	8	6
5	x	7

(1) 32 (2) 40 (3) 44 (4) 48

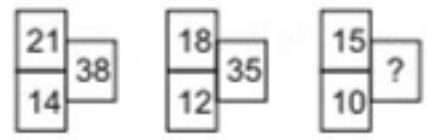
4. Next term of 69, 55, 26, 13, ... is

(1) 5 (2) 4 (3) 6 (4) 8

5. Next term of 86, 48, 32, ... is

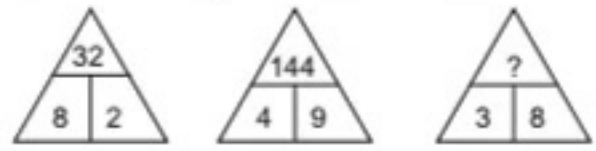
(1) 12 (2) 10 (3) 6 (4) 27

6. Identify the pattern and find the value of question mark (?).



(1) 40 (2) 30 (3) 32 (4) 36

7. Identify the pattern and find the value of question mark (?).



(1) 72 (2) 68 (3) 65 (4) 81

Answers

1. (2)	**2.** (1)	**3.** (4)	**4.** (2)	**5.** (3)	**6.** (3)	**7.** (1)

CHAPTER

19

DATA INTERPRETATION

Data

A collection of numbers (values) gathered to give some information is called data. There are two types of data : (i) Primary data (ii) Secondary data

Pictograph

Pictograph is the way of representing data using image/picture of objects. Each picture (image) stands for a certain number of objects. It helps us to answer the questions on the data at a glance.

e.g., Rajesh was asked to find the number of students playing different games in the school. The information collected by him is as follows :

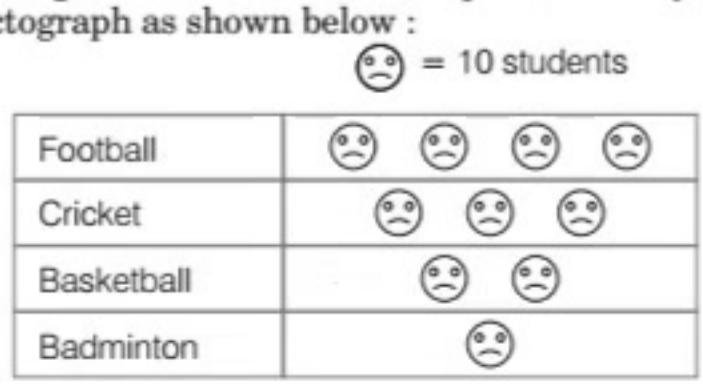
Football 40, Cricket 30, Basketball 20, Badminton 10

Represent the given information with a pictograph.

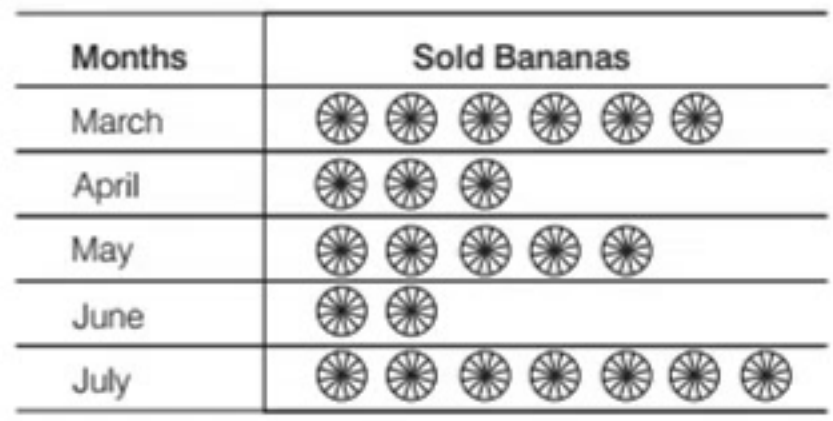
Given, information by Rajesh

Football → 40, Cricket → 30, Basketball → 20, Badminton → 10

The given data can be represented by a pictograph as shown below :



Direction (Example 1) *Read the given information carefully and answer the question given below.*



[Here, = 5 dozen]

Example **1.** What is the number of sold bananas during all the given months?

(1) 1380 (2) 1280 (3) 1180 (4) 1480

Sol. **(1)** ∵ 1 dozen = 12

∴ = 5 dozen = 5×12

Number of sold bananas in March = $6 \times 12 \times 5$
= 360 bananas

Number of sold bananas in April
= $3 \times 12 \times 5 = 180$ bananas

Number of sold bananas in May
= $5 \times 12 \times 5 = 300$ bananas

Number of sold bananas in June
= $2 \times 12 \times 5 = 120$ bananas

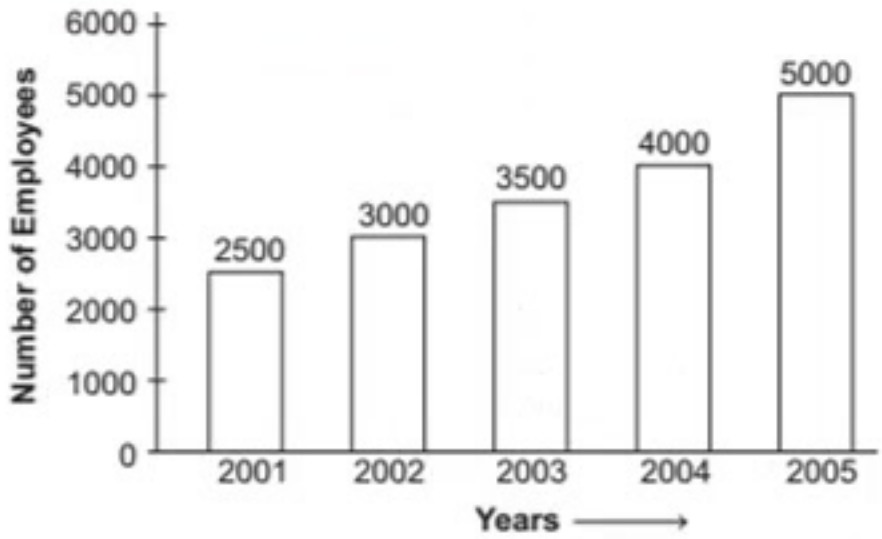
Number of sold bananas in July
= $7 \times 12 \times 5 = 420$ bananas

Hence, number of sold bananas
= $360 + 180 + 300 + 120 + 420 = 1380$ bananas

Bar Graph

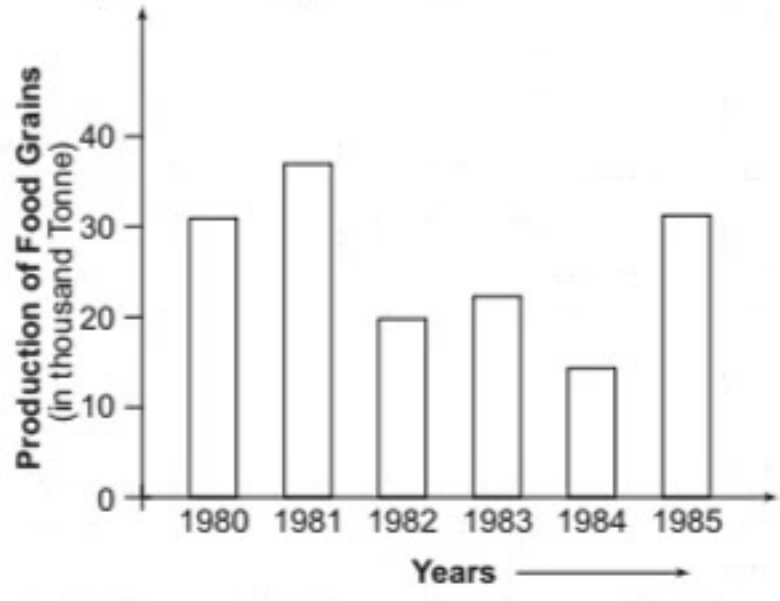
A bar graph is a pictorial representation of numerical data in the form of rectangles (or bars) of equal width and varying heights. Bars of uniform width can be drawn horizontally or vertically with equal spacing between them and the length of each bar represents the given number. Such method of representing data is called a **bar diagram** or a **bar graph.**

e.g., Number of Employees Over the Years 2001-2005 (in Thousands)



From the above graph it is clear that number of employees are increasing constantly by 500 and the number of employees in year 2002 are 3000 while as in year 2005 are 5000.

Example **2.** The given graph here shows the production of food grains of a country in different years. Find the percentage increase in production from 1984 to 1985.



(1) 50 (2) 100 (3) 75 (4) 150

Sol. **(2)** Production in 1984 = 15 (thousand Tonne)

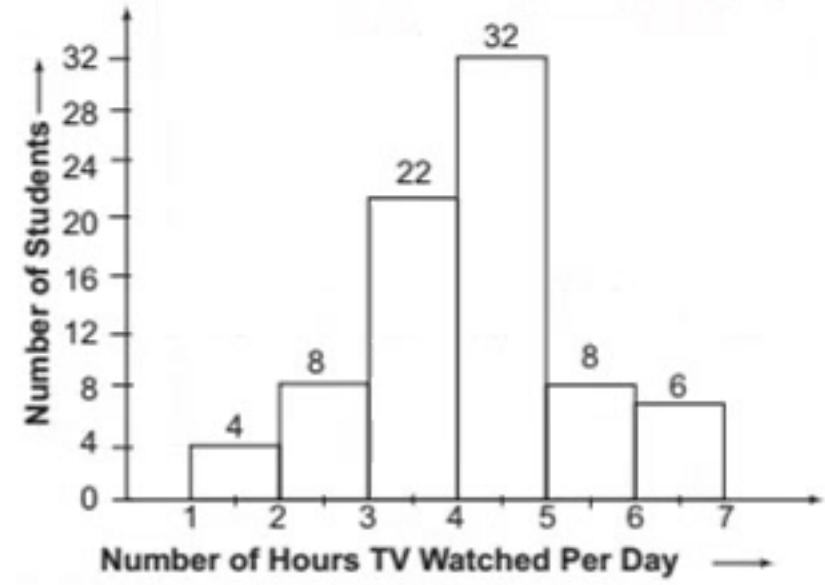
Production in 1985 = 30 (thousand Tonne)

$\therefore$ Percentage increase $= \frac{(30-15)}{15} \times 100 = 100\%$

Histogram

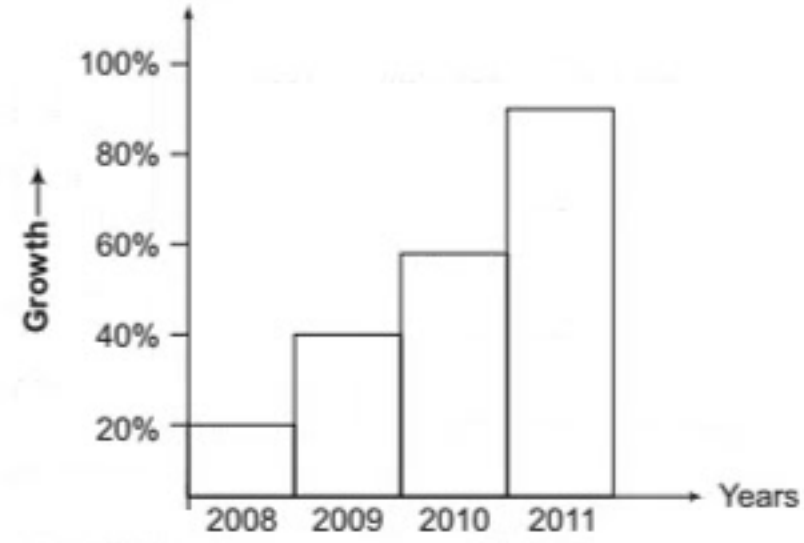
A histogram is a pictorial representation of numberical data in the form of rectangles (or bars of equal width and varying height. Bars of uniform width can be drawn horizontally or verically without space between them and the length of each bar represents the given number. Such method of representing data is called a histogram.

e.g., The number of hours for which students of a particular class watched television during holidays has been shown through the given graph.



From the above graph it is clear that number of maximum students (32) watching TV in hours 4 to 5, while minimum students (4) watching TV in hours 1 to 2.

Example **3.** From the given figure determine that in which year right back from this year India had to face the maximum growth in price comparing both the years growth?



(1) 2010 (2) 2009

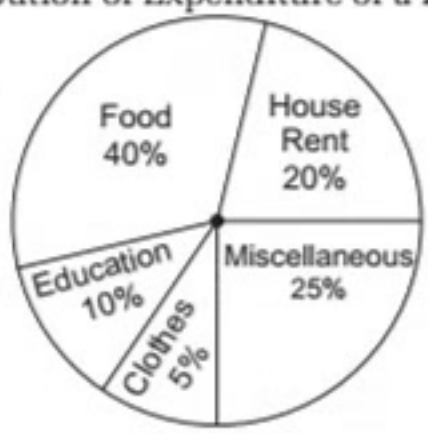
(3) 2011 (4) 2008

Sol. **(3)** Percentage growth in year 2008 = 20%
Percentage growth in year 2009 = 40%
Percentage growth in year 2010 = 60%
Percentage growth in year 2011 = 90%
Therefore, it is clear from the data that in year 2011 percentage growth in price is higher than the previous years.

Pie Chart (or Circle Graph)

A pie diagram is a pictorial representation of the numerical data by non-intersecting adjacent sectors of the circle such that area of each sector is proportional to the magnitude of the data represented by the sector.

e.g. Distribution of Expenditure of a Family



Directions (Examples 4 and 5) *Study the given information carefully and answer the question based on it.*

Adjoining pie chart gives the expenditure (in percentage) on various items and savings of a family during a month.

Example **4.** Expenditure on which item is equal to the total savings of the family?

(1) House rent
(2) Education for children
(3) Food
(4) Others

Sol. **(2)** Expenditure on education of children is the same (*i.e.*, 15%) as the savings of the faimly.

Example **5.** If the monthly savings of the family is ₹ 3000, what is the monthly expenditure on clothes?

(1) ₹ 1500
(2) ₹ 3000
(3) ₹ 2000
(4) ₹ 1800

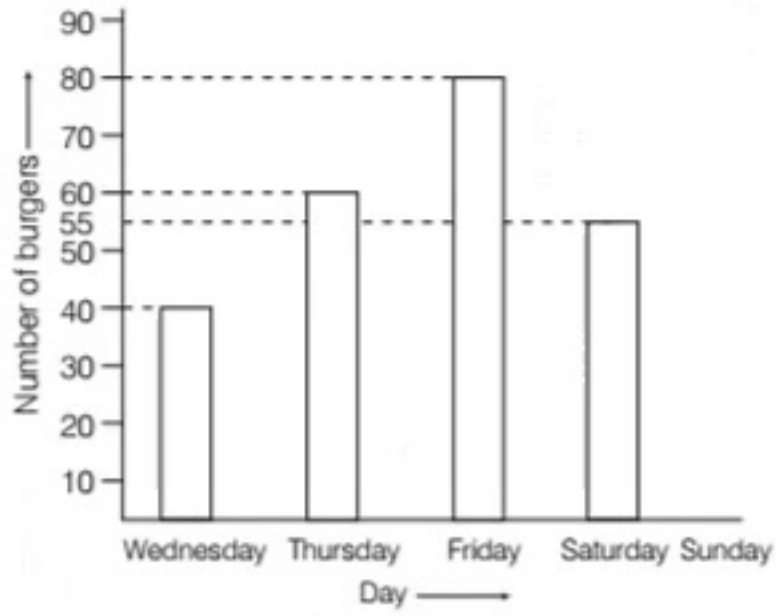
Sol. **(3)** ∵ 15% represents = ₹ 3000

Therefore, 10% represents = ₹ $\frac{3000}{15} \times 10$

= ₹ 2000

Entrance Corner

1. The following bar diagram shows the sale (number of burgers) of a burger saler during 5 days.



If total sale of burger was 320. Then number of burger sold on Sunday? **[JNV 2018]**

(1) 85 (2) 80 (3) 75 (4) 90

2. Pictograms shows the number of plants sold through a nursery from Monday to friday

Days	Sold Plants
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

= 20 plants

Find the number of plants sold from Monday fo Friday. **[JNV 2018]**

(1) 19 (2) 190 (3) 250 (4) 380

3. Read the given information carefully and answer the question.

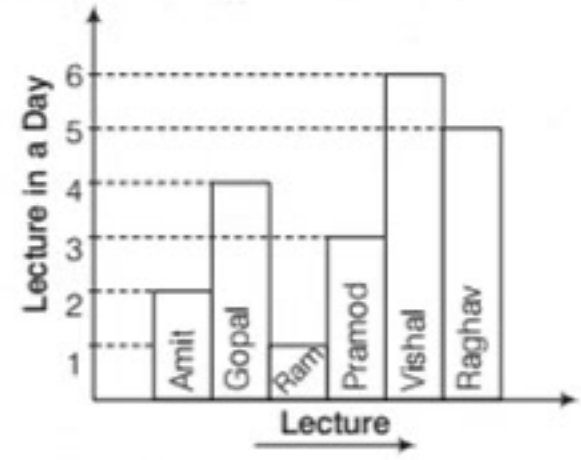
Months	Sold Bananas
March	
April	
May	
June	
July	

[Here, = 5 dozen]

What is the number of sold bananas during the given months? **[JNV 2017]**

(1) 1180 (2) 1380
(3) 1250 (4) 1450

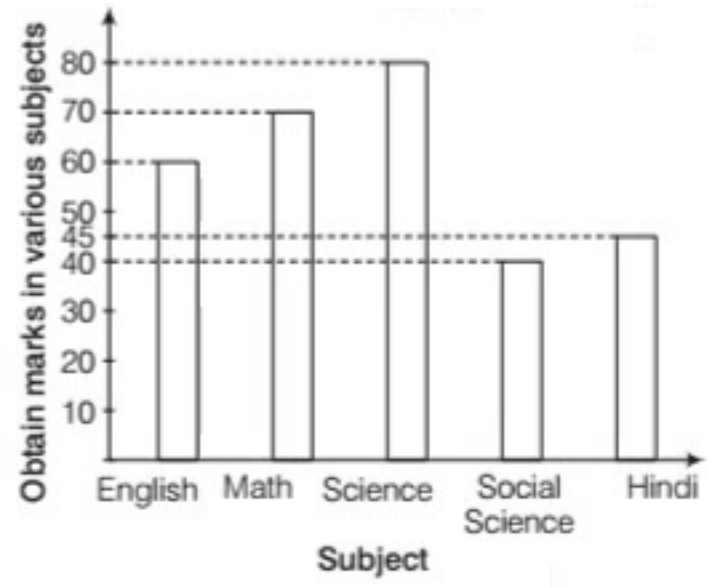
4. Study the graph and answer the questions



What is the difference between the lecture taken by Amit and Raghav to the Gopal and Pramod during a week? **[JNV 2017]**

(1) 42 (2) 7
(3) 35 (4) 0

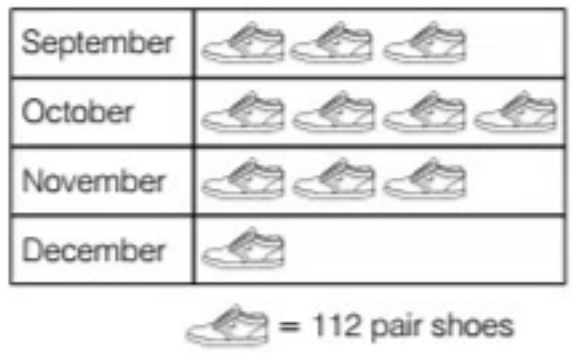
5. Study the bar chart given below which shows Shyam's marks in S_1 examination in different subjects out of 100 marks each.



The percentage of Shyam's marks in Science is **[JNV 2016]**

(1) 50
(2) 80
(3) 70
(4) 60

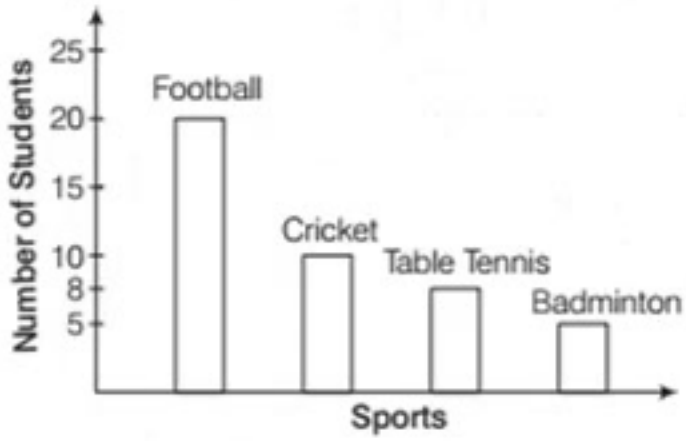
6. Following graph represents the number of shoes sold by a shopkeeper in last 4 months.



What was the number of shoes sold by the shopkeeper in 4 months? **[JNV 2016]**

(1) 1130 (2) 1120
(3) 1242 (4) 1232

7. Following bar chart represents the various sports play by students. Study the chart and give the answer.



How many students play table tennis? **[JNV 2015]**

(1) 10 (2) 8
(3) 18 (4) 20

8. Following graph represents the various transport medium used by the students.

Transport	Number of students
Bicycle	☺ ☺
Scooter	☺ ☺ ☺
Car	☺ ☺ ☺ ☺
School van	☺ ☺ ☺ ☺ ☺ ☺

Here, ☺ = 50 students

How many percentage of students use school van? **[JNV 2015]**

(1) 6 (2) 16
(3) 40 (4) 36

Direction (Q. No. 9) *Following graph represents the number of carton filled with oranges in 4 days of a week sold by a vendor.*

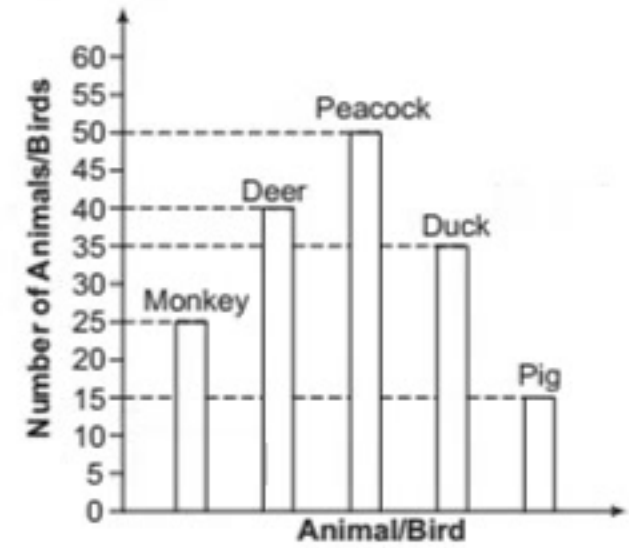
Day	Number of Oranges Sold
Monday	● ●
Wednesday	● ● ●
Friday	● ● ● ● ● ●
Sunday	● ● ● ●

● Represents 15 oranges

9. If vendor still remain with 25 oranges in a carton, then what was the number of oranges at the beginning? **[JNV 2014]**

(1) 200 (2) 225 (3) 250 (4) 300

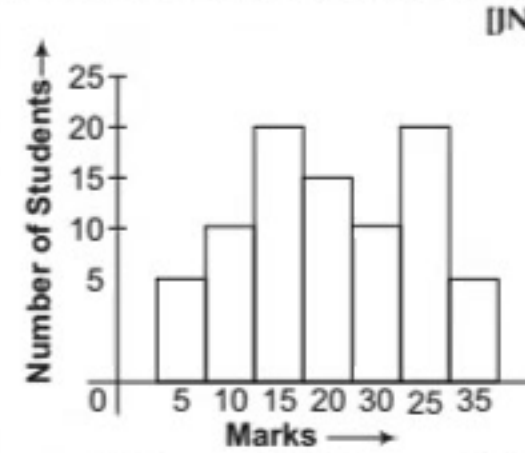
10. A class visit a park and they saw some animals and birds. They plot a graph by placing the number of animals and birds.



Sum of number of Deer and Monkey is more than the number of Peacock is **[JNV 2014]**

(1) 12 (2) 10 (3) 15 (4) 9

11. Study the diagram and find the number of students obtain less then 20 marks. **[JNV 2013]**

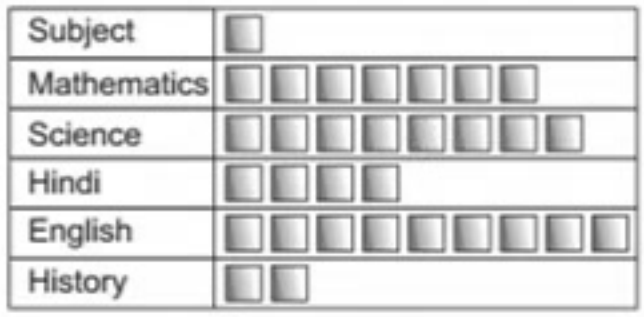


(1) 35 (2) 45 (3) 65 (4) 85

12. In the following pie chart if the expenditure on food is ₹ 6800 per month. Find out the expenditure on education. **[JNV 2012]**

(1) ₹ 5000
(2) ₹ 6400
(3) ₹ 6000
(4) ₹ 6260

13. In a college library diferent subjectwise book pictures detail are given below.

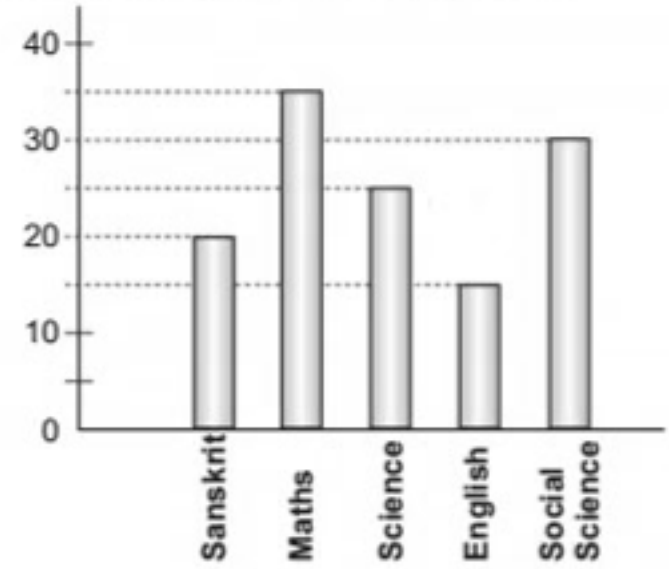


= 10 Books

How many subjects have books more than 50? **[JNV 2010]**

(1) 2 (2) 3
(3) 1 (4) 4

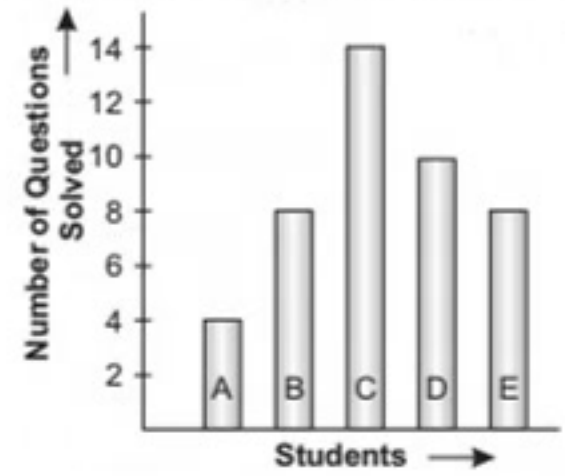
14. To study the graph say that, what per cent of the student in English has passed?



In different subjects, the number of passed students in a class of 40 students. **[JNV 2007]**

(1) 36.5 (2) 37.5 (3) 36 (4) 37

15. From the graph calculate how many questions do C and D solve more than A, B and E? **[JNV 2004]**



(1) 3 (2) 4 (3) 10 (4) 14

Answers

1. (1)	**2.** (4)	**3.** (2)	**4.** (4)	**5.** (2)	**6.** (4)	**7.** (2)	**8.** (3)	**9.** (3)	**10.** (3)
11. (2)	**12.** (2)	**13.** (2)	**14.** (2)	**15.** (2)					

Hints and Solutions

1. Total sale of Burger = 320
Burger sold on Wednesday = 40
Burger sold on Thursday = 60
Burger sold on Friday = 80
Burger sold on Saturday = 55
Now, burger sold on Sunday = Total sale − Sale on (Wed + Thu + Fri + Sat)
$= 320 - (40 + 60 + 80 + 55)$
$= 320 - 235 = 85$

2. Number of plant sold from Monday to friday
$= 20 \times (2 + 4 + 5 + 3 + 5)$
$= 20 \times 19$
$= 380$

3. Number of sold bananas in March
$= 6 \times 12 \times 5 = 360$ bananas
Number of sold bananas in April
$= 3 \times 12 \times 5 = 180$ bananas
Number of sold bananas in May
$= 5 \times 12 \times 5 = 300$ bananas
Number of sold bananas in June
$= 2 \times 12 \times 5 = 120$ bananas
Number of sold bananas in July
$= 7 \times 12 \times 5 = 420$ bananas
Hence, number of sold bananas
$= 360 + 180 + 300 + 120 + 420$
$= 1380$ bananas

4. Lectures taken by Amit in a day = 2
Lectures taken by Raghav in a day = 5
Total number of Lectures by Amit and Raghav
$= 2 + 5 = 7$
Total number of Lectures by Amit and Raghav in a week $= 7 \times 6 = 42$
Lectures taken by Gopal in a day = 4
Lectures taken by Pramod in a day = 3
Total number of Lectures by Gopal and Pramod
$= 4 + 3 = 7$
Total number of Lectures by Gopal and Pramod in a week $= 7 \times 6 = 42$
$\therefore$ Required difference $= 42 - 42 = 0$

5. It is clear from the bar chart Shyam gets 80 marks in Science.
$\therefore$ Required per cent marks
$$= \frac{\text{Obtained marks in Science}}{\text{Total marks in Science}} \times 100$$
$$= \frac{80}{100} \times 100 = 80\%$$

6. Shoes sold in September month $= 3 \times 112 = 336$
Shoes sold in October month $= 4 \times 112 = 448$
Shoes sold in November month $= 3 \times 112 = 336$
Shoes sold in December month $= 1 \times 112 = 112$
$\therefore$ Total number of shoes sold by the shopkeeper in 4 months
$= 336 + 448 + 336 + 112 = 1232$

7. From the given bar chart we clearly say that 8 students play table tennis.

8. Total number of students
$= 2 \times 50 + 3 \times 50 + 4 \times 50 + 6 \times 50$
$= 100 + 150 + 200 + 300 = 750$
Number of students use school van
$= 6 \times 50 = 300$
$\therefore$ Required percentage $= \frac{300}{750} \times 100 = 40\%$

9. Given one ● = 15 oranges
Number of oranges sold in four days = 15 (●)
Total oranges sold $= 15 \times 15 = 225$
Total oranges at beginning $= 225 + 25 = 250$

10. Sum of number of Deer and Monkey $= 40 + 25$
$= 65$
Number of Peacock = 50
Required difference $= 65 - 50 = 15$

11. Number of students obtain less than 20 marks
$= 5 + 10 + 15 + 10 + 5 = 45$

12. $\therefore$ 17% = ₹ 6800
$\therefore$ $1\% = \frac{6800}{17} =$ ₹ 400
$\therefore$ Expenditure on education (16%)
= ₹ 400×16
= ₹ 6400

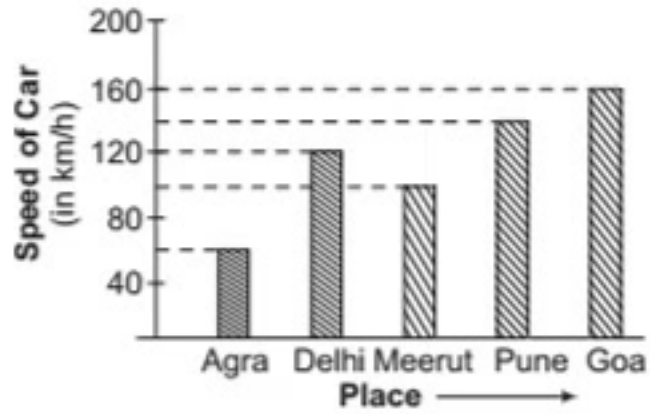
13. There are three subjects having books more than 50 *i.e.*, Mathematics , Science and English.

14. $\therefore$ Required passed students in English
$$= \frac{15 \times 100}{40} = 37.5\%$$

15. Number of questions solved by C = 14
Number of questions solved by D = 10
Total = 24
Number of questions solved by A, B and E
$= 4 + 8 + 8 = 20$
Required difference $= 24 - 20 = 4$

Practice Exercise

Directions (Q. Nos. 1 and 2) *Study the graph carefully and answer the questions given below.*



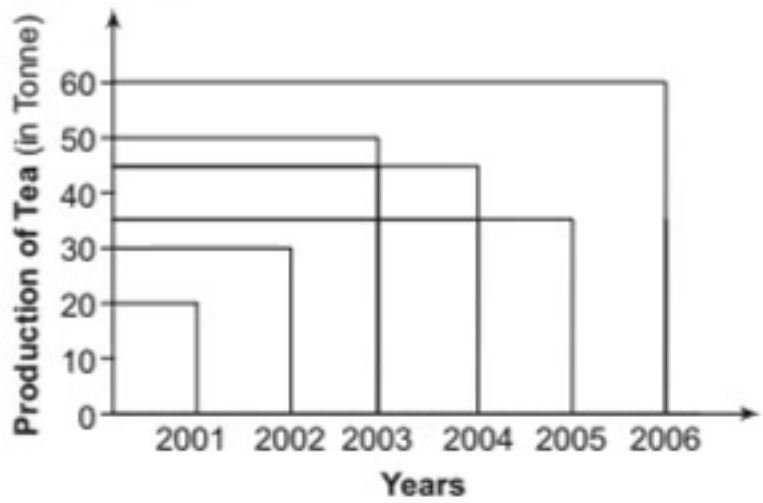
1. What is the difference between the speed of car at places Delhi and Goa?

(1) 30 km/h (2) 35 km/h
(3) 40 km/h (4) 38 km/h

2. The sum of speed of car at places Agra and Meerut is equal to the speed at which city?

(1) Delhi (2) Pune (3) Meerut (4) Goa

3. Study the graph carefully and answer the question given below.



In which year the production of tea was equal to the production of year 2001 and 2002?

(1) 2004 (2) 2003
(3) 2005 (4) 2006

4. A shopkeeper represents the data of his sales during the given months.

Months	Sales
January	
February	
March	
April	
May	

[Here, = 3 dozen]

If cost of one dozen articles is ₹ 150, then compute the total sale (in ₹) for the months of February and April.

(1) 2700 (2) 2800
(3) 2750 (4) 2650

5. A typist types pages according to given graph. Study the graph carefully and answer the question.

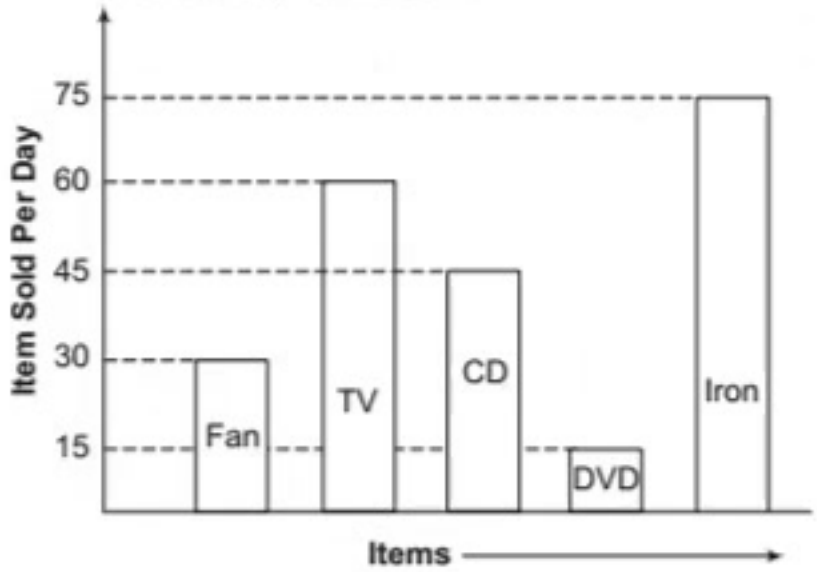
Days	Pages
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

[Here, = 10 pages]

What is the average number of pages typed by the typist during the day Monday, Thursday and Sunday?

(1) 35 pages (2) 30 pages
(3) 40 pages (4) 25 pages

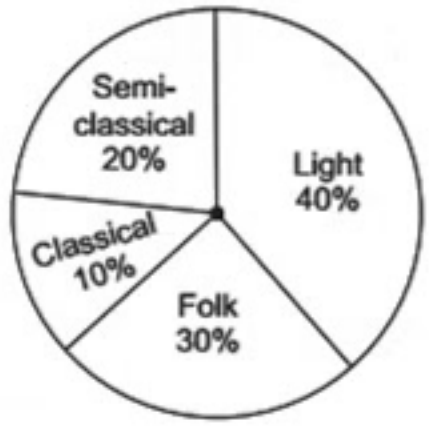
6. Study the graph carefully and answer the question given below.



Ramdas sold the item during a day according to above graph compute the sale of July month on the basis of given informations.

(1) 6925 (2) 6780 (3) 6980 (4) 6975

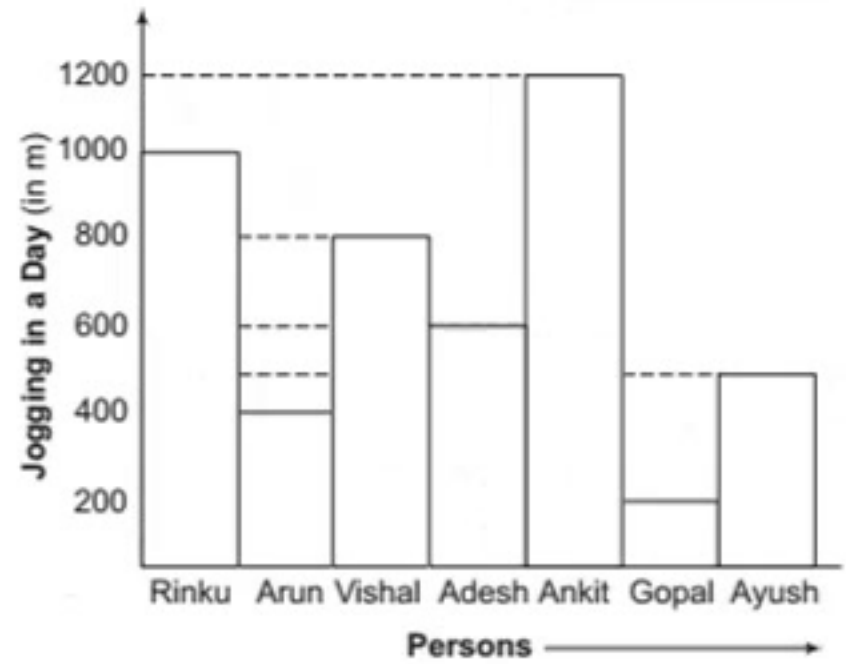
7. A Survey was made to find the types of music that a certain group of young people liked in a city. Following pie chart. Show the finding of this Survey.



Which type of music is liked by the maximum number of people

(1) Classical (2) Semi-classical
(3) Folk (4) Light

Directions (Q.Nos. 8 and 9) *Study the graph carefully and answer the questions given below.*



8. How many kilometers does Ayush jog in 15 days?

(1) 7 (2) 8
(3) 6.5 (4) 7.5

9. How many meters do Arun and Adesh jog less than that of Vishal and Rinku jog?

(1) 700 (2) 75
(3) 820 (4) 800

Answers

1. (3)	**2.** (4)	**3.** (3)	**4.** (1)	**5.** (2)	**6.** (4)	**7.** (4)	**8.** (4)	**9.** (4)

Hints and Solutions

1. Speed of car at Delhi = 120 km/h

Speed of car at Goa = 160 km/h

$\therefore$ Required difference = 160 − 120 = 40 km/h

2. Speed of car at Agra = 60 km/h

Speed of car at Meerut = 100 km/h

Sum of speed = 60 + 100 = 160 km/h

Clearly, sum of speed is equal to the speed at Goa city (160 = 160).

3. Production of tea in year 2001 = 20 tonne

Production of tea in year 2002 = 30 tonne

Total production = 50 tonne

Clearly, production of year 2001 and 2002 is equal to the production of year 2003 (50 = 50).

4. Sale of articles in February = 4 × 3 = 12 dozen

Sale of February in rupees = 12 × 150 = ₹1800

Sale of articles in April = 2 × 3 = 6 dozen

Sale of April in rupees = 6 × 150 = ₹900

Total sale of February and April = 1800 + 900

= ₹2700

5. Pages typed by the typist on Monday = 3 × 10

= 30 pages

Pages typed by typist on Thursday

= 5 × 10 = 50 pages

Pages typed by typist on Sunday

= 1 × 10 = 10 pages

Total number of typed pages = 30 + 50 + 10

= 90 pages

$\therefore$ Required average $= \dfrac{\text{Number of typed pages}}{\text{Number of days}}$

$= \dfrac{90}{3} = 30$ pages

6. Sale of a day by Ramdas

= Sale of Fan + TV + CD + DVD + Iron

= 30 + 60 + 45 + 15 + 75 = 225 items

$\because$ Number of days in month July = 31 days

$\therefore$ Required sale = 225 × 31

= 6975 items

7. Light music is liked by the maximum number of peoples 40%.

8. Jogging by Ayush in a day = 500 m

Jogging by Ayush in 15 days = 500 × 15

= 7500 m

Hence, jogging by Ayush $= \dfrac{7500}{1000} = 7.5$ km

[$\because$ 1000 m = 1 km]

9. Jogging by Arun in a day = 400 m

Jogging by Adesh in a day = 600 m

Total jogging by both = 1000 m

Jogging by Vishal in a day = 800 m

Jogging by Rinku in a day = 1000 m

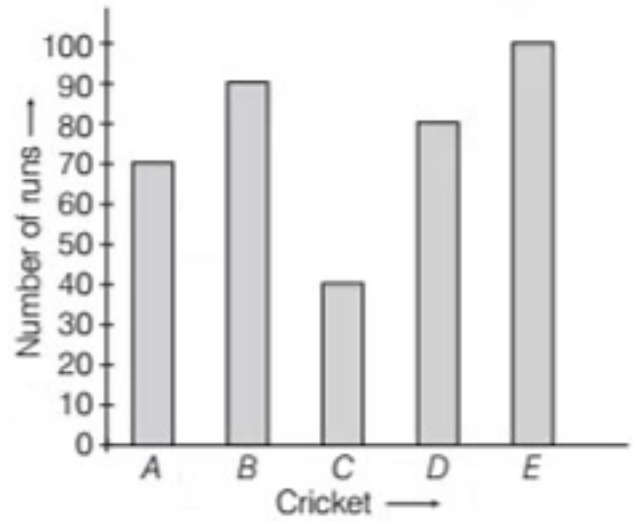
Total jogging by both = 1800 m

$\therefore$ Required difference = 1800 − 1000

= 800 m

Self Practice

1. The following graph shows the runs scored by some cricketers in a selection test. Study the graph carefully and answer the questions.



If 50 is the qualifying run, who failed the test?

(1) A (2) B (3) C (4) D

2. The number of scouts in a school is depicted by the following pictograph.

Class	Number of scouts ☺ = 10 scouts
VI	☺ ☺ ☺ ☺
VII	☺ ☺
VIII	☺ ☺ ☺ ☺ ☺ ☺
IX	☺ ☺ ☺
X	☺

What is the total number of scouts in the classes VI to X?

(1) 150 (2) 160 (3) 140 (4) 130

3. Pie chart shown below gives the expenditure (in percentage) on varius items and savings of a family during a month.

On which item, the expenditure was maximum?

(1) Food (2) Education (3) Others (4) Transport

Answers

1. (3)	**2.** (2)	**3.** (1)	

JAWAHAR
NAVODAYA
VIDYALAYA

LANGUAGE TEST
ENGLISH

CHAPTER

01

SYNONYM, ANTONYM AND WORD-MEANING

In examination, there is no any direct question asked from this chapter but the **Comprehension section** contains 2-3 questions based on antonyms, synonyms and word meaning. Hence, this chapter is given for practice purpose.

Synonyms

Synonyms are the words which are similar to each other in meaning. e.g.

- **Wise** Its synonyms are humorous, prudent, learned, well-read etc.
- **Wrong** Its synonyms are erroneous, incorrect, inacurate etc.

Some Important Synonyms

Word	*Synonyms*
Alien	Foreigner, Outsider
Absolve	Pardon, Forgive
Advice	Suggestion, Counsel
Abandon	Leave, Desert
Attain	Gain, Acquire
Avoid	Ignore, Shun
Ability	Capacity, Skill
Acknowledge	Admit, Confess
Aid	Help, Relief
Apology	Pardon, Excuse
Anger	Fury, Rage
Adept	Proficient, Expert
Ban	Prohibit, Debar

Word	*Synonyms*
Belated	Delayed, Overdue
Bias	Partiality, Favouritism
Confess	Admit
Contradict	Deny, Oppose
Consent	Agree, Permit
Calamity	Adversity, Misfortune
Cavity	Depth, Hole
Demolish	Ruin, Devastate
Delicious	Palatable, Tasteful
Dedicate	Devote, Consecrate
Deceit	Deception, Artifice
Dearth	Lack, Shortage
Dull	Stupid, Drab

Word	*Synonyms*
Damage	Harm, Hurt
Evident	Obvious, Apparent
Esteem	Respect
Eradicate	Destroy, Exterminate
Endeavour	Undertake, Aspire
Fragile	Weak, Infirm
Fluctuate	Deflect
Exact	Accurate, Right
Fantastic	Fanciful, Uncommon
Gorgeous	Magnificent, Dazzling
Gloom	Darkness
Hazard	Presumption, Danger
Harass	Irritable, Molest
Hardship	Misfortune, Difficulty
Horror	Terrible, Fear
Hurdle	Difficulty, Problem
Genuine	Actual
Bold	Fearless
Prize	Award
Idle	Lazy
Keen	Clever
Strange	Odd
Praise	Admire
Trust	Faith
Postpone	Delay
Variety	Diversity
Guarantee	Assure
Quarrel	Dispute
Pray	Beg
Idle	Lazy
Outbreak	Eruption
Ornamental	Decorative, Adorned
Offensive	Abhorrent, Arrogant
Panic	Fear, Restlessness
Quit	Leave, Abandon
Regard	Respect, Esteem
Rival	Competitor, Opponent
Raise	Increase, Lift

Word	*Synonyms*
Recover	Regain, Obtain
Release	Free, Liberate
Reliable	Trustworthy, Dependable
Realize	Accomplish, Fulfil
Significant	Distinctive, Important
Separate	Part, Divide
Simple	Plain, Natural
Summary	Synopsis, Substance
Sacred	Holy, Consecrated
Gift	Present
Grief	Sorrow
Struggle	Strive
Variety	Diversity
Lucky	Fortunate
Struggle	Fight, Battle
Summit	Top, Peak
Seize	Capture, Arrest
Temper	Mood, Nature
Tasty	Delicious, Palatable
Thin	Slim, Slender
Thick	Dense, Compact
Target	Goal, Object
Tedious	Boring, Dull
Timid	Cowardly, Shy
Trust	Faith, Confidence
Unique	Unequalled, Matchless
Urge	Solicit, Plead
Understanding	Insight, Perception
Variety	Assortment, Diversify
Valid	Authorised, Legitimate
Various	Several, Many
Vague	Nuclear, Indefinite
Vivid	Living, Real
Vigour	Energy, Force
Victory	Conguest, Success
Venture	Dare, Risk
Withhold	Retrain, Detain

Antonyms

Antonyms are the words which are opposite to each other in meaning. e.g.

- **Wise** Its antonyms are foolish, silly, stupid etc.
- **Wrong** Its antonyms are right, correct, accurate etc.

Some Important Antonyms

Word	*Antonyms*
Active	Passive, Inactive
Assemble	Scatter, Disperse
Ancient	Modern, Recent, Contemporary
Adversity	Prosperity, Good fortune
Ascent	Descent, Decline
Acceptance	Rejection, Disagreement, Refusal
Absolute	Partial, Compliant
Angel	Devil, Demon
Always	Never
Awake	Sleep
Above	Below
Attack	Defend
Agree	Disagree
Bless	Curse, Denounce
Broad	Narrow, Limited
Buy	Sell, Bargain
Blunt	Sharp, Acute
Busy	Idle, Lazy
Beautiful	Ugly, Awful
Bravery	Cowardice, Timidity
Beneficial	Harmful, Destructive
Barren	Fertile, Productive
Boon	Bane, Curse
Better	Worse, Poor
Bold	Meek, Coward
Bitter	Sweet, Delicious
Begin	End
Before	After
Bad	Good
Big	Small
Buy	Sell
Beautiful	Ugly
Black	White
Blunt	Sharp
Cheerful	Gloomy, Sad, Morose

Word	*Antonyms*
Complicated	Simple, Smooth, Straight forward
Confess	Deny, Renounce, Decline
Compare	Contrast, Divergence
Courageous	Timid, Modest
Cursed	Blessed, Glorified, Sacred
Creation	Destruction, Elimination
Civilised	Uncivilised, Wild
Cause	Effect, Consequence
Cruel	Kind, Generous, Cordial
Contradict	Approve, Confirm
Contempt	Regard, Praise
Consolidate	Separate, Weak
Consequence	Origin, Start
Consent	Object, Disagree
Compassion	Cruelty, Barbarity
Caricature	Exactness, Precision
Captivity	Freedom, Liberty
Calamity	Happiness, Fortune
Cold	Hot
Clever	Foolish
Come	Go
Deprive	Restore, Renew
Demolish	Repair, Construct
Delicious	Distasteful, Unsavoury
Dedicate	Refuse, Negate
Dirty	Clean
Day	Night
Dry	Wet
Difficult	Easy
Direct	Indirect
Eliminate	Restore, Accept
Extreme	Normal, Balanced
Early	Late
Empty	Full

Word	*Antonyms*
Enjoy	Suffer
Evening	Morning
Fragile	Enduring, Tough
Fantastic	Ordinary, Normal
Fail	Pass
False	True
Far	Near
Fast	Slow
Friend	Enemy
Fat	Slim
Forget	Remember
Gracious	Rude, Unforgiving
Gorgeous	Dull, Unpretentious
Guilty	Innocent
Hazard	Conviction, Security
Harass	Assist, Comfort
Happy	Sad
Honest	Dishonest
Import	Export, Send out
Increase	Decrease, Lesser
Innocent	Guilty, Condemned
Initial	Final, Subordinate
Inhale	Exhale, Breathe out
In	Out
Junior	Senior, Major, Superior
Justice	Injustice, Maltreatment
Joy	Sorrow, Anguish, Pain
Junior	Senior
Known	Unknown, Mysterious, Anonymous
Knowledge	Ignorance, Illiteracy
Kind	Cruel, Brutal, Atrocious
Literate	Illiterate, Ignorant
Logical	Illogical, Unreasonable
Lack	Abundance, Ample, Surplus
Laugh	Cry, Weep bitterly, Shed tears
Love	Hate
Life	Death
Material	Spiritual, Divine, Sacrad

Word	*Antonyms*
Maximum	Minimum, Least possible
Miser	Spendthrift, Big spender, Prodigal
Merit	Demerit, Fault
Mature	Immature, Childish, Premature
Mad	Sane, Wise
Natural	Unnatural, Artificial
Native	Foreign, Alien, Unfamiliar
Noise	Quiet, Reticent, Peaceful
New	Old
Narrow	Wide
Oral	Written, Recorded
Offer	Refuse, Deny
Order	Disorder, Chaos, Clutter
Optimistic	Pessimistic, Gloomy
Old	Young, New
Obey	Disobey
Open	Close
Pride	Shame, Embarrassment
Poor	Rich
Presence	Absence
Possible	Impossible
Pure	Impure
Profit	Loss
Permanent	Temporary
Punish	Reward
Remote	Adjoining, Adjacent
Rude	Polite
Sweet	Sour
Soft	Hard
Tired	Rested, Energised, Refreshed
Timid	Bold, Intrepid
Temperate	Boisterous, Violent
Useful	Useless
Up	Down
Vulgar	Elegant, Civil
Victory	Defeat
Weak	Strong
Zenith	Nadir, Base

Word-Meaning

Following are the list of some important words with their meanings

Word	*Meaning*
Abandon	Quit
Abolish	Cancel
Accomplish	Achieve
Admire	Appreciate
Adventurous	Bold, Daring
Affection	Attachment, Fondness
Agree	Accept
Amazing	Fabulous
Biased	Unfair, Unjust
Blunt	Short
Calm	Quiet, Peaceful
Casual	Informal
Certainty	Sureness
Cheater	Scammer
Compile	Assemble
Complain	Grieve
Conceal	Hide
Courteous	Polite, Attentive
Deadly	Mortal, Ghastly
Decline	Dismiss
Depart	Leave

Word	*Meaning*
Diminish	Decrease
Erase	Delete
Expensive	Costly
Familiar	Friendly
Flexible	Supple, Ductile
Foe	Enemy
Loyal	Faithful
Merge	Mix
Moderate	Mild, Temperate
Mute	Silent
Neglect	Ignore
Obsolete	Useless
Original	Genuine
Precise	Specific, Accurate
Prohibit	Ban
Prosperous	Flourishing
Regard	Concern
Reliable	Trustworthy
Respect	Prestige
Usual	General
Widen	Expand

CHAPTER

02

COMPREHENSION

Reading passages are meant to test student's analytical skills. This type of exercises makes the students learn how to be precise while giving answers. Comprehension test makes the assessment of how well a student can infer the facts, using their intelligence and word power of the students. Therefore, a student is required to read the passage carefully and choose the correct answer out of the alternatives, given under the questions.

