Sainik School
Entrance Exam (Class IX)

SOLVED PAPER 2019

Instructions

1. This question paper contains 125 questions in Paper I and 25 questions in paper II. Paper I is divided into following four sections.
   Section I Mathematics (50 Questions); **Section II** English (25 Questions); **Section III** General Science (25 Questions) and **Section IV** Social Studies (25 Questions)
2. In **Section I** Mathematics each question carries 4 marks and in **Section II** English, **Section III** General Science & **Section IV** Social Studies each question carries 2 marks and in Paper II each question carries 2 marks.
3. The candidate is expected to attempt all questions.

Paper I

Section I Mathematics

1. The face value of each share is ₹ 10. If dividend is 16%, then what will be the income from 600 shares?
(a) ₹ 900 (b) ₹ 960 (c) ₹ 860 (d) ₹ 800

2. A solid gold ball of radius 7 cm was melted and then drawn into a wire of diameter 0.2 cm. Find the length of the wire.
(a) 457.33 m (b) 475.33 m
(c) 547.33 m (d) 745.33 m

3. A horse is tethered for grazing inside a rectangular field 70 m by 52 m and is tethered to one corner by a rope 21 m long. How much area can it graze?
(a) 346.5 sq m (b) 340 sq m
(c) 349.5 sq m (d) 348.5 sq m

4. A racing boat covers a distance of 66 km downstream in 110 min. It covers the same distance upstream in 120 min. The speed of the boat in still water is 34.5 km/h. The speed of the stream will be
(a) 1.5 km/h (b) 2 km/h (c) 2.5 km/h (d) 3 km/h

5. The value of 10001^2 is
(a) 1002001 (b) 100201
(c) 100020001 (d) 1000201

6. With the help of ruler and compass it is not possible to construct an angle of
(a) 22.5° (b) 37.5°
(c) 67.5° (d) 40°

7. What time period is taken when interest is calculated half-yearly?
(a) Twice as much as the number of given years.
(b) Half as much as the number of given years.
(c) Same as the number of given years.
(d) None of the above

8. If a number is doubled then which of the following is a correct statement?
(a) Its cube is two times the cube of given number.
(b) Its cube is three times the cube of the given number.
(c) Its cube is six times the cube of the given number.
(d) Its cube is eight times the cube of given number.

9. Which of the following is the cube root of $-64/343$?
(a) 7/4 (b) $-7/4$
(c) 4/7 (d) $-4/7$

10. $[(1/2)^{-1} + (2/3)^2 - (3/4)^0]^{-2}$ is equal to
(a) 81/484 (b) 81/169
(c) 169/81 (d) 16/81

11. Which of the following is equal to $x^3 - 225x$?
(a) $x(1 - 15x)(1 + 15x)$ (b) $x(x - 15)(x + 15)$
(c) $x(1 - 15x)(1 - 15x)$ (d) $x(1 + 15x)(1 - 15x)$

12. The points $(-3, 2)$ and $(2, -3)$ represent
(a) different points (b) same point
(