How to Attempt?

- Read the given passage carefully.
- Study the questions thoroughly. Turn to the relevant portions of the passage and choose the correct answer.
- The answers must be based on the information given in the passage. You should not choose the answer according to your own thought or opinion.

Entrance Corner

Directions *Each passage is followed by five questions. Read passage carefully and answer the questions that follow. For each questions four probable answer bearing letters* (1), (2), (3) *and* (4) *are given. Only one out of these is correct.*

Passage 1

Chewing gum was discovered a thousand years ago by the Mayans in the Mexican jungles. They found a liquid leaking from a sapodilla tree. As it oozed out, it thickened into something that they called chicle which was chewable and tasty. Today, workers called chicleros still collect chicle.

The chicle is boiled to remove the water. It is then made into slabs about 30 pounds each or 14 kilograms each. These slabs are sent to gum factories. There it is mixed with several ingredients to sweeten, soften, flavour and colour the gum. [JNV 2019]

1. ..... discovered chewing gum.
(1) The Mayans (2) Sapodillas
(3) Chicleros (4) Gum factories

2. ..... are the workers who collect chicle.
(1) Sapodillas (2) The Mayans
(3) Chicleros (4) Gummers

3. Slabs of chicle are sent to
(1) recycling centers
(2) gum factories
(3) the Mexican jungles
(4) candy stores

4. Several ingredients are added to chicle to do all of the following except to ..... it.
(1) soften (2) flavour
(3) thicken (4) sweeten

5. A suitable title for the passage will be
(1) The Gum
(2) Chiclero
(3) The Story of Chiclero
(4) The Story of Chewing Gum

Passage 2

India is a land of pilgrims and pilgrimages. These holy places, whether in the hills or in the plains, are **generally** situated on river banks or by the sea. It is not only the religious people who visit these places of pilgrimages, but also travellers and sight-seers from all over India and abroad. Wherever two or more rivers meet, pilgrims come to bathe and worship because that place is supposed to be holy. One such place is Haridwar which is situated on the bank of river Ganga.

[JNV 2019]

1. Holy places are visited by religious people, sight-seers as well as ..... .
   (1) children (2) travellers
   (3) traders (4) voyagers
2. Which one of the following is a synonym of the word 'generally'?
   (1) usually (2) publicly
   (3) occasionally (4) eventually
3. The place is considered 'holy' where two or more rivers meet.
   Here the antonym of the word 'holy' is
   (1) godly (2) religious
   (3) cursed (4) pious
4. People come to bathe and worship in the Ganga as its water is
   (1) holy (2) clear and clean
   (3) cool (4) healthy
5. People go on a pilgrimage because they are
   (1) curious (2) religious (3) explorers (4) old

Passage 3

It was Ajit's birthday. All his friends and relatives had gathered. He received many gifts. There were books, toys and clothes. Ajit's aunt gave him a surprise gift-a rose sapling. Ajit liked his aunt's gift the best and at once ran to the garden and planted the sapling. Ajit watered the plant everyday. As soon as he woke up in the morning, he would rush to see how much the plant had grown. One day he saw two little rose buds peeping out. He kept watching the buds bloom into beautiful yellow roses. He was happy and thrilled. With his mother's help, he plucked the flowers. He gifted the first two roses to his mother and sister. Ajit decided to plant more saplings in his garden.

[JNV 2019]

1. Ajit's best birthday gift was a
   (1) race car (2) shirt
   (3) rose sapling (4) book
2. As soon as Ajit woke up he
   (1) started studying
   (2) rushed to see the sapling
   (3) had a bath
   (4) went to school
3. How many rose buds appeared first?
   (1) one (2) four
   (3) two (4) many
4. Ajit gifted the first two roses to
   (1) his friends (2) his aunt
   (3) his mother and sister (4) his mother and aunt
5. The word 'thrilled' means
   (1) sad (2) excited
   (3) afraid (4) surprised

Passage 4

The neem tree is known as a village pharmacy due to the medicinal benefits of its seeds, bark and leaves. It is called *arista* in Sanskrit which means perfect, imperishable and complete. Neem oil plays an important role in pest control and can also be used as a replacement for mosquito repellent. Neem seed cakes are used as fertilizer. A paste of neem leaves is used to treat chickenpox. Neem twigs commonly referred to as 'datun' are used as toothbrushes in villages. The bark and roots are also used, in powdered form, to control fleas and ticks on pets.

[JNV 2019]

1. A pharmacy is
   (1) farm land (2) a medical store
   (3) a playground (4) a farm house
2. The part of the neem tree that is useful to the farmers is
   (1) seeds (2) bark
   (3) twigs (4) leaves
3. Which one of the following is not a synonym of 'perfect'?
   (1) faultless (2) flawless
   (3) seamless (4) blemished
4. The word 'pest' in the passage means
   (1) an insect that destroys crops
   (2) an angry person
   (3) dirty water
   (4) pollution
5. Neem ... are used as toothbrushes in villages.
   (1) roots
   (2) leaves
   (3) twigs
   (4) seed cakes

Passage 5

Our voyage was very prosperous, but I shall not trouble the reader with a journal of it. The captain called in at one or two ports and sent in his long-boat for provisions and fresh water, but I never went out of the ship still we came into the Downs, which was on the 3rd day of June, 1706, about nine months after my escape. I offered to leave my goods in security for payment of my freight, but the captain protested he would not receive one farthing. We took kind leave of each other, and I made him promise that he would come to see me at my house in Redriff. I hired a house and a guide for five shillings which I borrowed from the captain. [JNV 2018]

1. When the writer uses the word 'prosperous' to describe the voyage, he means that
   (1) it made him rich (2) it made him healthy
   (3) it was very pleasant (4) it was uneventful
2. On the voyage, the author
   (1) left the ship at intervals
   (2) was not able to leave the ship because it did not stop
   (3) never left the ship at all
   (4) never left the ship till they came into the Downs
3. In the context of the passage, the word 'provisions' means
   (1) mainly food (2) mainly security
   (3) money (4) mainly ammunition
4. For the payment of the author's freight, the captain
   (1) kept his goods as security
   (2) refused to accept any money
   (3) protested against being paid only a farthing
   (4) accepted a sum of money
5. From the passage, it is clear that the captain's attitude to the author was
   (1) one of hostility
   (2) one of indifference
   (3) one of extreme friendliness and kindness
   (4) one of disgust and irritation

Passage 6

A story tells that two friends were walking through the desert. During some point of the journey they had an argument, and one friend slapped the other one in the face. The one who got slapped was hurt, but without saying anything, wrote in the sand: "TODAY MY BEST FRIEND SLAPPED ME IN THE FACE." They kept on walking until they found an oasis, where they decided to take a bath. The one who had been slapped got stuck in the mire and started drowning, but the friend saved him. After the friend recovered from the near drowning, he wrote on a stone: "TODAY MY BEST FRIEND SAVED MY LIFE." The friend who had slapped and saved his best friend asked him, "After I hurt you, you wrote in the sand, and now, you write on a stone. Why?"

The other friend replied: "When someone hurts us, we should write it down in sand where winds of forgiveness can erase it away. But, when someone does something good for us, we must **engrave** it in stone where no wind can ever erase it." [JNV 2018]

1. Why did the friend who got hurt write on the sand?
   (1) Because he was very kind-hearted
   (2) Because he was too weak to take revenge
   (3) Because he knew that his feeling of hurt was temporary
   (4) Because he loved his friend too much
2. What is an oasis?
   (1) An oasis is a tall tree found in a desert
   (2) An oasis is a water body found in a desert
   (3) An oasis is a creature like centipede
   (4) An oasis is grassland
3. What did one of the friends do after recovering from the near drowning?
   (1) He rebuked his friend
   (2) He avenged by slapping his friend in his face
   (3) He wrote something on sand in his praise
   (4) He wrote something about his friend to express his gratitude
4. What does writing on the stone suggest?
   (1) Writing something on stone means expressing one's love for another
   (2) Writing on stone means writing something with an intention to make it last forever
   (3) Writing something on stone means expressing one's extreme anger
   (4) Writing something on stone means writing something with a view to preaching one and all
5. What is the synonym of the word 'engrave' as used in the passage?
   (1) dislodge (2) neglect
   (3) aid (4) inscribe

Passage 7

I woke up one August morning in a warm sweat. I ran to the refrigerator to get a cold drink, but the refrigerator was broken and all the drinks were as hot as me. I walked over to my electric fan, but it wasn't working either. I then turned on the television and finally realised that the electricity in my house was out. Later that day, I went to the pool to cool off. I dived right in! I swam eight laps before I got tired. My friend Lucy then bought me an ice-cream cone. I got a vanilla ice-cream cone with rainbow sprinkles. Even though it was really hot, I did have a lot of fun. [JNV 2018]

1. What did the narrator want from the refrigerator?
   (1) a ham sandwich (2) a fan
   (3) a drink (4) an apple
2. Why does the electric fan not work?
   (1) it was broken (2) it needed batteries
   (3) the power was out (4) it wasn't oiled
3. How many laps did it take for the narrator to tire of the pool?
   (1) two (2) four (3) six (4) eight
4. Who bought the narrator an ice-cream cone?
   (1) Lucy (2) Sam (3) Peter (4) Prince
5. What was the flavour of the ice-cream?
   (1) rainbow (2) vanilla
   (3) chocolate (4) strawberry

Passage 8

Once upon a time I went for a week's holiday in the Continent with an Indian friend. We both enjoyed ourselves and were sorry when the week was over, but on parting our behaviour was absolutely different. He was plunged in despair. He felt that because the holiday was over all happiness was over until the world ended. He could not express his sorrow too much, but in me the Englishman came out strong. I could not see what there was to make a fuss about. It was not as if we were parting forever or dying. 'Buck up', I said, 'do buck up'. He refused to buck up, and I left him plunged in gloom. [JNV 2018]

1. What is the Continent in the context of the passage?
   (1) An island (2) The countryside
   (3) African safari (4) Europe
2. What does the author mean by 'buck up'?
   (1) Buckle yourself up (2) Stand up
   (3) Cheer up (4) Shut up
3. Why was the Indian friend plunged in despair?
   (1) He was hopeless
   (2) He experienced racial discrimination
   (3) He would never be so happy again
   (4) He had spend lot of money
4. What does 'but in me the Englishman came out strong' imply?
   (1) He was strong Englishman
   (2) He had the typical English character
   (3) The Englishman went out of him
   (4) He started following Indian traditions
5. What is the author's intension in the passage?
   (1) To contrast the Indian character with the English character
   (2) To show that an Indian is sorrowful
   (3) To ridicule the Indian traditions
   (4) To praise the Englishman

Passage 9

One day a wolf found a sheepskin. He covered himself with the sheepskin and got into a flock of sheep grazing in a field. He thought, "The shepherd will shut the sheep in the pen after sunset. At night I will run away with a fat sheep and eat it."

All went well till the shepherd shut the sheep in the pen and left. The wolf waited patiently for the night to advance and grow darker. But then an unexpected thing happened. One of the servants of the shepherd entered the pen. His master had sent him to bring a fat sheep for supper. As luck would have it, the servant picked up the wolf dressed in the sheepskin. That night the shepherd and his guests had wolf for supper. [JNV 2018]

1. Why did the wolf cover himself with the sheepskin and get into a flock of sheep?
   (1) He wanted to look like a beautiful sheep
   (2) He wanted to eat a sheep
   (3) He wanted to enter into the pen
   (4) He wanted to make friends with the sheep
2. How did the wolf meet his end?
   (1) All the sheep attacked the wolf and killed him.
   (2) The shepherd recognised the wolf in sheep's clothing and killed him
   (3) The shepherd's servant picked up the wolf dressed in the sheepskin for supper
   (4) The wolf died of a serious disease
3. What is the moral of the passage?
   (1) An evil design has an evil end
   (2) Pen is mightier than the sword
   (3) Might is right (4) Die in harness

4. Why did the servant pick the wolf for supper? Select the most appropriate answer.
   1. Because he wanted to have the tasty meat of wolf.
   2. Because the wolf was in sheep's clothing.
   3. Because the servant thought the wolf to be a fat sheep.

   (1) Only 1 (2) Only 2 (3) Only 3 (4) 1 and 2
5. What is the antonym of the word 'shut' as used in the passage?

   (1) kill (2) close (3) imprison (4) free

Passage 10

Among the major tasks before us, none is of greater-importance for our strength and stability than the task of building up the unity and solidarity of our people. Our country often stood like a solid rock in the face of common danger and there is a deep underlying unity which runs like a golden thread through all our seeming diversity. There have been occasions when unfortunate and disturbing divisions, some of them accompanied by violence, have appeared in our society.

Political democracy and the way it has functioned in our country is surely a great achievement. Here again we owe an immeasurable debt to Shri JL Nehruji for his deep attachment to democracy as a form of government and as a way of life. There is something in our older cultural heritage too. I have particularly in view that enduring strength in Indian life which can best be described as respect for human personality and the spirit of tolerance. I have no doubt in my mind that it is only by methods of persuasion and mutual accommodation and by a constant search for areas of agreement as the basis for action, that democracy and work. It is in this spirit that I shall devote myself to the duties and responsibilities of the office I have been called upon to fill. [JNV 2017]

1. The writer thinks that
   (1) we have never faced dangers
   (2) in our country there is unity underlying diversity
   (3) our society is tribal in organisation
   (4) stability of the nation depends upon many factors
2. The author believes that democracy can work
   (1) if leaders are honest
   (2) if people participate
   (3) if method of persuasion and mutual adjustment are employed
   (4) if people have faith in democracy
3. What is the permanent trend in Indian life?
   (1) Respect for human personality
   (2) Love for animals
   (3) Worship of nature
   (4) Hero-worshipping
4. Shri Nehru was deeply attached to
   (1) democracy as a way of life
   (2) democracy of the Western
   (3) democracy which emerges from our culture
   (4) the Indian way of living
5. The writer wants to work for
   (1) just economic forces
   (2) just social order
   (3) democratic forces
   (4) None of the above

Passage 11

Desert is a place where there is send all-around. It is a hot and dry place. There is very little rain in Deserts. So, very few trees grow there. The only plants that grow in the deserts are cactus, date palms and thorny bushes which do not need much water to grow.

The Sahara is the biggest desert in the world. It stretches across the whole of North Africa. The Arabian desert is also a very large desert. In India too, there is a desert called Thar desert in Rajasthan. Life in a desert is tough. The days are very hot and nights are cool. [JNV 2017, 1999]

1. The biggest desert in the world is in
   (1) India (2) Africa
   (3) Arabia (4) America
2. In desert regions
   (1) there is no rainfall
   (2) it rains heavily
   (3) there is enough rain
   (4) there is a little rain
3. The climate in a desert is
   (1) pleasant (2) difficult
   (3) comfortable (4) cold
4. Date palms grow in
   (1) plains
   (2) hilly regions
   (3) deserts
   (4) snowy regions
5. Very few trees grow in deserts because
   (1) most trees need water to grow
   (2) there is sand all-around
   (3) nights are very cold
   (4) there is no one to take care of trees

Passage 12

About three hundred and fifty years there lived in India an Emperor called Shah Jahan. He had a beautiful and intelligent wife, whom he loved very much. Her name was Mumtaz Mahal; its shortened form, Taj Mahal, means 'pride of the palace'. In the year 1630, this beloved wife of the emperor died. The emperor decided, out of love for his wife, to build her the most beautiful tomb that had ever been seen.

Shah Jahan gathered the best artists and architects from India, Turkey, Persia and Arabia to design the building. It took more than 20000 men working over a period of 18 years to build the Taj Mahal, perhaps the most beautiful building in India. [JNV 2017, 2005, 2000]

1. Which of the following is the work of an 'architect'?
   (1) To advise the king
   (2) To build a palace
   (3) To design a building
   (4) To supervise cooking of meals
2. People consider Taj Mahal as
   (1) a large river
   (2) the most beautiful building in India
   (3) a very tall building
   (4) a memory of an emperor
3. Which one of the statements agrees with the paragraph?
   (1) Shah Jahan wanted to build a palace for himself
   (2) Artists and Architects from India asked Shah Jahan to give them work
   (3) 'Pride of the palace' means 'Shah Jahan'
   (4) Shah Jahan decided to build a beautiful tomb for his beloved wife
4. Which one of the following pairs is not associated with buildings?
   (1) Painters and carpenters
   (2) Teachers and doctors
   (3) Architects and engineers
   (4) Masons and plumbers
5. Taj Mahal was built
   (1) out of love for Mumtaz Mahal
   (2) because Mumtaz Mahal was intelligent
   (3) to let the world know that Mumtaz Mahal was beautiful
   (4) to protect Mumtaz Mahal from his enemies

Passage 13

Since, the most ancient times, India has been not only periodically invaded by greedy hordes but also visited by tradesman and travellers, scholars and sight-seers. Some of them have written books. The books of these writers become all the more important because there were not too many of them and they have served as rich sources for the historian. It is especially in this context that observations provided by the great Chinese writer Hiuen Tsang become very relevant.

Already in the 7th century, Buddhism was a powerful cultural force among the educated classes of China. It was common for Chinese pilgrims to come to India, the native land of the Buddha, to pay their respects to the founder of their religion. Perhaps the most famous of them all was this gentle observer who had studied and travelled extensively in China before entering the Indian sub-continent. Being both scholar and sophisticated, he was not given to easy praise. Within India itself he traversed deserts and climbed mountains, stayed in villages and lived in capitals, practised in monasteries and studied in universities and spent time in some royal courts as well. [JNV 2017]

1. Why are the writings of Hiuen Tsang considered as relevant?
   (1) He had spent sometime in some royal courts
   (2) He visited India as a trader and sight-seer
   (3) He had travelled to many Asian countries
   (4) He was a gentle observer
2. Chinese pilgrims commonly come to visit
   (1) mountains (2) villages
   (3) deserts (4) the native land of Buddha
3. What probably prompted Hiuen Tsang to travel to India?
   (1) To study influence of Buddhism on Hindu religion
   (2) To spread his religion in India
   (3) To undertake pilgrimage and enhance knowledge
   (4) To study the powerful cultural force in India
4. In the most ancient times, India was visited by except
   (1) scholars (2) tradesman
   (3) farmers (4) sight-seers
5. Hiuen Tsang did all of the following travel in India except
   (1) travelled in deserts
   (2) lived in villages
   (3) followed the schedule in Monasteries
   (4) taught in the university

Passage 14

Man-made satellites play a very important role in the modern man's world today. It helps in the study of space which has fascinated and inspired people for centuries and also helps us to find out more about the earth and our solar system. Advances in satellite technology have diversified to such an extent that it has improved our quality of life. Satellites help us communicate with people anywhere in the world, forecast weather, look at climate change and monitor disaster. Almost everyone today use satellite technology. Paying by credit card, or using an ATM machine-all involve satellite technology. Thus satellites have become an integral part of present-day man. [JNV 2017]

1. Satellites help in the study of
   (1) animals (2) space (3) plastics (4) bacteria
2. The word 'fascinated' used in the paragraph means
   (1) pleased (2) interested
   (3) affected (4) enthused
3. Which of the following sequences is correct as mentioned in the paragraph?
   (1) Technology—Monitor—Study
   (2) Monitor—Study—Technology
   (3) Study—Monitor—Technology
   (4) Technology—Study—Monitor
4. The phrase 'present-day man' means
   (1) man who is present (2) man present everyday
   (3) man of everyday (4) man of today
5. Satellite technology cannot be used for
   (1) speaking to a friend in America
   (2) washing and drying clothes
   (3) taking out money from a bank
   (4) warning against a storm

Passage 15

Pinku was walking through a forest. He had a bag of mangoes. After sometime, he felt tired. He took shelter under a tree and soon fell asleep. After a while, he felt that someone was trying to snatch his bag of mangoes. He woke up and caught the person. It was a witch who tried to frighten Pinku and ran away. But Pinku was strong and brave. He chased the witch and caught her. The witch removed her mask. She told Pinku that she was a poor and old widow. She had nobody to look after her. Therefore, she used to live in the forest. She used to wear mask to frighten people and take away their belongings. Pinku took pity on her and gave her the bag of mangoes. [JNV 2016]

1. Why did Pinku take shelter under a tree?
   (1) He wanted to sleep
   (2) He wanted to eat mangoes
   (3) It was very hot
   (4) He was tired
2. The witch was trying to
   (1) climb up the tree
   (2) hit Pinku
   (3) take the bag of mangoes
   (4) sleep under the tree
3. Pinku was a
   (1) lazy boy (2) shy boy
   (3) courageous boy (4) weak boy
4. The witch was
   (1) a bad woman (2) an old lady
   (3) a poor and old widow (4) very strong
5. The opposite word for 'brave' is
   (1) gentle (2) coward
   (3) thin (4) kind

Passage 16

Graham Bell was born at Edinborough, Scotland. He was a teacher and was dedicated to the noble cause of teaching the deaf and dumb. Due to severe illness, Bell was sent to Canada in 1870. Thereafter, he shifted to the USA. He continued his work by opening a school for deaf and dumb. Bell was fond of scientific inventions. He was always engaged in making some machines in his spare time. Apart from being an artist, he was a kind human being. He died in 1922 in Canada. The entire Northern America paid him a tribute by hanging up their telephones during his funeral. [JNV 2016]

1. Where was Bell born?
   (1) USA (2) Canada
   (3) Scotland (4) France
2. Bell was sent to Canada because
   (1) he was a teacher (2) his parents lived there
   (3) he was severely ill (4) he liked Canada
3. Bell was fond of
   (1) teaching (2) travelling
   (3) talking (4) scientific inventions
4. Bell shifted to
   (1) Scotland (2) USA
   (3) Edinborough (4) France
5. Bell used to teach the
   (1) poor (2) blind
   (3) dumb (4) wealthy

Passage 17

There was a poor man. He was thought to bring bad luck. Akbar heard of this man's reputation and wanted to see him. He was brought to Akbar. The emperor took a look at him and asked him to be brought back in the evening. That day Akbar was very busy and even forgot to eat. By the evening, he was very tired. He was informed that his son Prince Salim had fallen ill. It was that man's fault, Akbar decided. He called his courtiers and told them that he wanted to hang that man. All of them agreed immediately. But Birbal said, "Your face was the first face that man saw today and he has to die because of it." Akbar realised his mistake and rewarded Birbal for his wisdom. [JNV 2016]

1. Why had Akbar not eaten his food?
   (1) He was ill (2) He had seen that man
   (3) He was very busy (4) He was not hungry
2. Who was not well on that day?
   (1) King Akbar (2) His courtier
   (3) The poor man (4) Prince Salim
3. Why did the king decide to hang the poor man?
   (1) The poor man refused to meet him
   (2) The poor man was really very unlucky
   (3) Birbal advised him to do so
   (4) The king had a very bad day
4. Birbal was rewarded because
   (1) he was in king's favour
   (2) he brought the poor man to the king
   (3) he made the king realise his mistake
   (4) he taught the poor man a lesson
5. The opposite word for 'forget' is
   (1) forgive (2) active
   (3) remember (4) meet

Passage 18

An old woman lived in a village with her youngest son. Her eldest son was a government servant. He lived with his wife and children in a far away city. Her second son had left home years ago. He was a merchant and travelled all over the world. The yearly festival was approaching fast. The old woman was sending out gifts to everyone. The store room was packed with silk fabrics, bowls full of sweets, gold ornaments and toys. When she had sent gifts to everyone. She asked her son what gift he would like to have. He replied that he didn't want any gift. He just wanted to live with her. [JNV 2016]

1. The eldest son was
   (1) a servant (2) in government job
   (3) unemployed (4) a leader
2. Why did the woman's second son travel?
   (1) He did not want to stay at home
   (2) He was very rich
   (3) He was a merchant
   (4) He was searching something
3. What was not in the store room?
   (1) Sweets (2) Clothes
   (3) Toys (4) Fruits
4. The woman was sending gifts to
   (1) the eldest son (2) the children
   (3) the second son (4) All of them
5. The youngest son wanted ..... .
   (1) to travel all over the world
   (2) to get all the gifts
   (3) to live with her mother
   (4) to live with his brothers

Passage 19

There was a small and beautiful village. The men of that village were very lazy. They didn't do any work. Every morning they had their breakfast and gather in groups. They spent the day telling each other stories. They returned home only at lunch and dinner time. Women had to take all the responsibilities. They cooked food, cleaned the house and sent the children to school. They worked in the fields, took the crops to the market and manage everything. They were very sad because of all this. [JNV 2016]

1. What did the men do when they gathered in groups?
   (1) They played cards
   (2) They sang songs
   (3) They shared stories
   (4) They did nothing
2. The men returned home only when
   (1) their children called them
   (2) they were hungry
   (3) the women worked
   (4) they were ashamed
3. What was not in the village?
   (1) School (2) Fields
   (3) Children (4) River
4. The opposite word for 'lazy' is
   (1) healthy (2) strong
   (3) active (4) brave

5. The women were very sad because
   (1) their children were naughty
   (2) they were very poor
   (3) they had to do everything
   (4) their village was small

Passage 20

Abraham Lincoln was born on 12th February, 1809 in a log cabin in Kentucky. A cabin is a small house made of wood. When he was seven years old, his family moved to Indiana. In 1830, the family moved to Illinois. As a boy, Abraham Lincoln loved books. He always borrowed books from his neighbours. He read them for a short time and then took them back to their owners.

Abraham Lincoln studied law in his free time. He was also interested in Politics. He became President of the United States in 1861. He was the 16th President of the US. [JNV 2015]

1. Where was Lincoln born?
   (1) Illinois (2) Indiana
   (3) Kentucky (4) Tennessee
2. Lincoln moved to Indiana at age....
   (1) 4 (2) 6
   (3) 7 (4) 12
3. Abraham Lincoln became
   (1) an author
   (2) a woodcutter
   (3) Prime Minister
   (4) 16th President of the US
4. What did Abraham use to borrow from his neighbours?
   (1) Wood (2) Books
   (3) Money (4) Food
5. Lincoln was fond of
   (1) books (2) politics
   (3) reading (4) All of these

Passage 21

Alexander, on his way back, met a saint. The saint was sitting on a course grass-mat and basking in the sunshine. Alexander stood in front of him and hoped that the saint would pay respect to him, but he did not. Instead, he said, "Please stand aside. Let the sunshine come to me."

Alexander asked angrily, "Do you know who am I?"

The saint did not reply.

"I am an Emperor-Alexander the Great," he said.

"Emperor! you! No, you are not," said the saint.

"Yes I am," said Alexander, "I have conquered half of the world."

To this the saint said, calmly, "The emperors do not roam restlessly like you. Go, man, try to conquer the hearts of the people by love."

Alexander bowed and quietly walked away. [JNV 2015]

1. Why did the saint asked Alexander to stand aside?
   (1) He was not a devotee
   (2) He was blocking the sunshine
   (3) He wandered restlessly
   (4) He did not seek permission
2. Which of the following words is the synonym of 'conquer'?
   (1) Win (2) Defeat (3) Tell (4) Bow
3. What the emperors usually do not do?
   (1) Visit a saint (2) Rule an empire
   (3) Roam restlessly (4) Bow to saints
4. Which of the following does not describe an emperor?
   (1) A ruler (2) A king
   (3) An employee (4) A conqueror
5. Hearts of the people can be won by
   (1) Love (2) Power
   (3) Money (4) Sword

Passage 22

Simi was a puppy. She was very cute, Asha found her crying in a park. When she picked her up, the puppy stopped crying and looked at her. Asha liked that glance of her and she decided to take her home. Her mother approved the idea. They together gave her the name 'Simi', and happily brought her home.

So far nobody had trained the puppy, so Asha thought she should train her. Next morning she took Simi out and gave her some lessons. A trainer has to be a bit strict. So, she punished her when she disobeyed and rewarded her when she did what Asha wanted her to do. On the whole, the training was not so difficult. In a week's time, Simi became a good cultured puppy. [JNV 2015, 1993]

1. Asha took the puppy home, because she
   (1) pitied her (2) liked her glance
   (3) liked dogs (4) needed a puppy
2. 'She disobeyed .....'. Here 'she' refers to
   (1) Asha (2) Asha's mother
   (3) the puppy (4) the storyteller

5. The women were very sad because
   (1) their children were naughty
   (2) they were very poor
   (3) they had to do everything
   (4) their village was small

Passage 20

Abraham Lincoln was born on 12th February, 1809 in a log cabin in Kentucky. A cabin is a small house made of wood. When he was seven years old, his family moved to Indiana. In 1830, the family moved to Illinois. As a boy, Abraham Lincoln loved books. He always borrowed books from his neighbours. He read them for a short time and then took them back to their owners.

Abraham Lincoln studied law in his free time. He was also interested in Politics. He became President of the United States in 1861. He was the 16th President of the US. [JNV 2015]

1. Where was Lincoln born?
   (1) Illinois (2) Indiana
   (3) Kentucky (4) Tennessee
2. Lincoln moved to Indiana at age....
   (1) 4 (2) 6
   (3) 7 (4) 12
3. Abraham Lincoln became
   (1) an author
   (2) a woodcutter
   (3) Prime Minister
   (4) 16th President of the US
4. What did Abraham use to borrow from his neighbours?
   (1) Wood (2) Books
   (3) Money (4) Food
5. Lincoln was fond of
   (1) books (2) politics
   (3) reading (4) All of these

Passage 21

Alexander, on his way back, met a saint. The saint was sitting on a course grass-mat and basking in the sunshine. Alexander stood in front of him and hoped that the saint would pay respect to him, but he did not. Instead, he said, "Please stand aside. Let the sunshine come to me."

Alexander asked angrily, "Do you know who am I?"

The saint did not reply.

"I am an Emperor-Alexander the Great," he said.

"Emperor! you! No, you are not," said the saint.

"Yes I am," said Alexander, "I have conquered half of the world."

To this the saint said, calmly, "The emperors do not roam restlessly like you. Go, man, try to conquer the hearts of the people by love."

Alexander bowed and quietly walked away. [JNV 2015]

1. Why did the saint asked Alexander to stand aside?
   (1) He was not a devotee
   (2) He was blocking the sunshine
   (3) He wandered restlessly
   (4) He did not seek permission
2. Which of the following words is the synonym of 'conquer'?
   (1) Win (2) Defeat (3) Tell (4) Bow
3. What the emperors usually do not do?
   (1) Visit a saint (2) Rule an empire
   (3) Roam restlessly (4) Bow to saints
4. Which of the following does not describe an emperor?
   (1) A ruler (2) A king
   (3) An employee (4) A conqueror
5. Hearts of the people can be won by
   (1) Love (2) Power
   (3) Money (4) Sword

Passage 22

Simi was a puppy. She was very cute, Asha found her crying in a park. When she picked her up, the puppy stopped crying and looked at her. Asha liked that glance of her and she decided to take her home. Her mother approved the idea. They together gave her the name 'Simi', and happily brought her home.

So far nobody had trained the puppy, so Asha thought she should train her. Next morning she took Simi out and gave her some lessons. A trainer has to be a bit strict. So, she punished her when she disobeyed and rewarded her when she did what Asha wanted her to do. On the whole, the training was not so difficult. In a week's time, Simi became a good cultured puppy. [JNV 2015, 1993]

1. Asha took the puppy home, because she
   (1) pitied her (2) liked her glance
   (3) liked dogs (4) needed a puppy
2. 'She disobeyed .....'. Here 'she' refers to
   (1) Asha (2) Asha's mother
   (3) the puppy (4) the storyteller

3. What is opposite word for reward?
   (1) Encouragement (2) Punishment
   (3) Gift (4) Scolding
4. The puppy was named Simi by
   (1) Asha
   (2) her mother
   (3) Asha and her mother
   (4) a friend of Asha
5. Which of the following words mean : "... did what she wanted her to do"?
   (1) Obeyed (2) Performed
   (3) Followed (4) Picked

Passage 23

It was a full-moon's night. Bright moonlight flooded the road. I was walking slowly. Suddenly, I heard a whistling sound. At first, I thought it was another late evening stroller like me. The sound was lour and cheerful. Suddenly, a boy on a bicycle sped past me. I could not see his face. After a few minutes, he was back again. This time, he stopped a few feet away from me and gave me a smile. He looked like a slim boy of fourteen. He wore a school blazer, a cap and a scarf. His eyes were bright and cool like moonlight. "You don't have a bell on your bicycle," I said. He said nothing. I put out my hand but he did not take it. Then, quite suddenly he sped past again. The next day I learnt that, that whistling boy was a ghost! [JNV 2015, 1994]

1. Who appeared quite rapidly?
   (1) The whistling boy (2) The author
   (3) The moon (4) The bicycle
2. Why could the narrator not see the face of the boy?
   (1) He was afraid of the boy
   (2) The boy sped past quickly
   (3) The boy did not like him
   (4) He was an ugly looking boy
3. What did the boy not wear?
   (1) Scarf (2) A cap
   (3) An overcoat (4) A blazer
4. Why did the boy not take the hands of the stroller?
   (1) He was busy (2) He did not like him
   (3) He was a ghost (4) He was in hurry
5. What was most unusual about the boy?
   (1) He was cycling fast
   (2) His eyes were bright but cool like moonlight
   (3) He wore a school uniform
   (4) He was whistling

Passage 24

I was about six years old. Once I saw a beautiful picture in a book. It was a picture of a dense forest. I thought about the forest and drew a picture of an animal. I showed it to some grown-ups and asked them. "Are you afraid of it?" But they asked me, "Afraid? Why should one be afraid of a hat?"

My drawing was not of a hat. To me, it was an elephant. But the grown-ups were not able to understand it. One of these grown-ups even advised me, 'Stop drawing. Devote yourself instead to Geography, Arithmetic or Grammar." That is why I gave up drawing. That is why I could not become a great artist. [JNV 2015, 2002]

1. The boy drew a picture of
   (1) a forest (2) an animal
   (3) a girl (4) a hat
2. 'Afraid?' is
   (1) a question (2) a statement
   (3) a request (4) an order
3. But for the advice of grown-ups, the child would have become
   (1) a geographer (2) a mathematician
   (3) an artist (4) a grammarian
4. Why did the child give up drawing?
   (1) He was so advised
   (2) He wanted to become a mathematician
   (3) He had no time for it
   (4) It was very difficult to draw
5. The opposite word for 'beautiful' is
   (1) Tidy (2) Lovely
   (3) Pretty (4) Ugly

Passage 25

A rich man went for fishing in a lake. When he was standing on a low bridge, his tin of bait fell into the lake. Leaning over the side of the bridge, he tired to catch the tin and pull it out of the lake. As he did so, his car keys fell out of his pocket and disappeared in the water. The man felt annoyed. He leaned over the bridge to try to see where his keys had gone. As he did so, he lost his balance and fell into the lake. He came out of the lake. He was very sad. He walked back home. [JNV 2013]

1. The man tried to pull out
   (1) his car keys
   (2) the tin of bait
   (3) a fish
   (4) himself

2. The man felt annoyed when
   (1) the tin fell in (2) he fell in
   (3) a fish (4) himself
3. How did the man go to the lake?
   (1) On a horse (2) In a boat
   (3) On foot (4) In a car
4. How did the man come back home?
   (1) On a horse (2) In a boat
   (3) On foot (4) In a car
5. Why did the rich man go on a lake?
   (1) For hunting
   (2) For walking
   (3) For fishing
   (4) For riding

Passage 26

Harshvardhan rose to be one of the greatest emperors of his time. He brought his sister to Thaneshwar and began to rule both the kingdoms. When she died, he shifted his capital to Kannauj. For six years, Harsha went on making conquests. His general Singhnad was an able warrior who won new territories for Harsha. Harsha became master of whole North India Harsha tried to push into South India also, but he could not do so. Pulkesin was a very brave king who defeated Harsha and forced him to return.

Harsha was at first a devotee of Lord Shiva, but later on he became a Buddhist. A Chinese pilgrim Hieun Tsang visited India during Harsha's reign. He visited almost every corner of India. He has written much about Harsha's government. During Harsha's reign, Nalanda was a Buddhist University. It was situated at Rajgiri near Patna. About 10000 students studied here. These students came from several countries. They were given free education, boarding and lodging. Hieun Tsang too studied in this university. Harsha gave large sums for this university. [JNV 2012]

1. Who was Hieun Tsang?
   (1) Hieun Tsang was a professor at Nalanda University
   (2) Hieun Tsang was a Chinese pilgrim
   (3) Hieun Tsang was a British writer
   (4) Hieun Tsang was the King of China
2. Nalanda University was
   (1) situated in Varanasi
   (2) situated in Kannauj
   (3) situated at Rajgiri near Patna
   (4) a famous Chinese University
3. Pulkesin was
   (1) a friend of Harsha
   (2) a general of Harsha
   (3) a priest
   (4) a brave King of South India
4. Harsha gave large sums
   (1) to Hieun Tsang to go round India
   (2) to Pulkesin
   (3) to Singhnad to expand his army
   (4) to Nalanda University
5. Harsha became
   (1) a Buddhist later on
   (2) a Christian
   (3) the King of the whole India
   (4) a follower of Lord Krishna

Passage 27

The family sat down at the table and began to talk about the summer holidays. They had to decide a place to visit during the vacation. Should they go to their village or to a hill station? The parents preferred the village while the children wished to go to the hill station. After few moments of discussion, the elders decided to visit both the places. First they shall go to the village for a week and then stay at the hill station for the remaining days. For the first time, the family shall be together during the holidays. The children were happy with the holiday plan. [JNV 2011, 1996]

1. The purpose for which the family set down at the table was to
   (1) decide a place to visit during the vacation
   (2) educate the children how to carry articles during a visit to a hill station
   (3) decide the date when they should start their journey
   (4) tell the children that they will visit a hill station during this vacation
2. The final plan was to visit
   (1) their village
   (2) a hill station
   (3) their village as well as a hill station
   (4) their home town
3. The final decision was made by the
   (1) boys (2) girls (3) women (4) elders
4. They decided first to go to their village and stay there for
   (1) a day (2) a week
   (3) ten days (4) a fortnight

5. Why were children happy?
   (1) Because a hill station was included in their holiday plan
   (2) Because a visit to their village was excluded from their holiday plan
   (3) Because their choice prevailed
   (4) Because they were going all alone to the hill station

Passage 28

A book is written, not to multiply the voice merely, not to carry it merely but to perpetuate it. The author has something to say which he perceives to be true and useful or helpfully beautiful. So far he knows no one has said it, so, far as he knows no one else can say it. He is bound to say it clearly and melodiously if he may; clearly at all events. In the sum of his life, he finds this to be the thing or group of things, manifest him; this, the piece of true knowledge, or sight which his share of sunshine and Earth has permitted him to seize. That is a book. [JNV 2010]

1. The opening sentence of the passage implies that the aim of writing a book is to
   (1) repeat the message it contains
   (2) enable the author to express his ideas in writing
   (3) preserve from extinction the message it contains
   (4) propagate the ideology of the author
2. Which of the following would be the most suitable title for the passage?
   (1) Contribution of an Author
   (2) Aim of Writing a Book
   (3) Book the Source of True Knowledge
   (4) Writers and Their Books
3. According to the writer, a person is impelled to write a book because
   (1) he wishes to satisfy his ego
   (2) he has something nice and pleasing to say
   (3) he is capable of expressing whatever he wants to say
   (4) he has discovered something unique true and good which he must convey distinctly and musically
4. Which of the following is not implied in the passage?
   (1) A writer is motivated to write a book if he discerns a great truth
   (2) An author of a book generally gathers some common truths and gives them a popular and pleasing expression
   (3) A great writer is convinced that whatever he says is not an echo or imitation of what others have said
   (4) An eminent writer's message is conveyed through plain unambiguous language
5. Which of the following is opposite in meaning to the word 'manifest' given in the passage?
   (1) Unclear (2) Dark (3) Pure (4) Hard

Passage 29

Primitive man was probably more concerned with fire as a source of warmth and as a means of cooking food than as a source of light. Before he discovered less laborious ways of making fire, he had to preserve it, and whenever he went on a journey he carried a fire-brand with him. His discovery that the fire-brand, from which the torch may very well have developed, could be used for illumination was probably incidental to the primary purpose of preserving a flame.

Lamps, too, probably developed by accident. Early man may have had his first conception of a lamp while watching a twig or fibre burning in the molten fat dropped from a roasting carcass. All he had to do was to fashion a vessel to contain fat and float a lighted reed in it. Such lamps, which were made of hollowed stones or sea shells, have persisted in identical form up to quite recent times. [JNV 2008]

1. The most important use of fire for primitive man was
   (1) to provide warmth (2) to provide light
   (3) to cook food (4) (1) and (3)
2. Primitive man used the fire-brand to
   (1) keep away the wild animals
   (2) lessen the labour
   (3) provide light
   (4) prevent accidents
3. In the passge 'primary' means
   (1) primitive (2) elemental
   (3) fundamental (4) essential
4. 'Lamps, too, probably developed by accident'. This statement shows that lamps developed through
   (1) an accident (2) chance
   (3) planning (4) fate
5. Which of the following may be the best title for the passage?
   (1) Discovery of fire (2) Uses of fire
   (3) Primitive man and fire (4) Lamps

Passage 30

Prevention is better than cure and it is recognised that the only way to get rid of malaria completely is to get rid of the mosquitoes which cause it. Malaria is always associated with damp and marshy land. This is not because the land is damp, but because stagnant water is the breeding place of the mosquito which begins its life as a larva living in the water. Malaria does not frequently occur in dry desert countries because mosquitoes cannot breed there. The only way to destroy mosquitoes is to prevent their breeding in standing water.

[JNV 2007]

1. What can be a suitable title for the passage?
   (1) Prevention is better than cure
   (2) How to get rid of malaria?
   (3) The breeding ground of malaria
   (4) The deadly mosquito
2. How does malaria occur?
   (1) It is caused by contaminated food
   (2) It is caused by contaminated water
   (3) It is caused by mosquitoes breeding in damp and marshy land
   (4) It is a seasonal disease, no cause is associated with it
3. How can we get rid of malaria?
   (1) We can get rid of malaria by destroying mosquitoes and preventing their breeding in standing water
   (2) We can get rid of malaria by inoculation
   (3) We can get rid of malaria by vaccination
   (4) We can prevent malaria by taking quinine pills regularly
4. Why do we not get malaria in the dry desert?
   (1) Because the sand of the dry desert kills mosquitoes causing malaria
   (2) Because mosquitoes causing malaria do not breed in dry desert
   (3) Because there is no pollution in the atmosphere of a dry desert
   (4) Because we develop immunity to malaria in the climate of dry desert
5. Give the opposite word of 'stagnant'.
   (1) still (2) deep
   (3) shallow (4) flowing

Passage 31

One day Tansen sang one of the songs taught by his master and deliberately introduced a false note. It had almost an electric effect on the saint; his aesthetic nature received a rude shock. He turned to Tansen and rebuked him, saying, 'What has happened to you, Tansen, that you, a pupil of mine, should commit such a gross blunder?'

He then started singing the piece correctly the mood came upon him and enveloped him, and he forgot himself in the music which filled the Earth and Heaven and Akbar and Tansen themselves in the sheer melody and charm of the music.

It was a unique experience. When the music stopped, Akbar turnd to Tansen and said, "You say you learnt music from this saint and yet you seem to have missed the living charm of it all. Yours seems to be chaff beside this soul stirring music".

[JNV 2003, 1997]

1. 'It had almost an electric effect on the saint'. Here 'saint' refers to
   (1) Akbar
   (2) Tansen
   (3) Tansen's Guru
   (4) Some other courtier
2. Which word did Akbar use to describe Tansen's music?
   (1) Charming (2) Thrilling
   (3) Soul stirring (4) Chaff
3. Tansen's Guru rebuked Tansen because
   (1) he sang a classical song
   (2) he sang a song with a false note
   (3) he tried do show his superiority over his master
   (4) he sang a song not suitable to the occasion
4. What did Akbar miss in Tansen's music?
   (1) Chaff
   (2) Right tunes
   (3) Living charm
   (4) Inspiration
5. "Tansen, ... should commit such a gross blunder". Here 'gross' means
   (1) twelve dozen (2) chocking
   (3) serious (4) melody

Passage 32

There are so many ways in which we can avoid waste.

We can see that taps are turned off properly, so that water is not wasted.

We must save energy. And means everything from electricity to petrol to cooking gas and firewood. Energy is useful in running all our factories, our transport, even the water pumps in the fields. Careful use of our energy resources can save us millions of rupees.

We must not waste food. There are many people less fortunate than us who do not get enough. We must also save paper and take care to our books. Wasteful use of paper means more felling of trees. [JNV 2001]

1. Which of the following is not true?
   (1) We must save water
   (2) We must save electricity
   (3) We must save factories
   (4) We must save paper
2. Which of the following does not provide us energy?
   (1) Electricity (2) Transport
   (3) Firewood (4) Petrol
3. Many poor people do not get enough
   (1) food (2) trees
   (3) books (4) paper
4. By saving energy we can save
   (1) money (2) people
   (3) taps (4) books
5. By wasting paper we cause
   (1) more felling of trees
   (2) more loss of water
   (3) shortage of books
   (4) shortage of food

Passage 33

The playground is as essential as the classroom. The student learns his lesson of the mind in the classroom and adds to his store of knowledge. But the playground trains his powers of mind and body both. Here he learns physical skill and endurance. He further learns how to remain alert and watchful; how to get an advantage over his opponent. Thus, the student gets mental and physical training in the playground together. But the greatest good derived by him is that he learns the team spirit. He is governed by no selfish or individual motives; he rather thinks of his team as a whole. This team spirit helps him to fight for noble causes in later life. [JNV 2000]

1. Where does a student learn physical skill?
   (1) Playground
   (2) Classroom
   (3) School
   (4) Computer hall
2. Where does a student learn lessons of mind?
   (1) Playground (2) Classroom
   (3) School (4) Computer hall
3. What is the greatest good learnt by the student?
   (1) Physical skill (2) Mental training
   (3) Selfish motive (4) Team spirit
4. Choose the incorrect statement.
   (1) Both playground and classroom are essential
   (2) A student learns team spirit
   (3) A student becomes careless and watchless
   (4) He gets mental and physical training
5. Which one of the following words means 'the ability to continue doing something painful or difficult for a long period of time without complaining'?
   (1) Essential (2) Watchful
   (3) Endurance (4) Advantage

Passage 34

The large part of Arabia is desert. The Arabs, who are not in the cities, live in the desert all the year round. They live in tents that can be put up and struck down easily. They move from one place to another seeking grass and water for their sheep and goats, camels and horses. These Arabs eat ripe sweet figs and dates. They dry them too and use them as food all the year round. These Arabs have the finest horses in the world. An Arab is very proud of riding his horse and loves him almost as much as he loves his wife and children. He never puts heavy loads upon his horse. The camel is much more useful to an Arab than his beautiful horse, since the former is much larger and stronger. An Arab loads the camel with goods and rides him, too, for miles and miles across the desert as if he were really the 'Ship of the Desert', which he is often called. [JNV 1998]

1. Arabs are fond of
   (1) camels (2) horses
   (3) drinking wine (4) living in cities in tents
2. Arabs eat
   (1) horse meat
   (2) ripe sweet figs and dates
   (3) rice and wheat
   (4) apples and dates
3. Arabs keep
   (1) horses and camels (2) sheep and dogs
   (3) cows and horses (4) All of these
4. Arabs call ..... 'ship of the desert'
   (1) goat (2) sheep
   (3) horse (4) camel

5. Arabs live in tents
   (1) in cities (2) in desert
   (3) in town (4) in village

Passage 35

English is an international language. It is the language of trade and commerce all over the world. It has a rich literature and a vast store of knowledge. It has tremendously influenced our culture and regional languages. It is still needed for scientific and technical education. Higher studies in any field are not possible without the knowledge of English. Infact, English is a window on our modern world culture and civilisation. If it is properly studied, it can make Indian languages rich. It may not be the official language of India, but it has come to stay as the library language in our country—a language of research and higher education.

The importance of English in India has increased during the post-Independence years and now it is viewed not as a colonial legacy but as a useful medium of communication. The study of English needs greater emphasis today than ever before, without blunting the growth of our mother tongue. [JNV 1998]

1. Which is an international language?
   (1) English (2) Hindi
   (3) Sanskrit (4) Chinese
2. English is the ..... of India.
   (1) window (2) official language
   (3) library language (4) colonial legacy
3. Are higher studies possible without the knowledge of English?
   (1) Yes (2) Sometimes
   (3) No (4) Always
4. Choose the incorrect statement.
   (1) English is the language of trade and commerce
   (2) English is a window to modern world
   (3) English is a library language in our country
   (4) English is a colonial legacy in our country
5. Which word in the passage is opposite of 'sharp'?
   (1) Legacy (2) Culture
   (3) Emphasis (4) Blunting

Passage 36

Subhash Chandra Bose was a great leader of India. People called him Netaji because he led them on the right path. He was sent to jail many times. But he soon found that more efforts should be made to make India free. The British power was getting weaker after the Second World War. He thought of striking at it from all sides. One day he escaped from Calcutta, dressed as a Pathan. He went to Germany. From there, he went to Japan. He organised the Indian National Army that fought many battles against the British Army. The Indians abroad gave their all for the good of India. It is said that Netaji died in an air-crash. We shall always remember him as the greatest fighter for the freedom of India. [JNV 1998]

1. Who was a great leader of India, according to the passage?
   (1) Indira Gandhi
   (2) Jawaharlal Nehru
   (3) Subhash Chandra Bose
   (4) Bhagat Singh
2. Where was he sent many times?
   (1) In train (2) In jail
   (3) To Japan (4) To Germany
3. Which war made the British power weaker?
   (1) First World War
   (2) Indo-Pak War
   (3) Second World WarI
   (4) Indo-China War
4. How did Netaji die?
   (1) In an air-crash (2) In a road-accident
   (3) By a snake-bite (4) In a war
5. People called Subhash as
   (1) Bapu (2) Chachaji
   (3) Netaji (4) Sardar

Answers

Passage 1
1. (1) **2.** (3) **3.** (2) **4.** (3) **5.** (4)

Passage 2
1. (2) **2.** (1) **3.** (3) **4.** (1) **5.** (2)

Passage 3
1. (3) **2.** (2) **3.** (3) **4.** (3) **5.** (2)

Passage 4
1. (2) **2.** (1) **3.** (4) **4.** (1) **5.** (3)

Passage 5
1. (3) **2.** (4) **3.** (1) **4.** (2) **5.** (3)

Passage 6
1. (3) **2.** (2) **3.** (4) **4.** (2) **5.** (4)

Passage 7
1. (3) **2.** (3) **3.** (4) **4.** (1) **5.** (2)

Passage 8
1. (4) **2.** (3) **3.** (1) **4.** (2) **5.** (1)

Passage 9
1. (2) **2.** (3) **3.** (1) **4.** (3) **5.** (4)

Passage 10
1. (2) **2.** (3) **3.** (1) **4.** (1) **5.** (2)

Passage 11
1. (2) **2.** (4) **3.** (2) **4.** (3) **5.** (1)

Passage 12
1. (3) **2.** (2) **3.** (4) **4.** (2) **5.** (1)

Passage 13
1. (4) **2.** (4) **3.** (3) **4.** (3) **5.** (4)

Passage 14
1. (2) **2.** (2) **3.** (3) **4.** (4) **5.** (2)

Passage 15
1. (4) **2.** (3) **3.** (3) **4.** (3) **5.** (2)

Passage 16
1. (3) **2.** (3) **3.** (4) **4.** (2) **5.** (3)

Passage 17
1. (3) **2.** (4) **3.** (4) **4.** (3) **5.** (3)

Passage 18
1. (2) **2.** (3) **3.** (4) **4.** (4) **5.** (3)

Passage 19
1. (3) **2.** (2) **3.** (4) **4.** (3) **5.** (3)

Passage 20
1. (3) **2.** (3) **3.** (4) **4.** (2) **5.** (4)

Passage 21
1. (2) **2.** (1) **3.** (3) **4.** (3) **5.** (1)

Passage 22
1. (2) **2.** (3) **3.** (2) **4.** (3) **5.** (1)

Passage 23
1. (1) **2.** (2) **3.** (3) **4.** (3) **5.** (2)

Passage 24
1. (2) **2.** (1) **3.** (3) **4.** (1) **5.** (4)

Passage 25
1. (2) **2.** (3) **3.** (4) **4.** (3) **5.** (3)

Passage 26
1. (2) **2.** (3) **3.** (4) **4.** (4) **5.** (1)

Passage 27
1. (1) **2.** (3) **3.** (4) **4.** (2) **5.** (1)

Passage 28
1. (4) **2.** (3) **3.** (4) **4.** (2) **5.** (1)

Passage 29
1. (4) **2.** (3) **3.** (2) **4.** (2) **5.** (3)

Passage 30
1. (2) **2.** (3) **3.** (1) **4.** (2) **5.** (4)

Passage 31
1. (3) **2.** (4) **3.** (2) **4.** (3) **5.** (3)

Passage 32
1. (3) **2.** (2) **3.** (1) **4.** (1) **5.** (1)

Passage 33
1. (1) **2.** (2) **3.** (4) **4.** (3) **5.** (3)

Passage 34
1. (2) **2.** (2) **3.** (1) **4.** (4) **5.** (2)

Passage 35
1. (1) **2.** (3) **3.** (3) **4.** (4) **5.** (4)

Passage 36
1. (3) **2.** (2) **3.** (3) **4.** (1) **5.** (3)

Practice Exercise

Directions *Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each questions four probable answer bearing letters* (1), (2), (3) *and* (4) *are given. Only one out of these is correct.*

Passage 1

Mahatma Gandhi is unanimously looked upon as the greatest man of the world today. This is no underserved epithet. The ideals of self-sacrifice and love of truth which he has brought before the world's eyes are simply adorable. His message of truth has awakened the sleeping population of India.

But Gandhiji, like all other personages, belongs not only to a particular country but the whole world. His philanthropic mission is exemplary in the history of mankind. It is no wonder if the future progeny will look upon him as the incarnation of God himself.

1. What has awakened the sleeping population of India?
(1) Gandhiji's message of truth
(2) Gandhiji's faith in non-violence
(3) Gandhiji's ideal of self-sacrifice
(4) Gandhiji's vision of free India

2. Like all other personages Gandhiji
(1) belongs to the whole world
(2) likes truth
(3) believes only in non-violence
(4) is worshipped as God

3. What does the expression 'unanimously looked upon' mean?
(1) Loved by all
(2) Regarded by all
(3) Decided by all
(4) Deputed by all

4. It is no wonder if the future generation will look upon Mahatma Gandhi as
(1) a great man of India
(2) a lover of human kind
(3) the incarnation of God himself
(4) a divine person

5. The two ideals Gandhiji brought before the world are
(1) self-sacrifice and love of truth
(2) truth and non-violence
(3) self-sacrifice and non-violence
(4) truth and tolerance

Passage 2

It is strange that ducks mostly swim in water, though their feathers keep dry. They swim in water for long hours and sometimes plunge into water but the feathers still keep dry. What is the secret of it? There is a small oil limb produced in the root of a duck's tail. The duck expels oil by pressing this limb which spreads over their feathers. Generally, all the birds have this oil producing limb but it is well developed in an aquatic animal, there is no sweat producing limb in birds.

1. The above passage, describes about a duck's
(1) sweat limb
(2) oily feathers
(3) oil limbs
(4) secret of remaining dry

2. The peculiarity of ducks is that they
(1) can swim for long
(2) can swim very fast
(3) can plunge quickly
(4) can remain dry inspite of swimming in water

3. The oil limb of a duck is
(1) on its back (2) in its tail
(3) in its feathers (4) in its feet

4. "What is the secret of it?" Which action of a duck is represented by these words?
(1) Swimming
(2) Plunging
(3) Remaining dry
(4) Remaining in water for a long time

5. The oil limb is
(1) not developed in all birds
(2) not found in all ducks
(3) not found in all birds
(4) well developed in only some ducks

Passage 3

The Sahara is the biggest desert in the world. It stretches across the whole of North Africa. The Arabian desert is also a very large desert. In India too, there is a desert called Thar desert in Rajasthan. Life in a desert is tough. The days are very hot and nights are cold.

1. The biggest desert in the world is in
(1) India (2) Africa
(3) Arabia (4) America

2. Date palms grow in
(1) plains (2) hilly regions
(3) deserts (4) snowy regions

3. In desert regions
   (1) there is no rainfall (2) it rains heavily
   (3) there is enough rain (4) there is a little rain
4. The antonym of the word 'hot' is
   (1) cold (2) warm
   (3) pleasant (4) difficult
5. Very few trees grow in deserts because
   (1) most tress need water to grow
   (2) there is sand all around
   (3) nights are very cold
   (4) there is no one to take care of trees

Passage 4

Mr. Verma is a typist in the town hospital. He lives near the hospital. He, his wife and their daughter, Leela, are a small and happy family. They are hard working. Mr. Verma's wife, Smt. Aruna is busy from morning to evening. She has no servant. She gets up before sunrise and begins her work. She sweeps the rooms, washes the vessels and cooks the food.

Leela wakes up before 6 o'clock. She helps her mother with her work in the kitchen. She brings water from the well and washes the clothes. So, she is busy too. She does her homework after breakfast and leaves for school at nine.

1. Who is a typist in the town hospital?
   (1) Smt. Aruna (2) Leela
   (3) Mr. Verma (4) None of these
2. Who is busy from morning to evening?
   (1) Smt. Aruna (2) Mr. Verma
   (3) Leela (4) None of these
3. Smt. Aruna has no ..... .
   (1) room (2) food
   (3) work (4) servant
4. Who brings water from the well?
   (1) Leela (2) Smt. Aruna
   (3) Mr. Verma (4) Servant
5. At what time does Leela get up?
   (1) After 6 o'clock (2) Before 6 o'clock
   (3) At 6 o'clock (4) None of these

Passage 5

There was once a boy who would never pay any attention to his studies. His parents sent him to school but he took to playing on the road and did not care for the opinion of even those friends who helped him in danger. One day a gentleman who was on the look out for a boy-servant, happened to come across him, wandering all alone in the street. He carried him away to a different town and made him work day and night as a servant. Now, the boy repented his folly and one day while his master was fast asleep, he slipped away and after a good deal of trouble, reached home. He applied himself hard to his books now and rose, in after life, to be a great man.

1. Who took to playing on the road?
   (1) A servant
   (2) A boy
   (3) Parents
   (4) A gentleman
2. Who helped him in danger?
   (1) Friends (2) Parents
   (3) A gentleman (4) A boy-servant
3. What did the gentleman make him to do day and night?
   (1) Play (2) Study (3) Work (4) Sleep
4. "The boy slipped away when the master was ..... ".
   (1) working (2) sleeping
   (3) playing cards (4) having lunch
5. The opposite gender for the word 'gentleman' is
   (1) gentlewoman (2) lady
   (3) gentlemen (4) madam

Passage 6

The Earth is known as a 'watery planet' because it is the only planet of the solar system containing water in abundance. The presence of life on our planet is mainly due to water and air. More than two-thirds of the Earth's surface is covered with water. Oceans contain about 97% of the total water available on the Earth's surface. The fresh water found in the form of snow and ice on the ground and water in lakes and rivers accounts for the remaining 3%. Ocean water is always saline. Hence, it is not of direct use to man. It is however, important as it provides the bulk of water vapour that enters the atmosphere where it forms clouds.

1. The presence of life on our Earth is due to
   (1) good food and crops
   (2) good roads and motor cars
   (3) air and water
   (4) sunlight
2. ..... surface of the Earth is covered with water.
   (1) More than half
   (2) More than two-thirds
   (3) Less than half
   (4) Less than two-thirds

3. Spot the correct statement.
(1) Man uses ocean water directly
(2) Fresh water is always saline
(3) Ocean water is always saline
(4) Earth gets water from Sun

4. Oceans contain
(1) 50% of the total water
(2) 3% of the total water
(3) 97% of the total water
(4) ice and snow

5. Which one of the following is not a synonym of 'abundance'?
(1) Plenty (2) Ampleness
(3) Lack (4) Riches

Passage 7

In our approach to life, be it pragmatic or otherwise a basic fact that confronts us squarely and unmistakably is the desire for peace, security and happiness. Different forms of life at different levels of existence make- up the teeming denizens of this Earth of ours. And no matter whether they belong or the higher groups such as human beings or to the lower groups such as animals, all beings primarily seek peace, comfort and security. Life is as dear to a mute creature as it is to a man. Even the lowliest insect strives for protection against dangers that threaten its life. Just as each one of us wants to live and not to die, so do all other creatures.

1. The author's main point is that
(1) different forms of life are found on Earth
(2) different levels of existence are possible in nature
(3) peace and security are the chief goals of all living beings
(4) even the weakest creature struggles to preserve its life

2. How is life of a mute creature?
(1) They are ignorant
(2) It is as dear as a man itself
(3) Cannot be forecast
(4) It is comfortable

3. According to the passage, the higher groups are mentioned as
(1) all the animals (2) all human beings
(3) under threaten (4) mute like insects

4. The lowliest insect strives for
(1) food
(2) existence
(3) peace
(4) protection

5. Who does want to die?
(1) One of us and all other creature
(2) Happiness, peace
(3) Human beings
(4) Lower groups of animals

Passage 8

One of the major crises facing the country is the looming water shortage. A recent report of the UN has named India among the worst countries for poor quality of water. The report ranks 122 countries according to the quality of their water as well as their ability and communent to improve the situation. Belgium is considered the worst basically because of the quality of its ground water. Rains failed in most parts of India last year and the vast areas of Rajasthan, Madhya Pradesh, Andhra and Odisha were in the grip of devastating drought. People without water turn desperate and violent. Villagers in Rajasthan last year attacked the Food Corporation godowns. Worse may be coming. With man refusing to control pollution (America, the world's greatest polluter, refuses to cooperate with, other countries) the world's getting hotter. This means that the great ice shelves (weighing billions of tonnes) of the Antarctic are collapsing. We cannot even conceptualise the dangerous consequences.

1. Belgium, is suffering acutely because
(1) the sluggish pace of its economy
(2) the discharge of industrial effluents
(3) quality of its ground water
(4) rising cost of living

2. Villagers in Rajasthan attacked Food Corporation godowns because of
(1) low prices offered to them for wheat
(2) refusal of Food Corporation to buy wheat from the local farmers
(3) no financial help from the government bodies
(4) shortage of water

3. What major crises is the country facing today?
(1) Rainfall
(2) Water shortage
(3) Drought
(4) Violent

4. The word 'Devastating' means
(1) Blessed (2) Disastrous
(3) Fortunate (4) Peace

5. The world's greatest polluter country is
(1) India (2) America
(3) Belgium (4) Unknown

3. Spot the correct statement.
(1) Man uses ocean water directly
(2) Fresh water is always saline
(3) Ocean water is always saline
(4) Earth gets water from Sun

4. Oceans contain
(1) 50% of the total water
(2) 3% of the total water
(3) 97% of the total water
(4) ice and snow

5. Which one of the following is not a synonym of 'abundance'?
(1) Plenty (2) Ampleness
(3) Lack (4) Riches

Passage 7

In our approach to life, be it pragmatic or otherwise a basic fact that confronts us squarely and unmistakably is the desire for peace, security and happiness. Different forms of life at different levels of existence make- up the teeming denizens of this Earth of ours. And no matter whether they belong or the higher groups such as human beings or to the lower groups such as animals, all beings primarily seek peace, comfort and security. Life is as dear to a mute creature as it is to a man. Even the lowliest insect strives for protection against dangers that threaten its life. Just as each one of us wants to live and not to die, so do all other creatures.

1. The author's main point is that
(1) different forms of life are found on Earth
(2) different levels of existence are possible in nature
(3) peace and security are the chief goals of all living beings
(4) even the weakest creature struggles to preserve its life

2. How is life of a mute creature?
(1) They are ignorant
(2) It is as dear as a man itself
(3) Cannot be forecast
(4) It is comfortable

3. According to the passage, the higher groups are mentioned as
(1) all the animals (2) all human beings
(3) under threaten (4) mute like insects

4. The lowliest insect strives for
(1) food
(2) existence
(3) peace
(4) protection

5. Who does want to die?
(1) One of us and all other creature
(2) Happiness, peace
(3) Human beings
(4) Lower groups of animals

Passage 8

One of the major crises facing the country is the looming water shortage. A recent report of the UN has named India among the worst countries for poor quality of water. The report ranks 122 countries according to the quality of their water as well as their ability and communent to improve the situation. Belgium is considered the worst basically because of the quality of its ground water. Rains failed in most parts of India last year and the vast areas of Rajasthan, Madhya Pradesh, Andhra and Odisha were in the grip of devastating drought. People without water turn desperate and violent. Villagers in Rajasthan last year attacked the Food Corporation godowns. Worse may be coming. With man refusing to control pollution (America, the world's greatest polluter, refuses to cooperate with, other countries) the world's getting hotter. This means that the great ice shelves (weighing billions of tonnes) of the Antarctic are collapsing. We cannot even conceptualise the dangerous consequences.

1. Belgium, is suffering acutely because
(1) the sluggish pace of its economy
(2) the discharge of industrial effluents
(3) quality of its ground water
(4) rising cost of living

2. Villagers in Rajasthan attacked Food Corporation godowns because of
(1) low prices offered to them for wheat
(2) refusal of Food Corporation to buy wheat from the local farmers
(3) no financial help from the government bodies
(4) shortage of water

3. What major crises is the country facing today?
(1) Rainfall
(2) Water shortage
(3) Drought
(4) Violent

4. The word 'Devastating' means
(1) Blessed (2) Disastrous
(3) Fortunate (4) Peace

5. The world's greatest polluter country is
(1) India (2) America
(3) Belgium (4) Unknown

Passage 9

In Asia and much of Third World, trees are still destroyed in the old-fashioned way: they are cut down for fuel and cropland. In Europe, there is new and potentially more deadly culprit, The Germans call it 'Waldsterben', the dying forest syndrome. But the disease is far more than a German phenomenon. Since, it was first observed by German scientists in the autumn of 1980, the mysterious malady has raced across Europe, blighting woods in countries as far apart as Sweden and Italy. Explanations for the epidemic range from a cyclic change in the environment to a baffling form of tree cancer. But the most convincing evidence points to air pollution. Indeed, saving the rapidly deteriorating forests of Europe will probably require a two-pronged strategy an offensive campaign that includes the breeding of pollution- immune tees and a defensive scheme that calls for reductions in toxic emissions. But both will require more money than is currently being spent on such measures, as well as total commitment to protecting the environment.

1. According to this passage, which one of the following statements is correct?
   (1) There is less damage in Asia than in Europe
   (2) More forests are dying in Germany than anywhere else in Europe
   (3) A cyclic change in the environment is responsible for deforestation
   (4) Air pollution is the main culprit of destroying European forests
2. Saving the trees of European forests
   (1) should not be difficult because of the advances in experimental research
   (2 appears to be a hopeless task and therefore pointless to undertake
   (3) requires a much bigger budget
   (4) demands vigilance and punitive measures against those who cut down the trees
3. The dying forest syndrome is a disease that
   (1) is peculiar to the forests of Asia
   (2) has spread rapidly over the forests of Europe
   (3) is confined to the forests of Germany
   (4) has affected forests all over me world
4. The writer suggests that
   (1) it is no longer possible to grow trees in industrialised areas
   (2) pollution immune trees will absorb toxic emissions
   (3) all pollution-prone trees should be destroyed
   (4) it is not possible to grow trees that remain unaffected by pollution
5. The writer's approach toward the problem of forest devastation in one of
   (1) tolerance
   (2) indifference
   (3) well thought—out strategy
   (4) despondency

Passage 10

Thomas Edison was an American scientist. As a little boy, he used to sell newspapers on the American railway station. Most of the time, he was found in the telegraph office watching the operators at work. One day, he saw the station master's little boy in danger of meeting an accident. Jumping forward, he saved the child and in return for the service the station master taught him all about telegraphy. Many hours did the young man spend in research and to him we owe some of the greatest comforts of modern life. He was only twenty years old when he invented gramophone.

1. Which country did Thomas Edison belong to?
   (1) India (2) China
   (3) America (4) Japan
2. Where did he sell newspapers?
   (1) At the railway station
   (2) At the airport
   (3) At the bus-stop
   (4) At the mall
3. What did he do in the telegraph office?
   (1) Talk to the people (2) Help the people
   (3) Fill the details (4) Watch the operators
4. What was his age when he invented gramophone?
   (1) Eighteen (2) Twenty-four
   (3) Twelve (4) Twenty
5. Who was in danger?
   (1) Thomas Edison
   (2) The station master
   (3) The station master's little boy
   (4) None of the above

Passage 11

Ram Mohan Roy was born at Radhanagar in the Hoogly district of Bengal on 22nd May, 1772. His father, Ramakant Roy, had settled at Radhanagar after giving up his post under Sirajuddoula, the Nawab of Bengal. He had been unjustly treated by the Nawab and he also had some trouble about his lands. So, he became unattached to the world and generally spent his time in prayer and thinking of God.

1. Who was born at Radhanagar?
   (1) Sirajuddoula
   (2) Ram Mohan Roy
   (3) Ramakant Roy
   (4) The Nawab of Bengal
2. According to the pasage, the word 'unattached' mens
   (1) separate (2) unloved
   (3) involved (4) trouble
3. Who spent his most of the time in prayer?
   (1) Ramakant Roy (2) Sirajuddoula
   (3) Ram Mohan Roy (4) None of these
4. Choose the incorrect statement.
   (1) Radhanagar is in Bengal
   (2) Ramakant Roy worked under Sirajuddoula
   (3) Ram Mohan Roy had trouble about his lands
   (4) Ramakant Roy became unattached to the world
5. The district Hoogly is in
   (1) Odisha (2) Paschim Banga
   (3) Bihar (4) Uttar Pradesh

Passage 12

On a summer day, a stag felt very thirsty. He went in search of water. After searching for a long time, he came across a lake. He began to drink water. While drinking, he saw his own reflection in the water. His beautiful branching horns attracted him very much. He was proud of his horns but he condemned God for giving him thin, ugly legs.

In the meantime, a hunter came in the forest. The stag thought that his life was in danger. The dogs chased him. But his ugly legs helped him very much in running very fast. He defeated the dogs but his branching horns were caught in a thick bush. At the same time, the dogs came and killed him.

1. What was the stag proud of?
   (1) His height (2) His horns
   (3) His legs (4) God
2. Which season is mentioned in the story?
   (1) Winter (2) Summer
   (3) Spring (4) Autumn
3. What did he hate in himself?
   (1) His horns (2) His stomach
   (3) His body (4) His thin legs
4. The opposite of the word 'thick' is
   (1) Small (2) thin
   (3) large (4) fast
5. ..... helped the stag.
   (1) His horns (2) His thin legs
   (3) His body (4) His stomach

Passage 13

Florence Nightingale was born on 15th May, 1820, at Florence in Italy. Her parents called her Florence after the name of the city where she was born. Her main ambition was to be a nurse and so she gave up all thoughts of marriage and personal happiness. She spent years visiting hospital after hospital.

Day and night, she visited every bed in the hospital to see that no patient was neglected and all were as comfortable as possible. However hard, she might have worked all day, every night she would take her lamp and move from bed to bed. The soldiers named her 'The Lady with the Lamp'.

1. In which city was Florence Nightingale born?
   (1) France (2) Italy
   (3) Florence (4) London
2. What was her main ambition?
   (1) Nursing (2) Teaching
   (3) Personal happiness (4) Travelling
3. Where did she spend years?
   (1) In schools (2) In forests
   (3) In hospitals (4) In the temple
4. What did she do every night?
   (1) Sleep in her bedroom
   (2) Did not sleep at all
   (3) Watched mysterious dreams
   (4) Visited all the patients
5. What did the soldiers name her?
   (1) The Lady without the Lamp
   (2) The Lamp with the Lady
   (3) The Lady with the Lamp
   (4) No Lady without the Lamp

Passage 14

The blue whale is the largest living animal to have ever lived on the planet Earth. Blue whales are way larger than the largest dinosaur that ever lived. The largest blue whales can grow as large as 100 feet long, which is longer than three school buses put together!

Even though blue whales are huge, they eat tiny creatures known as krill. The blue whale may eat over 8000 pounds of krill in a single day!

1. Which is the largest living animal on the Earth?
   (1) Elephant
   (2) Human
   (3) Ostrich
   (4) Blue whale

2. The blue whale eats.....
   (1) sharks
   (2) big fish
   (3) humans
   (4) small creatures called krill
3. Blue whales can grow
   (1) 1100 ft (2) 100 ft
   (3) 1000 ft (4) 10 ft
4. 8000 pounds of krill may be eaten by
   (1) elephant
   (2) crocodile
   (3) blue whale
   (4) dinosaur
5. Opposite of 'longer' is
   (1) bigger (2) higher
   (3) shorter (4) greater

Passage 15

A woodpecker is a kind of bird. Woodpeckers are found all over the world except in the North and South poles, Australia and New Zealand. There are over 200 different kinds of woodpeckers. The two largest woodpeckers, the imperial woodpecker and the ivory-billed woodpecker are most likely extinct. Animals that are extinct are no longer found on Earth.

Woodpeckers have sharp bills for drilling into wood and short, stiff tails. Woodpeckers also have very long tongues, which help them get at insects deep within trees. Woodpeckers are often heard drumming loudly on trees. Woodpeckers can even become pests if they learn to drum on siding of a house.

1. Why do woodpeckers have long tongues?
   (1) So they can drum on trees
   (2) To get at insects on the ground
   (3) To get at insects within trees
   (4) To eat seeds
2. When do woodpeckers sometimes become pests?
   (1) When they become extinct
   (2) When they drum on houses
   (3) When they eat suet
   (4) When they visit feeders
3. Woodpeckers are not found in
   (1) South Poles (2) Australia
   (3) New Zealand (4) All of these
4. The word 'extinct' means
   (1) the two largest woodpeckers
   (2) pest
   (3) insects
   (4) animals that are no longer found
5. Woodpeckers use their sharp bills for
   (1) flying high
   (2) drilling wood
   (3) sitting on the tree branches
   (4) drinking

Passage 16

Rainbows are often seen when the Sun comes out after or during a rainstorm. Rainbows are caused when sunlight shines through drops of water in the sky at a specific angle. When white sunlight enters a raindrop, it exits the raindrop a different colour. When light exits lots of different raindrops at different angles, it produces the red, orange, yellow, green, blue, indigo and violet that you see in a rainbow. Together, these colours are known as the spectrum. These colours can sometimes be seen in waterfalls and fountains as well.

1. Rainbows are often seen
   (1) after a rainstorm
   (2) before a rainstorm
   (3) after the Sun sets at night
   (4) before a storm
2. Rainbows are produced when
   (1) light exits many raindrops at different angles
   (2) the Sun causes a rainstorm
   (3) the spectrum causes a rainstorm
   (4) the Sun comes out after a storm
3. Which one of the following is a synonym of the word 'specific'?
   (1) exact (2) general (3) common (4) similar
4. What is spectrum?
   (1) Bright part of the rainbow
   (2) Entire colour of rainbow
   (3) Indigo and violent
   (4) Sunlight
5. How many colours are there in a rainbow?
   (1) 5 (2) 7
   (3) 6 (4) 4

Passage 17

Venus, named after the Roman God of love and beauty, is the second planet from the Sun and the closest planet to Earth. The thick cloud cover on Venus reflect the Sun's light which causes Venus to be the second brightest object in our night sky Venus is also called the evening star.

Venus is also the hottest planet. It covered by very thick, rapidly spinning clouds of water vapour and carbon dioxide.These clouds hold in heat and are continually warming the planet. The surface of Venus can reach almost 900° F!

1. Which planet is closest to Venus?
   (1) Mars (2) Jupiter
   (3) Earth (4) Mercury
2. The surface of Venus can reach
   (1) 9000° (2) 900° (3) 910° (4) 90°
3. Venus is often known as
   (1) Roman Star (2) Night Star
   (3) Morning Star (4) Evening Star
4. Venus was named after the
   (1) God of Sacrifice (2) Roman God
   (3) Love and Rome (4) Love and Beauty
5. Venus is the.....planet.
   (1) closet (2) coldest
   (3) hottest (4) darkest

Passage 18

The martyrs who laid down their lives for the freedom of the country, had a lofty vision of the future. They wanted the nation to be free from all the slavery and bondage. They wanted an India in which all the communities would live in prefect harmony and in which there would be no high class and no low class and no low class of people, the curse of untouchability having been wiped out completely.

Women would enjoy equal rights with men and contribute their fullest to the making of a great nation. Such a vision was in keeping with the ancient glory of the country renowned for its splendid achievements in literature, art and culture. We must now revitalise this ancient culture of ours with tolerance as its masthead. If we forget or cease to take pride in our noble heritage. We shall have to face severe indictment in the court of history which is a ruthless judge and seldom spares the erring people.

1. The martyrs who died for the freedom of India wanted
   (1) the country to be the strongest nation in the world
   (2) the country to rule over the other nations
   (3) the country to be free from slavery
   (4) the people to give up their antiquated customs
2. These martyrs wanted that
   (1) there should be reservation in the jobs for the backward section of the society
   (2) there should be perfect communal love and peace in the country
   (3) the old caste system should be retained in the future
   (4) the women should look after their families only
3. We must strive with our total commitment
   (1) defeat and overcome the enemies of the nation
   (2) revitalise our rich past culture
   (3) inject scientific temper into our past culture
   (4) make scientific advancements
4. Our freedom fighters envisioned that in free India
   (1) there should be an egalitarian society
   (2) women would enjoy higher privileges and rights than others
   (3) the country would be taken forward by some selected classes of the society
   (4) industrialisation should occupy the top priority
5. Opposite word for 'equal' is
   (1) complete (2) inequal
   (3) enquality (4) unequal

Passage 19

Dr. S Radhakrishnan , the illustrious philosopher statesman of India, was one of the greatest sons of our motherland. He cautioned the world against the domination of Science in society. It is erroneous to claim that scientific knowledge would bring with it perpetual progress and a steady improvement in human relations.

The recent period of great scientific achievements has also increased human misery in the world wars, concentration camps, atomic destruction, cold war, deadly wars in the middle East, Persian Gulf and at many other places in the world. Growth in human wisdom has not been commensurate with the increase in scientific knowledge and power.

The fear of universal destruction hangs over the world. There is a feeling of disenchantment, anxiety and even despair. Science had failed to liberate man from the tyranny of his own nature. Mankind is passing through a critical period and an education of the human spirit has become essential. In order to remake society, man has to remake himself. If humanity is to suntive, man must integrate his knowledge with a social responsibility.

1. Dr. S Radhakrishnan has
   (1) emphasised that Science should be banished from the society
   (2) opposed the teaching of Science in educational institutions
   (3) favoured scientific thinking in life
   (4) counseled that preponderance of Science in life does not necessarily generate happiness

2. The recent past of tremendous scientific progress has
   (1) made the world a very happy place
   (2) led to global warming
   (3) brought about internal transformation in men
   (4) shown that human wisdom has not kept peace with galloping scientific knowledge
3. Man is despaired of Science because
   (1) Science has given too much knowledge
   (2) Science has brought him excessive material comforts
   (3) he has become a captive of Science
   (4) he is confronted with the nightmare of total annihilation of the world
4. Man can save humanity only if he
   (1) abandons Science
   (2) brings about an internal transformation in himself
   (3) makes his life more comfortable with scientific gadgets
   (4) goes back to nature and primitive times
5. In this passage, the writer has tried to show that
   (1) Science is the only savior that shall lead humanity forward
   (2) Science can bring about an end to all the wars
   (3) social change comes with the advancement of Science
   (4) human wisdom must grow proportionately with growth of knowledge to evolve a creative integration to help mankind

Passage 20

Most of us use the products of science railways, aeroplanes, electricity, wireless and thousands of others—without thinking how did they come into existence. We take them for granted, as if we were entitled to them as a matter of right. And we are very proud of the tact that we live in an advanced age and and ate ourselves so very advanced. Now, there is no doubt that our age is a very different one from previous ages and I think it is perfectly correct to say that it is far more advanced. But that is a different thing from saying that we as individuals or groups are more advanced. It would be the height of absurdity to say that because an engine driver can run an engine and Plato or Socrates could not, the engine driver is more advanced than, or is superior to, Plato or Socrates. But it would be perfectly correct to say that the engine itself is a more advanced method of locomotion than Plato's chariot was.

1. Which one of the following statements is correct?
   (1) An engine driver cannot be compared to Plato or Socrates
   (2) Plato or Socrates is in no way inferior to the engine driver
   (3) Plato or Socrates surpassed the engine driver in every respect
   (4) An engine driver is cleverer than Plato or Socrates
2. According to the pasage, the word 'doubt' means
   (1) unsureness (2) surity
   (3) distinct (4) precise
3. Many of us make use of machines
   (1) with full knowledge of their genesis
   (2) without knowing how were they invented
   (3) with very little knowledge of their mechanism
   (4) without any knowledge of their historical significance
4. In this passage, the writer mentions Plato and Socrates to emphasise that
   (1) they had a great respect for learning
   (2) they were men of great scholarship
   (3) people as individuals in the modern age are not more advanced than their predecessors
   (4) the engine is a better mode of locomotion than Plato's chariot
5. Which is not the product of Science?
   (1) Wireless (2) Aeroplanes
   (3) Electricity (4) Wood

Passage 21

Bees are insects. Bees are special insects because they can fly! They can move through the air like an airplane! They need to fly to get to the flowers!

Bees can have three colours. They can be yellow, red and orange. All bees are black in some places. Bees have three main parts. They have a head. They have a body. And, they have a stinger. The stinger is used to defend against enemies. They also have six legs. They use their legs to stand and climb. They also use their legs to eat and collect pollen. Bees live in many places. They live in Africa, Australia, Asia, Europe, North America, South America. The only continent that bees do not live on is Antarctica!

1. What are bees?
   (1) Mammals
   (2) Birds
   (3) Reptiles
   (4) Insects

2. How do bees fly?
(1) They use their legs (2) They use their head
(3) They use their wings (4) None of the above

3. The bees defend against enemies with their
(1) legs (2) wings
(3) head (4) stinger

4. Bees do not live in
(1) Antarctica (2) Australia
(3) Europe (4) Africa

5. Bees have
(1) five legs, two wings (2) six legs, two wings
(3) six legs, one wing (4) five legs, one wing

Passage 22

My name is Sam. Today is very hot. The Sun is very strong. I am hot. I want to be cool. How can I get cool ?

Wait.... I know!

I can go to the pool. The pool is cool. I can swim in the pool. Is the pool open? Or is the pool closed?

Where is the phone? I need to call the pool. I need to find out if the pool is open or closed.

—Ring! Ring!—

"Hello! My name is Andrea. I am at the pool. Can I help you?"

"Hi, Andrea. Is the pool open?"

"Yes. The pool is open."

"Okay. Thank you!"

"You are welcome. Bye!"

Great! The pool is open! Now I can cool down!

1. What is the weather like today?
(1) It is cold (2) It is cool
(3) It is warm (4) It is hot

2. Sam is hot but Sam wants to be
(1) cold (2) cool (3) warm (4) hot

3. How can Sam get cool?
(1) He can go to the library
(2) He can go to the pool
(3) He can go to school
(4) He can go to work

4. Why does Sam talk to Andrea?
(1) Because she is his friend
(2) Because she knows his sister
(3) Because Sam needs to know what time it is
(4) Because Sam wants to know if the pool is open

5. Opposite word of 'open' is
(1) strong
(2) down
(3) close
(4) hot

Passage 23

The Ganga is a holy river of the Hindus. The Hindus call the Ganga 'Mother Ganga'. Every Hindu wishes to die on the banks of the holy Ganga, so that he may reach heaven. At Allahabad, the Yamuna also joins it and the confluence is known as Triveni. After flowing through Bihar and Bengal, it flows into the Bay of Bengal.

The Ganga is very useful for the country. It brings with it rich soil from the mountains and spreads it on the land to make it very fertile. The fields in this area produce two crops a year. The Ganga is also very useful in other ways. Many saints and holy persons live on its banks and we can learn much from their teachings and wisdom.

1. Which is the holy river of the Hindus?
(1) The Ganga (2) The Yamuna
(3) The Sindhu (4) None of these

2. What do Hindus call it?
(1) Father Ganga (2) Mother Ganga
(3) Devi Ganga (4) Sister Ganga

3. What is the opposite of 'Heaven'?
(1) Earth (2) Paradise
(3) Hell (4) Ganga

4. What is the name of the confluence?
(1) Hindus (2) Ganga
(3) Allahabad (4) Triveni

5. What does every Hindu wish to do at the bank of holy Ganga?
(1) Prayer (2) Sacrifice
(3) Meditation (4) Die

Passage 24

In Shantiniketan, the boys rise very early in the morning. Sometimes, before it is light. They attend to the drawing of water for their bath. They make-up their beds. They do all those things that tend to cultivate the spirit of self-help. I believe in the hour of meditation and I set fifteen minutes both in morning and evening for that purpose. I do not insist on this period of meditation because it can make them hypocrites and make them believe that they are meditating. But I do insist that they remain quiet, so that they can exert the power of self-control.

1. ..... get up early in the morning.
(1) Students
(2) Attendants
(3) Teachers
(4) Boys

2. What do they do early in the morning?
   (1) Their homework
   (2) Pray to God
   (3) Cook their lunch
   (4) Do all their work like drawing water from wells and washing their clothes
3. How much time is set for meditation?
   (1) One hour
   (2) Ten minutes twice a day
   (3) Fifteen minutes twice a day
   (4) Fifteen minutes thrice a day
4. Why should they remain quiet?
   (1) Not to make noise
   (2) Not to disturb others
   (3) To practice silence
   (4) To practice self-control
5. The opposite of 'before' is
   (1) forward (2) after
   (3) backward (4) early

Passage 25

People think all insects are our enemies. Children like to kill flies, bugs and mosquitoes. Many kinds of insects are our enemies. Some of them harm our trees, our clothes, our books, our houses and some of them poison our food. Some of them bite us and spread diseases.

But many insects are our friends too. They eat insects that we want to get rid of.

There are many insects that are neither our friends nor our enemies. They do nothing to help or harm us.

1. "Some of them bite us..."
   'Some' here refers to
   (1) People (2) Children
   (3) Enemies (4) Insects
2. Some insects do good to us because
   (1) they live in our houses
   (2) they spoil some kinds of food
   (3) they save us from harmful insects
   (4) they eat harmful insects
3. Some insects do more harm than good because
   (1) they are annoying
   (2) they are covered with dirt
   (3) they spread diseases
   (4) they eat other insects
4. In this passage, the writer tells us about
   (1) the nature of children
   (2) many kinds of insects
   (3) usefulness of insects
   (4) the nature of insects
5. Which of the following statements about the insects is wrong?
   (1) Insects are harmful
   (2) Insects harm our important belongings
   (3) Insects are the carriers of many diseases
   (4) Insects live in clean conditions

Passage 26

Have you heard of a place called Kanya Kumari? It is a cape at the Southernmost end of India. We sometimes say that the Himalayas are the crown of Mother India, so we can regard Kanya Kumari as her holy feet. At Kanya Kumari, there is a famous old temple. It stands on the Southern most point of land, very near the shore. Pilgrims bathe in the sea and go up into the temple for worship. In the temple, there stands a praying figure of a girl-Goddess; she stands facing the Bay of Bengal in the East. The Goddess is called Kanya Kumari. The place is called Kanya Kumari after her. In foreign countries, it is generally known by the name Cape Camorine; but its Indian name Kanya Kumari has now become popular.

1. Kanya Kumari is situated
   (1) in the Bay of Bengal
   (2) at the Southern most end of India
   (3) in the Arabian Sea
   (4) at the South-Eastern end of India
2. At Kanya Kumari, there is an old temple which is
   (1) in the sea (2) in the deep sea
   (3) very near the sea (4) on a hill top
3. The temple at Kanya Kumari is named after
   (1) the Goddess called Kanya Kumari
   (2) the Goddess of the sea
   (3) the Himalayas
   (4) a girl who built the temple
4. What is true about the Kanya Kumari temple?
   (1) A famous old temple
   (2) Very near the sea
   (3) A deity of Goddess Kanya Kumari
   (4) All of the above
5. What does the word 'holy' mean?
   (1) sacred (2) whole
   (3) hole (4) a festival name

Passage 27

To sum up the whole, we should say that the aim of the Platonic philosophy was to exalt man into a God. The aim of the Baconian Philosophy was to

provide man with what he requires while he continues to be a man. The aim of Platonic philosophy was to raise us far above the vulgar wants. The aim of Baconian Philosophy was to supply our vulgar wants. The former aim was noble; but the latter was attainable. Plato drew a good bow; he aimed at the stars and therefore, though there was no want of strength or skill, the shot was thrown away. His arrow was indeed followed by a track of dazzling radiance; but it struck nothing. Bacon fixed his eye on a mark which was placed on Earth and hit it in the white. The Philosophy of Plato began with words and ended in words, noble words indeed, words such as were to be expected from me finest of human intellects exercising boundless dominion over the fittest of languages.

1. The above passage presents Platonic Philosophy as
   (1) giving rise to vulgar wants
   (2) too idealistic in terms of a realistic/assessment of a man
   (3) no more than mere words
   (4) being pragmatic
2. What does the word 'vulgar' mean?
   (1) Dirty (2) Ordinary
   (3) Mannerly (4) Polite
3. Which one of the following best reflects the underlying tone of the passage?
   (1) All ideas regarding man are couched in noble words
   (2) Man when exalted into a God comes to nothing
   (3) It is better for man to continue to the man
   (4) It is the image of man conceived differently that makes the basic distinction between different systems
4. Which of the following words/sentences in the passage confirm the exalted notions of man according to Plato?
   (1) Exercising boundless dominion
   (2) He aimed at the stars
   (3) Fixed his eye on the mark and hit it in the white
   (4) There was no want of strength or skill, the shot was thrown away

Passage 28

Butterflies are some of the most interesting insects on the planet Earth. There are more than seventeen thousand different kinds of butterflies ! Butterflies come in all shapes and sizes. Butterflies go through four main stages of life. The first stage is the egg stage, followed by the larva stage. As a larva, or caterpillar, the future butterfly eats as much as possible. As it grows, it sheds its outer skin, or exoskeleton. This may happen four or five times. After a few weeks, the caterpillar enters the next stage of its life, the chrysalis stage. In the chrysalis, the caterpillar will liquify into a soup of living cells. Then, it will reorganise into a butterfly and the metamorphosis is complete. In later parts of the chrysalis stage, you can see the forming butterfly through the chrysalis.

When the butterfly emerges from the chrysalis, it pumps its wings to send blood through them so that it can fly. Most butterflies only live a couple of weeks, just enough time to drink flower nectar and to mate. Some, like the Monarch butterfly, however, may live many months.

1. Which of the following is not true?
   (1) Butterflies must wait until blood drains into their wings before flying
   (2) The butterfly may shed its skin 10 to 12 times
   (3) Caterpillars liquifies into a soup of living cells
   (4) Most butterflies live for weeks, at the most for a few months
2. The second stage of life of a butterfly is .....
   (1) larva (2) egg
   (3) chrysalis (4) butterfly
3. Which of the following statements is true?
   (1) There are about a thousand different kinds of butterflies in the world
   (2) There are more than seventeen thousand different kinds of butterflies
   (3) There are only a few hundred different kinds of butterflies
   (4) There is only one kind of butterfly in the world
4. The word 'metamorphosis' used the passage would mean ..... .
   (1) translation
   (2) transformation
   (3) stagnation
   (4) adjustment
5. Find the antonym of the word 'emerges' given in the last paragraph.
   (1) appears (2) reveals
   (3) disappears (4) rises

Passage 29

One day, a rich man took his son on a trip to village. He wanted to show him how poor someone can be. They spent time on the farm of poor family.

Dad asked, " Did you see how poor they are? What did you learn?" Son said,"We have one dog, they have four, we have pool, they have rivers, we have lanterns at night, they have stars, we buy foods, they grow theirs, we have walls to protect us, they have friends, we have encyclopaedias, they have Bible" Then, he headed, "Thanks dad for showing me how poor we are."

1. Where did the rich man take his son?
   (1) Park (2) Trip
   (3) Hospital (4) Picnic
2. Encyclopaedia is a kind of
   (1) newspaper
   (2) games
   (3) set of books containing vast information
   (4) place of rural area
3. What did the rich man want to show his son?
   (1) Friends (2) Poor family
   (3) Dogs (4) Rivers
4. Who grows food?
   (1) Rich man (2) Farmers
   (3) Poor family (4) Nobody
5. What will be the moral of this passage?
   (1) It's not about money that make us rich
   (2) We should not visit poor family
   (3) One should believe in God
   (4) We should avoid hurting others

Passage 30

Once, an old man was sitting on a bench of a garden with his 25 years old son. There was a tree beside the bench. Old man saw a bird sitting on the tree. He asked the son- what's this? Son replied- it's a crow. The old... man again asked what's this? Son said- I already told you that it's crow. The old man again asked what's this? Son angrily said- are you deaf or mad, papa? How many times to tell you it's a crow. Can't you understand?

Old man patiently replied- my dear son, when you were 5 years old, you asked me 174 times the same question that what's this and I replied every time with a kiss that, it's a crow! Now, I asked you 3 times and you were irritated.

1. Who was sitting with the old man in a garden?
   (1) Unknown (2) Friend
   (3) Nobody (4) Son
2. How many times did the old man ask the same question to his son?
   (1) 3 times (2) 174 times
   (3) 5 times (4) 25 times
3. Who got irritated?
   (1) An old man (2) Son
   (3) Crow (4) Not known
4. Who was deaf?
   (1) An old man (2) Son
   (3) Crow (4) Nobody else
5. What was the age of the son, when he asked the similar question again and again?
   (1) 25 years (2) 5 years
   (3) 174 years (4) Not clear

Passage 31

I felt lonely in a classroom full of boys and girls and a teacher. The teacher walked up to me smiling. She put her hand tenderly on my shoulder and asked—"What is your name?"
'Abhayankar…'— I whispered.

"Say loudly, so I can hear it," she said. I tried but I could not. My lips were dry, perhaps sealed. I could not open my mouth. Then the teacher asked me to write my name on the blackboard. I went up to the blackboard, lifted the white chalk and as I was about to write, my mind went blank. I knew my name, I knew how to write it, but standing in front of so many boys and girls and the teacher made me uncomfortable.

1. What does not describe the narrator?
   (1) Nervous (2) Uncomfortable
   (3) Confident (4) Timid
2. The opposite of 'sealed' is …… .
   (1) close (2) tight
   (3) open (4) free
3. The word 'whispered' means
   (1) said slowly (2) told loudly
   (3) kept quiet (4) did not speak
4. The boy could not write his name, because he was …… .
   (1) lonely (2) afraid
   (3) sick (4) nervous
5. The teacher was …… towards the boy.
   (1) sympathetic (2) rude
   (3) unhelpful (4) indifferent

Passage 32

Pratap was a king and yet he had no love of comfort. He had the welfare of his people at heart. He was proud of his honour and he was so good to the people that they were ever willing to sacrifice their all for his welfare. There is a story that Pratap once gave his turban to a poet who had pleased him with his verses. The poet went to Akbar's court but took off the turban before bowing to the emperor, who was surprised and asked him why he bowed bare headed. The poet answered, "Your Majesty, this turban belonged to a man, who has never bowed his head to another man. This is Maharana Pratap's turban."

1. What was the name of the king in the story?
   (1) Akbar (2) Shah Jahan
   (3) Ranjit Singh (4) Pratap
2. What did Pratap give to the poet?
   (1) His horse (2) His turban
   (3) His necklace (4) His kingdom
3. Who bowed bare headed to Akbar?
   (1) The poet (2) Pratap
   (3) The people (4) All of these
4. Choose the incorrect statement.
   (1) Rana Pratap was a great king
   (2) He hated poets
   (3) He was proud of his honour
   (4) He never bowed his head to another man
5. The antonym of 'comfortable' is
   (1) relaxed (2) pleasant
   (3) free from pain (4) uncomfortable

Passage 33

Theseus was the son of Aegeus, king of Athens. The people of Athens were sad because the king of Crete demanded a human sacrifice from them every year. So, seven youths and seven maidens were sent to Crete each year. They never came back to Athens, for a monster ate them. This monster was a man with a bull's head and was called the Minotaur. Theseus decided to go to Crete as one of the seven young men and to kill the monster. With his courage and cleverness, he succeeded in his plan and killed the monster.

1. What was the name of the father?
   (1) Theseus (2) King of Athens
   (3) Aegeus (4) Crete
2. What did the king of Crete demand?
   (1) A human sacrifice (2) Theseus
   (3) Kingdom (4) King of Athens
3. Who were sent to Crete every year?
   (1) Ten animals
   (2) Seven boys and seven girls
   (3) Seven men (4) Seven women
4. What was the name of the monster?
   (1) Theseus (2) Crete
   (3) Aegeus (4) Minotaur
5. Who is the hero of the story?
   (1) Aegeus (2) Minotaur
   (3) King of Crete (4) Theseus

Passage 34

Issac Newton was a great scientist. He was born in 1642 and died in 1727. He discovered the law of gravitation. It was the falling of an apple in the garden that set him thinking. He was trying to find why the Earth went round the Sun and the Moon round the Earth. He asked himself, "Why does an apple fall to the Earth?" This led him to his discovery. Newton also found out that white light is made up of seven colours. We see these colours in the rainbow. He also made many other discoveries. Newton was a very learned man. But he was very humble. Shortly before his death, he said, "I seem to have been only like a boy playing on the sea-shore while the great ocean of truth lay undiscovered before me."

1. Issac Newton was a great
   (1) doctor (2) teacher (3) leader (4) scientist
2. He was born
   (1) in 1727 (2) in 1627
   (3) in 1642 (4) in 1742
3. ..... colours make the white light.
   (1) Five (2) Ten
   (3) Three (4) Seven
4. Choose the word which means of opposite of 'discovered'.
   (1) Found (2) Lost
   (3) Searched (4) Started
5. Choose the word that has the same meaning as 'learned'.
   (1) Knowledgable (2) Lazy
   (3) Clever (4) Happy

Passage 35

Venus is sometimes called Earth's sister planet, though its similarities with Earth are limited, apart from size and relative condition of its surface. It is easily observed with the naked eye and is sometimes called the "evening star" or

"morning star." Venus is covered by thick, noxious clouds of sulphuric acid that obscure its surface. The thick layers of cloud create an extreme insulating effect (like the greenhouse effect) that radiates heat back to the surface and raises the temperature to over 425°C.

Its surface is rocky, dusty and dotted with mountains and canyons and a few volcanic hot spots. There are many lava flows.

1. Why is Venus called Earth's sister planet?
   (1) It is close to Earth
   (2) It is similar in size to Earth
   (3) It is hotter than Earth
   (4) Much like Earth, Venus can support life
2. What does the word "obscure" mean in the sentence, "Venus is covered by thick, noxious clouds of sulphuric acid that obscure its surface."
   (1) cover (2) damage
   (3) extend (4) create
3. Which of the following is not a feature of Venus-surface?
   (1) volcanoes (2) canyons
   (3) plains (4) glaciers
4. The thick clouds on Venus ..... .
   (1) make it much colder than Earth
   (2) radiate extreme heat back to the surface
   (3) allow heat to escape into space
   (4) make the planet very colourful
5. Give the suitable title for the passage?
   (1) Planets (2) Venus and Earth
   (3) Venus, A Planet (4) None of these

Passage 36

There are two types of camels in the world. One has a single hump, and the other has two. The dromedary camel has a single hump, and has domesticated in Arabia over 4,000 years ago. They are also found in North Africa, India, Pakistan and Australia. The size of the hump varies, becoming smaller and leaning to one side during times of starvation. The lips of dromedary camels are thick to allow them to eat coarse and thorny desert plants. Their long legs keep their bodies high off the ground to avoid the baking heat of the desert's surface.

Bactrian camels have two humps, and are found in the deserts of Central Asia. They are extremely adept at withstanding wide variations in temperature-from freezing cold to blistering heat. They can survive without water for months at a time, but when water is available, they may drink up to 57 liters at once. When well fed, the humps are plump and erect.

1. What types of camel are there in the world?
   (1) Dromedary (2) Bactrian
   (3) Both (1) and (2) (4) None of these
2. Single hump camels are found in ..... .
   (1) India and Pakistan (2) India and Sri Lanka
   (3) Pakistan and Nepal (4) Australia and Nepal
3. One unique characteristics of Dromedary camel to avoid the baking heat of the desert's surface is
   (1) thick lips (2) thick hump
   (3) long neck (4) long legs
4. Bactrian camels have ..... humps.
   (1) one (2) two (3) three (4) four
5. The feature that make Bactrian camels unique is
   (1) Adept at various temperature
   (2) Adept only at freezing temperature
   (3) Adept only at hot temperature
   (4) None of the above

Passage 37

A woodpecker is a kind of bird. Woodpeckers are found all over the world except in the North and South poles, Australia and New Zealand. There are over 200 different kinds of woodpeckers. The two largest woodpeckers, the Imperial Woodpecker and the Ivory-billed Woodpecker are most likely extinct. Animals that are extinct are no longer found on Earth.

Woodpeckers have sharp bills for drilling into wood, and short, stiff tails which help prop them up against tree trunks and branches. Woodpeckers also have very long tongues, which help them get at insects deep within trees. Woodpeckers are often heard drumming loudly on trees before they are seen. Woodpeckers can even become pests if they learn to drum on siding of a house. Woodpeckers can easily be attracted to backyard bird feeders with sunflower seeds or suet. Suet is a kind of animal fat that is very tasty to woodpeckers and other birds.

1. Why do woodpeckers have long tongues?
   (1) To get at insects on the ground
   (2) To eat seeds
   (3) To get at insects deep within trees
   (4) So that they can drum on trees

2. When do woodpeckers sometimes become pests?
   (1) When they become extinct
   (2) When they visit feeders
   (3) When they eat suet
   (4) When they drum on houses
3. Woodpeckers are often .....
   (1) found in Australia
   (2) found in the North Pole
   (3) heard before they are seen
   (4) seen before they are heard
4. The two largest woodpeckers in the world are
   (1) pests
   (2) most likely no longer on Earth
   (3) normally found at bird feeders
   (4) found all over the world
5. Which one of the following is a synonym of the word 'Attracted'?
   (1) Prevent (2) Reject
   (3) Discourage (4) Charm

Passage 38

Humming birds are amazing little birds. They are the smallest of all birds and weigh less than even a penny. The bee humming bird, at barely more than two inches long, is the smallest bird in the world!

Unlike most birds, humming birds have iridescent feathers. Iridescent feathers glitter and shine in the Sun. Humming birds are often dazzling combinations of greens and reds or greens and blues. Others are violet, orange, golden, silver or other combinations only Mother Nature could dream up. All humming birds have long bills to insert into flowers. Some humming birds have special bills to fit into specific flowers. Humming birds are the only birds that can fly backwards.

Humming birds are also unique among bird species in that they drink nectar from flowers. You can attract humming birds to your yard with special feeders that are filled with sugar water. These feeders are usually bright red in colour because humming birds are attracted to red.

1. Humming birds are the only birds that
   (1) can fly backwards
   (2) are small
   (3) will come to bird feeders
   (4) are green
2. Compared to other birds, humming birds are
   (1) about the same size (2) lighter
   (3) heavier (4) larger
3. To attract humming birds to your yard, put up feeders with ..... in them.
   (1) sugar water (2) flowers
   (3) berries (4) seeds
4. What colour is most humming birds feeders?
   (1) White (2) Green
   (3) Red (4) Golden
5. Humming birds eat
   (1) insects (2) berries
   (3) the story doesn't say (4) flower nectar

Passage 39

The first battle of the American Revolution occurred at Lexington, Massachusetts in 1775. The American colonists were angry about numerous taxes issued by the British king. In 1776, the colonists issued the Declaration of Independence, a document written by Thomas Jefferson that outlined America's intention to become a new country separate from England. England wanted to maintain control of America, and vowed to fight the colonists. The war lasted eight long years. The Americans won many important battles such as those at Saratoga and Yorktown. Many American heroes emerged such as George Washington, Thomas Jefferson and Benjamin Franklin. Finally, in 1781, the British surrendered at Yorktown, Virginia and a new nation was born two years later.

1. Why did the war happen?
   (1) Colonists were angry about their bad living conditions.
   (2) England attacked the colonists.
   (3) Colonists were angry about having to pay so many taxes.
   (4) Colonists wanted to have more land.
2. Which of the following was not true about the Declaration of Independence?
   (1) It said that the colonists wanted their own country.
   (2) It said that England wanted a separate country.
   (3) It said that colonists wanted to be separate from England.
   (4) It was written by Thomas Jefferson.
3. Which of the following was not an American hero who emerged from the war?
   (1) Thomas Jefferson
   (2) George Washington
   (3) Benjamin Franklin
   (4) Abraham Lincoln

4. What happened first?
   (1) The Declaration of Independence
   (2) The Revolutionary War
   (3) Evolution of heroes
   (4) Many taxes were issued against the colonists
5. What happened last?
   (1) The Battle of Lexington
   (2) The Declaration of Independence
   (3) Many taxes were issued against the colonists
   (4) The Americans won important battles at Saratoga and Yorktown

Passage 40

At this stage of civilisation, when many nations are brought into close and vital contact for good and evil, it is essential, as never before, that their gross ignorance of one another should be diminished, that they should begin to understand a little of one another's historical experience and resulting mentality. It is the fault of the English to expect the people of other countries to react as they do, to political and international situations. Our genuine goodwill and good intentions are often brought to nothing, because we expect other people to be like us. This would be corrected if we knew the history, not necessarily in detail but in broad outlines, of the social and political conditions which have given to each nation its present character.

1. According to the author of 'Mentality' of a nation is mainly product of its
   (1) history
   (2) international position
   (3) politics
   (4) present character
2. The need for a greater understanding between nations
   (1) was always there
   (2) is no longer there
   (3) is more today than ever before
   (4) will always be there
3. The character of a nation is the result of its
   (1) mentality
   (2) cultural heritage
   (3) gross ignorance
   (4) socio-political conditions
4. According to the author his countrymen should
   (1) read the story of other nations
   (2) have a better understanding of other nations
   (3) not react to other actions
   (4) have vital contacts with other nations
5. Englishmen like others to react to political situations like
   (1) us (2) themselves
   (3) others (4) each others

Passage 41

What needs to be set right is our approach to work. It is a common sight in our country of employees reporting for duty on time and at the same time doing little work. If an assessment is made of time they spent in gossiping, drinking tea, eating 'pan' and smoking cigarettes, it will be shocking to know that the time devoted to actual work is negligible. The problem is the standard which the leadership in administration sets for the staff. Forget the ministers because they mix politics and administration. What do top bureaucrats do? What do the below down officials do? The administration setup remains weak mainly because the employees do not have the right example to follow and they are more concerned about being in the good books of the bosses than doing work.

1. The employees in our country
   (1) are quite punctual but not duty conscious
   (2) are not punctual, but somehow manage to complete their work
   (3) are somewhat lazy but good natured
   (4) are not very highly qualified
2. According to the writer, the administration in India
   (1) is by and large effective
   (2) is very strict and firm
   (3) is affected by red tape
   (4) is more or less ineffective
3. The word 'assessment' means
   (1) enquiry (2) report
   (3) evaluation (4) summary
4. The leadership in administration
   (1) sets a fine example to the employees
   (2) is of a reasonably high standard
   (3) is composed of idealists
   (4) is of a very poor standard
5. The central idea of the passage could be best expressed by the following
   (1) The employee outlook towards work is justified
   (2) The employees must change their outlook towards work
   (3) The employees would never change their work culture
   (4) The employer-employee relationship is far from healthy

Passage 42

Emily and dad planted a garden. Emily waited for the plants to grow. Then, she watched for the vegetables to get ripe. "When can we pick the tomatoes"? Emily asked. "Tomorrow", said Dad. But, as the Sun came up, squirrel chomped on every tomato.

Emily's dog, Molly, munched on the cucumbers.

When the Sun climbed high in the sky, Emily put on her garden gloves. She picked ten jalapeno peppers.

Squirrel watched from a tree. Rabbit watched from behind a bush. Molly watched from a lawn chair. In the kitchen, Emily and Dad made a big batch of spicy salsa. Emily dipped a tortilla chip in the salsa, Crunch! Everyone was happy with the harvest.

1. What did the squirrel chomp?
   (1) Tomatoes (2) Potatoes
   (3) Guava (4) Berries
2. What did the dog named Molly munch on?
   (1) Tomatoes (2) Potatoes
   (3) Cucumber (4) Pea
3. What did Emily and her dad do with the peppers?
   (1) They made salsa
   (2) They sold it
   (3) They threw it
   (4) They didn't do anything
4. What did Emily pick from the garden?
   (1) Lemone (2) Jalapeno
   (3) Berries (4) Pea
5. Who were happy with the harvest?
   (1) No one (2) Some one
   (3) Any one (4) Every one

Passage 43

The Rajputs have always been fighting-men. They brought up their sons to become warriors. Before a child could lift real sword, he was given a toy one and with it he slashed at the heads of animals to strengthen his baby arm. Before he could walk, he was lifted on to the back of his father's war-horse. And if he could neither read nor write, he was not ashamed, if he could ride. In this way, the Rajput boys grew up strong and hardy, perfect horsemen and swordsmen and as a rule perfect gentlemen for they fought clean and fair.

1. What are Rajputs?
   (1) Labourers (2) Beggars
   (3) Saints (4) Fighting men
2. What did they want their sons to become?
   (1) To become kings
   (2) To become saints
   (3) To become warriors
   (4) To become farmers
3. What did the boys do to strengthen their arm?
   (1) Played with a toy-sword
   (2) Fired guns
   (3) Wrestled with siblings
   (4) Took exercise daily
4. Give the antonym of 'war'.
   (1) Holiday (2) Peace
   (3) Special (4) Fight
5. What is given to child before using the real sword?
   (1) A toy gun (2) A statue
   (3) A toy sword (4) An arrow and bow

Passage 44

Gandhiji always loved his people—Muslims as much as Hindus. Even when Pakistan was formed, he spoke for the Muslims of India who were comparatively few in number. Many Hindus thought that he favoured the Muslims too much. Nathuram Godse held misguided ideas of this kind. At a prayer meeting at Birla House in New Delhi, Godse shot Gandhiji on 30th January, 1948. The Great Mahatma died with 'Hey Ram' on his lips. He was murdered, yet he was calm and peaceful even in death. It seemed as if he were sleeping.

1. Which two religions are mentioned in the passage?
   (1) Hinduism
   (2) Islamism
   (3) Jainism
   (4) Both (1) and (2)
2. Who shot Gandhiji?
   (1) Nathuram Godse
   (2) Kalooram Godse
   (3) Vikram Godse
   (4) Shivlal Godse
3. Who died with 'Hey Ram' on his lips?
   (1) Mahatma Gandhi
   (2) Subhash Chandra Bose
   (3) Bhagat Singh
   (4) Jawaharlal Nehru
4. Who were less in number?
   (1) Hindus (2) Muslims
   (3) Jains (4) Buddhists
5. When did Gandhiji die?
   (1) 1947 (2) 1946
   (3) 1948 (4) 1949

Passage 45

Nagaland, one of India's smallest states, is located in the North-East part of India. It is bound by Myanmar on the East, Arunachal Pradesh on the North, Asom on the West and Manipur on the South. Nagaland is mostly mountainous except for the part bordering the Asom valley. The Nagas, inhabitants of Nagaland, form more than twenty tribes. *Konyak* is the largest of the Naga tribes.

Folk songs and ballads popular among the Nagas uphold such values as bravery, love, generosity etc. Dances are mostly woven around war themes and are performed with amazing mock war emotions. The bamboo dance is a well-known dance of the Nagas.

Wood carving is a famous Naga craft. The *Konyaks*, the best wood carvers among all the Naga tribes, are skilled in carving human and animal figures. Weaving is a traditional Naga art in which each tribe has its own special designs and colours. Shawls, shoulder bags and intricately woven mats and baskets make magnificent souvenirs for tourists.

1. Naga folk dances are mostly based on the theme of .....
(1) harvesting (2) religion
(3) war (4) health

2. Which Naga tribe is having the best wood carvers?
(1) The Angamis (2) The Konyaks
(3) The Zemis (4) The Aos

3. Which of the following statements is not correct?
(1) The Western part of Nagaland is not mountainous.
(2) Moatsu is a festival associated with agriculture.
(3) Naga girls perform the bamboo dance.
(4) The Konyaks are the smallest of the Naga tribes in number.

4. The word 'souvenirs' in the last paragraph means .....
(1) trophies or prizes
(2) some things to preserve the memory of an occasion
(3) crowns
(4) special shoes

5. A synonym for the word 'mock' used in the fourth paragraph is ..... .
(1) real (2) laughing
(3) artificial (4) ridiculing

Passage 46

A person who looks at the good side of things sees good things. We call such a person an optimist. One, who looks at the dark side of things, is a pessimist. One, who looks at the good qualities of others, will make many friends and live a happy life. The others, will make their own as well as the lives of others miserable. We expect others not to look at or mind our bad qualities. Let us remember that the others too expect the same from us. A very good way to live a happy life with several friends is to learn to look at the qualities of others.

1. Who is an optimist?
(1) One who looks at the good side of things
(2) One who looks at the bad side of things
(3) One who thinks in a different way
(4) One who has a scientific attitude

2. What do we expect from others?
(1) They must help us financially
(2) They must be social and helpful to the poor
(3) They must work hard day and night
(4) They must not look at or mind our bad qualities

3. What does a pessimist do?
(1) One who looks at the good side of things
(2) One who looks at the dark side of things
(3) One who craves for status and money
(4) One who seeks help from others always

4. What life does an optimist lead?
(1) Sorrowful (2) Tensed
(3) Happy (4) Jealous

5. Which is the synonym to 'unhappy'?
(1) Miserable (2) Miser
(3) Stake (4) Jealous

Passage 47

Having taken leave of his father at last, the young man set-off on a long journey into foreign lands. "When luck does not favour, an artist goes to a place where his name is not known." He said to himself and turned in a direction which he did not know. He was footsore and hungry when at last he arrived on the bank of a turbulent river, hindering his further passage until he could cross it. Espying a boat at a nearby ferry, he went thither. There were other men too, each with his fare ready in his hand. But, the young man had not even a broken cowrie on him.

"Pay the fare and only then step into the boat," the boatman told him. The young man was at his wit's end and the other people began to smile at his foolishness of going about without any money on him.

1. Where was the young man going?
   (1) Foreign lands (2) Another state
   (3) Town (4) Village
2. What was his condition when he came to the river bank?
   (1) Happy (2) Angry
   (3) Hungry (4) Embarrassed
3. What did the other people have in their hands?
   (1) Luggage (2) Fare
   (3) Goat (4) Bucket
4. What did the boatman tell him?
   (1) To go and take a bath first
   (2) To help him unload the luggage from boat
   (3) To sing a song for his entertainment
   (4) To pay the fare and then step into boat
5. Why did the other people smile?
   (1) On his foolishness of going without money
   (2) On his ragged clothes
   (3) On his manners of behaviour
   (4) On his story that he told them

Passage 48

Sugar comes from a plant which is called 'sugarcane'. The sugarcane grows in the hot countries. When sugarcanes are ripe, they are cut down. Then, their large green leaves are taken off. The canes, then are tied in bundles and sent to the sugar mills. Here, they are pressed hard, so that all the juice comes out of them. The juice now looks like dirty water. It is, then cleaned and heated in iron pans. All the water goes off, leaving the sugar behind. The sugar is brown in colour. It is heated again and cleaned till it becomes white. This is called cane sugar. In the past, all the sugar we used came to India from Java and other countries. Now, sugar is made in our own country. There are many sugar mills in Uttar Pradesh and Bihar.

1. In which type of countries are sugarcanes grown?
   (1) Hot countries
   (2) Cold countries
   (3) Humid countries
   (4) Arid countries
2. Which are the sugar producing states in India?
   (1) Uttar Pradesh (2) Bihar
   (3) UP and Bihar (4) None of these
3. What is the first colour of sugar?
   (1) Black (2) Brown
   (3) Red (4) White
4. Which part of sugarcanes is cut off before sending them to sugar mills?
   (1) Roots (2) Branches
   (3) Seeds (4) Leaves
5. The opposite word for 'tied' is
   (1) Untied (2) Crooked
   (3) Threw (4) Kept

Passage 49

One day a cat dies due to old age and goes to heaven. There she meets the lord God himself. The lord tells the cat, "You've lived a good life and if there is any way I can make your stay in heaven more comfortable, please let me know." The cat thinks for a moment and says, "Lord, all my life I have lived with a poor family and had to sleep on the hard wooden floor. Can I have a pillow to sleep on?" The lord stops the cat and says, "Say no more", and a wonderful fluffy pillow appears.

About a week later, the lord God stops by to see the cat and finds her in a deep sleep on the pillow. The lord gently wakes the cat and asks her, "How are things since you arrived?" The cat stretches, yawns and then replies, "It's wonderful here! In fact, it is much better than I could have expected! And those little meals on wheels you've been sending by are the best!"

1. The mice were tired of ..... .
   (1) eating whatever they could get
   (2) searching for new places to live
   (3) looking for work
   (4) getting chased by everyone
2. What did the cat ask God for?
   (1) A mouse to eat every day.
   (2) Send her back to earth.
   (3) Give her a comfortable pillow to sleep on.
   (4) Make the world a better place to live.
3. What will be a suitable title for this story?
   (1) God is great
   (2) The tired mice
   (3) Tom and Jerry
   (4) Cat in heaven
4. Which of the following is an antonym of the word 'fluffy' in the passage?
   (1) Rough (2) Hard
   (3) Woolly (4) Messy
5. Which of the following is the meaning of 'deep' in the passage?
   (1) Sound (2) Blissful
   (3) Relaxing (4) Obscure

Passage 50

One day, a mother duck and her little ducklings were on their way to a lake. The ducklings were very happy following their mother. All of a sudden the mother duck saw a fox. She was frightened and shouted, "Children, hurry to the lake. There's a fox."

The ducklings hurried towards the lake. The mother duck wondered what to do. She began walk back and forth dragging one wing on the ground. The fox became happy. He said to himself, "It seems that she's hurt and can't fly! I can easily catch and eat her!" Then he ran towards her. The mother duck ran, leading the fox away from the lake. The fox followed her. Now, he wouldn't be able to harm her ducklings. The mother duck looked towards her ducklings and saw that they had reached the lake. She was relieved, so she stopped and took a deep breath.

The fox thought she was tired and came closer, but the mother duck quickly spread her wings and rose up in the air. She landed in the middle of the lake and her ducklings followed her. The fox could not reach them because they were in the middle of the lake.

1. How did the mother duck save her ducklings?
   (1) By killing the fox
   (2) By running towards the lake, leaving her children
   (3) By shouting and giving instructions
   (4) By diverting the attention of the fox and letting her children move towards the lake
2. Why did the fox become happy after looking at the mother duck?
   (1) He thought the mother duck got hurt and could not fly so he could easily kill her
   (2) Because he killed the mother duck
   (3) Because he killed the ducklings
   (4) Because the fox was hungry
3. Find synonym for the word 'wonder'.
   (1) Stop (2) Speculate
   (3) Shout (4) Hurry
4. The mother duck was relieved because
   (1) she managed to escape from the fox
   (2) she entered into the lake
   (3) her ducklings reached the lake and were safe
   (4) the fox reached the lake and was safe from her
5. Write antonym for the word 'quickly'.
   (1) Lastly (2) Slowly
   (3) Finally (4) Continuously

Answers

Passage 1
1. (1) 2. (1) 3. (2) 4. (3) 5. (1)

Passage 2
1. (4) 2. (4) 3. (2) 4. (3) 5. (1)

Passage 3
1. (2) 2. (3) 3. (4) 4. (1) 5. (1)

Passage 4
1. (3) 2. (1) 3. (4) 4. (1) 5. (2)

Passage 5
1. (2) 2. (1) 3. (3) 4. (2) 5. (2)

Passage 6
1. (3) 2. (2) 3. (3) 4. (3) 5. (3)

Passage 7
1. (3) 2. (2) 3. (2) 4. (4) 5. (1)

Passage 8
1. (3) 2. (4) 3. (2) 4. (2) 5. (2)

Passage 9
1. (3) 2. (3) 3. (2) 4. (4) 5. (3)

Passage 10
1. (3) 2. (1) 3. (4) 4. (4) 5. (3)

Passage 11
1. (2) 2. (1) 3. (1) 4. (3) 5. (2)

Passage 12
1. (2) 2. (2) 3. (4) 4. (2) 5. (2)

Passage 13
1. (3) 2. (1) 3. (3) 4. (4) 5. (3)

Passage 14
1. (4) 2. (4) 3. (2) 4. (3) 5. (3)

Passage 15
1. (3) 2. (2) 3. (4) 4. (4) 5. (2)

Passage 16
1. (1) 2. (1) 3. (1) 4. (2) 5. (2)

Passage 17
1. (3) 2. (2) 3. (4) 4. (2) 5. (3)

Passage 18
1. (3) 2. (2) 3. (2) 4. (1) 5. (4)

Passage 19

1. (4) 2. (4) 3. (4) 4. (2) 5. (4)

Passage 20

1. (1) 2. (1) 3. (2) 4. (3) 5. (4)

Passage 21

1. (4) 2. (3) 3. (4) 4. (1) 5. (2)

Passage 22

1. (4) 2. (2) 3. (2) 4. (4) 5. (3)

Passage 23

1. (1) 2. (2) 3. (3) 4. (4) 5. (4)

Passage 24

1. (4) 2. (4) 3. (3) 4. (4) 5. (2)

Passage 25

1. (4) 2. (4) 3. (3) 4. (2) 5. (4)

Passage 26

1. (2) 2. (3) 3. (1) 4. (4) 5. (1)

Passage 27

1. (4) 2. (1) 3. (4) 4. (2)

Passage 28

1. (2) 2. (1) 3. (2) 4. (2) 5. (3)

Passage 29

1. (2) 2. (3) 3. (2) 4. (3) 5. (1)

Passage 30

1. (4) 2. (1) 3. (2) 4. (4) 5. (2)

Passage 31

1. (3) 2. (3) 3. (1) 4. (4) 5. (1)

Passage 32

1. (4) 2. (2) 3. (1) 4. (2) 5. (4)

Passage 33

1. (3) 2. (1) 3. (2) 4. (4) 5. (4)

Passage 34

1. (4) 2. (3) 3. (4) 4. (2) 5. (1)

Passage 35

1. (2) 2. (1) 3. (4) 4. (2) 5. (3)

Passage 36

1. (3) 2. (1) 3. (4) 4. (2) 5. (1)

Passage 37

1. (3) 2. (4) 3. (3) 4. (2) 5. (4)

Passage 38

1. (1) 2. (2) 3. (1) 4. (3) 5. (4)

Passage 39

1. (3) 2. (2) 3. (4) 4. (4) 5. (4)

Passage 40

1. (4) 2. (3) 3. (4) 4. (2) 5. (2)

Passage 41

1. (1) 2. (4) 3. (3) 4. (4) 5. (2)

Passage 42

1. (1) 2. (3) 3. (1) 4. (2) 5. (4)

Passage 43

1. (4) 2. (3) 3. (1) 4. (2) 5. (3)

Passage 44

1. (4) 2. (1) 3. (1) 4. (2) 5. (3)

Passage 45

1. (3) 2. (2) 3. (4) 4. (2) 5. (3)

Passage 46

1. (1) 2. (4) 3. (2) 4. (3) 5. (1)

Passage 47

1. (1) 2. (3) 3. (2) 4. (4) 5. (1)

Passage 48

1. (1) 2. (3) 3. (2) 4. (4) 5. (1)

Passage 49

1. (4) 2. (3) 3. (4) 4. (2) 5. (1)

Passage 50

1. (4) 2. (1) 3. (2) 4. (3) 5. (2)

Self Practice

Directions *There are four passages in this section. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each questions four probable answer bearing letters* (1), (2), (3) *and* (4) *are given. Only one out of these is correct. You have to choose the correct answer and indicate your correct response.*

Passage 1

Unless mothers are truly well educated, the upbringing of the children, both male and female, must suffer in the most important stages. This must be so whatever progress is to be made in the organisation of our schools and colleges. Therefore, we must pay much greater and more scientific attention to the education of girls than we are doing now.

Rushing girls into schools and colleges and enabling them to qualify for a degree is not enough. The education we should give to girls is one that should equip them for undertaking the duties of enlightened mothers, the task of the upbringing of children, both boys and girls, in the critical years of their life.

1. Who should be necessarily well educated?
   (1) Fathers (2) Mothers
   (3) Children (4) None of these
2. Where should we pay more attention?
   (1) To the education
   (2) To the dancing classes
   (3) To the cooking classes of girls
   (4) None of these
3. What is the plural of child?
   (1) Childs (2) Children
   (3) Babies (4) None of these
4. What is the opposite gender of 'male'?
   (1) Man (2) Woman
   (3) Girl (4) Female
5. The purpose of girls' education is
   (1) enabling them to qualify for a degree
   (2) enabling them to undertake the duties of enlightened mother
   (3) enabling them to cook delicious food
   (4) not given in the passage

Passage 2

There was a king called Midas. One day, he was walking through the fields, he met a man. He was God Pan. He challenged God Apollo to play better music than he could. King Midas was asked to be the judge. Both Gods played music well. But Midas was a great fan of God Pan the winner. Now Apollo was very angry. He shouted, "Can't you tell beautiful music when you hear it? What is wrong with your ears?" Midas ears began to grow bigger and bigger and he found that he could move them about. He ran to near by lake and saw that he had grown ass's ears.

1. What was the name of the king?
   (1) Midas (2) Pan
   (3) Apollo (4) None of these
2. Who challenged God Apollo?
   (1) Midas (2) Pan
   (3) A man (4) None of these
3. Which one of the following is a synonym of the word 'challenge'?
   (1) Approval (2) Dare
   (3) Agreement (4) Assent
4. Who became very angry?
   (1) Apollo (2) Pan
   (3) Midas (4) None of these
5. Who was the judge in the story?
   (1) Apollo (2) Midas
   (3) Pan (4) None of these

Passage 3

The weather is very cold in taiga ecosystems. The winter season lasts a long time, and the weather is icy cold. Storms are severe, bringing biting cold winds. Summers never get very warm and the summer season is exceptionally short.

Short, stubby grass and shrubs grow in taiga regions, but they are better known for their beautiful evergreen trees. All the trees you think of when you imagine kinds of Christmas trees are at home in the taiga. Pines, firs, and spruce trees are common. The thin, waxy leaves (sometimes called needles) of evergreen trees hold in water all year round. People living and working in taiga regions often disrupt the natural balance. Activities such

as hunting, trapping and fishing affect the animal populations, sometimes thinning them to the point that they are endangered. Mining for oil and gas and harvesting trees does irreparable damage, destroying animal habitats and robbing the Earth of important oxygen sources.

1. Which of the following best describes the seasons in a taiga ecosystem?
   (1) The winter is very cold and long, while the summer is short and slightly warm.
   (2) There is heavy rain in winter and the summer is hot.
   (3) Snow falls in the winter and rain falls in the summer.
   (4) None of the above
2. What characteristic of the trees in the taiga is well known?
   (1) The tree trunks are very tall.
   (2) They are evergreen with thin waxy leaves.
   (3) The trees shed their leaves in winter.
   (4) The trees do not use photosynthesis for making their food.
3. Which human activities disrupt the natural balance of the taiga ecosystems?
   (1) Planting new trees
   (2) Using natural resources in a way that makes resources renewable
   (3) Not damaging animal habitats
   (4) Hunting, trapping and fishing
4. The phrase 'biting cold' in the first paragraph means ..... .
   (1) cold which can be tolerated
   (2) warm
   (3) very cold and unpleasant
   (4) None of the above
5. The word 'irreparable' in the fourth paragraph means ..... .
   (1) drastic (2) too serious to put right
   (3) slight (4) None of these

Passage 4

Plants need sunlight and water to make their own food. You can do an experiment to test if this is true. Place a bucket over a patch of green grass. After a few days, lift the bucket. You will see that the grass is not as green anymore. If you leave the bucket in place for a week, the grass will be become very dull. This happens because the grass cannot make food in the dark. Remove the bucket. In a few days, the grass will start turning green again.

1. What do plants need?
   (1) Grass (2) Sunlight
   (3) Air (4) None of these
2. What is the experiment?
   (1) A way to grow grass
   (2) A way to test an idea
   (3) A way to use a bucket
   (4) A way to use air
3. Give the opposite of 'Dull'?
   (1) Bright (2) Light
   (3) Brown (4) Sunlight
4. According to the passage, how long does it take for the grass to become dull?
   (1) a month (2) a week
   (3) a year (4) a few days
5. Why do plants need sunlight and water?
   (1) To do a experiment
   (2) To make their food
   (3) To consume water
   (4) To live longer

Answers

Passage 1

1. (2) **2.** (1) **3.** (2) **4.** (4) **5.** (2)

Passage 2

1. (2) **2.** (1) **3.** (2) **4.** (4) **5.** (2)

Passage 3

1. (1) **2.** (2) **3.** (4) **4.** (3) **5.** (2)

Passage 4

1. (2) **2.** (1) **3.** (1) **4.** (4) **5.** (2)

JAWAHAR NAVODAYA VIDYALAYA

PRACTICE SETS (1-5)

Jawhar Navodaya Vidyalaya

Entrance Exam (Class VI)

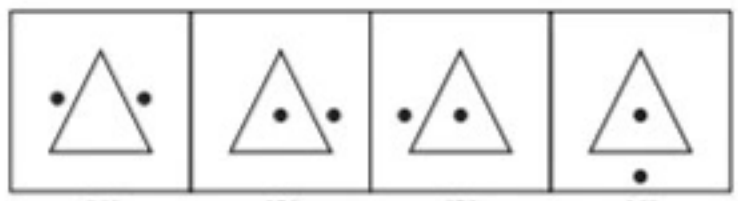
PRACTICE SET 1

Section I Mental Ability Test

Part I

Directions (Q. Nos 1-4) *In questions, four figures* 1, 2, 3, *and* 4 *have been given in each question of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different.*

1.



(1) (2) (3) (4)

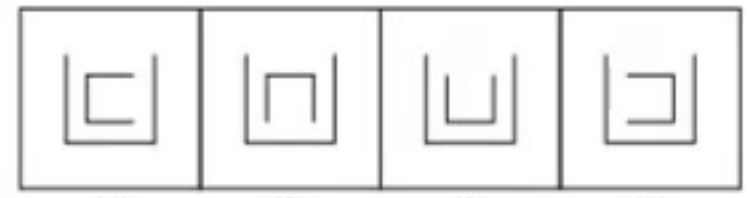
2.

(1) (2) (3) (4)

3.

(1) (2) (3) (4)

4.



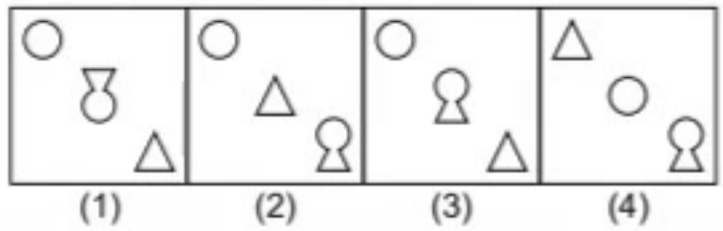
(1) (2) (3) (4)

Part II

Directions (Q. Nos 5-8) *In questions, a question figure is given and four answer figures marked* 1, 2, 3 and 4 *are also given. Select the answer figure which is exactly the same as the question figure.*

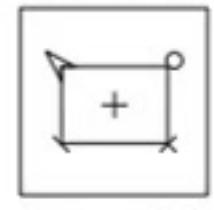
5. Question Figure

Answer Figures

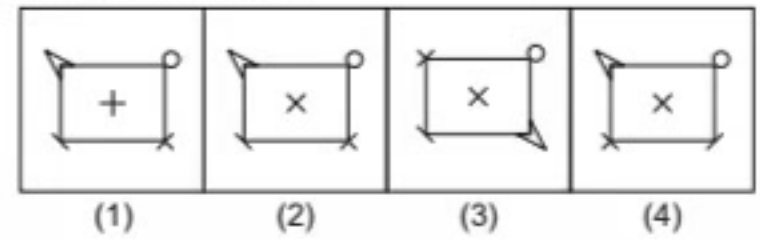


(1) (2) (3) (4)

6. Question Figure

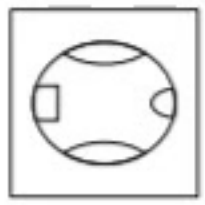


Answer Figures

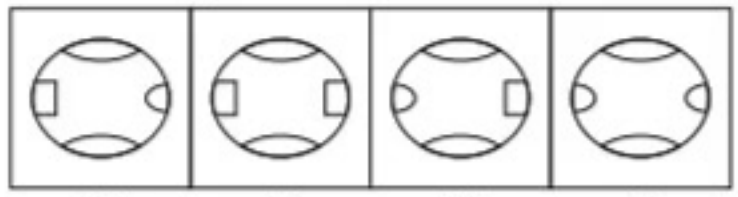


(1) (2) (3) (4)

7. Question Figure



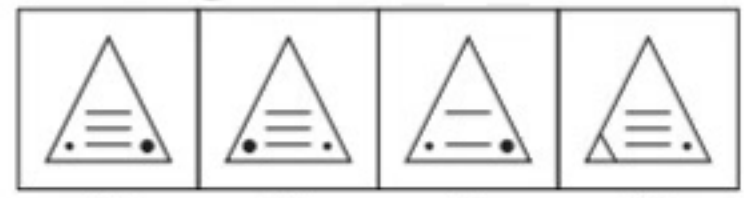
Answer Figures



(1) (2) (3) (4)

8. Question Figure

Answer Figures

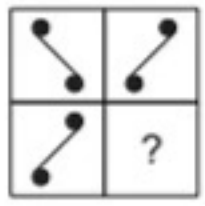


(1) (2) (3) (4)

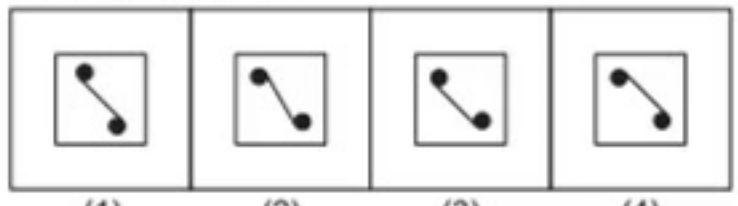
Part III

Directions (Q. Nos 9-12) *In questions, there is a question figure, a part of which is missing. Observe the answer figures* 1, 2, 3 *and* 4 *and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure.*

9. Question Figure

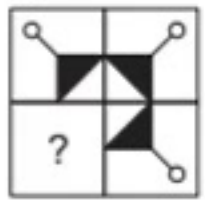


Answer Figures

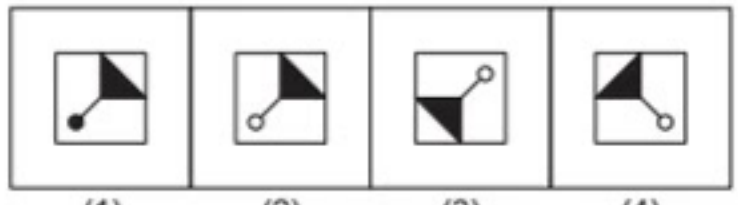


(1) (2) (3) (4)

10. Question Figure

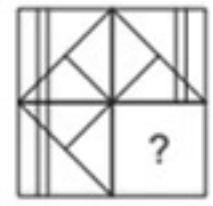


Answer Figures

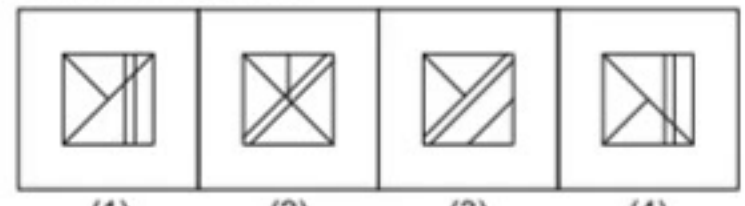


(1) (2) (3) (4)

11. Question Figure

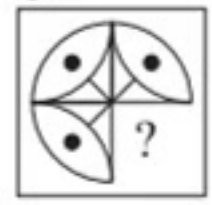


Answer Figures

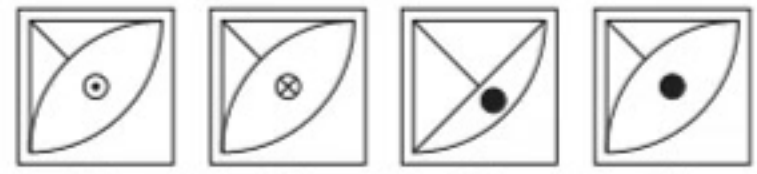


(1) (2) (3) (4)

12. Question Figure



Answer Figures



(1) (2) (3) (4)

Part IV

Directions (Q. Nos 13-16) *In questions, there are three question figures and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure among the answer figures, which occupies the blank space for the fourth figure and completes the series.*

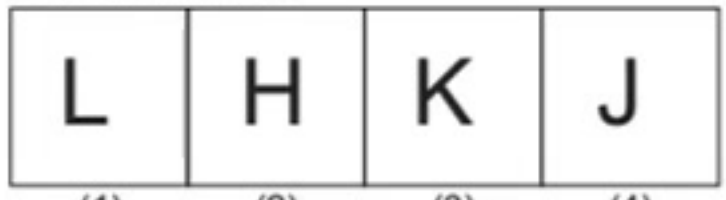
13. Question Figures

Answer Figures

(1) (2) (3) (4)

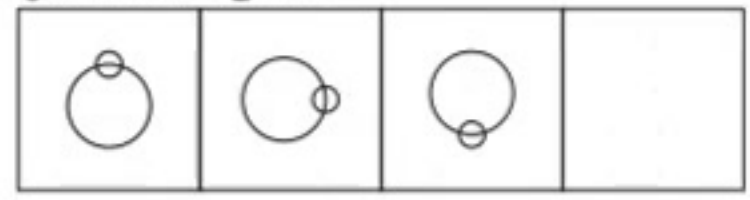
14. Question Figures

Answer Figures

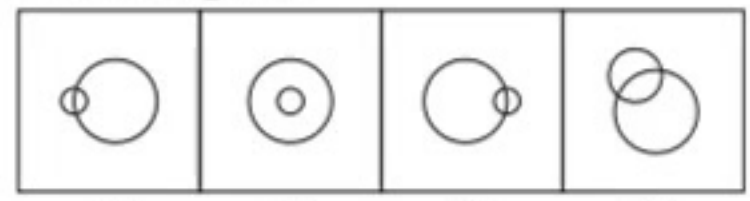


(1) (2) (3) (4)

15. Question Figures

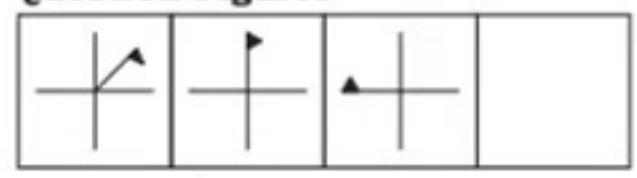


Answer Figures

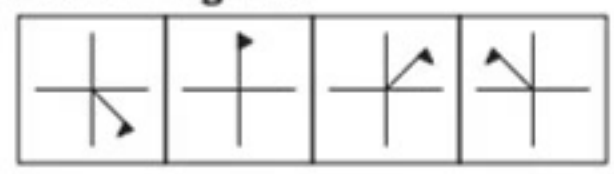


(1) (2) (3) (4)

16. Question Figures



Answer Figures

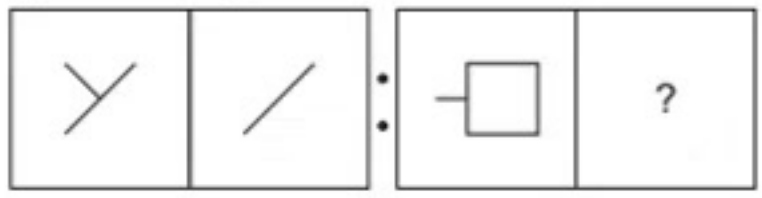


(1) (2) (3) (4)

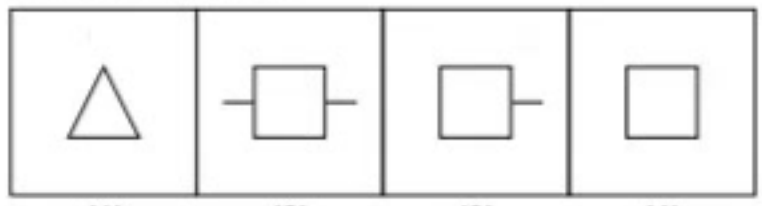
Part V

Directions (Q. Nos. 17-20) *In questions, there are two sets of two question figures each. The second set has a mark of interrogation (?). There exists a relationship between the first two question figures. Similar relationship should exist between the third and fourth question figure. Select one of the answer figure which replaces the mark of interrogation.*

17. Question Figures



Answer Figures



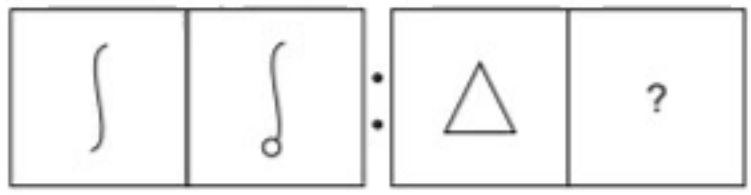
(1) (2) (3) (4)

18. Question Figures

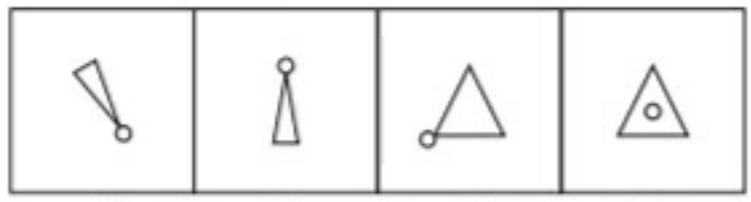
Answer Figures

(1) (2) (3) (4)

19. Question Figures

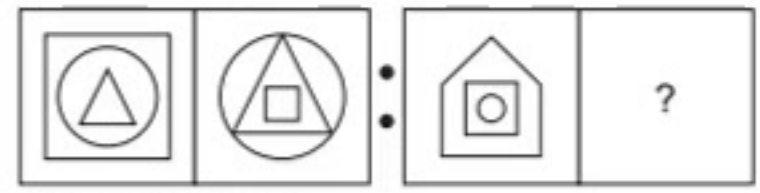


Answer Figures

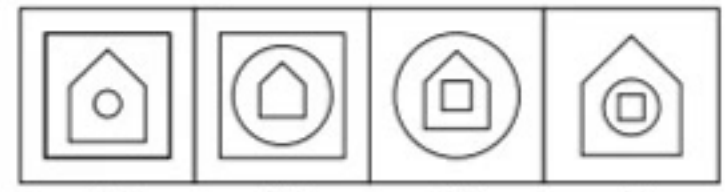


(1) (2) (3) (4)

20. Question Figures



Answer Figures

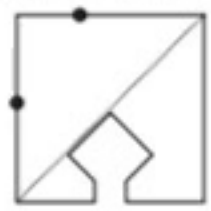


(1) (2) (3) (4)

Part VI

Directions (Q. Nos. 21-24) *In questions, one part of a geometrical and figure is given as question figure and the other one is among the four answer figures* 1, 2, 3 *and* 4 *are also given. Find out the figure that completes the geometrical figure.*

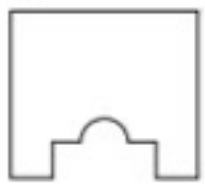
21. Question Figure



Answer Figures

(1) (2) (3) (4)

22. Question Figure



Answer Figures

(1) (2) (3) (4)

23. Question Figure

Answer Figures

(1) (2) (3) (4)

24. Question Figure

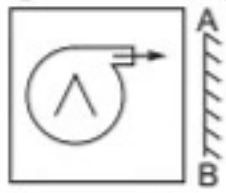
Answer Figures

(1) (2) (3) (4)

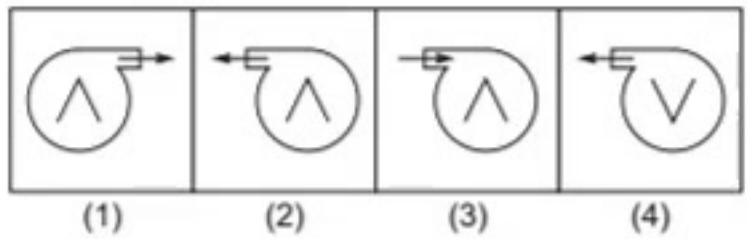
Part VII

Directions (Q. Nos. 25-28) *In questions, there is a question figure and four answer figures marked* 1, 2, 3 and 4 *are also given. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at* AB.

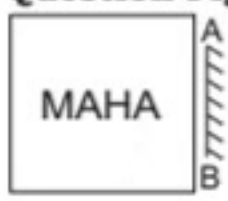
25. Question Figure



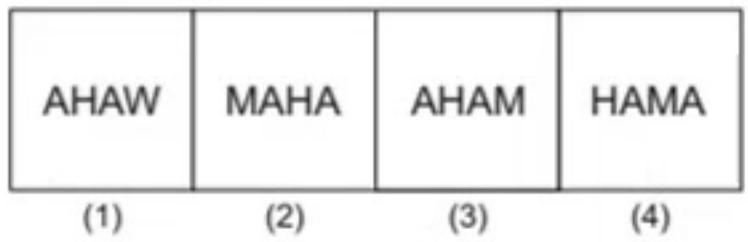
Answer Figures



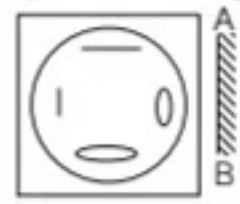
26. Question Figure



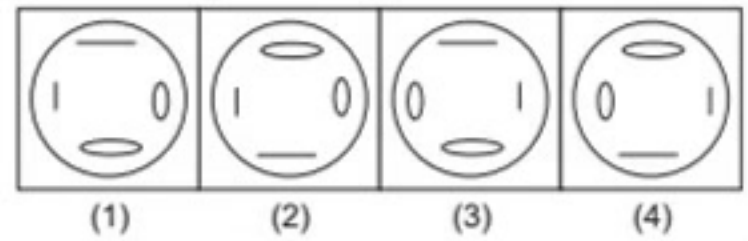
Answer Figures



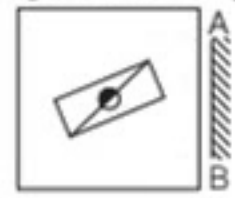
27. Question Figure



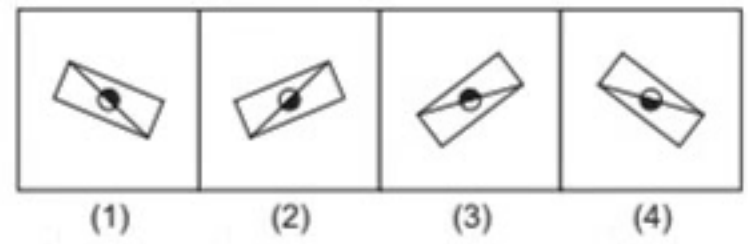
Answer Figures



28. Question Figure



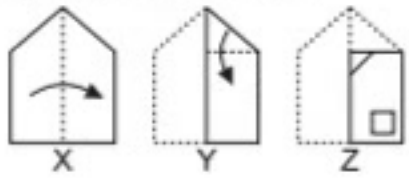
Answer Figures



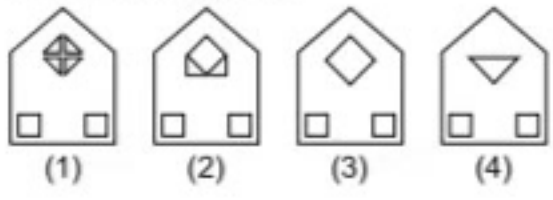
Part VIII

Directions (Q. Nos. 29-32) *In questions, a piece of paper is folded and punched as shown in question figures and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which indicates how the paper will appear when opened (unfolded).*

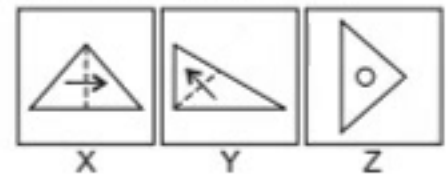
29. Question Figures



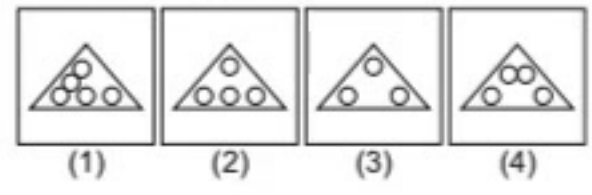
Answer Figures



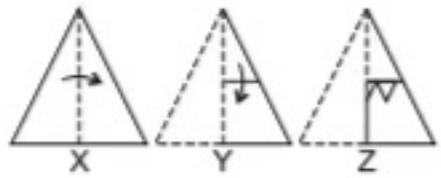
30. Question Figures



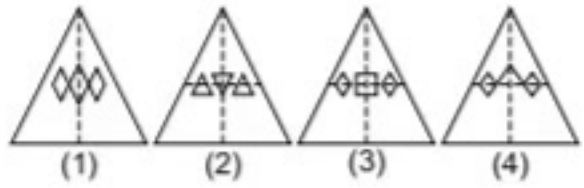
Answer Figures



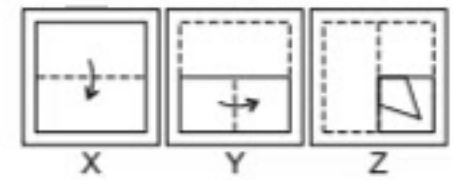
31. Question Figures



Answer Figures



32. Question Figures



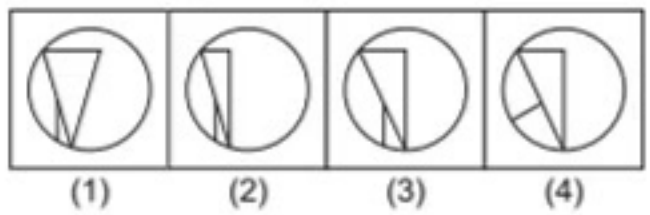
Answer Figures

Part IX

Directions (Q. Nos. 33-36) *In questions, a question figure is given and four answer figures, marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which can be formed from the cut-off pieces given in the question figure.*

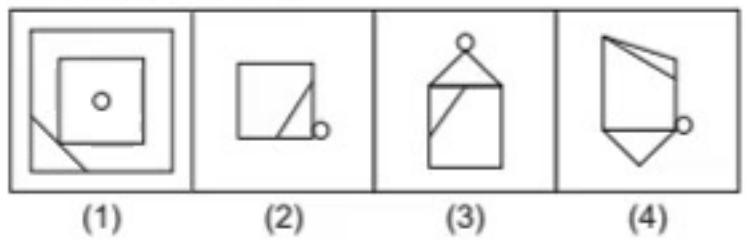
33. Question Figure

Answer Figures

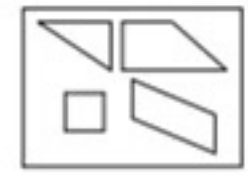


34. Question Figure

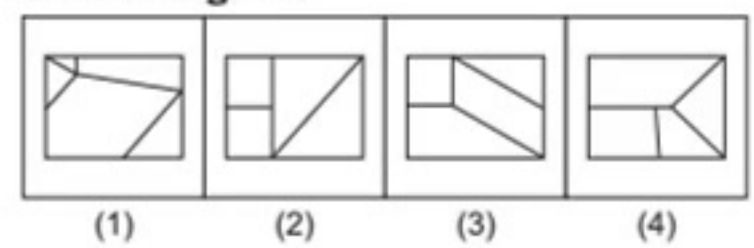
Answer Figures



35. Question Figure

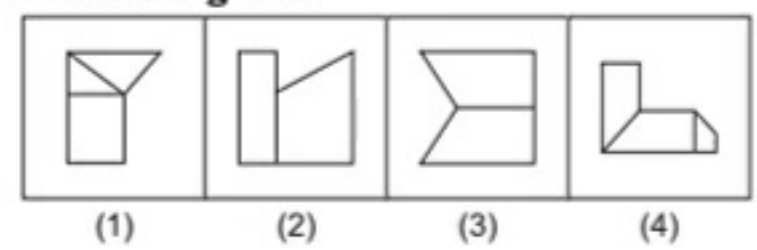


Answer Figures



36. Question Figure

Answer Figures

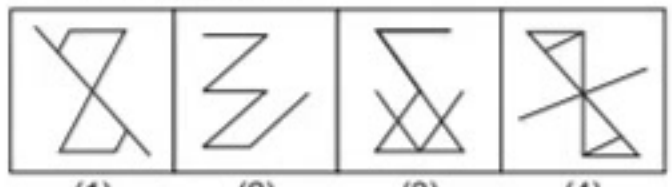


Part X

Directions (Q. Nos. 37-40) *In questions, a question figure is given and four answer figures, marked 1, 2, 3 and 4 are also given. Select the answer figure in which the question figure is hidden/embedded.*

37. Question Figure

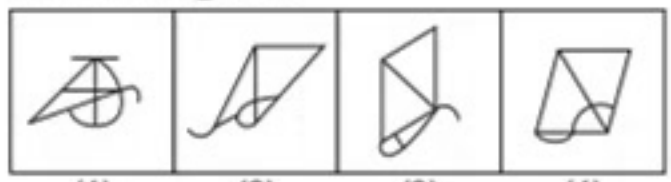
Answer Figures



(1) (2) (3) (4)

38. Question Figure

Answer Figures



(1) (2) (3) (4)

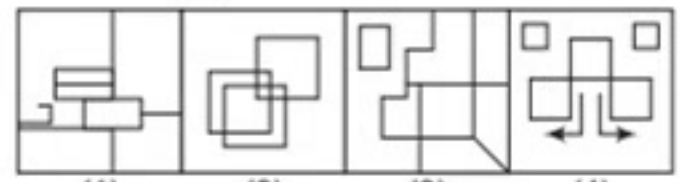
39. Question Figure

Answer Figures

(1) (2) (3) (4)

40. Question Figure

Answer Figures



(1) (2) (3) (4)

SECTION II Arithmetic Test

Directions (Q. Nos. 41-60) *For every question four probable answers bearing numbers* (1), (2), (3) *and* (4) *are given. Only one out of these is correct. You have to choose the correct.*

41. The difference of place value and face value of 4 in number 46890 is
(1) 4
(2) 40000
(3) 39996
(4) 39969

42. Out of a total of 250 marks, a student got 30% marks and failed by 25 marks. The marks necessary for passing is
(1) 50
(2) 75
(3) 100
(4) 125

43. The correct arrangement of the fractional numbers $\frac{17}{25}, \frac{17}{13}, \frac{17}{19}$ and $\frac{17}{27}$ in ascending order is
(1) $\frac{17}{19}, \frac{17}{13}, \frac{17}{27}, \frac{17}{25}$
(2) $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$
(3) $\frac{17}{27}, \frac{17}{19}, \frac{17}{13}, \frac{17}{25}$
(4) $\frac{17}{13}, \frac{17}{25}, \frac{17}{19}, \frac{17}{27}$

44. The simplification of $98 - [65 + \{32 - (12 + 5)\}]$ gives the result
(1) 8
(2) 18
(3) 178
(4) 212

45. A person buys 60 oranges at the rate of ₹ 21 per dozen and sells them at the rate of ₹ 24 per dozen. He makes a
(1) profit of ₹ 3
(2) profit of ₹ 15
(3) loss of ₹ 5
(4) profit of ₹ 180

46. The difference between the smallest number of six-digits and the largest number of four-digits is
(1) 90001 (2) 91000
(3) 90100 (4) 90010

47. Which one of the following is the correct statement for the numbers 56 and 84?
(1) Both the numbers are prime
(2) Both the numbers are co-prime
(3) Both the numbers are multiple of 14
(4) Both the numbers are odd

48. The perimeter of a square courtyard is 200 m, its area will be
(1) 800 m (2) 2500 m
(3) 800 sq m (4) 2500 sq m

49. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is
(1) 1197 (2) 2394
(3) 4932 (4) 2384

50. A student went to sleep at 9 : 30 pm and got up at 4 : 15 am. For how much time did the student sleep?
(1) 5 h 45 min
(2) 6 h 15 min
(3) 6 h 45 min
(4) 7 h 45 min

51. A train leaves New Delhi railway station at 10 : 50 am. It travels at a speed of 80 km/h. The train covers a distance of 120 km by
(1) 11 : 50 am
(2) 12 : 10 pm
(3) 12 : 20 pm
(4) 12 : 50 pm

52. A motorist drives at a speed of 80 km/h. He drives for 4 h and 6 min to reach his house. The distance covered by him to reach his house is
(1) 325 km (2) 328 km (3) 331 km (4) 334 km

53. HCF of 128, 288 and 160 is
(1) 16 (2) 24
(3) 32 (4) 48

54. If 1 cm = 10 mm, how much is 10 cu cm?
(1) 100 cu mm (2) 1000 cu mm
(3) 10000 cu mm (4) 100000 cu mm

55. The decimal form of $\frac{185 \times 25 \times 16}{37 \times 500}$ is
(1) 0.04 (2) 0.40
(3) 4.0 (4) 40.00

56. The area of square, whose perimeter is 48 m is
(1) $48\,m^2$ (2) $144\,m^2$
(3) $1152\,m^2$ (4) $2304\,m^2$

57. The volumes of a cube and a cuboid are equal. If the dimensions of the cuboid are 18 cm, 12 cm and 8 cm the edge of the cube is
(1) 8 cm (2) 10 cm
(3) 12 cm (4) 16 cm

58. What will be the rate of simple interest, at which ₹ 17500 will become ₹19250 in 2 yr?
(1) $12\frac{1}{2}\%$ (2) 10%
(3) $7\frac{1}{2}$ (4) 5%

59. When 10101 is multiplied by 17, the product is
(1) 17017017 (2) 1717017
(3) 171717 (4) 170017

60. A cellphone was bought for ₹ 1500 and then it was sold for ₹ 1650. What is the per cent profit?
(1) 10 (2) 15
(3) 20 (4) 16

SECTION III Language Test *(English)*

Directions (Q.Nos. 61-80) *There are Four passages. Each passage is followed by five questions. For each question four probable answers* (1), (2), (3) *and* (4) *are given. Only one out of these is correct. Choose the correct answer.*

Passage 1

Once upon a time there were six blind men. These blind men had never seen an elephant but they wanted to know what the elephant looked like. So they went near an elephant to find out.

The first blind man fell against the broad side of the elephant. He immediately said, "The elephant must be like a wall." The second blind man got hold of the elephant's tusk. He cried out, "I'm sure the elephant is like a spear." The third blind man happened to take the elephant's trunk in his hand.

He said confidently, "The elephant is surely like a snake". The fourth one stretched out his hand and felt the elephant's leg. "It's clear", he said, "The elephant is like a tree trunk". The fifth by chance touched the elephant ear. "I am confident elephant is like a fan". The sixth and the last of the blind man felt tail. "I tell you, he cried, "The elephant is like a rope."

And so these blind men argued and argued. Each one said he was right. But actually all were wrong.

61. Six blind men went near an elephant to find out
(1) what the elephant looked like
(2) what was the size of the trunk of the elephant
(3) what was the colour of the elephant
(4) what the elephant's tail looked like

62. To the first blind man the elephant looked like
(1) a pear (2) a tree trunk
(3) a wall (4) a fan

63. The third blind man said, " The elephant is like a snake." He said so because he had touched the elephant's
(1) leg (2) ear (3) tusk (4) trunk

64. All the six blind men were wrong to say how the elephant looked like because
(1) each one of them had touched only one part of the elephant
(2) each one of them said without confidence
(3) they argued on their views again and again
(4) they had decided to oppose each other

65. The fifth, by chance touched the elephant's ears. Here 'by chance' mean
(1) purposely (2) accidently
(3) on being asked (4) matter of choice

Passage 2

It is strange that ducks mostly swim in water, though their feathers keep dry. They swim in water for long hours and sometimes plunge into water but the feathers still keep dry. What is the secret of it? There is a small oil limb produced in the root of a duck's tail. The duck expels oil by pressing this limb which spreads over their feathers. Generally, all the birds have this oil producing limb but it is well developed in an aquatic animal, there is no sweat producing limb in birds.

66. The above passage, describes about a duck's
(1) sweat limb (2) oily feathers
(3) oil limbs (4) secret of remaining dry

67. The peculiarity of ducks is that they
(1) can swim for long
(2) can swim very fast
(3) can plunge quickly
(4) can remain dry in spite of swimming in water

68. The word 'expels' mean
(1) throw out (2) force (3) admit (4) absorb

69. "What is the secret of it?" Which action of a duck is represented by these words?
(1) Swimming
(2) Plunging
(3) Remaining dry
(4) Remaining in water for a long time

70. The oil limb is
(1) not developed in all birds
(2) not found in all ducks
(3) not found in all birds
(4) well developed in only some ducks

Passage 3

A king had an orchard of fig trees. He loved the fruit so much that he determined to have the trees guarded. He appointed a blind man and a lame man as guards. The next day the king found that much of the fine fruit had gone and he asked the watchmen who had stolen it. "We do not know" they replied.

Though both the guards said they had not taken the fruits, the king soon discovered that the blind man had carried the lame man on his shoulder. While the blind man had used his legs, the lame man had used his eyes and hands, and in this way the figs had been stolen. Both the men were severely punished.

71. The king wanted to have the trees guarded because
(1) someone had been stealing the figs
(2) he felt sorry and wanted to find a job for the lame man and the blind man
(3) the fruit was valuable
(4) he was afraid some one would steal the fruit

72. Which one of the following is a synonym of the word 'lame' as used in the passage?
(1) weak
(2) convincing
(3) persuasive
(4) strong

73. The blind man and the lame man lied because
(1) they had not been good watchmen
(2) they thought the king would not discover the theft
(3) they thought the king would never discover how they had stolen the fruit
(4) they feared the king

74. The figs were stolen
(1) for their value (2) by thieves
(3) by the king's men
(4) by those who had to guard them

75. The king discovered that
(1) the blind man had used his legs
(2) the lame man had used his eyes
(3) the two guards had stolen the fruit
(4) the guards told the truth

Passage 4

The Sahara is the biggest desert in the world. It stretches across the whole of North Africa. The Arabian desert is also a very large desert. In India too, there is a desert called Thar desert in Rajasthan. Life in a desert is tough. The days are very hot and nights are cold.

76. The biggest desert in the wold is in
(1) India (2) Africa (3) Arabia (4) America

77. In desert regions
(1) there is no rainfall (2) it rains heavily
(3) there is enough rain (4) there is a little rain

78. The climate in a desert is
(1) pleasant (2) difficult
(3) comfortable (4) cold

79. Date palms grow in
(1) plains (2) hilly regions
(3) deserts (4) snowy regions

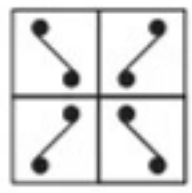
80. Very few trees grow in deserts because
(1) most trees need water to grow
(2) there is sand all-around
(3) nights are very cold
(4) there is no one to take care of trees

Answers

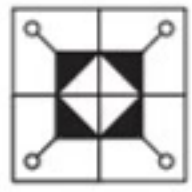
1 (1)	**2** (4)	**3** (1)	**4** (3)	**5** (3)	**6** (1)	**7** (1)	**8** (2)	**9** (1)	**10** (2)
11 (1)	**12** (4)	**13** (4)	**14** (4)	**15** (1)	**16** (1)	**17** (4)	**18** (1)	**19** (3)	**20** (2)
21 (1)	**22** (1)	**23** (2)	**24** (2)	**25** (2)	**26** (3)	**27** (3)	**28** (1)	**29** (3)	**30** (4)
31 (1)	**32** (2)	**33** (2)	**34** (3)	**35** (3)	**36** (1)	**37** (3)	**38** (4)	**39** (3)	**40** (2)
41 (3)	**42** (3)	**43** (2)	**44** (2)	**45** (2)	**46** (1)	**47** (3)	**48** (4)	**49** (2)	**50** (3)
51 (3)	**52** (2)	**53** (3)	**54** (3)	**55** (3)	**56** (2)	**57** (3)	**58** (4)	**59** (3)	**60** (1)
61 (1)	**62** (3)	**63** (4)	**64** (1)	**65** (2)	**66** (4)	**67** (4)	**68** (1)	**69** (3)	**70** (1)
71 (4)	**72** (1)	**73** (3)	**74** (4)	**75** (3)	**76** (1)	**77** (4)	**78** (4)	**79** (1)	**80** (1)

Hints and Solutions

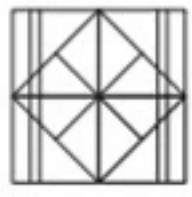
1. Except figure (1), there is certainly one point inside the triangle.
2. Except figure (4), each figures contains vowels from English language.
3. Except figure (1), each figures have same upper and lower design.
4. Except figure (3), design inside the each figure faces towards the side of outer design.
5. Answer figure (3) is same as the question figure.
6. Answer figure (1) is same as the given question figure.
7. Answer figure (1) is same as the given question figure.
8. Answer figure (2) is same as the given question figure.
9. Answer figure (1) will complete the given pattern.



10. Answer figure (2) will complete the given pattern.

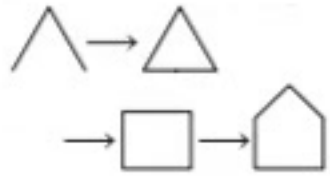


11. Answer figure (1) will complete the given pattern.



12. Answer figure (4) will complete the given pattern.

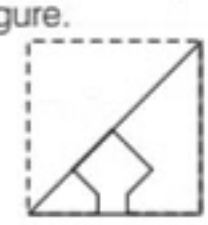
13. In every successive figure, one line is increasing. Hence, option (4) is the correct answer.



14. Each successive letter occurs after adding 3 position from the previous one. Hence, J comes after G.

$$A \xrightarrow[+3]{} D \xrightarrow[+3]{} G \xrightarrow[+3]{} \boxed{J}$$

15. Every successive figure is rotating clockwise with the angle of 90°. Hence, option (1) is the correct answer.
16. Every successive figure is rotating anticlockwise with the successive angle of 45°. Hence, option (1) is the correct answer.
17. As, from question figure (1) to (2) side line removes likewise. In question figure (3) side line removes to produce the answer figure (4).
18. As, spectacles worn on the eyes, in the same way ear rings worn in the ear. Hence, option (1) is the correct answer.
19. As, from question figure (1) to (2), a small circle placed under the designing figure. Same ways question figure (3) changes to (4) to produce answer figure (3).
20. As, from question figure (1) to (2), a outside figure is placed inside. Similarly, question figure (3) changes to (4) to produce answer figure (2).
21. Answer figure (1) will complete the given geometrical figure.

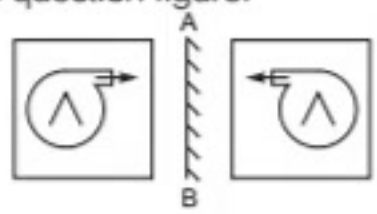


22. Answer figure (1) will complete the given geometrical figure.

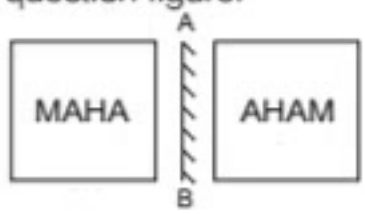
23. Answer figure (2) will complete the given geometrical figure.

24. Answer figure (2) will complete the given geometrical figure.

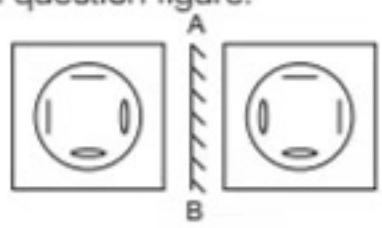
25. Answer figure (2) is the correct mirror image of the given question figure.



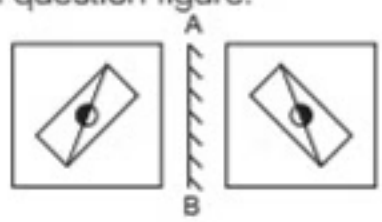
26. Answer figure (3) is the correct mirror image of the given question figure.



27. Answer figure (3) is the correct mirror image of the given question figure.

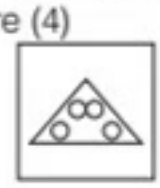


28. Answer figure (1) is the correct mirror image of the given question figure.

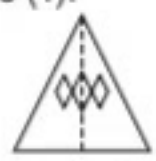


29. When the paper is unfolded, it is shown as in the answer figure (3).

30. When the paper is unfolded, it is shown as in the answer figure (4)



31. When the paper is unfolded, it is shown as in the answer figure (1).



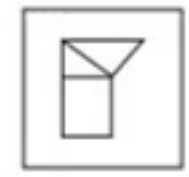
32. When the paper is unfolded, it is shown as in the answer figure (2).

33. Answer figure (2) can be formed by using the cut pieces.

34. Answer figure (3) can be formed by using the cut pieces.

35. Answer figure (3) can be formed by using the cut pieces.

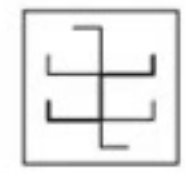
36. Answer figure (1) can be formed by using the cut pieces.



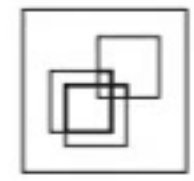
37. The question figure is embedded in the answer figure (3).

38. The question figure is embedded in the answer figure (4).

39. The question figure is embedded in the answer figure (3).



40. The question figure is embedded in the answer figure (2).



41. ∵ The place value of 4 in number 46890 = 40000

Face value of 4 = 4

∴ Difference = 40000 – 4 = 39996

42. ∵ Total marks = 250 Student got = 30%

i.e. $250 \times \frac{30}{100} = 75$ marks

Failed by = 25 marks

∴ Pass marks = 75 + 25 = 100 marks

43. $\frac{17}{27}, \frac{17}{25}, \frac{17}{19}, \frac{17}{13}$ are in ascending order

(In like fractions with equal numerators, the fraction with greatest denominators is the smallest.)

44. $98 - [65 + \{32 - (12 + 5)\}]$

$= 98 - [65 + \{32 - 17\}] = 98 - [65 + 15]$

$= 98 - 80 = 18$

45. CP of 1 dozen oranges = ₹ 21

CP of 60 oranges or 5 dozen oranges = 21 × 5

= ₹ 105 (1 dozen = 12)

SP of 1 dozen oranges = ₹ 24

SP of 5 dozen oranges = 24 × 5 = ₹ 120

∴ Profit = SP – CP = 120 – 105 = ₹ 15

46. Smallest number of 6 digits = 100000

Largest number of 4-digits = 9999

Then, the required difference

= 100000 – 9999 = 90001

47. 56 = 14 × 4 and 84 = 14 × 6

It is clear from the above factors both numbers are multiple of 14.

48. The side of square = $\frac{\text{Perimeter}}{4}$

∴The side of the given square = $\frac{200}{4} = 50$ m

∴ Area = Side × Side = 50 × 50 = 2500 sq m

49. Other number

$= \frac{\text{HCF} \times \text{LCM}}{\text{First number}} = \frac{38 \times 98154}{1558} = 2394$

50. The student went to sleep at = 9 : 30 pm

The student got up at = 4 : 15 am

Time from 9 : 30 to 12 : 00 (midnight)

= 2 h 30 min

Time from 12 : 00 to 4 : 15 = 4 h 15 min

Total time = 6 h 45 min

∴The student slept for = 6 h 45 min

51. ∵ Time = $\frac{\text{Distance}}{\text{Speed}} = \frac{120}{80} = \frac{3}{2}$ h = 1 h 30 min

The train will cover the distance by

= 10 : 50 am + 1 h 30 min = 12 : 20 pm

52. ∵ Speed = 80 km/h

Time = 4 h 6 min

$= 4 \text{ h } \frac{6}{60} \text{ h} = 4\frac{1}{10} \text{ h} = \frac{41}{10} \text{ h}$

∵ Distance = Speed × Time

∴ Distance = $80 \times \frac{41}{10} = 328$ km

53. 128 = 2 × 2 × 2 × 2 × 2 × 2 × 2

288 = 2 × 2 × 2 × 2 × 2 × 3 × 3

160 = 2 × 2 × 2 × 2 × 2 × 5

So, the required HCF = Common factor

= 2 × 2 × 2 × 2 × 2 = 32

54. 1 cm = 10 mm

1 cu cm = 10 × 10 × 10 cu mm

10 cu cm = 10 × 10 × 10 × 10

= 10000 cu mm

55. $\frac{185 \times 25 \times 16}{37 \times 500} = 4.0$

56. ∵ Side of the square

$= \frac{\text{Perimeter}}{4} = \frac{48}{4} = 12$ m

∴ Area of the square

= Side × Side

= 12 × 12 = 144 m²

57. Volume of cuboid = $l \times b \times h$

= 18 × 12 × 8 cu cm

Volume of cube = Volume of cuboid

= 18 × 12 × 8

∴ Edge of cube

$= \sqrt[3]{18 \times 12 \times 8} = 12$ cm

58. ∵ Simple interest = $\frac{\text{Principle} \times \text{Rate} \times \text{Time}}{100}$

Amount – Principal = $\frac{17500 \times \text{Rate} \times 2}{100}$

19250 – 17500 = 350 × Rate

∴Rate = $\frac{1750}{350} = 5\%$

59. 10101 × 17 = 171717

60. The profit on cell phone

= SP – CP

= 1650 – 1500 = ₹ 150

Then, required per cent profit = $\frac{\text{Profit} \times 100}{\text{CP}}$

$= \frac{150 \times 100}{1500} = 10\%$

Jawhar Navodaya Vidyalaya

Entrance Exam (Class VI)

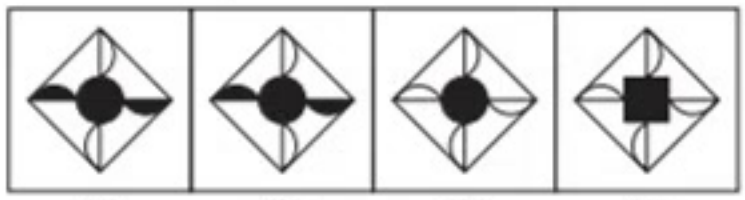
PRACTICE SET 2

Section I Mental Ability Test

Part I

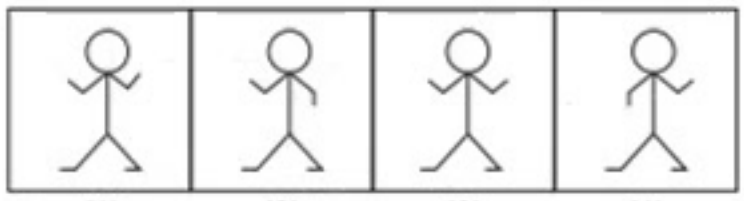
Directions (Q.Nos. 1-4) *In questions, four figures 1, 2, 3 and 4 have been given in each question of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different.*

1.



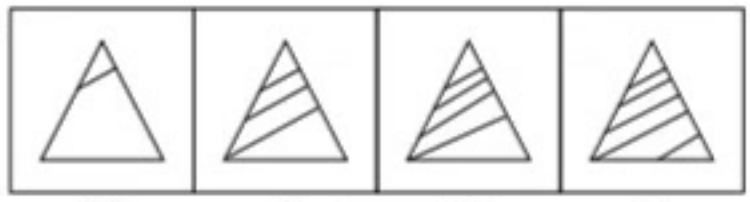
(1) (2) (3) (4)

2.



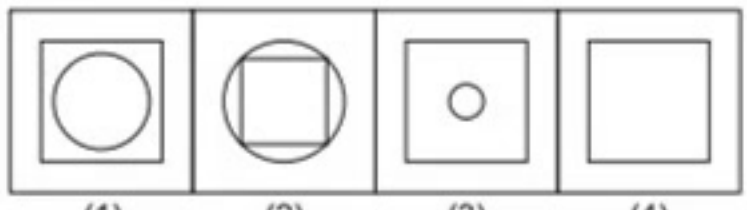
(1) (2) (3) (4)

3.



(1) (2) (3) (4)

4.



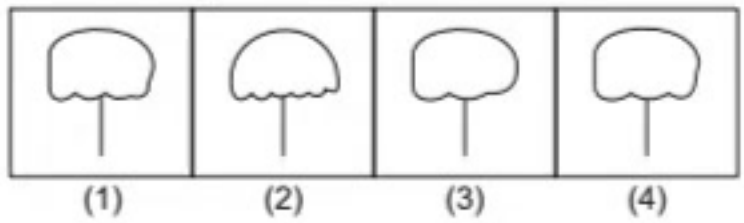
(1) (2) (3) (4)

Part II

Directions (Q.Nos. 5-8) *In questions, a question figure is given and four answer figures marked 1, 2, 3 and 4 are also given. Select the answer figure which is exactly the same as the question figure.*

5. Question Figure

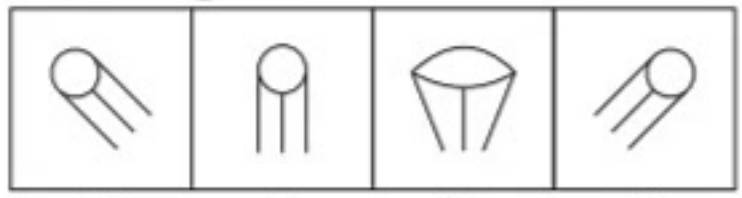
Answer Figures



(1) (2) (3) (4)

6. Question Figure

Answer Figures



(1) (2) (3) (4)

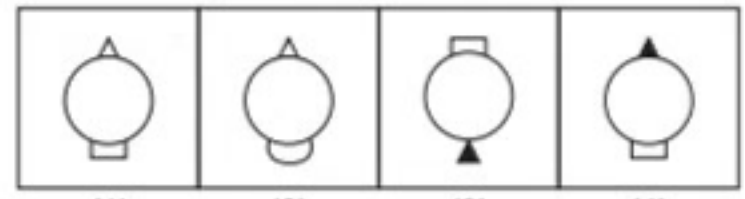
7. Question Figure

Answer Figures

(1) (2) (3) (4)

8. Question Figure

Answer Figures

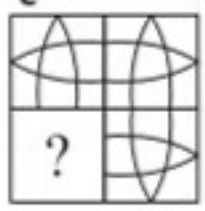


(1) (2) (3) (4)

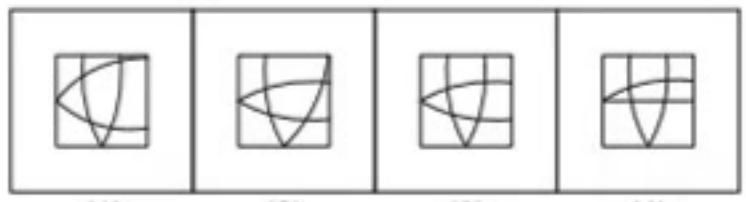
Part III

Directions (Q.Nos. 9-12) *In questions, there is a question figure, a part of which is missing. Observe the answer figures* 1, 2, 3 *and* 4 *and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure.*

9. Question Figure



Answer Figures



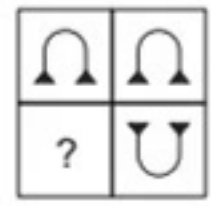
(1) (2) (3) (4)

10. Question Figure

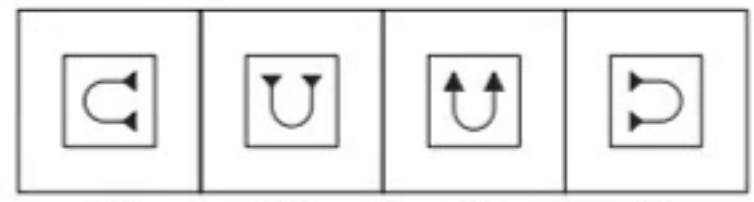
Answer Figures

(1) (2) (3) (4)

11. Question Figure

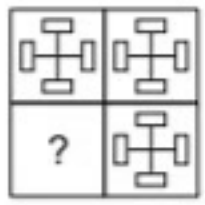


Answer Figures

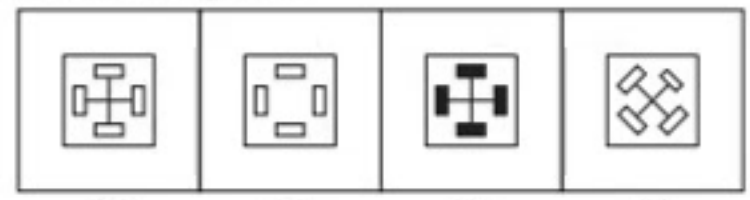


(1) (2) (3) (4)

12. Question Figure



Answer Figures

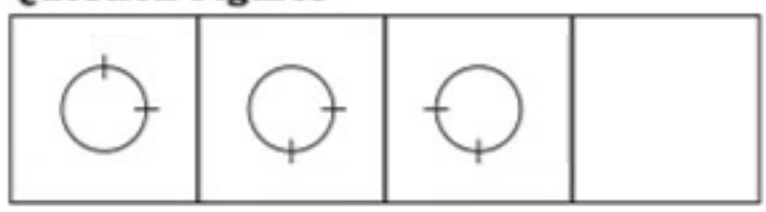


(1) (2) (3) (4)

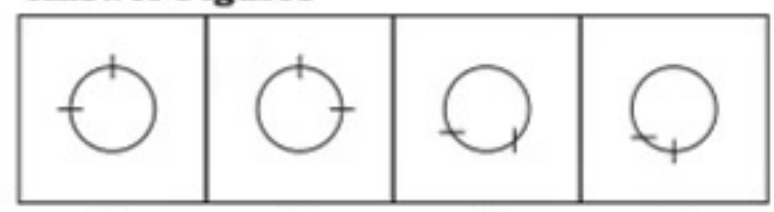
Part IV

Directions (Q.Nos. 13-16) *In questions there are three question figures and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure among the answer figures, which occupies the blank space for the fourth figure and completes the series.*

13. Question Figures

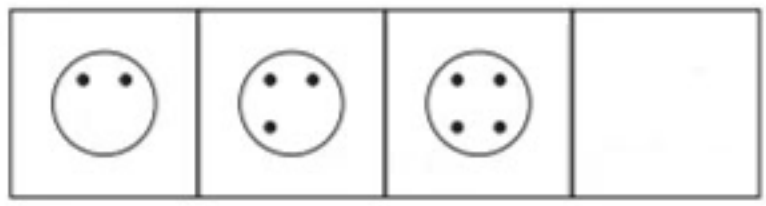


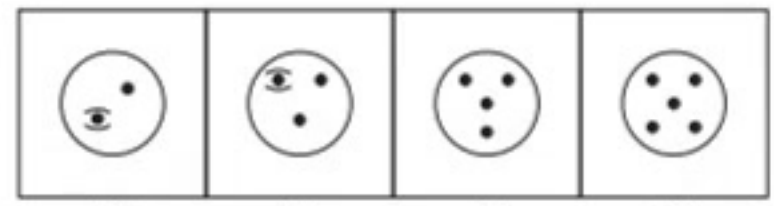
Answer Figures



(1) (2) (3) (4)

14.





(1) (2) (3) (4)

15.

5	10	15	

14	20	17	25

(1) (2) (3) (4)

16.

S L P T	L T S P	T P L S	

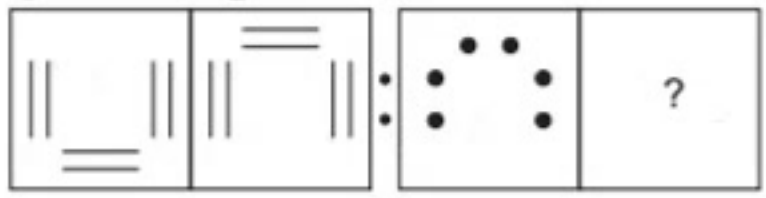
S P T L	P S T L	L T P S	P P S T

(1) (2) (3) (4)

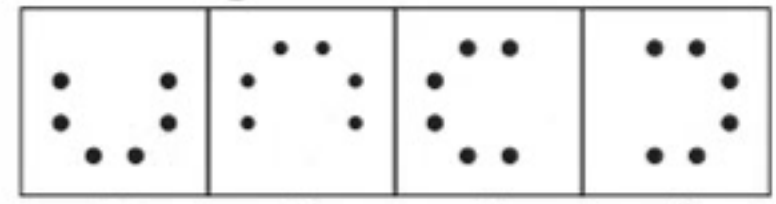
Part V

Directions (Q.Nos. 17-20) *In questions, there are two sets of two question figures each. The second set has a mark of interrogation (?). There exists a relationship between the first two question figures, similar relationship should exist between the third and fourth question figure. Select one of the answer figure which replaces the mark of interrogation.*

17. Question Figures

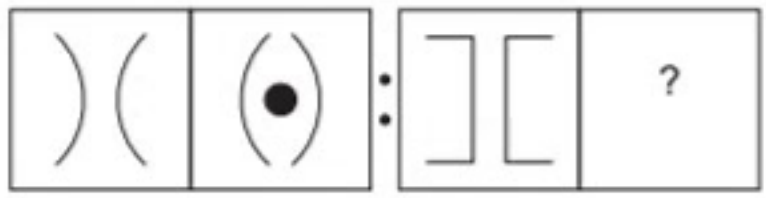


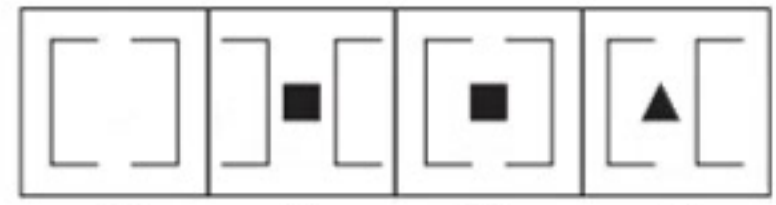
Answer Figures



(1) (2) (3) (4)

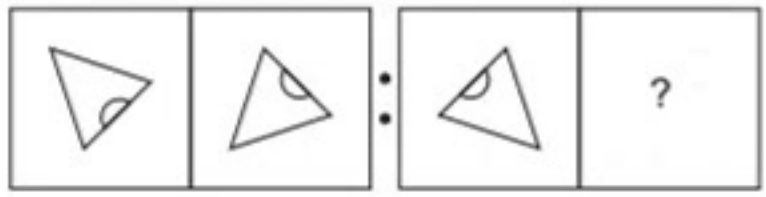
18.

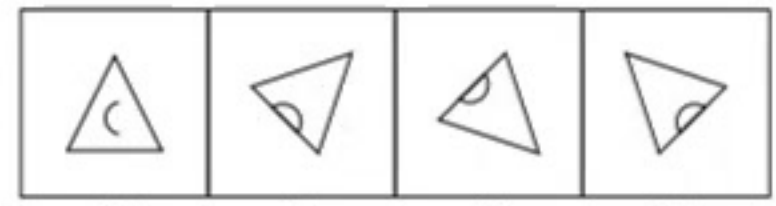




(1) (2) (3) (4)

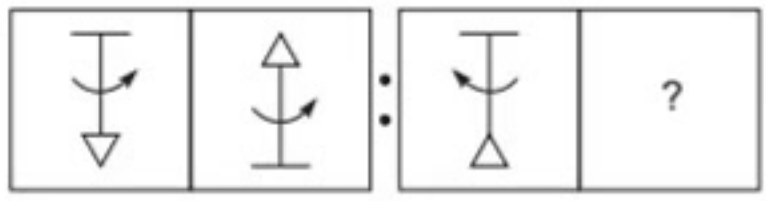
19.

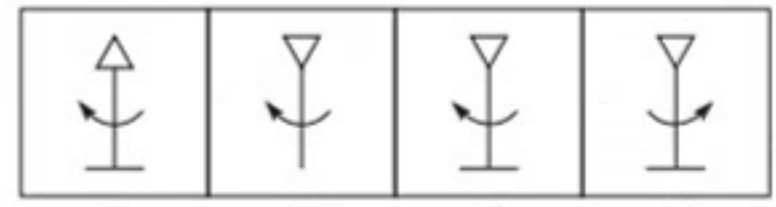




(1) (2) (3) (4)

20.





(1) (2) (3) (4)

Part VI

Directions (Q.Nos. 21-24) *In questions, one part of a geometrical figure is given as question figure and the other one is among the four answer figures 1, 2, 3 and 4 are also given. Find out the figure that completes the geometrical figure.*

21. Question Figure

Answer Figures

(1) (2) (3) (4)

22. Question Figure

Answer Figures

(1) (2) (3) (4)

23. Question Figure

Answer Figures

(1) (2) (3) (4)

24. Question Figure

Answer Figures

(1) (2) (3) (4)

Part VII

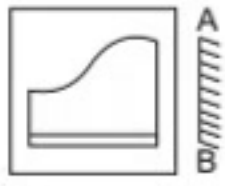
Directions (Q.Nos. 25-28) *In questions, there is a question figure and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at* AB.

25. Question Figure

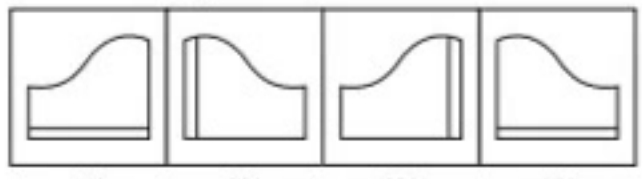
Answer Figures

(1) (2) (3) (4)

26. Question Figure

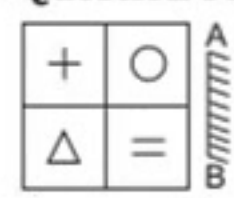


Answer Figures

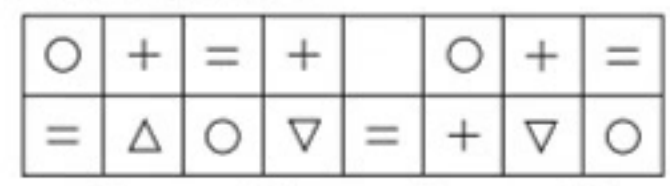


(1) (2) (3) (4)

27. Question Figure

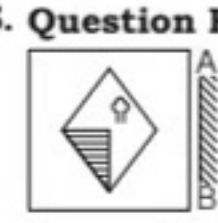


Answer Figures

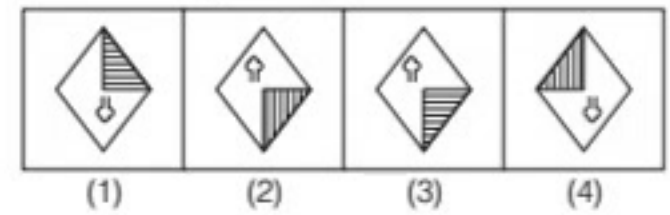


(1) (2) (3) (4)

28. Question Figure



Answer Figures

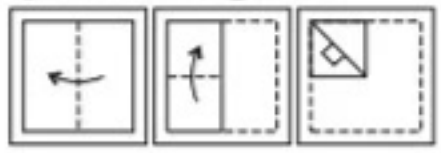


(1) (2) (3) (4)

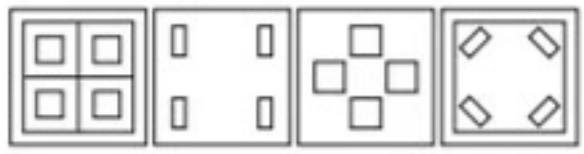
Part VIII

Directions (Q.Nos. 29-32) *In questions, a piece of paper is folded and punched as shown in question figures and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which indicates how the paper will appear when opened (unfolded).*

29. Question Figures

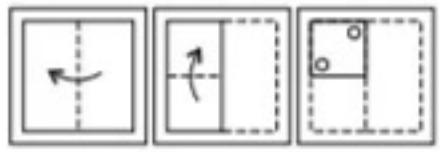


Answer Figures

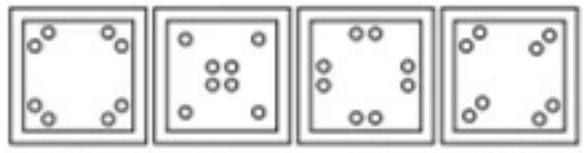


(1) (2) (3) (4)

30. Question Figures



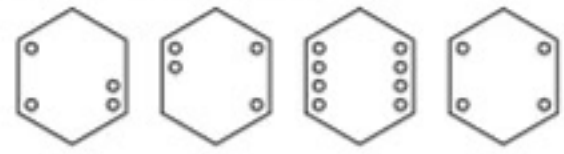
Answer Figures



(1) (2) (3) (4)

31. Question Figures

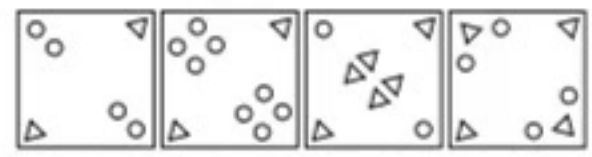
Answer Figures



(1) (2) (3) (4)

32. Question Figures

Answer Figures



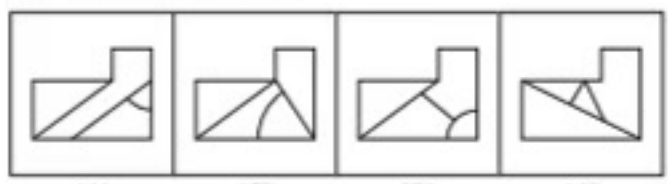
(1) (2) (3) (4)

Part IX

Directions (Q.Nos. 33-36) *In questions, a question figure is given and four answer figures, marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which can be formed from the cut off pieces given in the question figure.*

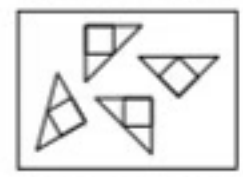
33. Question Figure

Answer Figures

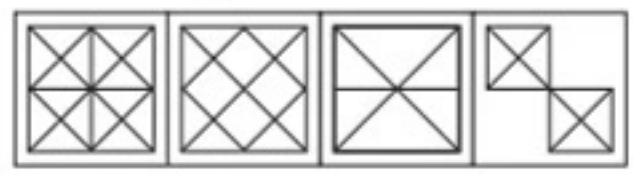


(1) (2) (3) (4)

34. Question Figure



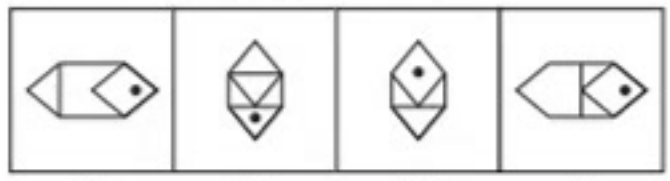
Answer Figures



(1) (2) (3) (4)

35. Question Figure

Answer Figures



(1) (2) (3) (4)

36. Question Figure

Answer Figures

(1) (2) (3) (4)

Part X

Directions (Q.Nos. 37-40) *In questions, a question figure is given and four answer figures, marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure in which the question figure is hidden/embedded.*

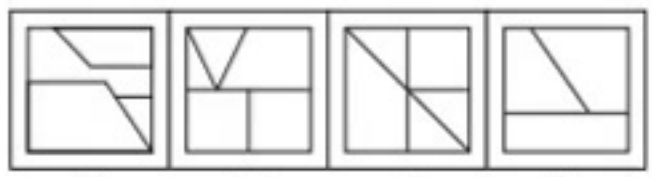
37. Question Figure

Answer Figures

(1) (2) (3) (4)

38. Question Figure

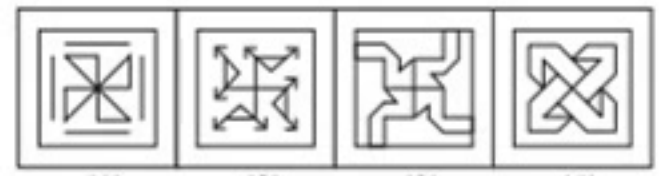
Answer Figures



(1) (2) (3) (4)

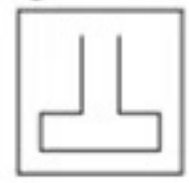
39. Question Figure

Answer Figures



(1) (2) (3) (4)

40. Question Figure



Answer Figures

(1) (2) (3) (4)

Section II Arithmetic Test

Directions (Q.Nos. 41-60) *For every question four probable answers bearing numbers* (1), (2), (3) *and* (4) *are given. Only one out of these is correct. You have to choose the correct answer.*

41. How many 4 digit numbers, in all are there?
(1) 9999 (2) 9990
(3) 9000 (4) 8999

42. Which statement is true for 11 and 21?
(1) Both are divisible numbers
(2) Both are even numbers
(3) Both are co-prime numbers
(4) Both are multiple of 3

43. How many days are there in 2 months, 5 weeks and 18 days?
(1) 113 (2) 115
(3) 116 (4) 114

44. After allowing a discount of 18% a washing machine is available for ₹ 13489. What is the market price of the washing machine?
(1) ₹ 16540 (2) ₹ 15450
(3) ₹ 16450 (4) ₹ 15540

45. Using digits 1, 0, 5 and 7 the greatest 4 digit number formed is
(1) 1075 (2) 1057
(3) 5017 (4) 7510

46. A train crosses a pole in 15 sec and a platform 100 m long in 25 sec. Its length is
(1) 50 m (2) 100 m
(3) 150 m (4) 200 m

47. The product of two numbers is $\frac{5}{4}$. If one number is $\frac{5}{6}$, what is the other number?
(1) 2 (2) $\frac{1}{2}$
(3) $\frac{3}{2}$ (4) $\frac{2}{3}$

48. The fraction equivalent to 1.25 is
(1) $1\frac{1}{4}$ (2) $12\frac{1}{2}$
(3) $1\frac{1}{8}$ (4) $12\frac{1}{4}$

49. The LCM of 12, 24 and 30 is
(1) 2 (2) 30
(3) 60 (4) 120

50. If $178 \times 34 = 6052$, what is $60.52 \div 17.8$?
(1) 34 (2) 3.4
(3) 0.34 (4) 0.034

51. 0.075 when expressed as per cent, is
(1) 75% (2) 7.5%
(3) 0.75% (4) 0.075%

52. On simplifying $15 \times 4 - 10 \div 5$, we get
(1) 10 (2) 30
(3) 58 (4) 120

53. A rectangular plot has sides 100 m × 80 m. Find the length of wire to surround it three times.
(1) 180 m (2) 1080 m
(3) 360 m (4) 720 m

54. A man buys a radio for ₹ 900 and sells it for ₹ 1200. Find his gain per cent.
(1) 20 (2) 25
(3) 30 (4) $33\frac{1}{3}$

55. A fish tank length, breadth and height is 40 cm, 60 cm and 50 cm respectively. It contains 50 *l* of water. How much water is needed to fill it completely.
(1) 50 *l* (2) 60 *l*
(3) 70 *l* (4) 120 *l*

56. Three bells start ringing together at 8 : 30 am. If they ring after 4 min, 5 min and 6 min respectively each time, the next time they will ring together at
(1) 8 : 45 am (2) 9 : 30 am
(3) 9 : 45 am (4) 10 : 15 am

57. In how many years will ₹ 500 amount to ₹ 600 at the rate of 5% per annum at simple interest?
(1) 3 yr (2) 4 yr
(3) 5 yr (4) 6 yr

58. A person crosses a 600 m long street in 5 min. What is his speed in km per hour?
(1) 3.6 (2) 7.2
(3) 8.4 (4) 10

59. How many rectangular plots of dimensions 40 m by 60 m can be made from a rectangular field of dimensions 120 m by 160 m?
(1) 2 (2) 3 (3) 4 (4) 8

60. A boy slept at 9 : 45 pm and woke up the next morning at 5 : 30 am. He slept for
(1) 4 h 15 min (2) 7 h 15 min
(3) 7 h 45 min (4) 8 h 15 min

SECTION III Language Test *(English)*

Directions (Q.Nos. 61-80) *There are four passages. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each question four probable answer bearing letters* (1), (2), (3) *and* (4) *are given. Only one out of these is correct. You have to choose the correct answer.*

Passage 1

People think all insects are our enemies. Children like to kill flies, bugs and mosquitoes. Many kinds of insects are our enemies. Some of them harm our trees, our clothes, our books, our houses and some of them poison our food. Some of them bite us and spread diseases. But many insects are our friends too. They eat insects that we want to get rid of. There are many insects that are neither our friends nor our enemies. They do nothing to help or harm us.

61. "Some of them bite us ....."
'Some' here refers to
(1) people
(2) children
(3) enemies
(4) insects

62. Some insects do good to us because
(1) they live in our houses
(2) they spoil some kinds of food
(3) they save us from harmful insects
(4) they eat harmful insects

63. Some insects do more harm than good because
(1) they are annoying
(2) they are covered with dirt
(3) they spread diseases
(4) they eat other insects

64. In this passage, the writer tells us about
(1) the nature of children
(2) many kinds of insects
(3) usefulness of insects
(4) the nature of insects

65. Which of the following is the correct antonym of the given word 'Enemies'
(1) Rival (2) Adversary
(3) Opponent (4) Friend

Passage 2

Fishing is my favourite sport. I often fish for hours without catching anything. But this does not worry me. Some fishermen are unlucky. Instead of catching fish, they catch old boots and rubbish. I am even less lucky. I never catch anything—not even old boots. After having spent the whole mornings on the river, I always go home with an empty bag. "You must give up fishing!" my friends say, "Its a waste of time." But they don't realise one important thing. I am not really interested in fishing. I am only interest in sitting in a boat and doing nothing at all.

66. Some fishermen are unlucky because
(1) they never catch a fish
(2) fishing is not their favourite sport
(3) they fish for hours together
(4) sometimes they catch old boots and rubbish instead of fish

67. Fishing is the writer's favourite sport as he
(1) always catches fish
(2) finds it a funny sport
(3) enjoys doing nothing while sitting in a boat
(4) collects old boots

68. The writer is not a good fisherman because
(1) he never catches anything
(2) he only catches old boots and rubbish
(3) he goes alone
(4) he spends hours fishing

69. The bag that writer carries home is
(1) empty
(2) old
(3) full of fish
(4) full of old boots and rubbish

70. Select the suitable antonym of 'Favourite' from the options given below.
(1) Preferred
(2) Favoured
(3) Ideal
(4) Dislike

Passage 3

It was a full-moon's night. Bright moonlight flooded the road. I was walking slowly. Suddenly I heard a whistling sound. At first, I though it was another late evening stroller like me. The sound was loud and cheerful. Suddenly, a boy on a bicycle sped past me. I could not see his face. After a few minutes, he was back again. This time, he stopped a few feet away from me and gave me a smile. He looked like a slim boy of fourteen. He wore a school blazer, a cap and a scarf. His eyes were bright and cool like moon-light. "You don't have a bell on your bicycle", I said. He said nothing. I put out my hand but he did not take it. Then quite suddenly, he sped past again. The next day, I learnt that, that whistling boy was a ghost.

71. Who appeared quite rapidly?
(1) The whistling boy
(2) The author
(3) The moon
(4) The bicycle

72. Why could the narrator not see the face of the boy?
(1) He was afraid of the boy
(2) The boy sped past quickly
(3) The boy did not like him
(4) He was an ugly looking boy

73. What did the boy not wear?
(1) A scarf (2) A cap
(3) An overcoat (4) A blazer

74. The word 'Stroller' means
(1) a wanderer (2) a fast runner
(3) an athlete (4) a beggar

75. What was most unusual about the boy?
(1) He was cycling fast
(2) His eyes were bright but cool like moon-light
(3) He wore a school uniform
(4) He was whistling

Passage 4

The Sahara is the biggest desert in the world. It stretches across the whole of North Africa. The Arabian desert is also a very large desert. In India too, there is a desert called Thar desert in Rajasthan. Life in a desert is tough. The days are very hot and nights are cold.

76. The biggest desert in the wold is in
(1) India
(2) Africa
(3) Arabia
(4) America

77. In desert regions
(1) there is no rainfall
(2) it rains heavily
(3) there is enough rain
(4) there is a little rain

78. The climate in a desert is
(1) pleasant (2) difficult
(3) comfortable (4) cold

79. Date palms grow in
(1) plains (2) hilly regions
(3) deserts (4) snowy regions

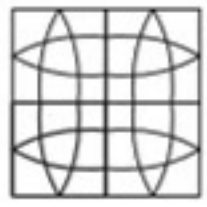
80. Which of the following is correct synonym of the given word 'biggest'.
(1) Huge (2) Small
(3) Tiny (4) Miniature

Answer Sheet

1 (4)	2 (4)	3 (3)	4 (4)	5 (3)	6 (3)	7 (2)	8 (4)	9 (3)	10 (2)
11 (2)	12 (1)	13 (1)	14 (4)	15 (2)	16 (2)	17 (1)	18 (3)	19 (2)	20 (3)
21 (1)	22 (2)	23 (2)	24 (2)	25 (3)	26 (4)	27 (1)	28 (3)	29 (4)	30 (4)
31 (3)	32 (2)	33 (2)	34 (2)	35 (3)	36 (2)	37 (2)	38 (4)	39 (2)	40 (1)
41 (3)	42 (3)	43 (1)	44 (3)	45 (4)	46 (3)	47 (3)	48 (1)	49 (4)	50 (2)
51 (2)	52 (3)	53 (2)	54 (4)	55 (3)	56 (2)	57 (2)	58 (2)	59 (4)	60 (3)
61 (4)	62 (4)	63 (3)	64 (2)	65 (4)	66 (4)	67 (3)	68 (1)	69 (1)	70 (4)
71 (1)	72 (2)	73 (3)	74 (1)	75 (2)	76 (2)	77 (3)	78 (4)	79 (2)	80 (1)

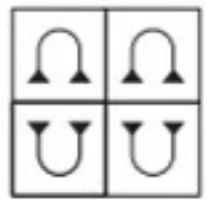
Hints and Solutions

1. Except figure (4) in all others shadded portion is circle. But in figure (4) shaded portion is square. Hence, option (4) is odd one out.
2. Except figure (4) right side of the figure changes its direction and left side remains same. Hence, option (4) is odd one out.
3. Except figure (3), all others have odd number of lines, whereas figure (3) has even number of lines. Hence, option (3) is odd one out.
4. Except figure (4), all others have two figures, whereas figure (4) has single figure. Hence, option (4) is odd one out.
5. Answer figure (3) is same as the question figure.
6. Answer figure (3) is same as the question figure.
7. Answer figure (2) is same as the question figure.
8. Answer figure (4) is same as the question figure.
9. Answer figure (3) will complete the given question figure.

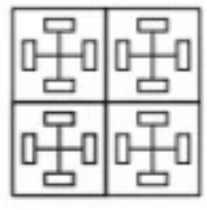


10. Answer figure (2) will complete the given question figure.

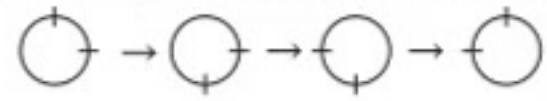
11. Answer figure (2) will complete the given question figure.



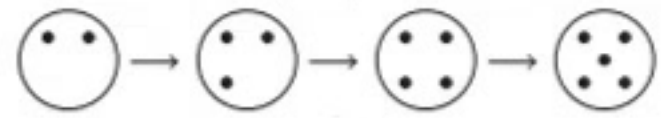
12. Answer figure (1) will complete the given question figure.



13. In every step, figure is rotating 90° clockwise.



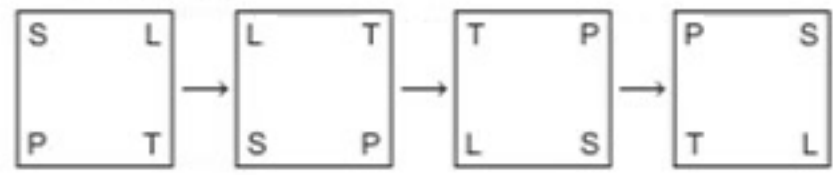
14. In every successive figure, one point is increasing.



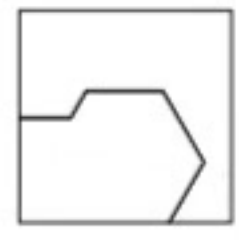
15. In every successive figure, number is increasing by 5.

$$5 \xrightarrow[+5]{} 10 \xrightarrow[+5]{} 15 \xrightarrow[+5]{} 20$$

16. In every step, figure is moving in anti-clockwise direction.



17. As, question figure (2) is water image of first. In the same way, water image of question figure is answer figure (1).
18. As, in question figure (1), both semi circle rotates in either side and contained one completely darken small circle within them. In the same way both figure rotates in either side and contained one completely darken small square in between them.
19. As in question figures, first figure rotates 90° anti-clockwise to produce the second one. In the same way, the third figure rotates 90° anti-clockwise to produce the fourth one.
20. As in question figure, triangle rotates 180° with keeping the arrow unchanged. In the same way, triangle rotates 180° with keeping the arrow unchanged.
21. Answer figure (1) will complete the given geometrical figure.

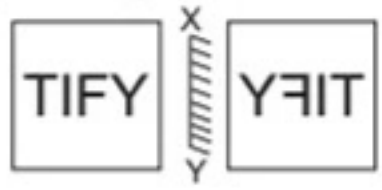


22. Answer figure (2) will complete the given geometrical figure.

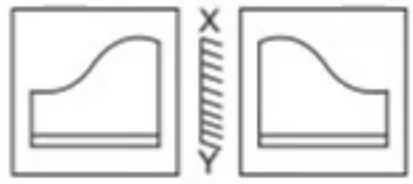
23. Answer figure (2) will complete the given geometrical figure.

24. Answer figure (2) will complete the given geometrical figure.

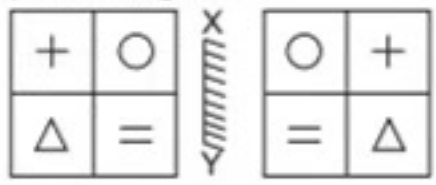
25. Answer figure (3) is the correct mirror image of the given question figure.



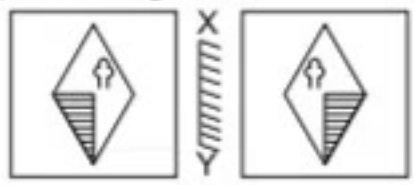
26. Answer figure (4) is the correct mirror image of the given question figure.



27. Answer figure (1) is the correct mirror image of the given question figure.



28. Answer figure (3) is the correct mirror image of the given question figure.



29. When the paper is unfolded, it is shown as in the answer figure (4).

30. When the paper is unfolded, it is shown as in the answer figure (4).

31. When the paper is unfolded, it is shown as in the answer figure (3).

32. When the paper is unfolded, it is shown as in the answer figure (2).

33. Answer figure (2) can be formed by using the cut pieces.

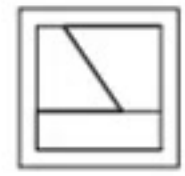
34. Answer figure (2) can be formed by using the cut pieces.

35. Answer figure (3) can be formed by using the cut pieces.

36. Answer figure (2) can be formed by using the cut pieces.

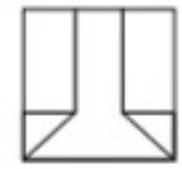
37. The question figure is embedded in the figure (2).

38. The question figure is embedded in the answer figure (4).



39. The question figure is embedded in the answer figure (2).

40. The question figure is embedded in the answer figure (1).



41. Total number of 4 digits are $= 9999 - 999$
$= 9000$

42. Both 11 and 21 are co-prime numbers.

43. 2 months, 5 weeks and 18 days
$= (2 \times 30 + 5 \times 7 + 18)$
$= 60 + 35 + 18$
$= 113$ days

44. Selling price of washing machine = ₹ 13489
Discount allowed = 18%
Let marked price of washing machine be ₹ x.

$$\therefore \quad x - \frac{18x}{100} = 13489$$

$$\frac{82x}{100} = 13489$$

$$\Rightarrow \quad x = \frac{13489 \times 100}{82}$$

$$= 16450$$

Marked price of washing machine is ₹ 16450.

45. 7510

46. Let the length of train = x m

$\therefore$ Speed of train crossing a pole = $\frac{x}{15}$ m/s

And speed of train crossing a platform

$$= \frac{x + 100}{25} \text{ m/s}$$

According to the question,

$$\frac{x}{15} = \frac{x + 100}{25}$$

$\Rightarrow$ $5x = 3x + 300$

$\therefore$ $x = 150$ m

47. $\because$ Product of two numbers = $\frac{5}{4}$

One number = $\frac{5}{6}$

Other number = $\frac{5}{4} \div \frac{5}{6} = \frac{5}{4} \times \frac{6}{5} = \frac{3}{2}$

48. $\because 1.25 = \frac{125}{100} = \frac{5}{4} = 1\frac{1}{4}$

49.

2	12, 24, 30
2	6, 12, 15
3	3, 6, 15
	1, 2, 5

$\therefore$ LCM = $2 \times 2 \times 3 \times 2 \times 5 = 120$

50. $\because$ $178 \times 34 = 6052$

or $34 = \frac{6052}{178}$

or $\frac{34}{10} = \frac{6052}{178 \times 10}$

or $3.4 = 60.52 \div 17.8$

51. $0.075 = 0.075 \times 100 = 7.5\%$

(to express number into per cent it is multiplied by 100.)

52. $15 \times 4 - 10 \div 5 = 15 \times 4 - 2$

$= 60 - 2 = 58$

53. Given,

length of rectangular plot = 100 m

Breadth of rectangular plot = 80 m

As we know that perimeter of plot

= 2 (length + breadth)

Perimeter = 2(100 + 80)

$= 2 \times 180 = 360$ m

Length of wire to surround it three times

$= 3 \times 360 = 1080$ m

54. $\because$ CP of radio = ₹ 900

SP of radio = ₹ 1200

$\therefore$ Profit = (1200 – 900) = ₹ 300

Hence, the profit percentage $= \frac{\text{Profit} \times 100}{\text{CP}}$

$$= \frac{300 \times 100}{900} = \frac{100}{3} \text{ or } 33\frac{1}{3}\%$$

55. Amount of water stored in the tank = Volume of the tank

$\therefore$ Volume of tank = length $\times$ breadth $\times$ height

$\therefore$ $V = 40 \times 60 \times 50$

$V = 120000$ cm

As $1000 \text{ cm}^3 = 1$ litre

$\therefore$ $V = 120\ l$

As tank already stored 50 l *of water*

$\therefore$ Amount of water to fill the tank completely

$= 120 - 50 = 70\ l$

56. The LCM of 4, 5 and 6 = 60

Hence, after 60 min i.e., after 1 h.

They will ring together i.e., at 9 : 30 am

57. Given, P = ₹ 500; A = ₹ 600; $r = 5\%$

SI = Amount – Principal = 600 – 500 = ₹ 100

Time, $t = \frac{\text{SI} \times 100}{P \times r} = \frac{100 \times 100}{500 \times 5} = 4$ yr

58. Speed = $\frac{\text{Distance}}{\text{Time}} = \left(\frac{600}{5 \times 60}\right)$ m/sec

= 2 m/sec

Now, converting m/sec to km/h

$= \left(2 \times \frac{18}{5}\right)$ km/h

= 7.2 km/h

59. The area of rectangular field = 120×160

= 19200 sq m

The area of one rectangular plot = 40×60

= 2400 sq m

$\therefore$ Number of rectangular plots = $\frac{19200}{2400} = 8$

60. The boy slept at = 9 : 45 pm

The boy woke up at = 5 : 30 am (next morning)

Time taken in sleeping from 9 : 45 to 12 : 00 (midnight)

= 2 h 15 min

Time taken in sleeping from 12 : 00 to 5 : 30

= 5 h 30 min

Total time he slept for

= 2 h 15 min + 5 h 30 min

= 7 h 45 min

Jawhar Navodaya Vidyalaya

Entrance Exam (Class VI)

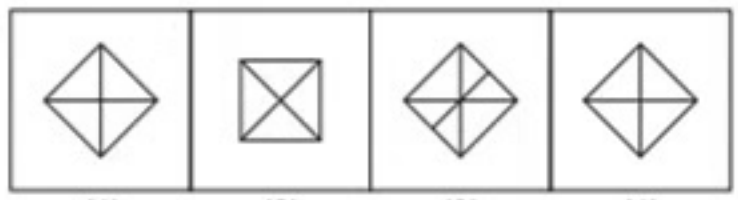
PRACTICE SET 3

Section I Mental Ability Test

Part I

Directions (Q.Nos. 1-4) *In questions, four figures* 1, 2, 3 *and* 4 *have been given in each question of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different.*

1.

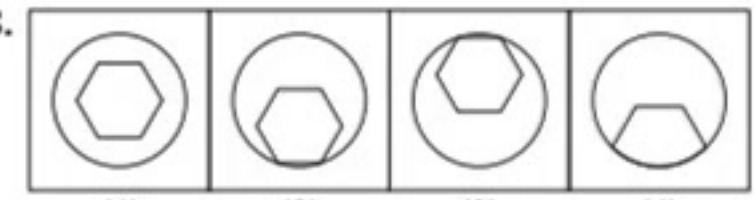


(1) (2) (3) (4)

2.

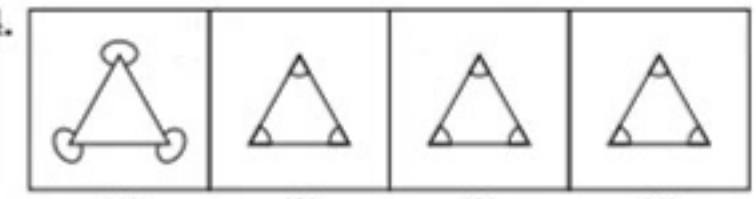
(1) (2) (3) (4)

3.



(1) (2) (3) (4)

4.



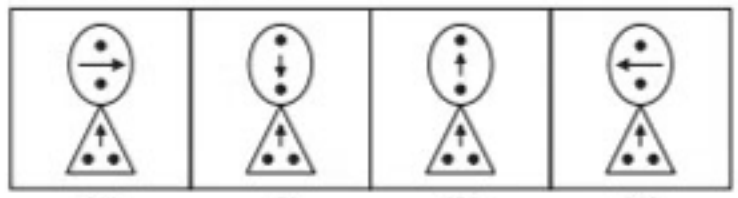
(1) (2) (3) (4)

Part II

Directions (Q. Nos. 5-8) *In questions, a question figure is given and four answer figures marked* 1, 2, 3 and 4 *are also given. Select the answer figure which is exactly the same as the question figure.*

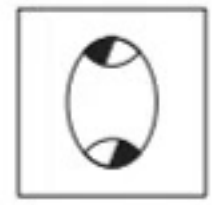
5. Question Figure

Answer Figures

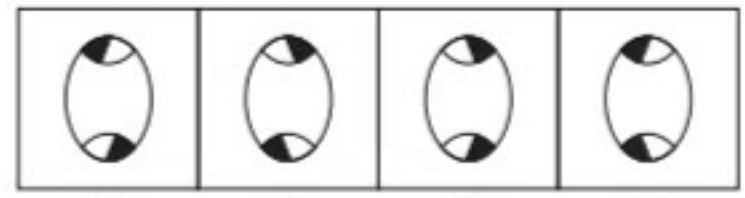


(1) (2) (3) (4)

6. Question Figure



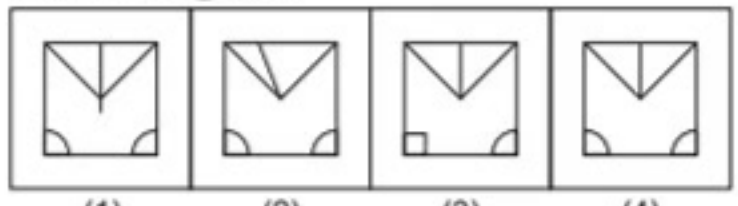
Answer Figures



(1) (2) (3) (4)

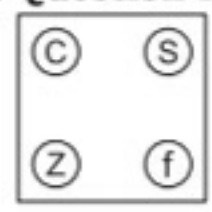
7. Question Figure

Answer Figures

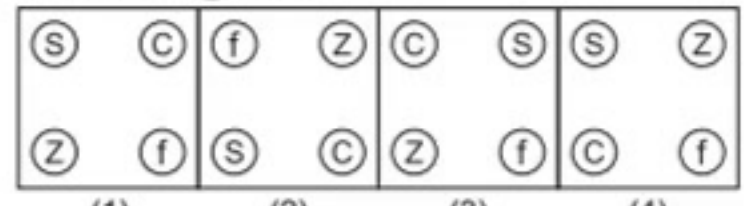


(1) (2) (3) (4)

8. Question Figure



Answer Figures



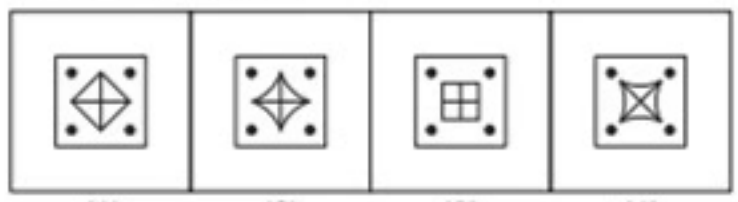
(1) (2) (3) (4)

Part III

Directions (Q. Nos. 9-12) *In questions, there is a question figure given, a part of which is missing. Observe the answer figures* 1, 2, 3 *and* 4 *and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure.*

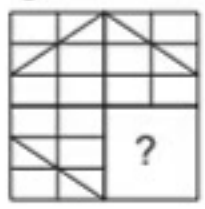
9. Question Figure

Answer Figures

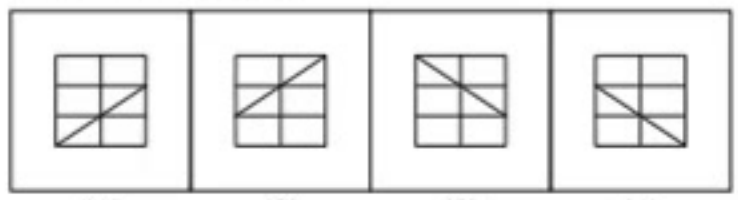


(1) (2) (3) (4)

10. Question Figure

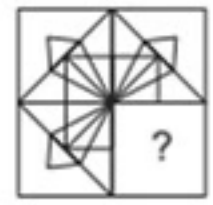


Answer Figures

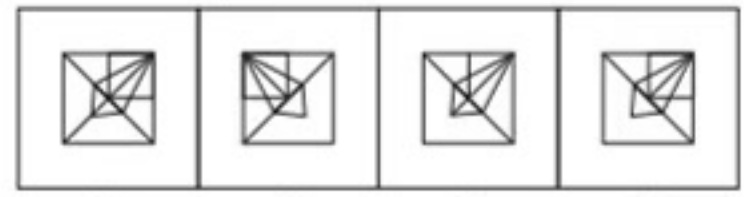


(1) (2) (3) (4)

11. Question Figure

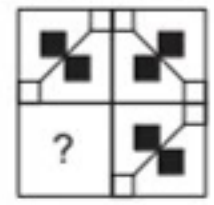


Answer Figures

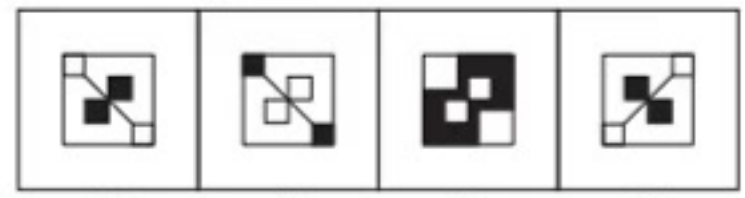


(1) (2) (3) (4)

12. Question Figure



Answer Figures

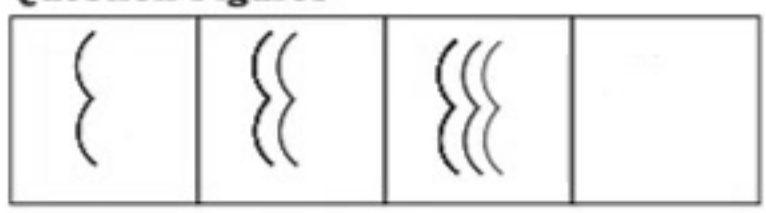


(1) (2) (3) (4)

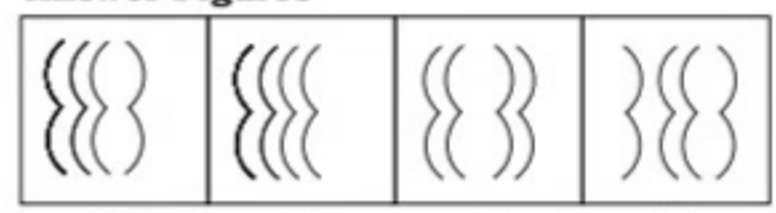
Part IV

Directions (Q. Nos. 13-16) *There are three question figures and the space for the fourth figure is left blank. The question figures are in series. Find out one figure among the answer figures, which occupies the blank space for the fourth figure and completes the series.*

13. Question Figures

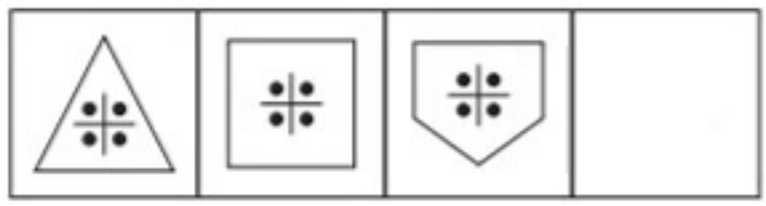


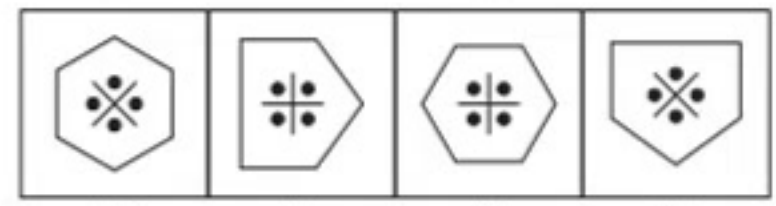
Answer Figures



(1) (2) (3) (4)

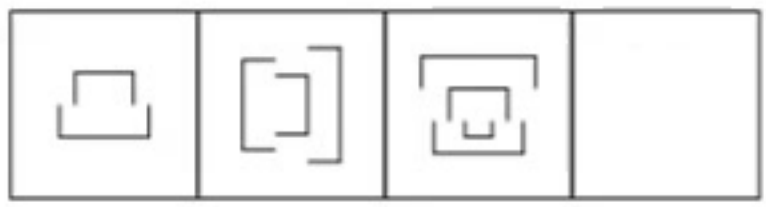
14.

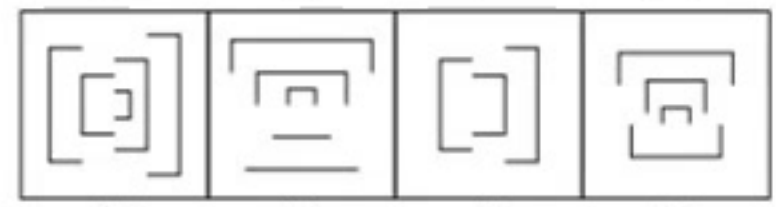




(1) (2) (3) (4)

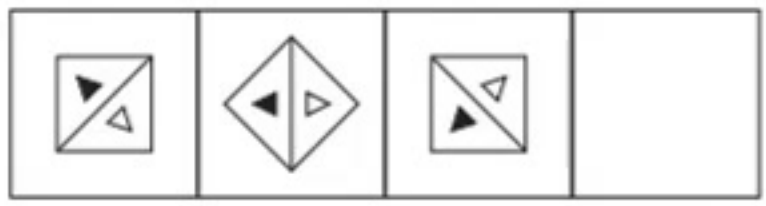
15.

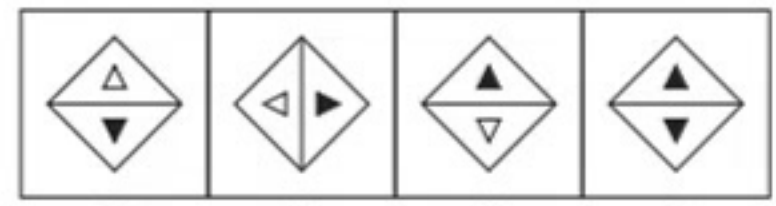




(1) (2) (3) (4)

16.



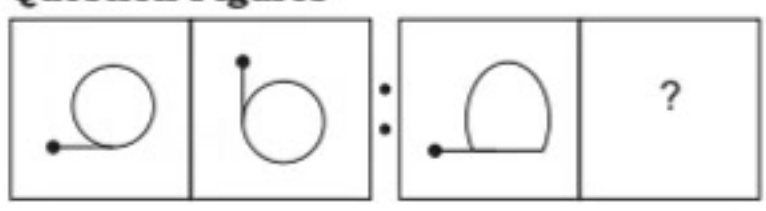


(1) (2) (3) (4)

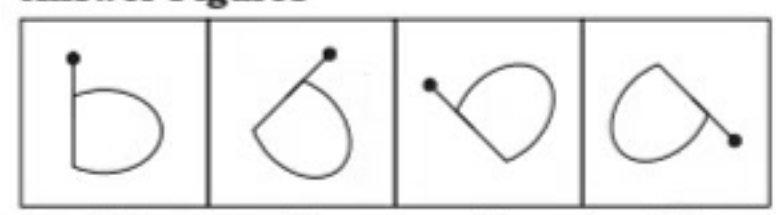
Part V

Directions (Q.Nos. 17-20) *In questions, there are two sets of two question figures each. The second set has a mark of interrogations (?). There exists a relationship between the first two question figure, similar relationship should exist between the third and fourth question figure. Select one of the answer figure which replaces the mark of interrogation.*

17. Question Figures

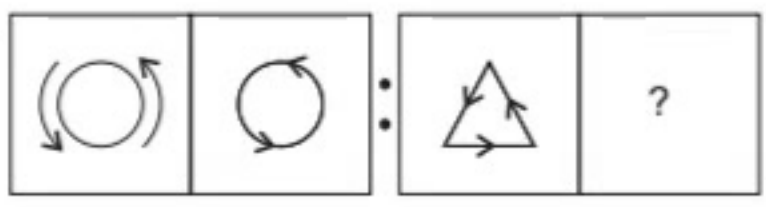


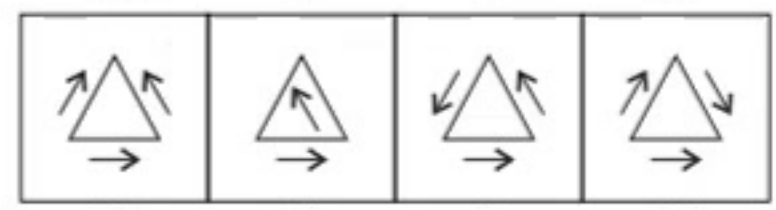
Answer Figures



(1) (2) (3) (4)

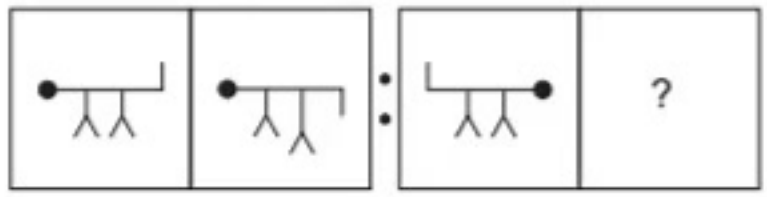
18.



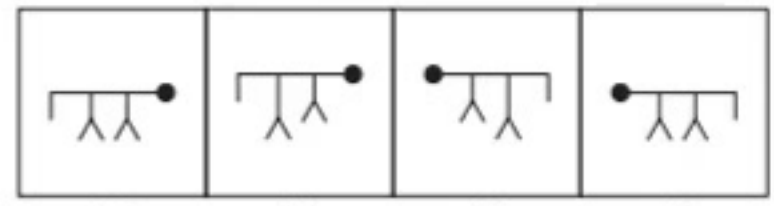


(1) (2) (3) (4)

19. Question Figures

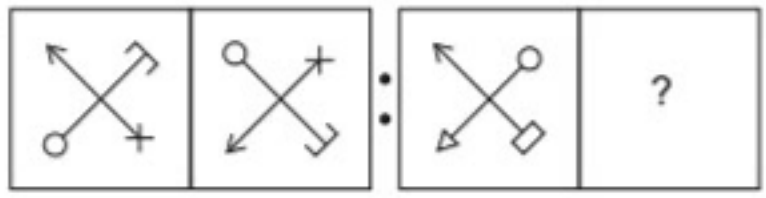


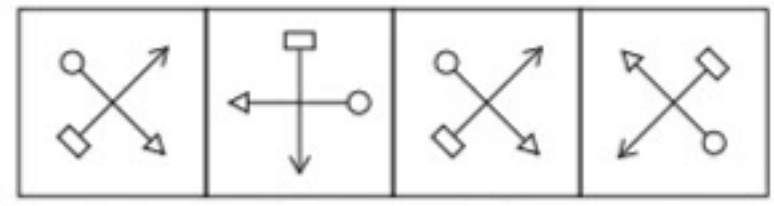
Answer Figures



(1) (2) (3) (4)

20.





(1) (2) (3) (4)

Part VI

Directions (Q. Nos. 21-24) *In questions, one part of a geometrical figure is given as question figure and the other one is among the four answer figures* 1, 2, 3 *and* 4 *are also given. Find out the figure that completes the geometrical figure.*

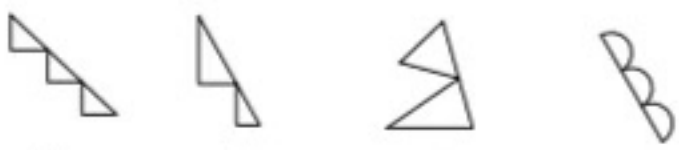
21. Question Figure

Answer Figures

(1) (2) (3) (4)

22. Question Figure

Answer Figures



(1) (2) (3) (4)

23. Question Figure

Answer Figures

(1) (2) (3) (4)

24. Question Figure

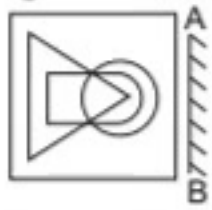
Answer Figures

(1) (2) (3) (4)

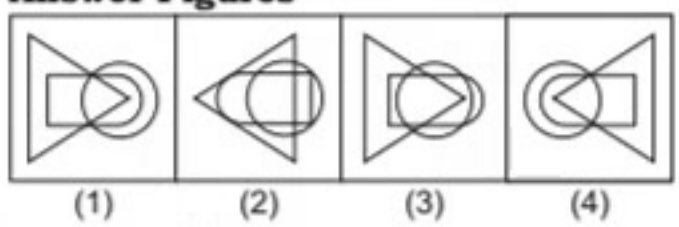
Part VII

Directions (Q.Nos. 25-28) *In questions, there is a question figure and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at* AB.

25. Question Figure

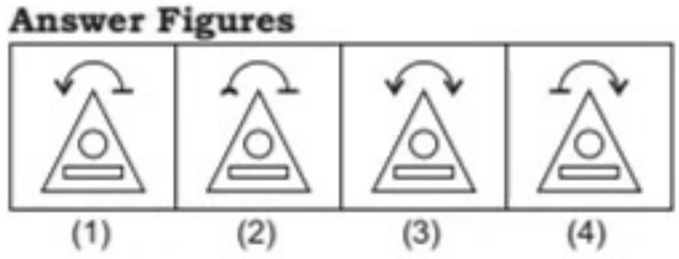


Answer Figures



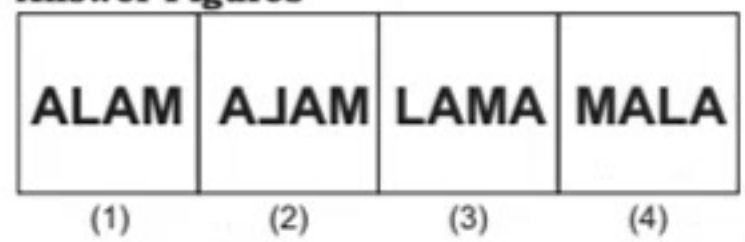
26. Question Figure

Answer Figures



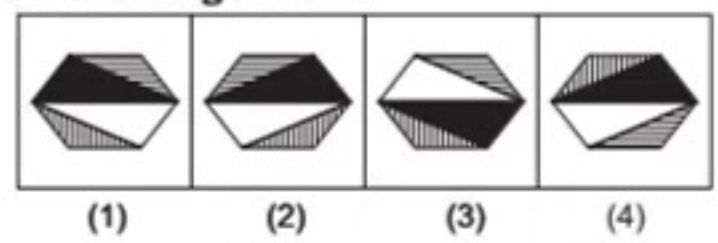
27. Question Figure

Answer Figures



28. Question Figure

Answer Figures

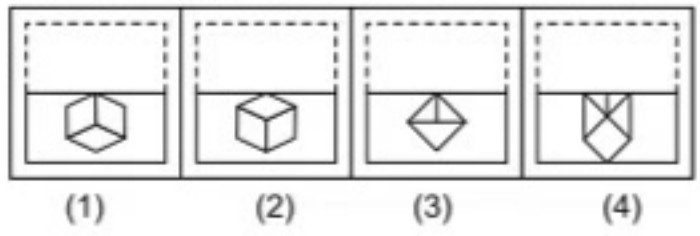


Part VIII

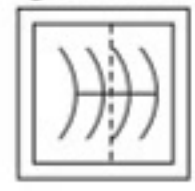
Directions (Q.Nos. 29-32) *In questions, a piece of paper is folded and punched as shown in question figures and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which indicates how the paper will appear when opened (unfolded).*

29. Question Figure

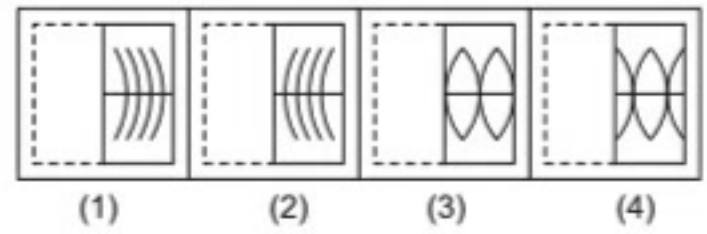
Answer Figures



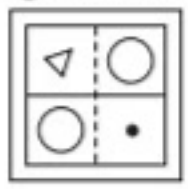
30. Question Figure



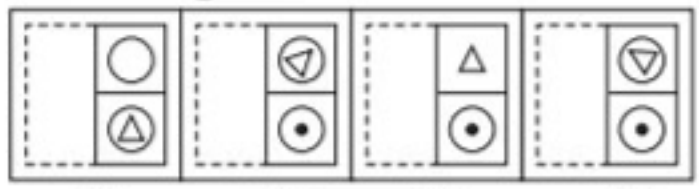
Answer Figures



31. Question Figure

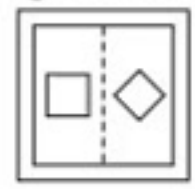


Answer Figures

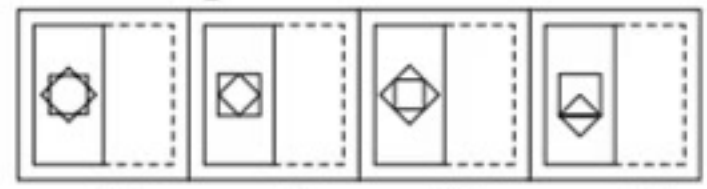


(1) (2) (3) (4)

32. Question Figure



Answer Figures



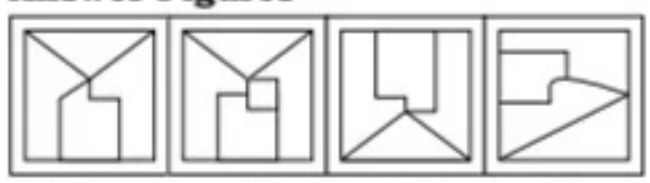
(1) (2) (3) (4)

Part IX

Directions (Q.Nos. 33-36) *In questions, a question figure is given and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which can be formed from the cut off pieces given the question figure.*

33. Question Figure

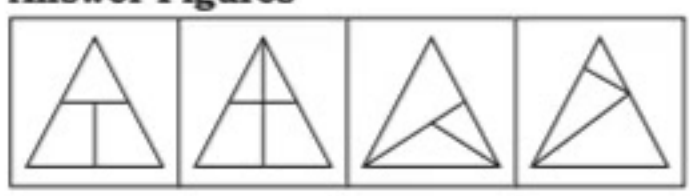
Answer Figures



(1) (2) (3) (4)

34. Question Figure

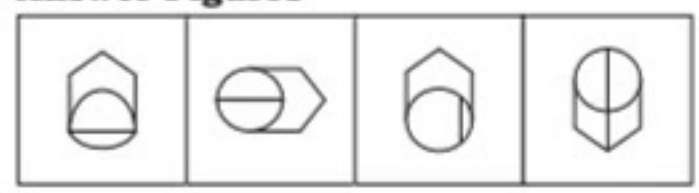
Answer Figures



(1) (2) (3) (4)

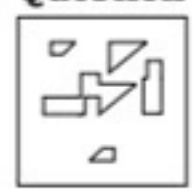
35. Question Figure

Answer Figures

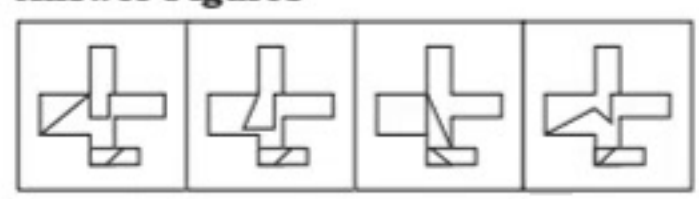


(1) (2) (3) (4)

36. Question Figure



Answer Figures



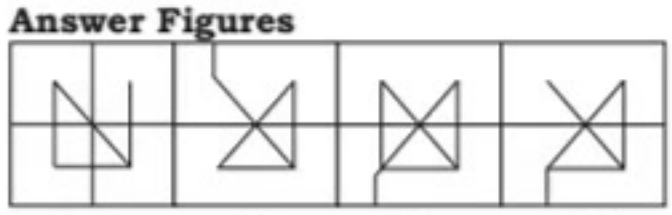
(1) (2) (3) (4)

Part X

Directions (Q.Nos. 37-40) *In questions, a question figure is given and four answer figures, marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure in which the question figure is hidden/embedded.*

37. Question Figure

Answer Figures



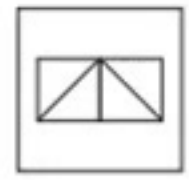
(1) (2) (3) (4)

38. Question Figure

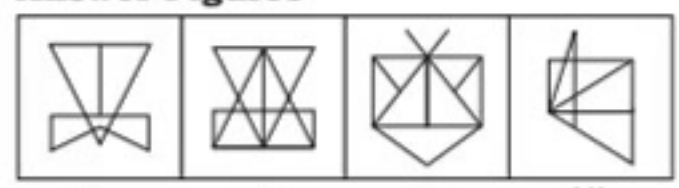
Answer Figures

(1) (2) (3) (4)

39. question Figure



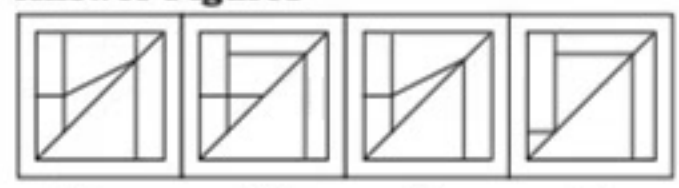
Answer Figures



(1) (2) (3) (4)

40. Question Figure

Answer Figures



(1) (2) (3) (4)

SECTION II Arithmetic Test

Directions (Q.Nos. 41-60) *For every question four probable answers bearing numbers* 1, 2, 3 *and* 4 *are given. Only one out of these is correct. You have to choose the correct answer.*

41. The smallest 4 digit even number formed by the digits 0, 1, 2 and 3 is
(1) 1023 (2) 1032
(3) 3201 (4) 3210

42. The sum of two numbers is 11009. If one number is 9999, the other number is
(1) 1010 (2) 1110
(3) 2110 (4) 21008

43. The place value of 5 in 214.56
(1) 5×1 (2) 5×10
(3) 5×0.1 (4) 5×0.01

44. The simplification of $6 \div 6 + 6 \times 6 - 6$ gives
(1) 1 (2) 7 (3) 31 (4) 36

45. The sum of the fractions $\frac{4}{3}$, $\frac{5}{9}$ and $\frac{6}{18}$ is
(1) $\frac{2}{5}$ (2) $\frac{11}{18}$
(3) $\frac{19}{9}$ (4) $\frac{20}{9}$

46. The LCM of 8, 12, 20 and 36 is
(1) 120 (2) 180
(3) 360 (4) 720

47. The HCF of two co-prime numbers is
(1) 1
(2) 0
(3) sum of the numbers
(4) difference of the numbers

48. Convert 4 m 2604 cm into centimetres.
(1) 3040 cm (2) 3400 cm
(3) 3004 cm (4) 6604 cm

49. 10 m is what per cent of 10 km?
(1) 0.1% (2) 1.0% (3) 10.0% (4) 40.0%

50. Which of the following numbers are in ascending order?
(1) $\frac{1}{3}, \frac{1}{2}, 0.25$ (2) $0.25, \frac{1}{2}, \frac{1}{3}$
(3) $0.25, \frac{1}{3}, \frac{1}{2}$ (4) $\frac{1}{2}, \frac{1}{3}, 0.25$

51. A bus left Delhi for Amritsar at 5 : 30 pm and reached Amritsar at 7 : 36 am next day. How much time did it take to reach Amritsar?
(1) 2 h 6 min
(2) 14 h 6 min
(3) 13 h 6 min
(4) 12 h 6 min

52. The area of a square, whose perimeter is 48 m, will be
(1) 48 sq m
(2) 144 sq m
(3) 1152 sq m
(4) 2304 sq m

53. After bought a ceilling fan on ₹ 750, one sells it with a profit of 18% then find the selling price.
(1) ₹ 850 (2) ₹ 885
(3) ₹ 860 (4) ₹ 855

54. The simplification of $1 + \frac{1}{10} + \frac{1}{100} + \frac{1}{1000}$ in decimal form gives
(1) 1.0001 (2) 1.111 (3) 1.001 (4) 0.111

55. Factors of 30 are
(1) 2, 3, 5
(2) 1, 2, 3, 5, 10
(3) 1, 2, 3, 10, 10
(4) 1, 2, 3, 5, 6, 10, 15, 30

56. What is the volume of a box whose each edge measures 3 m in length?
(1) 54 cu m (2) 27 cu m
(3) 18 cu m (d) 9 cu m

57. The simple interest on ₹ 300 at the rate of 6% per annum in $2\frac{1}{2}$ yr will be
(1) ₹ 18 (2) ₹ 36 (3) ₹ 40 (4) ₹ 45

58. The area of circle is 38.5 sq cm. What will be its circumference?
(1) 2.2 cm (2) 22 cm (3) 220 cm (4) 185 cm

59. How much time will be taken to cover a distance of 100 km as a speed of 10 km/h?
(1) 10 h (2) 15 h (3) 5 h (4) 20 h

60. Dia bought rice bag ₹ 500 per bag. Due to spoilage she had to sold them for ₹ 450 per bag. Find the gain or loss per cent.
(1) 10% loss (2) 10% gain
(3) $33\frac{1}{3}$% loss (4) $33\frac{1}{3}$% gain

SECTION III Language Test *(English)*

Directions (Q.Nos. 61-80) *There are four passages. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each question four probable answers bearing letters* 1, 2, 3 *and* 4 *are given. Only one out of these is correct. You have to choose the correct answer.*

Passage 1

There are so many ways in which we can avoid waste. We can see that taps are turned off properly so that water is not wasted. We must save energy and energy means everything from electricity to petrol to cooking gas and firewood. Energy is useful in running all our factories, our transport, even the water pumps in the fields. Careful use of our energy resources can save us millions of rupees.

We must not waste food. There are many people less fortunate than us who do not get enough. We must also save paper and take care of our books. Wasteful use of paper means more felling of trees.

61. Which of the following is not true?
(1) We must save water
(2) We must save electricity
(3) We must save factories
(4) We must save paper

62. Which of the following does not provide us energy?
(1) Electricity
(2) Transport
(3) Firewood
(4) Petrol

63. Many poor people do not get enough
(1) food
(2) trees
(3) books
(4) paper

64. By saving energy we can save
(1) money (2) people (3) taps (4) books

65. The word 'Fortunate' means
(1) Lucky (2) Strong
(3) God (4) Unlucky

Passage 2

One day Tansen sang one of the songs taught by his master and deliberately introduced a false note. It had almost an electric effect on the saint; his aesthetic nature received a rude shock. He turned to Tansen and rebuked him, saying, "What has happened to you, Tansen, that you, a pupil of mine, should commit such a gross blunder ?"

He then started singing the piece correctly, the mood came upon him and enveloped him, and he forgot himself in the music which filled the earth and heaven and Akbar and Tansen themselves in the sheer melody and charm of the music. It was a unique experience. When the music stopped, Akbar turned to Tansen and said, "You say you learnt music from this saint and yet you seem to have missed the living charm of it all. Yours seems to be chaff beside this soul stirring music".

66. 'It had almost an electric effect on the saint'. Here 'saint' refers to
(1) Akbar
(2) Tansen
(3) Tansen's Guru
(4) some other courtier

67. Which word did Akbar use to describe Tansen's music?
(1) Charming
(2) Thrilling
(3) Soul stirring
(4) Chaff

68. Tansen's Guru rebuked Tansen because
(1) he sang a classical song
(2) he sang a song with a false note
(3) he tried to show his superiority over his master
(4) he sang a song not suitable to the occasion

69. What did Akbar miss in Tansen's music?
(1) Chaff (2) Right tunes
(3) Living charm (4) Inspiration

70. Which one of the following is the antonym of the word 'Blunder'?
(1) Fault (2) Misstep
(3) Fluff (4) Accurate

Passage 3

Edward was glad because he had escaped from Hugo and his deceitful game. But he was very tired and hungry. He reached a farm house on the way. He saw an open door of a store of straw of paddy and wheat. He was shivering with cold and the store was hot. Therefore, he went into the room. He saw a blanket in the corner of the store. He took the blanket and covered himself and lay on the straw.

At the same moment, something touched him but he could not see that thing due to darkness. He wanted to sleep soon because he was tired but again his hand touched a smooth and warm thing. He caught hold of it. Was it a rope? But it had a lock of hair. He sat up holding it. He realised soon that it was not a rope but the tail of a calf.

71. Edward
(1) like to live with Hugo and his deceitful game
(2) did not wish to live with Hugo and his deceitful game
(3) wanted to live with Hugo but wanted to escape from his deceitful game
(4) did not want to live with Hugo but wanted to live with thieves

72. Edward went into the store because
(1) he was hungry and tired
(2) he wanted to sleep
(3) he was feeling cold
(4) he was in need of straw

73. In the store
(1) there was no animal
(2) there was no door
(3) there was no blanket
(4) there was no rope

74. Edward was holding
(1) a rope (2) a tail
(3) a snake (4) any other thing

75. Which of the following is synonym of the word 'Glad' ?
(1) Happy (2) Beautiful
(3) Sad (4) Joy

Passage 4

There was a poor man. He was thought to bring bad luck. Akbar heard of this man's reputation and wanted to see him. He was brought to Akbar. The emperor took a look at him and asked him to be brought back in the evening. That day Akbar was very busy and even forgot to eat. By the evening, he was very tired. He was informed that his son Prince Salim had fallen ill. It was that man's fault, Akbar decided. He called his courtiers and told them that he wanted to hang that man. All of them agreed immediately. But Birbal said, "Your face was the first face that man saw today and he has to die because of it." Akbar realised his mistake and rewarded Birbal for his wisdom.

76. Why had Akbar not eaten his food?
(1) He was ill
(2) He had seen that man
(3) He was very busy
(4) He was not hungry

77. Who was not well on that day?
(1) King Akbar (2) His courtier
(3) The poor man (4) Prince Salim

78. Why did the king decide to hang the poor man?
(1) The poor man refused to meet him
(2) The poor man was really very unlucky
(3) Birbal advised him to do so
(4) The king had a very good day

79. Birbal was rewarded because
(1) he was in king's favour
(2) he brought the poor man to the king
(3) he made the king realise his mistake
(4) he taught the poor man a lesson

80. The opposite word for 'forget' is
(1) forgive (2) active
(3) remember (4) meet

Answers

1 (3)	2 (4)	3 (4)	4 (1)	5 (1)	6 (1)	7 (4)	8 (3)	9 (2)	10 (1)
11 (2)	12 (1)	13 (2)	14 (3)	15 (1)	16 (1)	17 (1)	18 (3)	19 (2)	20 (4)
21 (1)	22 (1)	23 (4)	24 (2)	25 (4)	26 (1)	27 (2)	28 (4)	29 (4)	30 (3)
31 (4)	32 (1)	33 (3)	34 (3)	35 (2)	36 (1)	37 (1)	38 (3)	39 (3)	40 (4)
41 (2)	42 (1)	43 (3)	44 (3)	45 (4)	46 (3)	47 (1)	48 (3)	49 (1)	50 (3)
51 (2)	52 (2)	53 (2)	54 (2)	55 (4)	56 (2)	57 (4)	58 (2)	59 (1)	60 (1)
61 (3)	62 (2)	63 (1)	64 (1)	65 (1)	66 (3)	67 (4)	68 (2)	69 (3)	70 (3)
71 (2)	72 (3)	73 (4)	74 (2)	75 (1)	76 (3)	77 (4)	78 (2)	79 (3)	80 (3)

Hints and Solutions

1. Except figure (3), all the other are divided into four parts. Hence, figure (3) is odd one out.

2. Except figure (4), all the other are related to suck or edible stuff. Hence, figure (4) is odd one out.

3. Except figure. (4), there is a hexagon inside the circles in all the figures. Hence, figure (4) is odd one out.

4. Except figure (1), all the figures are similar. Hence, figure (1) is odd one out.

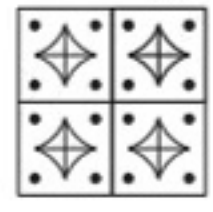
5. Answer figures (1) is same as the given question figure.

6. Answer figure (1) is same as the given question figure.

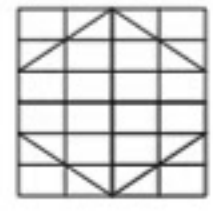
7. Answer figure (4) is same as the given question figure.

8. Answer figure (3) is same as the given question figure.

9. Answer figure (2) will complete the given pattern.

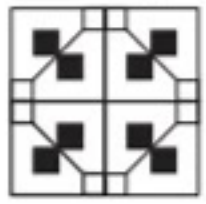


10. Answer figure (1) will complete the given figure.

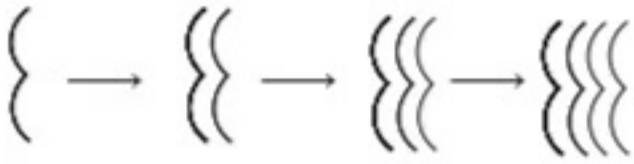


11. Answer figure (2) will complete the given figure.

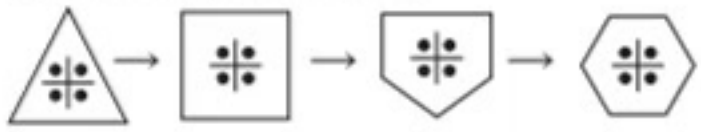
12. Answer figure (1) will complete the given figure.



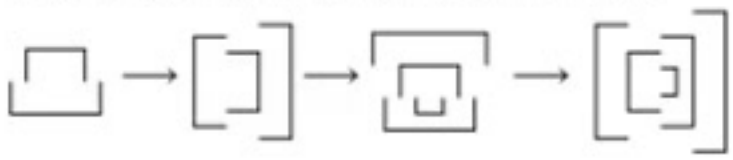
13. In every successive figure, one design is increasing. Hence, answer figure (2) will complete the series.



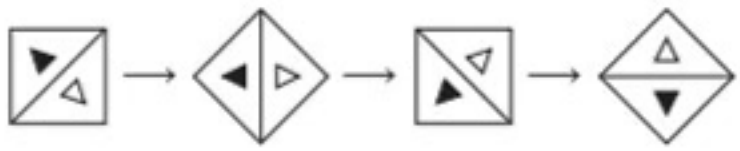
14. In every successive figure, a new arm is increasing in outer figure. Hence, answer figure (3) will complete the series.



15. In every step, figure is rotating 90° anti-clockwise and a figure is increasing in inner space. Hence, answer figure (1) will complete the series.



16. In every step, figure is rotating 45° anti-clockwise. Hence, answer figure (1) will complete the series.



17. As in question figure, first figure rotates 90° clockwise. In the same way, third figure rotates 90° clockwise. Hence, answer figure (1) is the correct choice.

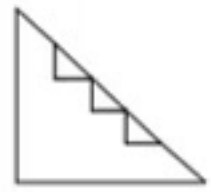
18. As in question figure, arrow from first figure resolve in second one. In the same way, third figure resolve in fourth one. Hence, answer figure (3) is the correct choice.

19. As in question figure, line from upper side of first figure getting lowered in the next one and hence increase the length of design. In the same way, line from upper side of third figure getting lowered in the next one and increase the length of design. Hence, answer figure (2) is the correct choice.

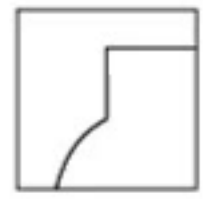
20. As in question figure, second figure is water image of first one. In the same way, fourth one is water image of third one. Hence, answer figure (4) is the correct choice.

21. Answer figure (1) will complete the given geometrical figure.

22. Answer figure (1) will complete the given geometrical figure.

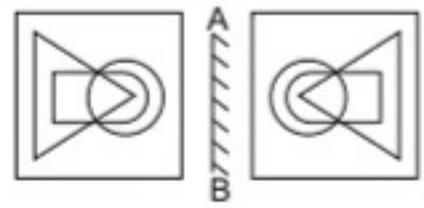


23. Answer figure (4) will complete the given geometrical figure.

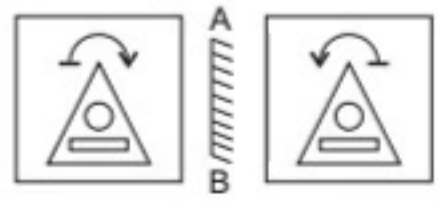


24. Answer figure (2) will complete the given geometrical figure.

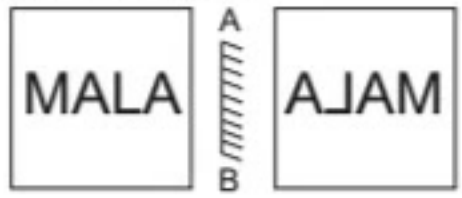
25. Answer figure (4) is the correct mirror image of the given question figure.



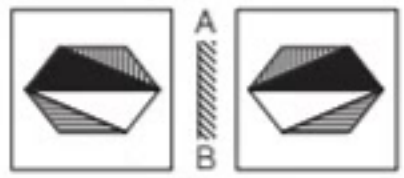
26. Answer figure (1) is the correct mirror image of the given question figure.



27. Answer figure (2) is the correct mirror image of the given question figure.



28. Answer figure (4) is the correct mirror image of the given question figure.



29. When the paper is folded, it is shown as in the answer figure (4).

30. When the paper is folded, it is shown as in the answer figure (3).

31. When the paper is folded, it is shown as in the answer figure (4).

32. When the paper is folded, it is shown as in the answer figure (1).

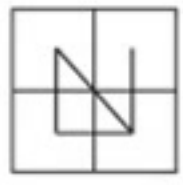
33. Answer figure (3) can be formed by using the cut pieces.

34. Answer figure (3) can be formed by using the cut pieces.

35. Answer figure (2) can be formed by using the cut pieces.

36. Answer figure (1) can be formed by using the cut pieces.

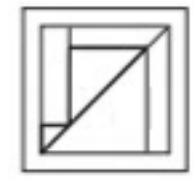
37. The question figure is embedded in the answer figure (1).



38. The question figure is embedded in the answer figure (3).

39. The question figure is embedded in the answer figure (3).

40. The question figure is embedded in the answer figure (4).



41. Smallest four digit even number = 1032

42. The sum of two numbers = 11009

One number = 9999

$\therefore$ Other number = 11009 − 9999 = 1010

43. 214.56

$\rightarrow 5 \times 0.1$

Hence, place value of 5 in 214. 56

$= 5 \times 0.1$

44. $6 \div 6 + 6 \times 6 - 6 = 1 + 6 \times 6 - 6$

$= 1 + 36 - 6 = 37 - 6 = 31$

45. $\frac{4}{3} + \frac{5}{9} + \frac{6}{18} = \frac{6 \times 4 + 2 \times 5 + 1 \times 6}{18}$

$= \frac{24 + 10 + 6}{18} = \frac{40}{18} = \frac{20}{9}$

46.

2	8, 12, 20, 36
2	4, 6, 10, 18
3	2, 3, 5, 9
	2, 1, 5, 3

LCM $= 2 \times 2 \times 3 \times 2 \times 5 \times 3 = 360$

47. $\therefore$ Required number = 1

48. $\because$ 1 m = 100 cm

4 m = 400 cm

Now, 400 cm + 2604 cm = 3004 cm

49. $\because$ 10 km = 10 × 1000 m = 10000 m

Let x% of 10 km = 10 m

$\therefore \frac{x}{100} \times 10000 \text{ m} = 10 \text{ m}$

$x = \frac{10 \times 100}{10000}$

$= \frac{1}{10} = 0.1\%$

50. $\because$ $\frac{1}{3} = 0.33; \frac{1}{2} = 0.50$

$\therefore$ In ascending order the numbers will be written as

$0.25 < 0.33 < 0.50$

or $0.25, \frac{1}{3}, \frac{1}{2}$

51. ∵ Bus left Delhi at = 5 : 30 pm
Reached Amritsar at = 7 : 36 am
Time from 5 : 30 pm to 12 : 00 pm (mid-night)
= 12 : 00 – 5 : 30
= 6 h 30 min
Time from 12 : 00 to 7 : 36 am = 7 h 36 min
∴ Total time = 6 h 30 min + 7 h 36 min
= 14 h 6 min

52. ∵ The side of a square $= \frac{\text{Perimeter}}{4}$
∴ The side of given square $= \frac{48}{4} = 12$ m
∴ Area = Side × Side
$= 12 \times 12$
= 144 sq m

53. Let the cost price = 100% = ₹ 750
Then, profit percentage = (100 + 18)
= 118%
The selling price $= \frac{118 \times 750}{100} =$ ₹ 885

54. $1 + \frac{1}{10} + \frac{1}{100} + \frac{1}{1000}$
$= 1 + 0.1 + 0.01 + 0.001 = 1.111$

55. $30 = 1 \times 30 = 2 \times 15 = 3 \times 10 = 5 \times 6$
∴ Factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30.

56. Volume of box = $(\text{side})^3$
$= 3 \times 3 \times 3 = 27$ cu m

57. Simple Interest $= \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$
$= \frac{300 \times 6 \times 5}{100 \times 2} =$ ₹ 45

58. ∵ Area of circle $= \pi r^2$
$38.5 = \frac{22}{7} \times r^2$
$\Rightarrow \quad r^2 = \frac{269.5}{22} = 12.25$
$\therefore \quad r = \sqrt{12.25} = 3.5$ cm
Hence, circumference of circle
$= 2\pi r = 2 \times \frac{22}{7} \times 3.5$
= 22 cm

59. Time taken to cover 10 km = 1 h
Time taken to cover 1 km $= \frac{1}{10}$ h
∴ Time taken to cover 100 km $= \frac{1}{10} \times 100 = 10$ h

60. Here, CP = ₹ 500 per bag
SP = ₹ 450 per bag
As, SP < CP, therefore Dia suffer a loss.
Loss = CP – SP = 500 – 450 = ₹ 50 per bag
∴ Loss % $= \frac{\text{Loss}}{\text{CP}} \times 100$
$= \frac{50}{500} \times 100 = 10\%$

Jawhar Navodaya Vidyalaya

Entrance Exam (Class VI)

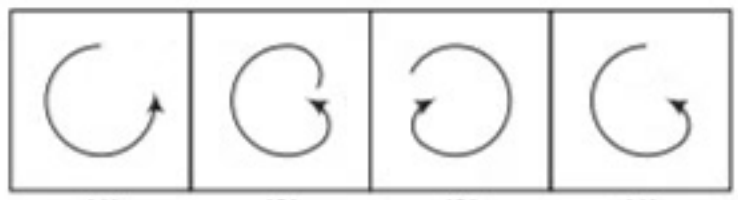
PRACTICE SET 4

Section I Mental Ability Test

Part I

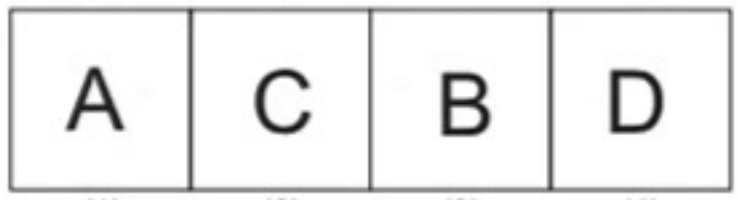
Directions (Q.Nos. 1-4) *In questions, four figures 1, 2, 3 and 4 have been given in each question of these four figures, three figures are similar in some way and one figure is different. Select the figure which is different.*

1.



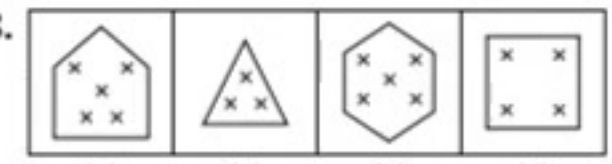
(1) (2) (3) (4)

2.



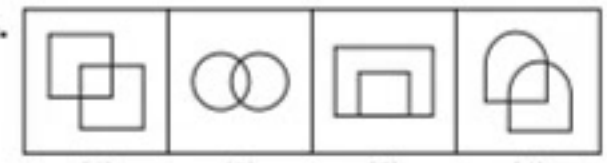
(1) (2) (3) (4)

3.



(1) (2) (3) (4)

4.



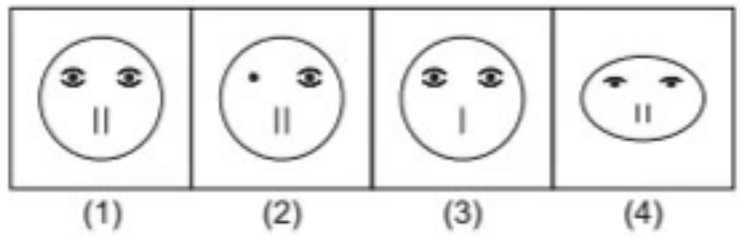
(1) (2) (3) (4)

Part II

Directions (Q.Nos. 5-8) *In questions, a question figure is given and four answer figures marked 1, 2, 3 and 4 are also given. Select the answer figure which is exactly the same as the question figure.*

5. Question Figure

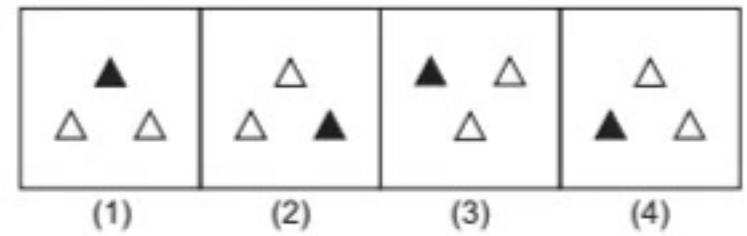
Answer Figures



(1) (2) (3) (4)

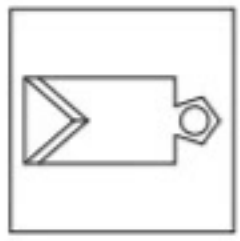
6. Question Figure

Answer Figures

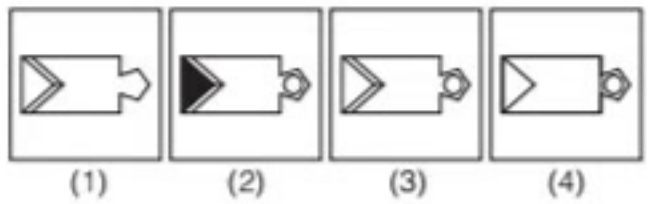


(1) (2) (3) (4)

7. Question figure

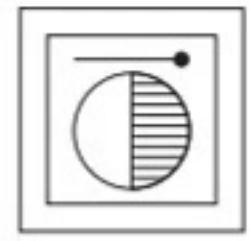


Answer figures

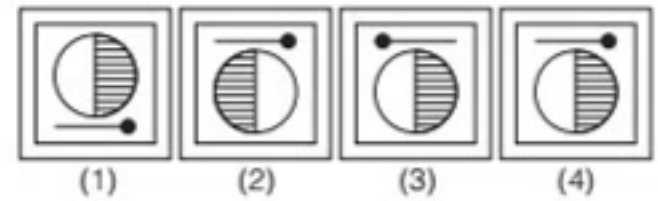


(1) (2) (3) (4)

8. Question Figure



Answer figures



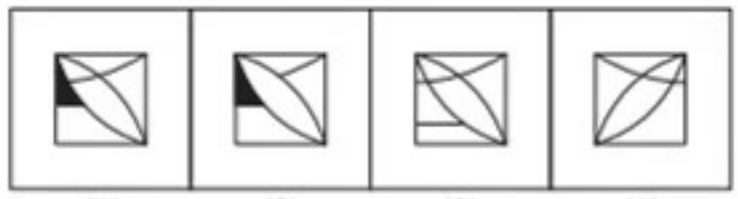
(1) (2) (3) (4)

Part III

Directions (Q.Nos. 9-12) *In questions, there is a question figure, a part of which is missing. Observe the answer figures* 1, 2, 3 *and* 4 *and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure.*

9. Question Figure

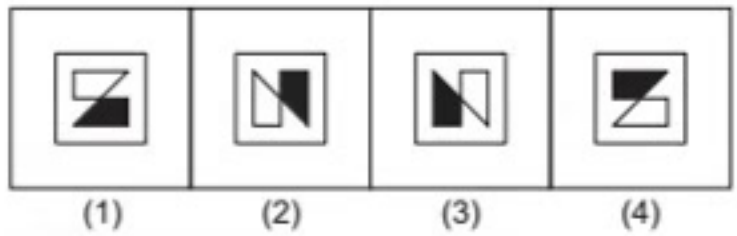
Answer Figures



(1) (2) (3) (4)

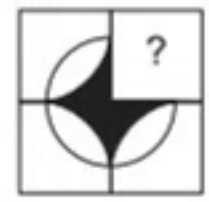
10. Question Figure

Answer Figures

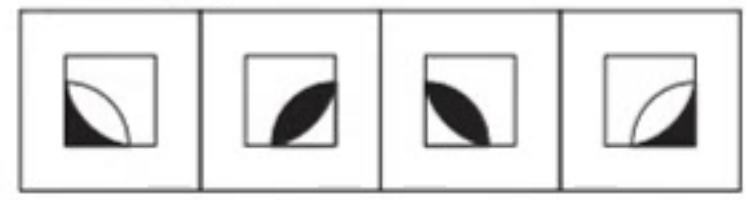


(1) (2) (3) (4)

11. Question Figure

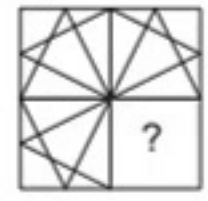


Answer Figures

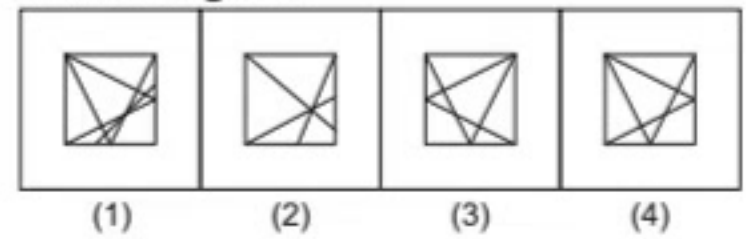


(1) (2) (3) (4)

12. Question Figure



Answer Figures

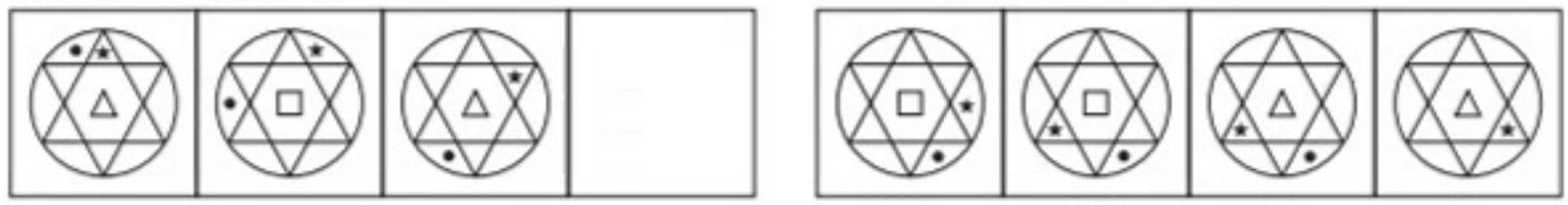


(1) (2) (3) (4)

Part IV

Directions (Q.Nos. 13-16) *There are three question figures and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure among the answer figures given, which occupies the blank space for the fourth figure and completes the series.*

13. Question Figures **Answer Figures**

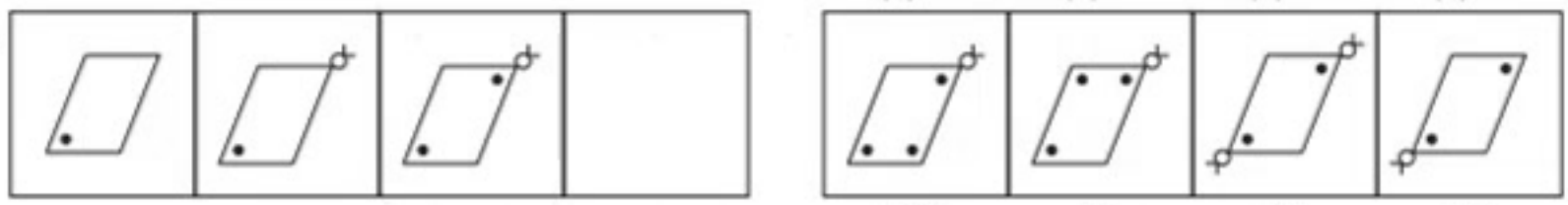


(1) (2) (3) (4)

14.

(1) (2) (3) (4)

15.



(1) (2) (3) (4)

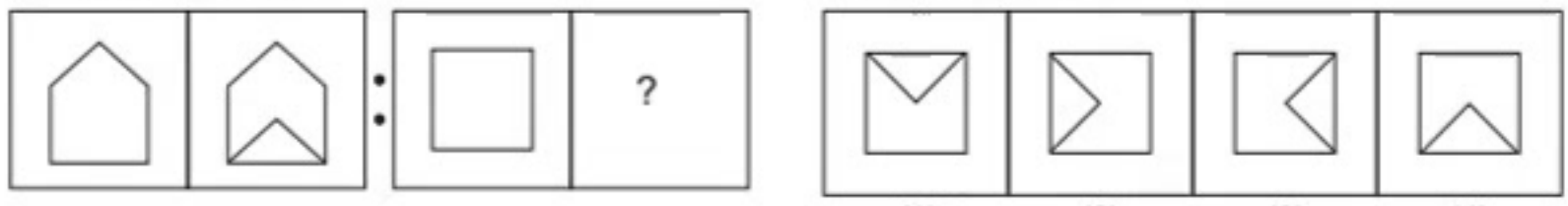
16.

(1) (2) (3) (4)

Part V

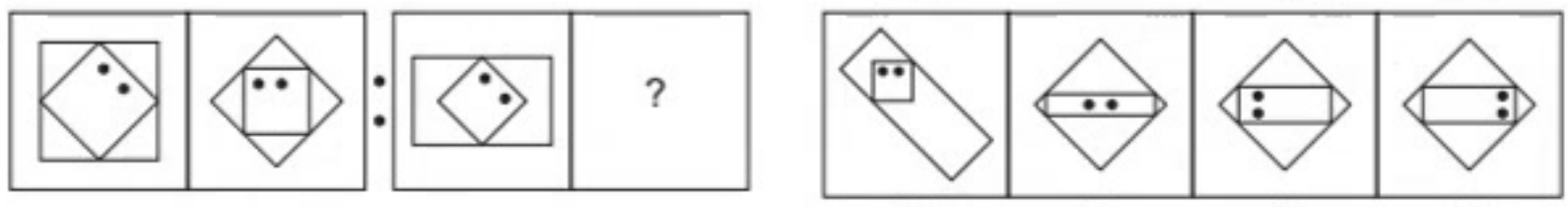
Directions (Q.Nos. 17-20) *In questions, there are two sets of two question figures each. The second set has a mark of interrogative (?). There exists a relationship between the first two question figures, similar relationship should exist between the third and fourth question figure. Select one of the answer figure which replace the mark of interrogative.*

17. Question Figures **Answer Figures**



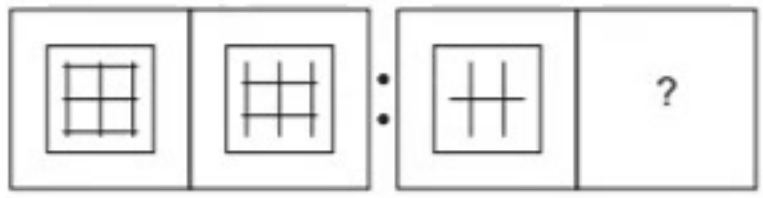
(1) (2) (3) (4)

18.



(1) (2) (3) (4)

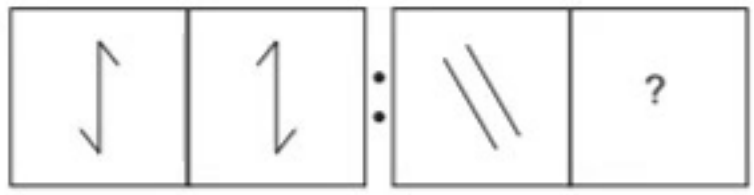
19. Question Figures

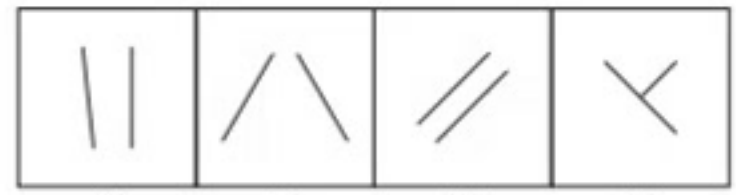


Answer Figures

(1) (2) (3) (4)

20.





(1) (2) (3) (4)

Part VI

Directions (Q.Nos. 21-24) *In questions, one part of geometrical figure is given as question figure and the other one is among the four answer figures* 1, 2, 3 *and* 4 *are also given. Find out the figure that completes the geometrical figure.*

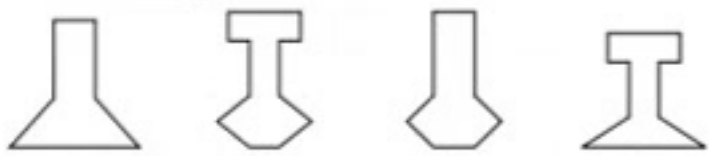
21. Question Figure

Answer Figures

(1) (2) (3) (4)

22. Question Figure

Answer Figures



(1) (2) (3) (4)

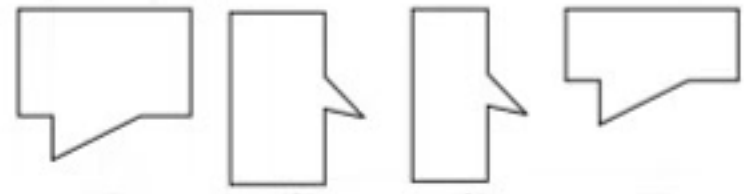
23. Question Figure

Answer Figures

(1) (2) (3) (4)

24. Question Figure

Answer Figures

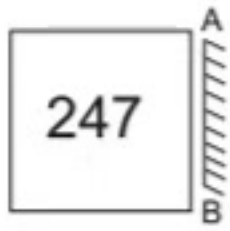


(1) (2) (3) (4)

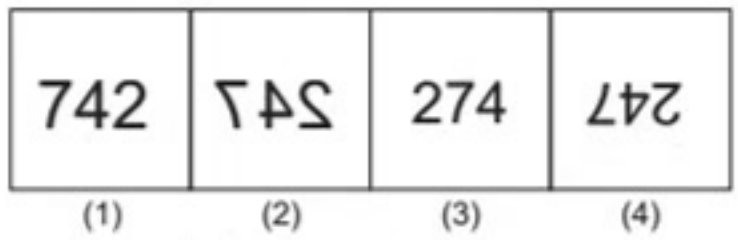
Part VII

Directions (Q.Nos. 25-28) *In question, there is a question figure and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at* AB.

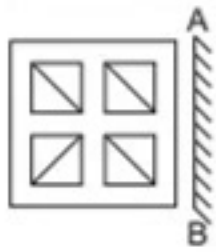
25. Question Figure



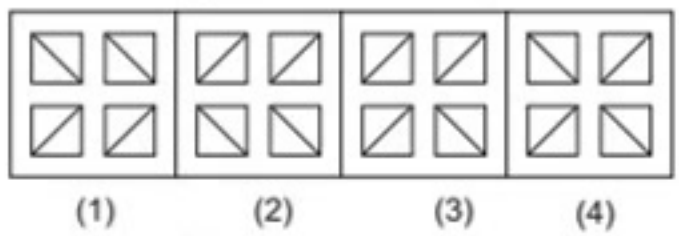
Answer Figures



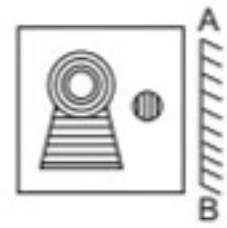
26. Question Figure



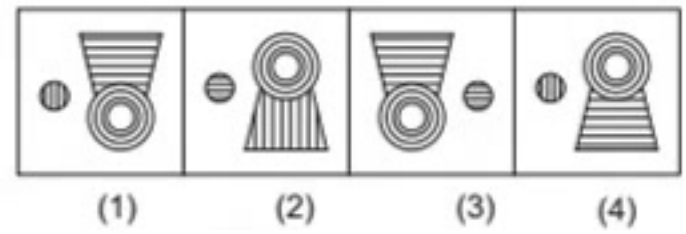
Answer Figures



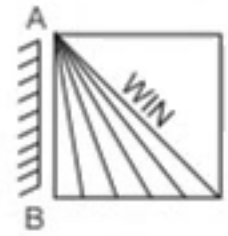
27. Question Figure



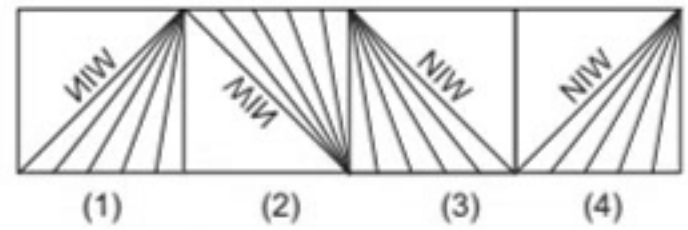
Answer Figures



28. Question Figure



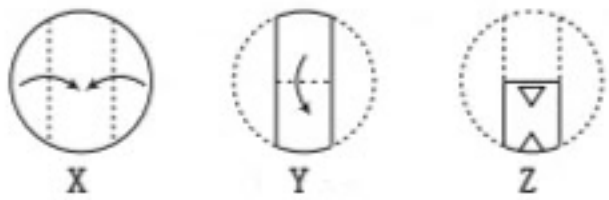
Answer Figures



Part VII

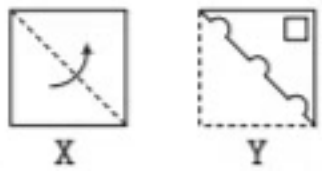
Directions (Q.Nos. 29-32) *In questions, a piece of paper is folded and punched as shown in question figures and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which indicats how the paper will appear when opened (unfolded).*

29. Question Figures

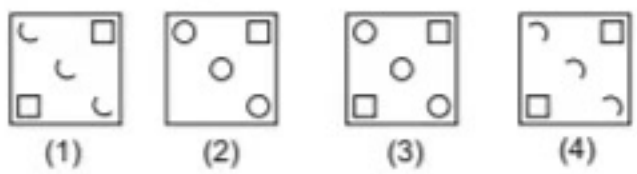


Answer Figures

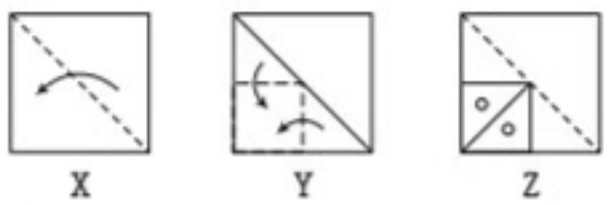
30. Question Figures



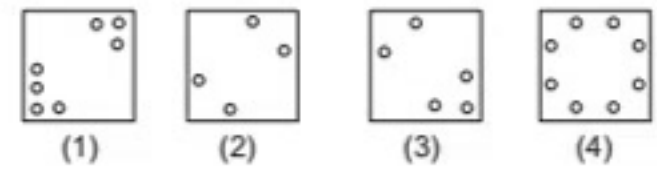
Answer Figures



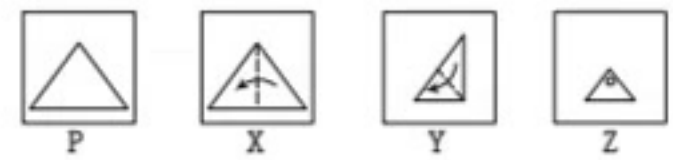
31. Question Figures



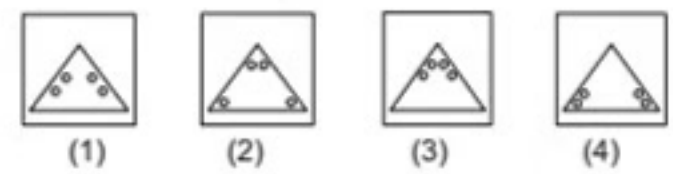
Answer Figures



32. Question Figures



Answer Figures

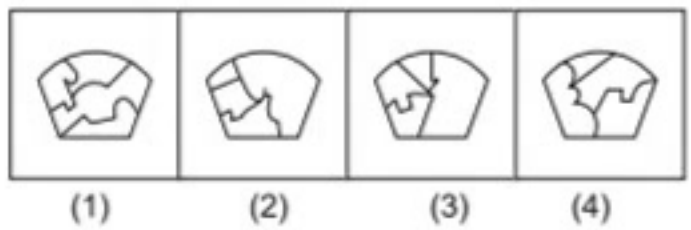


Part IX

Directions (Q.Nos. 33-36) *In questions, a question figure is given and four answer figures, marked 1, 2, 3 and 4 are also given. Select the answer figure which can be formed from the cut off pieces given in the question figure.*

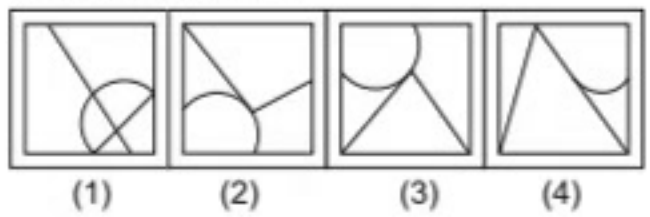
33. Question Figure

Answer Figures



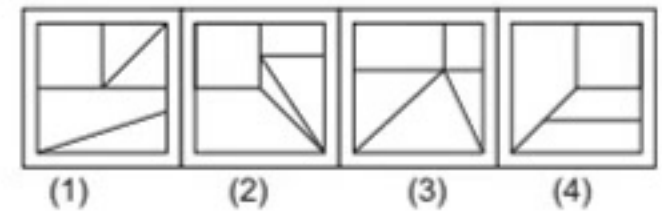
34. Question Figure

Answer Figures



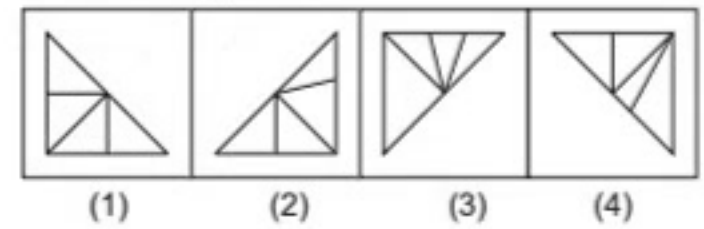
35. Question Figure

Answer Figures



36. Question Figure

Answer Figures

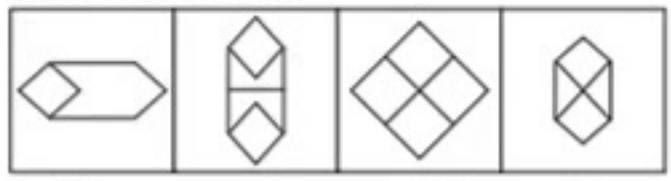


Part X

Directions (Q.Nos. 37-40) *In questions, a question figure is given and four answer figures, marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure in which the question figure in hidden/embedded.*

37. Question Figure

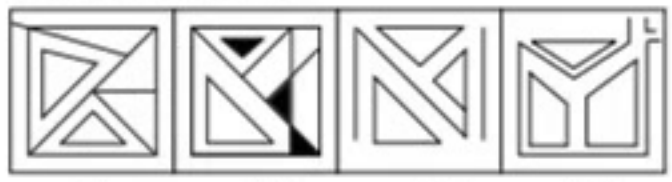
Answer Figures



(1) (2) (3) (4)

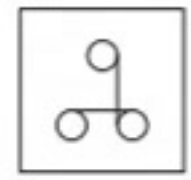
38. Question Figure

Answer Figures

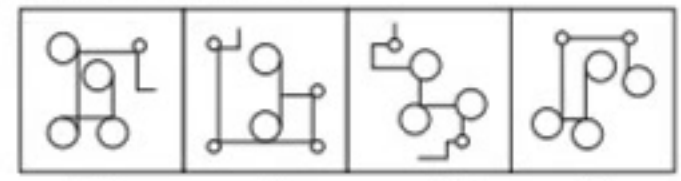


(1) (2) (3) (4)

39. Question Figure



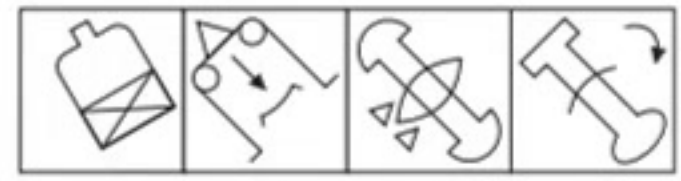
Answer Figures



(1) (2) (3) (4)

40. Question Figure

Answer Figures



(1) (2) (3) (4)

Section II Arithmetic Test

Directions (Q.Nos. 41-60) *For every question, four probable answers bearing numbers* 1, 2, 3 *and* 4 *are given. Only one out of these is correct. You have to choose the correct answer.*

41. What is the smallest 5 digit number which can be formed with the digits 4, 0 and 9?

(1) 40940 (2) 40009
(3) 99940 (4) 90004

42. What is the LCM of 16, 80 and 48?

(1) 8 (2) 16
(3) 240 (4) 480

43. How many seconds are there in 24 h?

(1) 30 (2) 60
(3) 3600 (4) 86400

44. In per cent, what is 10.01 written as?

(1) 10.01% (2) 10%
(3) 1001% (4) 100100%

45. In what time ₹ 3500 will become ₹ 4130 when annual rate of interest is 6%.

(1) 4 yr (2) 3 yr
(3) 6 yr (4) 5 yr

46. A man buys a TV at ₹ 18200. He spends ₹ 1800 on repairing of TV. If he want ₹ 3000 as profit. What is the selling price of TV?

(1) ₹ 20430 (2) ₹ 21200
(3) ₹ 23000 (4) ₹ 25200

47. On dividing 93.45 by 0.015, what is the approximate answer?

(1) 0.6 (2) 60
(3) 600 (4) 6000

48. What is the result of simplification of the expression?

$$2.5 \div 0.5 \times 0.1 - 0.05$$

(1) 0.45 (2) 49.95 (3) 0.25 (4) 100

49. A soapcake measures 7 cm in length, 5 cm in breadth and 2.5 cm in height. How many soapcakes can be placed in a cardboard box whose length, breadth and height are, respectively, 56 cm, 40 cm and 25 cm?

(1) 64 (2) 640 (3) 6400 (4) 6440

50. If 1 cm = 10 mm, how much is 10 cu cm?

(1) 100 cm mm (2) 1000 cu mm
(3) 10000 cu mm (4) 100000 cu mm

51. The product of two fractions is 6. If one fraction is $\frac{5}{3}$. Find the other.

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{18}{5}$ (4) $\frac{12}{5}$

52. Four pieces of 75 cm were cut from a piece of 14 m 25 cm of fabric. Find the length of remaining fabric.

(1) 13 m 50 cm (2) 11 m 25 cm
(3) 10 m 50 cm (4) 10 m 25 cm

53. Pictograms shows the number the number of plants sold through a nursery from Monday to Friday.

Days	Sold Plants
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

= 20 plants

Find the number of plants sold from Monday to Friday.

(1) 19 (2) 190
(3) 250 (4) 380

54. A moped costs ₹ 7250. A scooter costs ₹ 3750 more. What is the total cost of moped and a scooter?

(1) ₹ 18250 (2) ₹ 11000
(3) ₹ 14750 (4) ₹ 3500

55. What is the prime factorisation of 37800?

(1) $2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 7 \times 7$
(2) $2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 7$
(3) $8 \times 27 \times 25 \times 7$
(4) $2 \times 4 \times 25 \times 27 \times 7$

56. The difference between the LCM and HCF of the numbers 30, 36 and 90 is

(1) 366 (2) 354
(3) 186 (4) 174

57. In a race of 1 km *A* defeats *B* by 36 m or 18 s. How much time (in s) did *A* take to complete the full distance?

(1) 500
(2) 582
(3) 460
(4) 482

58. The number of 15 cm sq tiles required to lay a floor of size 3.6 m ×4.6 m is

(1) 720
(2) 360
(3) 10800
(4) 5400

59. Find the average of the following set of scores 567, 434, 323, 290, 401.

(1) 398
(2) 412
(3) 407
(4) 403

60. *A*, *B* and *C* will divide an amount of ₹ 9861 amongst themselves in the ratio of 3 : 11 : 5, respectively. What is the *B*'s share in the amount?

(1) ₹ 4671
(2) ₹ 5709
(3) ₹ 6228
(4) ₹ 7266

SECTION III Language Test *(English)*

Directions (Q Nos. 61–80) *There are four passages in this section. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each question four probable answers bearing numbers* 1, 2, 3 *and* 4 *are given. Only one out of these is correct. You have to choose the correct answer.*

Passage 1

I felt lonely in a classroom full of boys and girls and a teacher. The teacher walked up to me smiling. She put her hand tenderly on my shoulder and asked—"What is your name?" "Abhayankar…"— I whispered.
"Say aloud, so I can hear it," she said. I tried but I could not. My lips were dry, perhaps sealed. I could not open my mouth. Then the teacher asked me to write my name on the blackboard. I went up to the blackboard, lifted the white chalk and as I was about to write, my mind went blank. I knew my name, I knew how to write it, but standing in front of so many boys and girls and the teacher made me uncomfortable.

61. Which of the following words does not describe the narrator?
(1) Nervous
(2) Uncomfortable
(3) Confident
(4) Timid

62. The most appropriate heading for this passage would be
(1) how to write ones name
(2) first day in the class
(3) a rude teacher
(4) a shy boy

63. Select the most suitable synonym of 'Uncomfortable'.
(1) Inconvenient (2) Comfortable
(3) Convenient (4) Satisfying

64. The boy could not write his name, because he was
(1) lonely (2) afraid
(3) sick (4) nervous

65. The teacher was … towards the boy.
(1) sympathetic (2) rude
(3) unhelpful (4) indifferent

Passage 2

It was a cold and dark night. Passing through the street, I heard a woman scream—"Help! Help". I stopped and looked around. There was no light in most of the houses. Everyone seemed to be sleeping. It could be my imagination—I thought and continued walking homewards. Suddenly I heard the same voice again, "Please, do not kill me! Take my money … my ornaments, but leave me …!" So, it was not my imagination. Some woman was in distress in the house nearby. I must save her. I rushed to the door of the house and with all my strength, pushed it open. I could still hear some sobs coming from the bedroom. So I ran into his bedroom, searched but could find no woman there. The radio was on. I heard the announcer, saying, "You had just heard a radio play 'Stranger murder'. Now, please standby for the news that follows".

66. He thought everyone was asleep, because
(1) it was a cold night
(2) there was no light in the houses
(3) no one responded to the screams
(4) there was darkness everywhere

67. Why did the narrator enter the bedroom?
(1) To look for the murderer of some woman
(2) To save the woman from being killed
(3) To pick up a fight with the murderer
(4) To listen to the radio play

68. "You had just heard a radio play …" here 'you' refers to
(1) the narrator (2) the tall man
(3) the woman (4) the listener

69. What compelled the narrator to enter the house?
(1) His sense of bravery
(2) Fellow feeling
(3) His desire to help someone in distress
(4) His need of some mysterious story

70. Which of the following is the correct synonym of the given word 'Distress' ?
(1) Pleasure (2) Relief
(3) Happiness (4) Anguish

Passage 3

India is very hot, especially in summer. It is easy to grow cotton and produce silk here. Cotton and silk can be made into thin clothes. People who live in hot countries often wear white clothes because white does not absorb heat as quickly as other colours do. Saris are also comfortable to wear because they do not cling to the body.

We can often tell about the jobs of the people by looking at their clothes. Cooks usually wear white aprons so that they can see when their clothes are dirty. Policemen, firemen and soldiers have special uniforms. Students too wear uniforms to show which school they belong to.

71. If 'cold' is an opposite word for 'hot' what will be opposite for 'summer'?
(1) Rains (2) Spring
(3) Winter (4) Snowfall

72. Which of the following need not wear a uniform?
(1) A school student (2) A policeman
(3) An army man (4) A minister

73. Cooks wear white aprons, because
(1) they want to look smart
(2) it helps them cook fast
(3) white is a cool colour
(4) they can see when it is dirty

74. Saris are comfortable to wear, because
(1) they are made of one piece
(2) they do not cling to the body
(3) they are not very costly
(4) they help one look beautiful

75. Indians wear cotton clothes in summer, because cotton
(1) keeps their body cool
(2) is cheaper than wool and silk
(3) is easy to wash
(4) is available in attractive colours

Passage 4

The boys and the girls divided the work among themselves. Anil and Zeenat fetched two big baskets from their homes. The children picked up the pieces of paper, empty bottles and plastic bags that lay about. They put them into the baskets and emptied them into the garbage bin nearby. They knew a garbage truck come daily to clean out the bin. By the end of the morning, the park looked much cleaner and tidier. From that day onwards, the children made sure that their park looked clean and litter-free. Anil's father helped them to make flower beds. The children took turns to water the seeds. When the flowers bloomed, everyone in the neighbourhood was happy.

76. 'Picked up' means
(1) collected
(2) sought
(3) carried
(4) cleaned

77. People in the neighbourhood were happy, because
(1) they could walk in the park
(2) the park has been made litter-free
(3) the flowers in the park had bloomed
(4) the children helped themselves

78. The children did not pick up
(1) pieces of paper (2) plastic bags
(3) empty bottles (4) the garbage bin

79. The opposite word for 'sad' used in the passage above is
(1) neat (2) happy
(3) tidy (4) wise

80. They fetched the baskets to
(1) collect the flowers (2) collect the litter
(3) carry manure (4) carry seeds

Answers

1 (3)	2 (2)	3 (3)	4 (3)	5 (1)	6 (3)	7 (3)	8 (4)	9 (1)	10 (3)
11 (1)	12 (4)	13 (1)	14 (4)	15 (3)	16 (4)	17 (4)	18 (2)	19 (3)	20 (3)
21 (3)	22 (2)	23 (1)	24 (1)	25 (2)	26 (3)	27 (4)	28 (1)	29 (4)	30 (3)
31 (4)	32 (1)	33 (3)	34 (2)	35 (2)	36 (1)	37 (2)	38 (1)	39 (1)	40 (1)
41 (2)	42 (3)	43 (4)	44 (3)	45 (2)	46 (3)	47 (4)	48 (1)	49 (2)	50 (3)
51 (3)	52 (2)	53 (4)	54 (1)	55 (2)	56 (4)	57 (4)	58 (1)	59 (4)	60 (2)
61 (3)	62 (2)	63 (1)	64 (4)	65 (1)	66 (2)	67 (2)	68 (4)	69 (3)	70 (4)
71 (3)	72 (4)	73 (4)	74 (2)	75 (1)	76 (1)	77 (3)	78 (4)	79 (2)	80 (2)

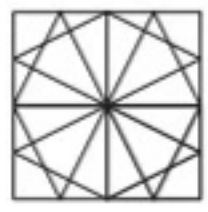
Hints and Solutions

1. Except figure (3) in all the other figures, sign of arrow is in anti-clockwise direction. Hence, figure (3) is odd one out.
2. Except figure (2), all other words are consonants. Whereas, word in the figure (2) is vowel. Hence, figure (2) is odd one out.
3. Except figure (3), in all other figures number of inside symbols are same as the number of lines in the outside figure. Hence, figure 3 is odd one out.
4. Except figure (3), in all others, two same figures are overlapping each other. Hence, figure (3) is odd one out.
5. Answer figure (1) is similar as the given question figure.
6. Answer figure (3) is similar as the given question figure.
7. Answer figure (3) is similar as the given question figure.
8. Answer figure (4) is similar as the given question figure.
9. Answer figure (1) will complete the given question figure.

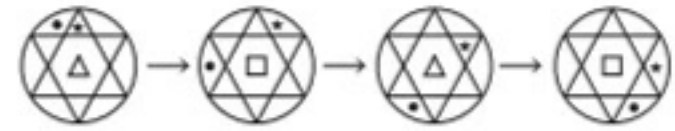
10. Answer figure (3) will complete the given question figure.

11. Answer figure (1) will complete the given question figure.

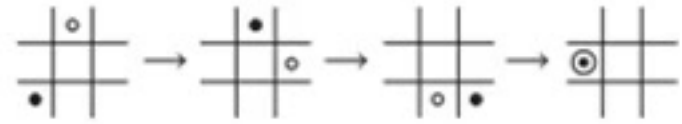
12. Answer figure (4) will complete the given question figure.



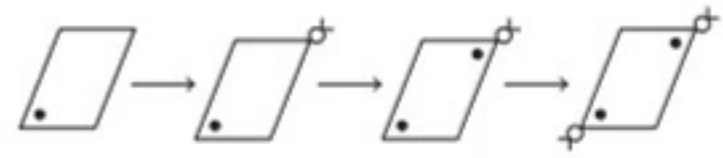
13. In every successive figure, darken smaller circle moving ahead in anti-clockwise direction upto two vacant space and darken star like design moving ahead upto one vacant space and inside the middle of the figure, triangle and square taken place on alter basis. Hence, answer figure (1) will complete the series.



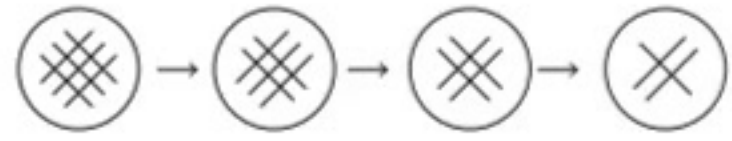
14. In every successive figure, blank circle moving ahead in clockwise direction upto one vacant space and darken smaller circle moving ahead in clockwise direction upto two vacant space. Hence, answer figure (4) will complete the series.



15. In every successive figure, a design is increasing as well as dot. Hence, answer figure (3) will complete the series.



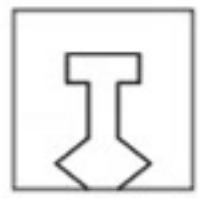
16. In every successive figure, a diagonal line is missing. Hence, answer figure (4) will complete the series.



17. As in question figure, second figure has extra triangle on the base as compare to first one. In the same way, fourth figure has extra triangle on the base as compare to third one.
18. As in question figure, interchange occurs from innermost to its outer one with dots horizontal. In the same way, interchange occurs again with getting dots horizontal.
19. As in question figure, horizontal line getting lesser as compare to figure one. In the same way, horizontal line getting lesser as compare to figure three.
20. As in question figure, mirror image of first figure produces the second one. In the same way, mirror image of third one produces the fourth one.

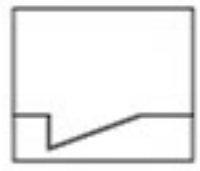
21. Answer figure (3) will complete the given geometrical figure.

22. Answer figure (2) will complete the given geometrical figure.

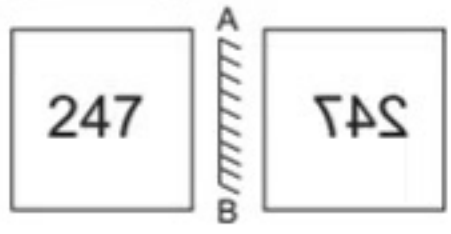


23. Answer figure (1) will complete the given geometrical figure.

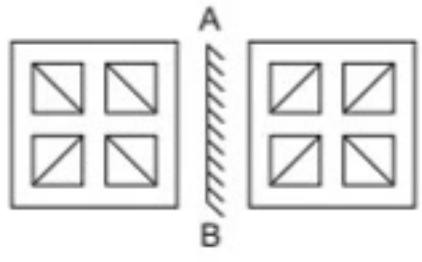
24. Answer figure (1) will complete the given geometrical figure.



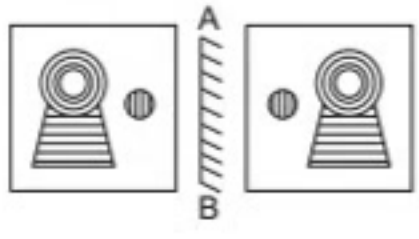
25. Answer figure (2) is the correct mirror image of the given question figure.



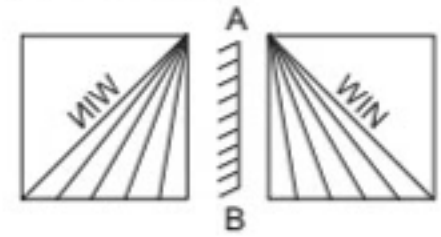
26. Answer figure (3) is the correct mirror image of the given question figure.



27. Answer figure (4) is the correct mirror image of the given question figure.



28. Answer figure (1) is the correct mirror image of the given question figure.



29. When the paper is unfolded, it is shown as in the answer figure (4).

30. When the paper is unfolded, it is shown as in the answer figure (3).

31. When the paper is unfolded, it is shown as in the answer figure (4).

32. When the paper is unfolded, it is shown as in the answer figure (1).

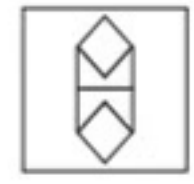
33. Answer figure (3) can be formed by using the cut pieces.

34. Answer figure (2) can be formed by using the cut pieces.

35. Answer figure (2) can be formed by using the cut pieces.

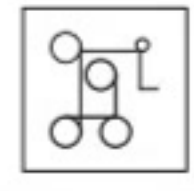
36. Answer figure (1) can be formed by using the cut pieces.

37. The question figure is embedded in the answer figure (2).



38. The question figure is embedded in the answer figure (1).

39. The question figure is embedded in the answer figure (1).



40. The question figure is embedded in the answer figure (1).

42. LCM of 16, 80 and 48

2	16, 80, 48
2	8, 40, 24
2	4, 20, 12
2	2, 10, 6
	1, 5, 3

$\text{LCM} = 2 \times 2 \times 2 \times 2 \times 5 \times 3 = 16 \times 15 = 240$

44. $10.01 = \frac{1001}{100} = 1001\%$

45. Simple interest = 4130 – 3500 = 630

We know that, $\text{SI} = \frac{P \times R \times T}{100}$

Where, P = Principal, R = Rate, T = Time

$630 = \frac{3500 \times 6 \times T}{100} \Rightarrow T = \frac{630}{35 \times 6} = \frac{630}{210} = 3\text{ yr}$

46. Total cost price of TV = ₹ (18200 + 1800)

= ₹ 20000

Profit = ₹ 3000 [given]

We know that,

Selling price = Cost price + Profit

= 20000 + 3000 = ₹ 23000

47. $93.45 \div 0.015 = \frac{93450}{15} = 6230$

= 6000 (approx.)

48. Expression $= 2.5 \div 0.5 \times 0.1 - 0.05$

$= \frac{2.5}{0.5} \times 0.1 - 0.05 = 5 \times 0.1 - 0.05$

$= 0.5 - 0.05 = 0.45$

49. Volume of a soapcake $= 7 \times 5 \times 2.5$ cu cm

Volume of the cardboard box

$= 56 \times 40 \times 25$ cu cm

Number of cakes that can be put inside the cardboard box $= \frac{56 \times 40 \times 25}{7 \times 5 \times 2.5} = 640$

50. 1 cm = 10 mm

1 cu cm $= 10 \times 10 \times 10$ cu mm

10 cu cm $= 10 \times 10 \times 10 \times 10 = 10000$ cu mm

51. Let x be the other fraction.

Then, $x \times \frac{5}{3} = 6 \Rightarrow \frac{5x}{3} = 6$

$\therefore \quad x = \frac{6 \times 3}{5} = \frac{18}{5}$

52. Total length of fabric = 14 m 25 cm

= 1400 + 25 = 1425 cm

Length of 4 pieces of 75 cm = 75 × 4 = 300 cm

Remaining length = 1425 cm – 300 cm

= 1125 cm = 11 m 25 cm

53. Number of plant sold from Monday to Friday

$= 20 \times (2 + 4 + 5 + 3 + 5) = 20 \times 19 = 380$

54. Cost of the maped = ₹ 7250

Cost of the scooter = ₹ 7250 + 3750 = ₹ 11000

∴Total cost of both the vehicles = 11000 + 7250

= ₹ 18250

55.

2	37800
2	18900
2	9450
3	4725
3	1575
3	525
5	175
5	35
	7

Prime factorisation

$= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 7$

56.

2	30, 36, 90
2	15, 18, 45
3	15, 9, 45
3	5, 3, 15
5	5, 1, 5
	1, 1, 1

$\text{LCM} = 2 \times 2 \times 3 \times 3 \times 5 = 180$

$30 = 2 \times 3 \times 5 \Rightarrow 36 = 2 \times 2 \times 3 \times 3$

$90 = 2 \times 3 \times 3 \times 5$

$\text{HCF} = 2 \times 3 = 6$

∴Required difference = 180 – 6 = 174

57. B, runs 36 m in 18 s

B will run 1000 m in $= \frac{18}{3} \times 1000\text{ s} = 500\text{ s}$

So, taken time by A for complete the race

= 500 – 18 = 482 s

58. Number of tiles required

$= \frac{\text{Area of floor}}{\text{Area of one tile}} = \frac{3.6 \times 4.5}{0.15 \times 0.15}$

$= \frac{36}{10} \times \frac{45}{10} \times \frac{100}{15} \times \frac{100}{15} = 720$

59. $\text{Average} = \frac{567 + 434 + 323 + 290 + 401}{5} = \frac{2015}{5}$

= 403

60. B's share in the amount $= \frac{9861 \times 11}{19}$

= ₹ 5709

Jawhar Navodaya Vidyalaya

Entrance Exam (Class VI)

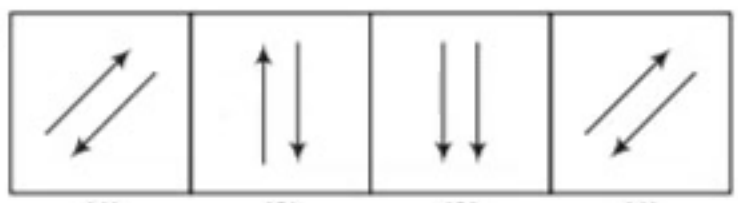
PRACTICE SET 5

Section I Mental Ability Test

Part I

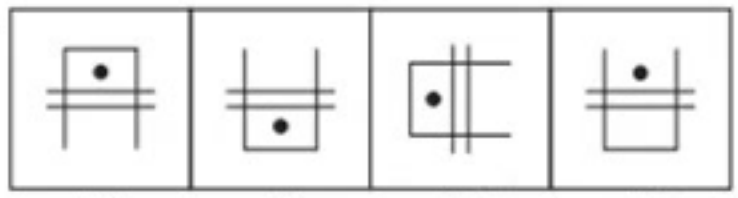
Directions (Q.Nos. 1-4) *In questions, four figures 1, 2, 3 and 4 have been given in each question of these four figures, there figures are similar in some way and one figure is different. Select the figure which is different.*

1.



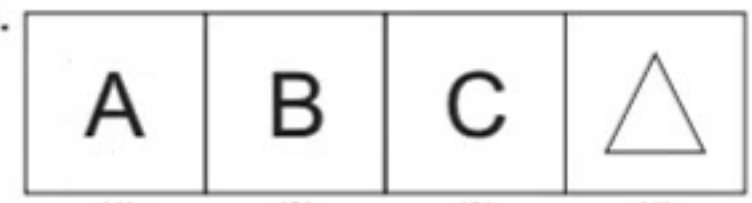
(1) (2) (3) (4)

2.



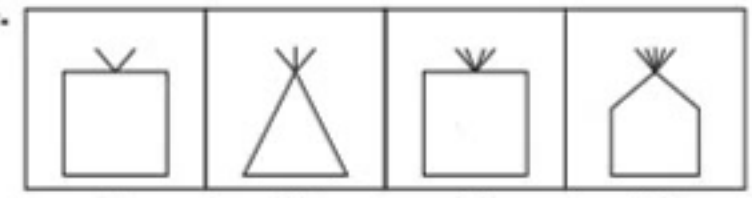
(1) (2) (3) (4)

3.



(1) (2) (3) (4)

4.

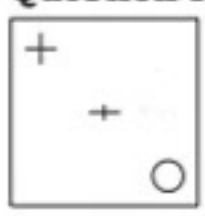


(1) (2) (3) (4)

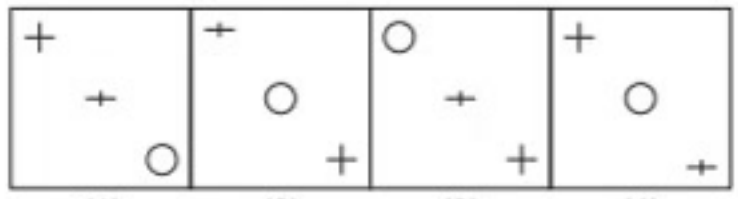
Part II

Directions (Q. Nos. 5-8) *In questions, a question figure is given and four answer figures marked 1, 2, 3 and 4 are also given. Select the answer figure which is exactly the same as the question figure.*

5. Question Figure

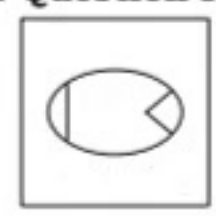


Answer Figures

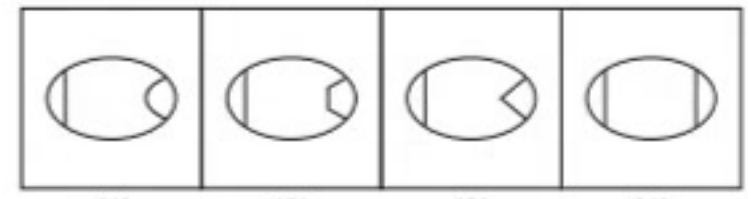


(1) (2) (3) (4)

6. Question Figure

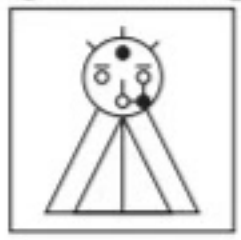


Answer Figures

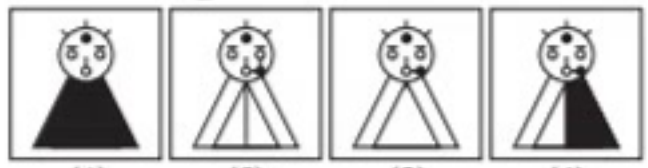


(1) (2) (3) (4)

7. Question Figure

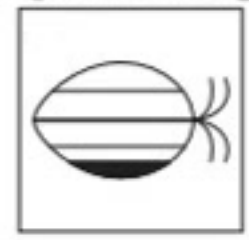


Answer Figures

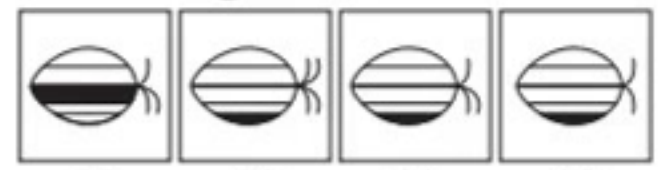


(1) (2) (3) (4)

8. Question Figure



Answer Figures

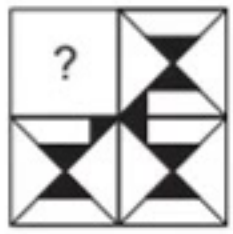


(1) (2) (3) (4)

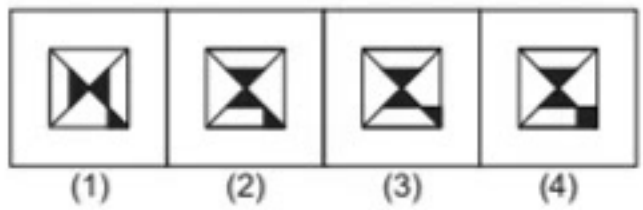
Part III

Directions (Q. Nos. 9-12) *In questions, there is a question figure, a part of which is missing. Observe the answer figure* 1, 2, 3 *and* 4 *and find out the answer figure which without changing the direction, fits in the missing part of the question figure in order to complete the pattern in the question figure.*

9. Question Figure



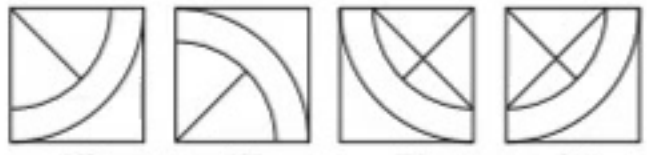
Answer Figures



(1) (2) (3) (4)

10. Question Figure

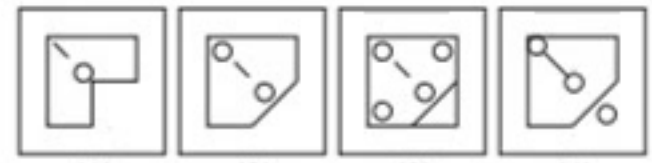
Answer Figures



(1) (2) (3) (4)

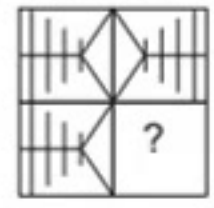
11. Question Figure

Answer Figures

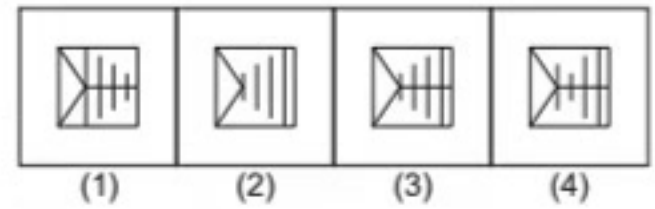


(1) (2) (3) (4)

12. Question Figure



Answer Figures

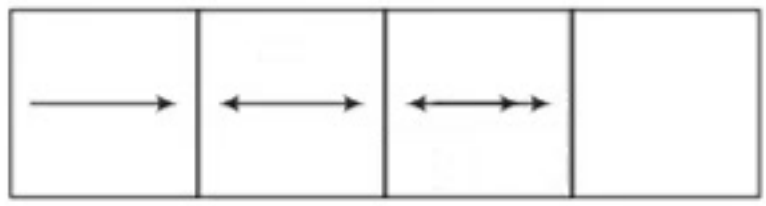


(1) (2) (3) (4)

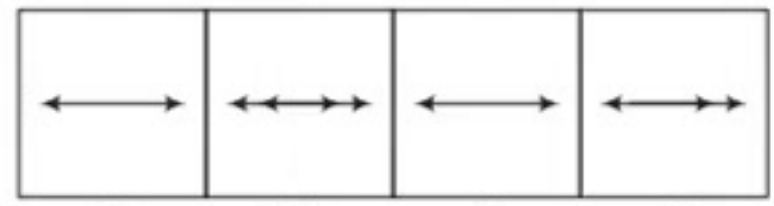
Part IV

Directions (Q. Nos. 13-16) *There are three question figures and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure among the answer figures given, which occupies the blank space for the fourth figure and completes the series.*

13. Question Figures

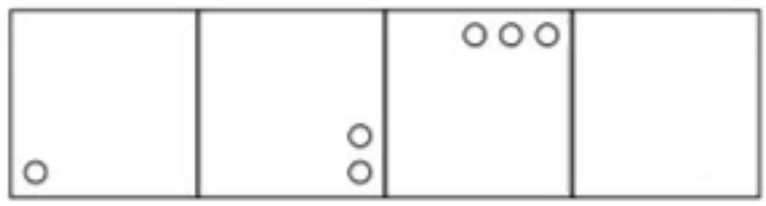


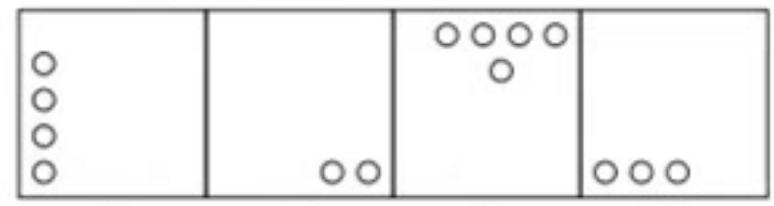
Answer Figures



(1) (2) (3) (4)

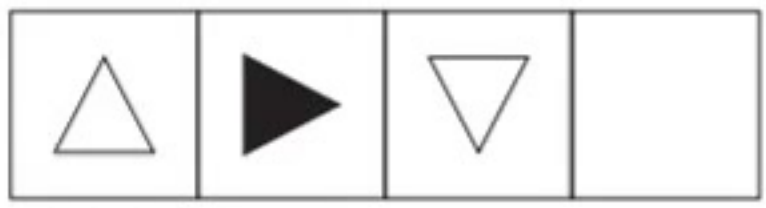
14.

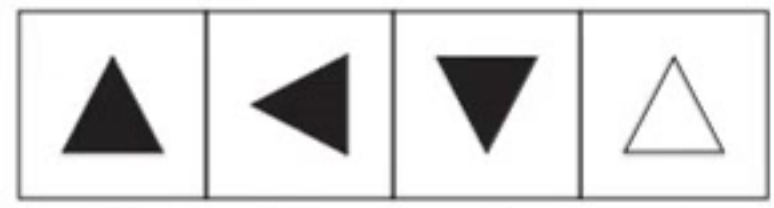




(1) (2) (3) (4)

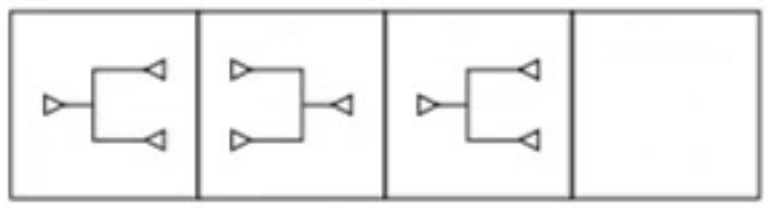
15.

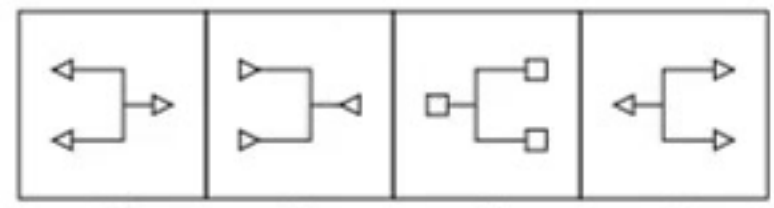




(1) (2) (3) (4)

16.



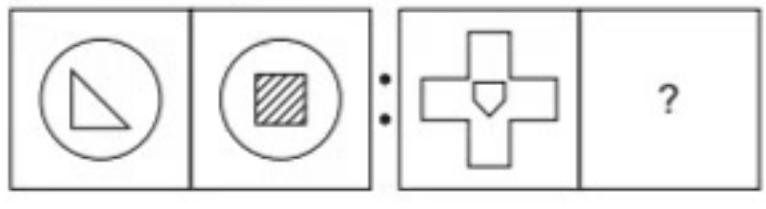


(1) (2) (3) (4)

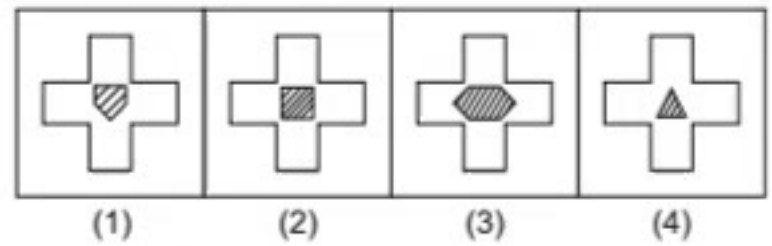
Part V

Directions (Q.Nos. 17-20) *In questions, there are two sets of two question figures each. The second set has a mark of interrogation (?). There exists a relationship between the first two question figures, similar relationship should exist between the third and fourth question figure. Select one of the answer figure which replace the mark of interrogation.*

17. Question Figures



Answer Figures

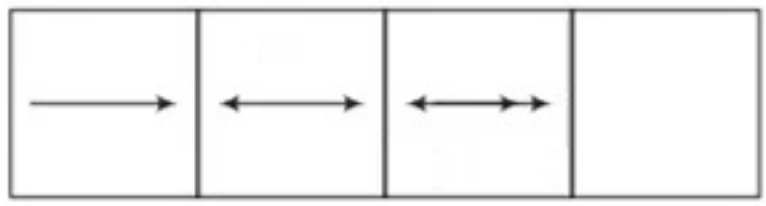


(1) (2) (3) (4)

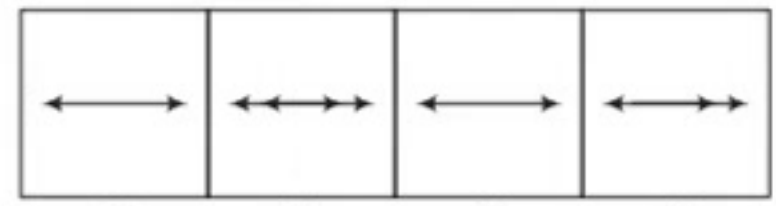
Part IV

Directions (Q. Nos. 13-16) *There are three question figures and the space for the fourth figure is left blank. The question figures are in a series. Find out one figure among the answer figures given, which occupies the blank space for the fourth figure and completes the series.*

13. Question Figures

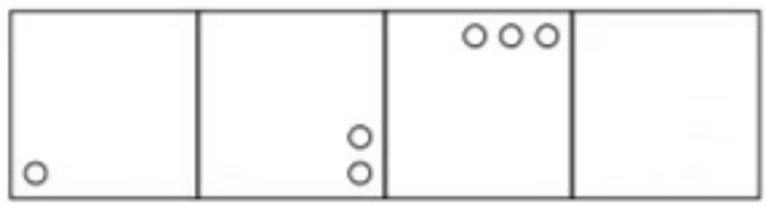


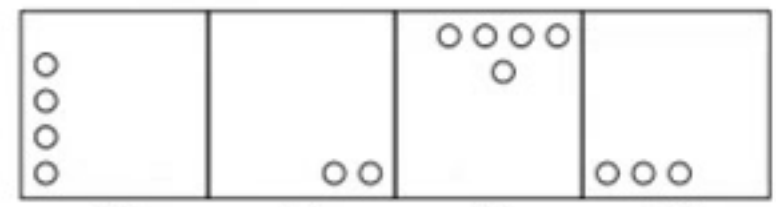
Answer Figures



(1) (2) (3) (4)

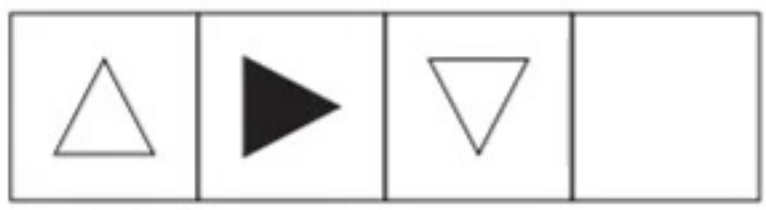
14.

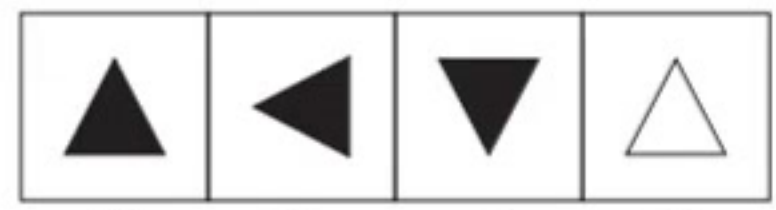




(1) (2) (3) (4)

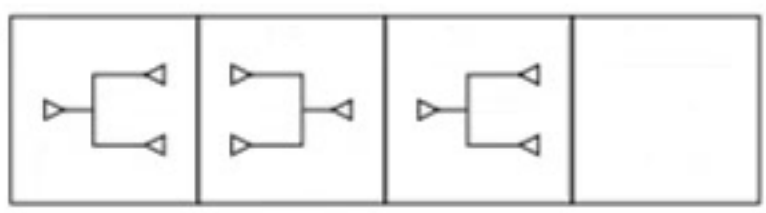
15.

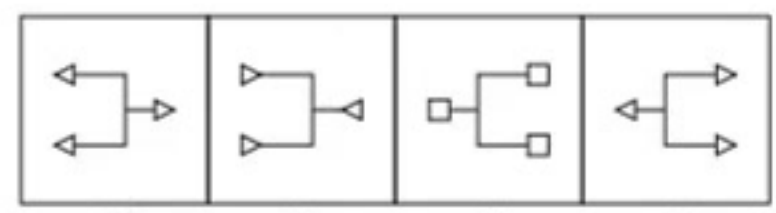




(1) (2) (3) (4)

16.



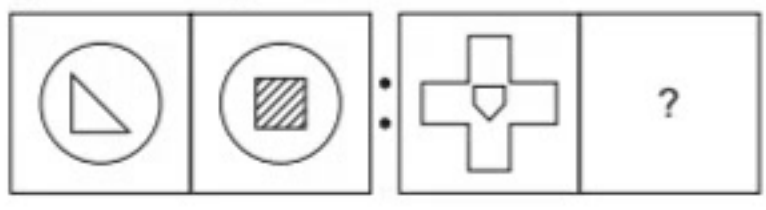


(1) (2) (3) (4)

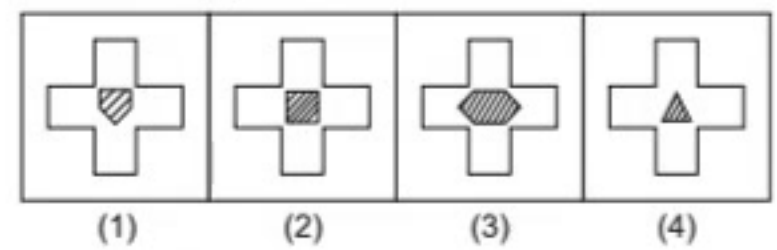
Part V

Directions (Q.Nos. 17-20) *In questions, there are two sets of two question figures each. The second set has a mark of interrogation (?). There exists a relationship between the first two question figures, similar relationship should exist between the third and fourth question figure. Select one of the answer figure which replace the mark of interrogation.*

17. Question Figures

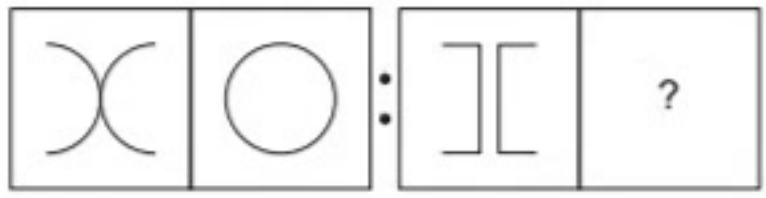


Answer Figures



(1) (2) (3) (4)

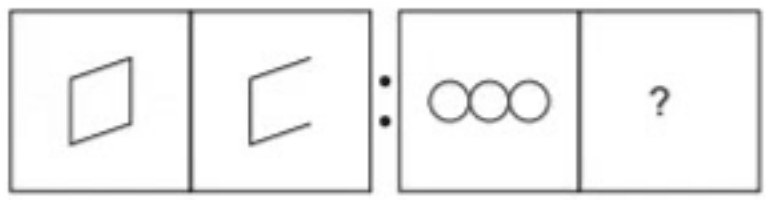
18. Question Figures

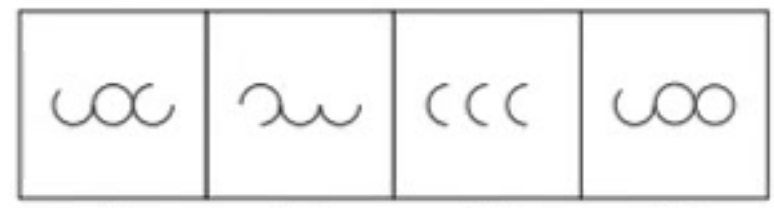


Answer Figures

(1) (2) (3) (4)

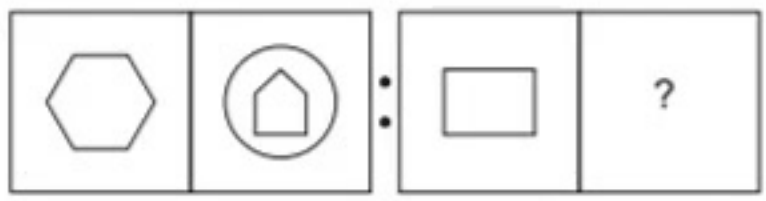
19.

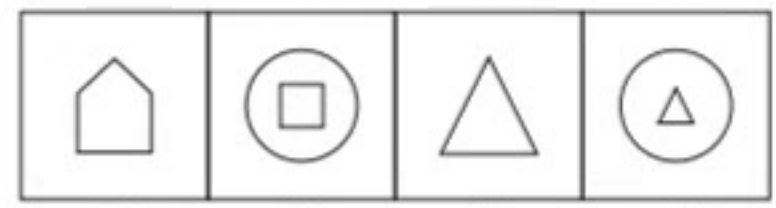




(1) (2) (3) (4)

20.





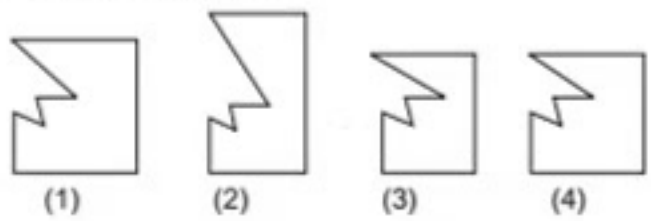
(1) (2) (3) (4)

Part VI

Directions (Q.Nos. 21-24) *In questions, one part of a geometrical figure is given as question figure and the other one is among the four answer figures* 1, 2, 3 *and* 4 *are also given. Find out the figure that completes the geometrical figure.*

21. Question Figure

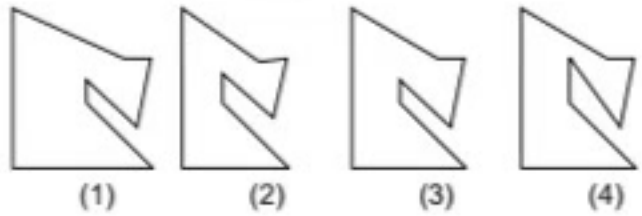
Answer Figures



(1) (2) (3) (4)

22. Question Figure

Answer Figures



(1) (2) (3) (4)

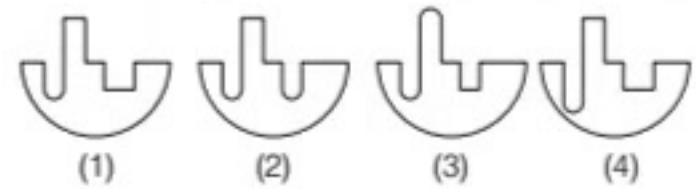
23. Question Figure

Answer Figures

(1) (2) (3) (4)

24. Question Figure

Answer Figures

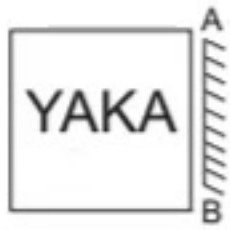


(1) (2) (3) (4)

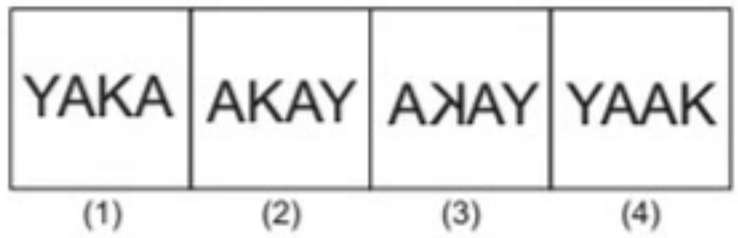
Part VII

Directions (Q.Nos. 25-28) *In questions, there is a question figure and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which is exactly the mirror image of the question figure when the mirror is held at* AB.

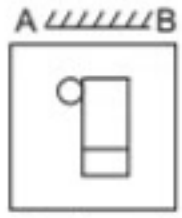
25. Question Figure



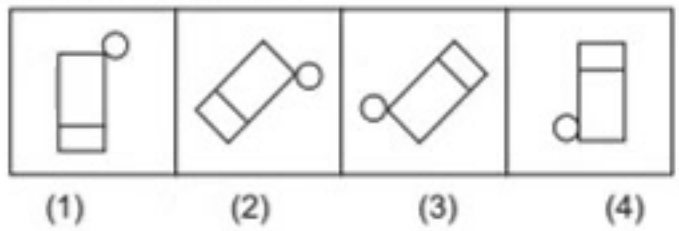
Answer Figures



26. Question Figure

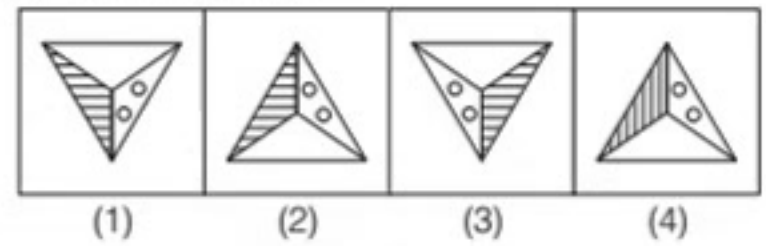


Answer Figures

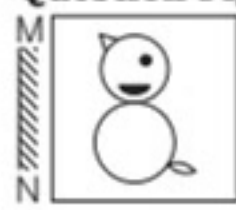


27. Question Figure

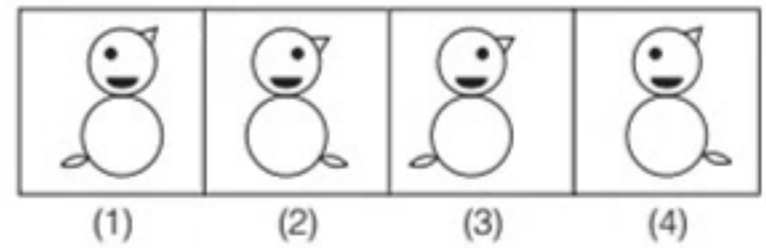
Answer Figures



28. Question Figure



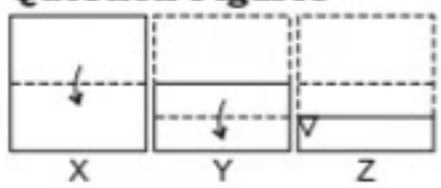
Answer Figures



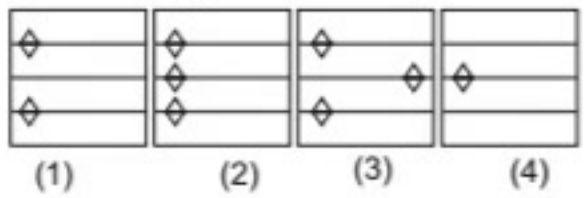
Part VIII

Directions (Q.Nos. 29-32) *In questions, a piece of paper is folded and punched as shown in question figures and four answer figures marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which indicated how the paper will appear when opened (unfolded).*

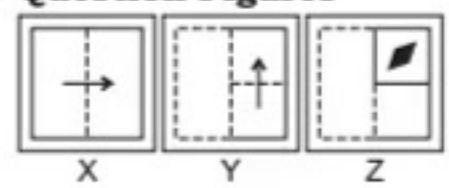
29. Question Figures



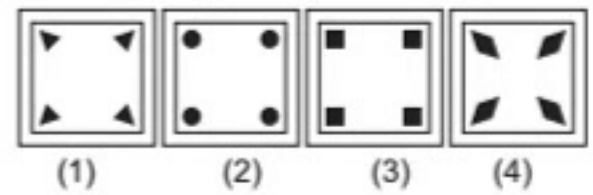
Answer Figures



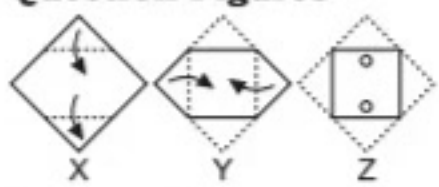
30. Question Figures



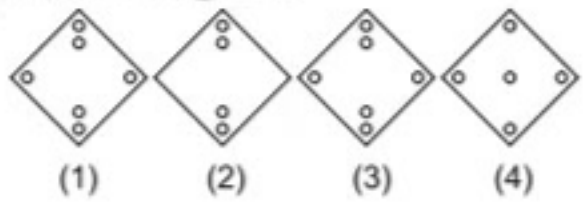
Answer Figures



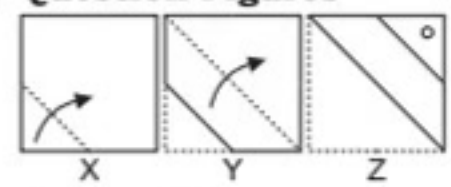
31. Question Figures



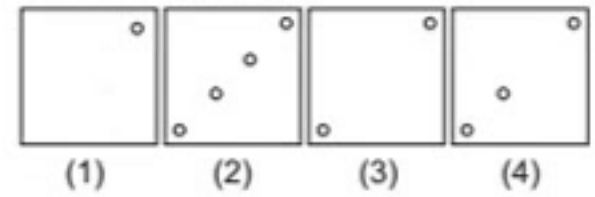
Answer Figures



32. Question Figures



Answer Figures

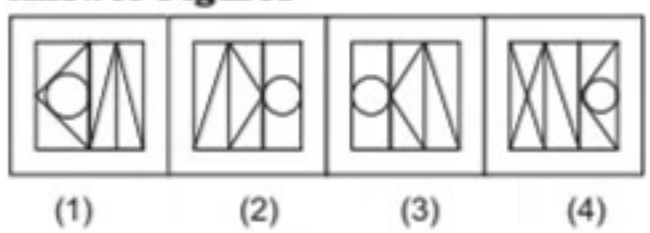


Part IX

Directions (Q.Nos. 33-36) *In questions, a question figure is given and four answer figures, marked* 1, 2, 3 *and* 4 *are also given. Select the answer figure which can be formed from the cut off pieces given in the question figure.*

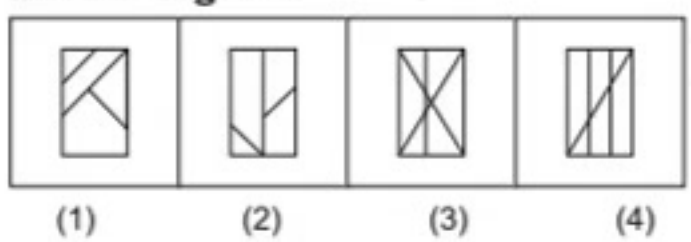
33. Question Figure

Answer Figures



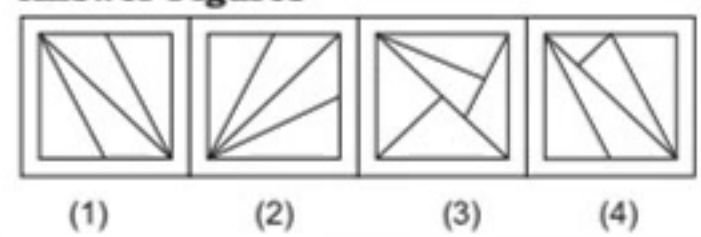
34. Question Figure

Answer Figures



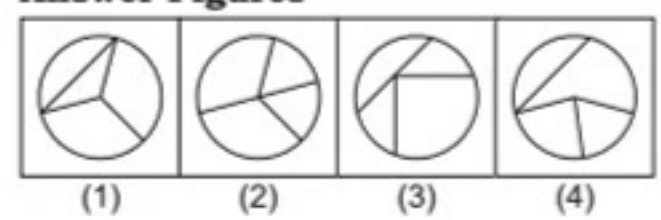
35. Question Figure

Answer Figures



36. Question Figure

Answer Figures

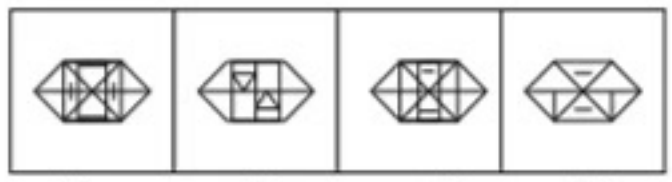


Part X

Directions (Q.Nos. 37-40) *In questions, a question figure is given and four answer figures, marked 1, 2, 3 and 4 are also given. Select the answer figure in which the question figure is hidden/embedded.*

37. Question Figure

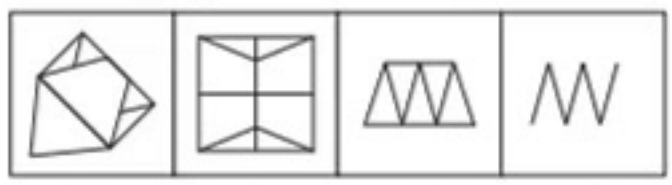
Answer Figures



(1) (2) (3) (4)

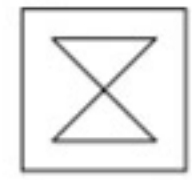
38. Question Figure

Answer Figures

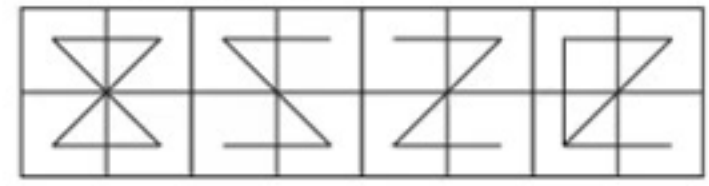


(1) (2) (3) (4)

39. Question Figure



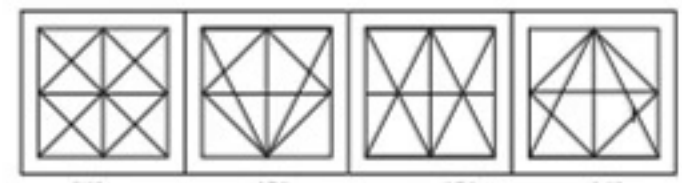
Answer Figures



(1) (2) (3) (4)

40. Question Figure

Answer Figures



(1) (2) (3) (4)

Section II Arithmetic Test

Directions (Q.Nos. 41-60) *Four alternative choices 1, 2, 3 and 4 are given for the all questions, in which only one is correct. To select the correct answer.*

41. What will be the sum of the numbers from 1 to 25?
(1) 322 (2) 325
(3) 340 (4) 285

42. What will be the HCF of 48, 144 and 576?
(1) 576 (2) 144
(3) 48 (4) 1

43. Simplify $(0.50 + 0.15 \div 0.05) \times \frac{2}{7}$.
(1) 1 (2) 0
(3) 3 (4) 5

44. What is the approx value of 16268?
(1) 16200 (2) 16300
(3) 16260 (4) 16270

45. After bought a ceilling fan on ₹ 750, one sells it with a profit of 18%, then find the selling price.
(1) ₹ 850 (2) ₹ 885
(3) ₹ 860 (4) ₹ 855

46. A sum amounted to ₹ 2486 with the interest of 13% per annum, then what is the sum?
(1) ₹ 2300 (2) ₹ 2150
(3) ₹ 2000 (4) ₹ 2200

47. Sampurna Kranti Express departures from Patna at 5:50 pm and arrives New Delhi at 8:15 am of the next day. What is the total time of the journey?
(1) 12 h 25 min (2) 14 h 35 min
(3) 14 h 25 min (4) 12 h 35 min

48. What is the greatest four digits number in which all the digits are different?
(1) 9876 (2) 9768
(3) 9867 (4) 9786

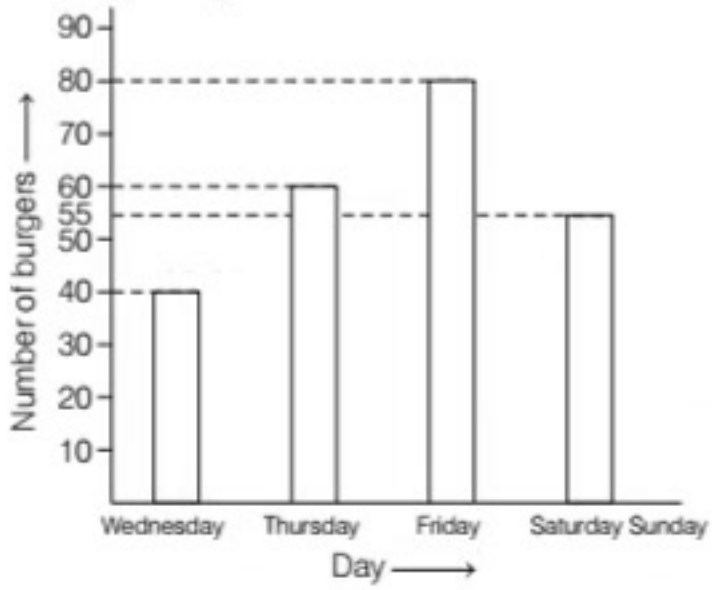
49. Next term of 258, 130, 66, 34, 18,..... is
(1) 12 (2) 10
(3) 8 (4) 13

50. In which number quotient is 23 and remainder is 7. When divided by 17?
(1) 368 (2) 328
(3) 358 (4) 398

51. The product of two decimals is 20.7326. If one decimal is 4.13, what is the other decimal?
(1) 5.12 (2) 4.82
(3) 5.23 (4) 5.02

52. If the cost price of 12 packets of biscuits is ₹ 240, the cost price of 8 packets of biscuits will be
(1) ₹ 160 (2) ₹ 140
(3) ₹ 120 (4) ₹ 240

53. The following bar diagram shows the sale (number of burgers) of a burger saler during 5 days.



If total sale of burger was 320. Then number of burger sold on Sunday?
(1) 85 (2) 80
(3) 75 (4) 90

54. The value of $5-\left(2\frac{1}{2}-\frac{3}{4}\right)+\left(3\frac{1}{2}-1\frac{1}{4}\right)$ is
(1) $4\frac{1}{2}$ (2) $5\frac{1}{2}$
(3) $5\frac{1}{4}$ (4) $3\frac{1}{2}$

55. The value of 0.05% is
(1) 0.0005
(2) 0.005
(3) 0.05
(4) 0.5

56. Find a prime even number out of the following numebrs.
(1) 4 (2) 6
(3) 2 (4) 13

57. I bought a watch for ₹ 400 and sold of it for ₹ 484. Find the gain per cent.
(1) 40 (2) 21
(3) 36 (4) 24

58. What is the greatest number that divides both 16 and 20 exactly?
(1) 40
(2) 32
(3) 80
(4) 4

59. A cyclist travels at a speed of 25 km/h. How far will be travels in 30 min?
(1) 12.5 km
(2) 12 km
(3) 10 km
(4) 15 km

60. Each side of square is of 10 m. What will be the area of the square?
(1) 100 m^2
(2) 90 m^2
(3) 30 m^2
(4) 40 m^2

Section III Language Test *(English)*

Directions (Q.Nos. 61-80) *There are four passages in this section. Each passage is followed by five questions. Read each passage carefully and answer the questions that follow. For each question four probable answers bearing numbers* 1, 2, 3 *and* 4 *are given. Only one out of these are correct. You have to choose the correct answer.*

Passage 1

A certain king once fell ill and doctors declared that only a sudden fright would restore him to health. But the king was not a man for anyone to play tricks on, except his fool. One day, when the fool was with him in his boat, he cleverly pushed the king into the water. Help had already been arranged and the king was drawn ashore and put to bed. The fright, the bath and the rest in bed cured the diseased king, but he was so angry with the fool that he turned him out of the country. The fool returned, however and the king ordered him to be put to death. Saying privately that he would only repay fright with fright, he directed the executioner not to use the axe but to let fall a single drop of water on the fool's neck. The fool was led to the gallows. The executioner dropped a drop of water on the fool's neck and amidst shouts and laughter the fool was asked to rise and thank the king for his kindness. But the fool never moved; he was dead–killed by his master's joke.

61. How could the sick king be cured?
(1) The fool pushed the king into the water from his boat. The fright so caused, the bath and the rest in bed cured the king of his sickness
(2) The fool arranged for expert doctors who cured the sick king
(3) The doctors attending on the sick king cut with him fine jokes which cured the sick king
(4) The king undertook the treatment given by the doctors very carefully; therefore, he was cured in due course

62. Who alone could afford to play tricks on the king?
(1) The queen alone
(2) The fool alone
(3) The doctor alone
(4) The king's son alone

63. Why did the king turn the fool out of his country?
(1) Because the fool was useless and didn't do anything
(2) Because the fool played a dangerous trick on the king and this made the king very angry with him
(3) Because the doctors had advised him to do so since the fool overstepped his authority
(4) Because the fool had consciously misbehaved with the king

64. How did the fool meet his end?
(1) His master, the king's joke killed him
(2) He was drowned into the water and was killed
(3) The king got him hanged on the gallows
(4) The king turned the fool out of the country; the fool starved and died uncared for

65. Did the king really want the fool to die?
(1) Yes, the king really wanted the fool to die
(2) No, the king didn't really want the fool to die
(3) No mention has been made in the passage regarding the king's intention in this regard
(4) It is difficult to ascertain from king's order to send him to gallows

Passage 2

Prevention is better than cure, and it is recognised that the only way to get rid of malaria completely is to get rid of the mosquitoes which cause it. Malaria is always associated with damp and marshy land. This is not because the land is damp, but because stagnant water is the breeding place of the mosquito which begins its life as a larva living in the water. Malaria does not frequently occur in dry desert countries because mosquitoes cannot breed there. The only way to destroy mosquitoes is to prevent their breeding in standing water.

66. What can be a suitable title for the passage?
(1) Prevention is better than cure
(2) How to get rid of malaria
(3) The breeding ground of malaria
(4) The deadly mosquito

67. How does malaria occur?
(1) It is caused by contaminated food
(2) It is caused by contaminated water
(3) It is caused by mosquitoes breeding in damp and marshy land
(4) It is a seasonal disease, no cause is associated with it

68. How can we get rid of malaria?
(1) We can get rid of malaria by destroying mosquitoes and preventing their breeding in standing water
(2) We can get rid of malaria by inoculation
(3) We can get rid of malaria by vaccination
(4) We can prevent malaria by taking quinine pills regularly

69. Why do we not get malaria in the dry desert?
(1) Because the sand of the dry desert kills mosquitoes causing malaria
(2) Because mosquitoes causing malaria do not breed in dry desert
(3) Because there is no pollution in the atmosphere of a dry desert
(4) Because we develop immunity to malaria in the climate of dry desert

70. Give the opposite word of 'stagnant'.
(1) still
(2) deep
(3) shallow
(4) flowing

Passage 3

All the housewives who went to the Kalpatharu Supermarket in Bengaluru had one great ambition : to be the lucky customer who did not have to pay for her shopping. For this was what the notice just inside the entrance promised. It said : 'Remember, once a week, one of our customers gets free goods. This may be your lucky day !'

For several weeks Mrs Batliwala hoped, like many of her friends, to be the lucky customer, Unlike her friends she never gave up hope. Her kitchen was full of things which she did not need. Her husband failed to dissuade her. She dreamed of the day when the manager of the Supermarket would approach her and say : "Madam, this is your lucky day. Everything in your basket is free". One Saturday morning, Mrs Batliwala finished her shopping and left the Supermarket. But soon she discovered that she had forgotten to buy tea. She rushed back, got the tea and went towards the cash-desk. As she did so, she saw the manager of the Supermarket come up to her. 'Madam', he said, holding out his hand, "I want to congratulate you ! You are our lucky customer and everything you have in your basket is free".

71. 'It said' What does 'It' stand for?
(1) The notice
(2) The cash-desk
(3) The basket
(4) The Supermarket

72. What happened on lucky days?
(1) Prize was awarded to the customer having made the largest purchases
(2) One of the customers got free goods
(3) Every customer got some prize money irrespective of what he or she purchased
(4) One of the items of purchase was allowed to be taken free by every customer

73. Why did Mrs Batliwala buy things which she did not need?
(1) She dreamed of the lucky day when she would get every item in the basket free of cost
(2) She was fond of shopping for shopping's sake
(3) She was generous enough to share items, which she did not need, with her friends
(4) She used to flaunt her superiority by buying things which she didn't need

74. 'Her husband failed to dissuade her'. What did her husband want?
(1) Her husband wanted her to continue shopping every day until she became the lucky customer
(2) Her husband wanted her to stop purchasing of things which she did not need
(3) Her husband wanted her not to be misguided by the manager of the Supermarket
(4) Her husband wanted to make purchases himself

75. Why did the manager congratulate Mrs Batliwala?
(1) As she had become their permanent customer
(2) Since she had become the luckiest of all customers
(3) Since he knew that she had got a very generous husband
(4) Mrs Batliwala had become the lucky customer for she did not have to pay for her shopping

Passage 4

A person who looks at the good side of things sees good things. We call such a person an *optimist*. One who looks at the bad side of things is a *pessimist*. One who looks at the good qualities of others will make many friends and live a happy life. The others will make their own as well as the lives of others miserable. We expect others not to look at or mind our bad qualities. Let us remember that the others too expect the same from us. A very good way to live a happy life with several friends is to lean to look at the good qualities of other.

76. Who is an optimist?
(1) One who looks at the dark side of things
(2) One who looks at the good side of things
(3) One who enjoys helping others
(4) One who relishes finding fault with others

77. What do we expect from others?
(1) They must help us
(2) They must be friendly with us
(3) They must not look at or mind our bad qualities
(4) They should live like good neighbours

78. What does a pessimist do?
(1) A pessimist looks at the good side of things
(2) A pessimist looks at the bad side of things
(3) A pessimist believes in making friends with others
(4) A pessimist is a selfish sort of person

79. In what way does being an optimist help one?
(1) It helps one make many friends and live a happy life
(2) An optimist acquires good habits which help him to live happily
(3) An optimist can easily withstand the troubles of life
(4) An optimist helps others, therefore others are always ready to help him

80. Which word in the passage means 'unhappy, pitiable'?
(1) Pessimist
(2) Optimist
(3) Bad
(4) Miserable

Answers

1 (3)	**2** (4)	**3** (4)	**4** (1)	**5** (1)	**6** (3)	**7** (2)	**8** (2)	**9** (2)	**10** (3)
11 (4)	**12** (3)	**13** (2)	**14** (1)	**15** (2)	**16** (2)	**17** (3)	**18** (3)	**19** (4)	**20** (4)
21 (3)	**22** (3)	**23** (4)	**24** (2)	**25** (3)	**26** (4)	**27** (2)	**28** (1)	**29** (1)	**30** (4)
31 (2)	**32** (1)	**33** (1)	**34** (1)	**35** (4)	**36** (1)	**37** (3)	**38** (1)	**39** (1)	**40** (3)
41 (2)	**42** (3)	**43** (1)	**44** (4)	**45** (2)	**46** (4)	**47** (3)	**48** (1)	**49** (2)	**50** (4)
51 (4)	**52** (1)	**53** (1)	**54** (2)	**55** (1)	**56** (3)	**57** (2)	**58** (3)	**59** (1)	**60** (1)
61 (1)	**62** (2)	**63** (2)	**64** (1)	**65** (2)	**66** (2)	**67** (3)	**68** (1)	**69** (2)	**70** (4)
71 (1)	**72** (2)	**73** (1)	**74** (2)	**75** (4)	**76** (2)	**77** (3)	**78** (2)	**79** (1)	**80** (4)

Hints and Solutions

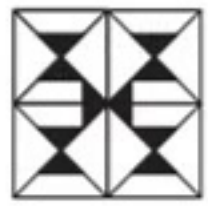
1. Except figure (3), in all the figures, both the arrow opposite from each other. Hence, answer figure (3) is odd one out.

2. Figure (4) is different from other due to positioning of darken smaller circle. Hence, answer figure (4) is odd one out.

3. Except figure (4), there are all the English language letters in all the figures. Hence, answer figure (4) is odd one out.

4. Figure (1) is different from other due to having the lesser number of line as compare to the sides of geometrical shape inside the figure. Hence, answer figure (1) is odd one out.

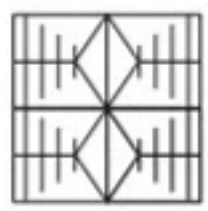
9. Answer figure (2) will complete the given question figure.



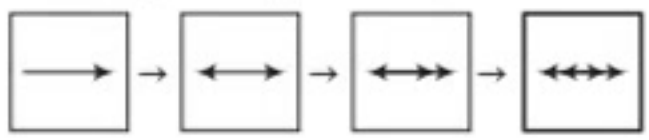
10. Answer figure (3) will complete the given question figure.

11. Answer figure (4) will complete the given question figure.

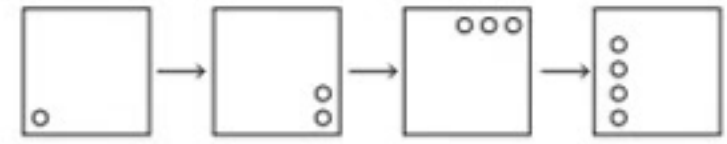
12. Answer figure (3) will complete the given question figure.



13. In every successive figure, a sign of an arrow is increasing in an opposite direction.

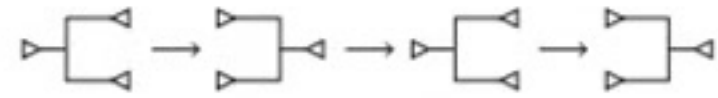


14. In every successive figure, there is an increase of smaller circle in anti-clockwise direction.



15. Every successive figure is rotating 90° clockwise and being white and black alternatively.

16. Figure are repeating an alternate basis, hence option (2) would be the right choice.



17. As in question figure, innermost design having increased one arm with shadow in second figure to first one, in the same way innermost design having increased one arm with shadow to have the final figure of third one.

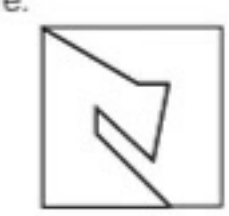
18. As in question innermost of second is result of an joining the innermost of first one after getting rotated in either side in the same way innermost of fourth is result of a joining the innermost of third one after getting rotated in either side.

19. As in question figure, some part of first figure is missing in second in the same way some part of third is missing in fourth.

20. As in question figure, first figure getting lesser with one arm in the same way third figure getting lesser with one arm resulting fourth one.

21. Answer figure (3) will complete the given geometrical figure.

22. Answer figure (3) will complete the given geometrical figure.



23. Answer figure (4) will complete the given geometrical figure.

24. Answer figure (2) will complete the given geometrical figure.

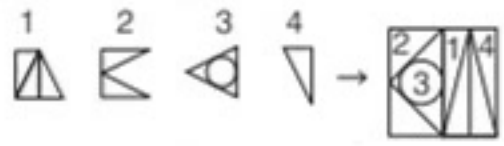
29. When the paper is unfolded, it is shown as in the answer figure (1).

30. When the paper is unfolded, it is shown as in the answer figure (4).

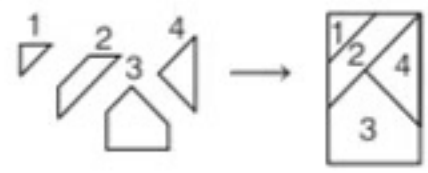
31. When the paper is unfolded, it is shown as in the answer figure (2).

32. When the paper is unfolded, it is shown as in the answer figure (1).

33. Answer figure (1) can be formed by using the cut pieces.

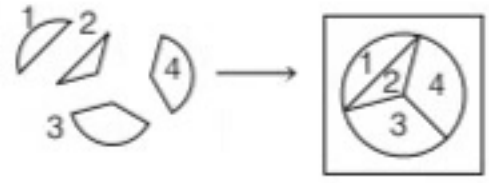


34. Answer figure (1) can be formed by using the cut pieces.

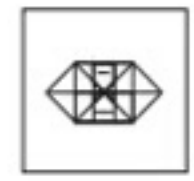


35. Answer figure (4) can be formed by using the cut pieces.

36. Answer figure (1) can be formed by using the cut pieces.

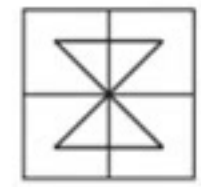


37. The question figure is embedded in the answer figure (3).

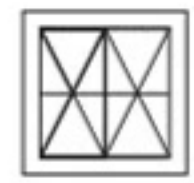


38. The question figure is embedded in the answer figure (1).

39. The question figure is embedded in the answer figure (1).



40. The question figure is embedded in the answer figure (3).



41. The sum of nth term $= \frac{n(n+1)}{2}$

Here, $n = 25$

$\therefore$ Sum $= \frac{25 \times (25+1)}{2} = \frac{25 \times 26}{2}$

$= 13 \times 25 = 325$

42.

48) 144 (3
144
×

Again, 48) 576 (12
48
96
96
×

$\therefore$ HCF = 48

43. $\left(0.50 + 0.15 \times \frac{1}{0.05}\right) \times \frac{2}{7} = (0.50 + 3) \times \frac{2}{7}$

$= 3.5 \times \frac{2}{7} = \frac{7}{7} = 1$

44. Approximate value of 16268 = 16270

45. Let the selling price be ₹ x.
According to the question,

$$\text{Selling price} = \frac{750 \times (100 + 18)}{100}$$

$\therefore$ Selling price = ₹ 885

46. Let the sum is 100%, then sum amounted with 13% per annum interest = (100 + 13)% = 113%

$\because$ 113% = 2486

$$\therefore \quad 100\% = \frac{100 \times 2486}{113}$$

= ₹ 2200

47. Time taken in the journey
= 8 : 15 am of the next day – 5 : 50 pm
= 20 : 15 – 5 : 50 = 14 : 25 = 14 h 25 min

48. Arrange it in descending order starting from 9.
Hence, required number = 9876

49.

258	130	66	34	18	10
÷ 2+1	÷ 2+1	÷ 2+1	÷ 2+1	÷ 2+1	

50. Number = 17 × 23 + 7 = 391 + 7 = 398

51. Suppose second decimal = x
Then $x \times 4.13 = 20.7326$

$$\Rightarrow \quad x = \frac{20.7326}{4.13} = 5.02$$

52. $\because$ Cost price of 12 packets = ₹ 240

$$\therefore \quad \text{Cost price of 1 packet} = \frac{240}{12} = ₹\,20$$

$\therefore$ Cost price of 8 packets = 8 × 20 = ₹ 160

53. Total sale of Burger = 320
Burger sold on Wednesday = 40
Burger sold on Thursday = 60
Burger sold on Friday = 80
Burger sold on Saturday = 55
Now, burger sold on Sunday
= Total sale – Sale on (Wed + Thu + Fri + Sat)
= 320 – (40 + 60 + 80 + 55)
= 320 – 235 = 85

54.
$$5 - \left[\frac{5}{2} - \frac{3}{4}\right] + \left[\frac{7}{2} - \frac{5}{4}\right]$$
$$= 5 - \left[\frac{10-3}{4}\right] + \left[\frac{14-5}{4}\right]$$
$$= 5 - \frac{7}{4} + \frac{9}{4}$$
$$= \frac{20 - 7 + 9}{4} = \frac{22}{4}$$
$$= \frac{11}{2} = 5\frac{1}{2}$$

55. $0.05\% = \frac{0.05}{100} = 0.0005$

56. Prime number are 2, 3, 5, 7, 11, 13, 17 etc.
$\therefore$ Prime even number is 2.

57. Profit = SP – CP = 484 – 400 = ₹ 84

$$\therefore \text{Gain percentage} = \frac{\text{Profit}}{\text{CP}} \times 100$$
$$= \frac{84}{400} \times 100 = 21\%$$

58. LCM of 16 and 20,

2	16,	20
2	8,	10
2	4,	5
2	2,	5
5	1,	5
	1,	1

= 2 × 2 × 2 × 2 × 5 = 80
Hence, required number = 80

59. 1 h = 60 min
Distance covered in 60 min = 25 km

$$\text{Distance covered in 1 min} = \frac{25}{60} \text{ min}$$

$$\text{Distance covered in 30 min} = \frac{25}{60} \times 30 = 12.5 \text{ km}$$

60. Area of square = Side × Side = 10 × 10 = 100 m²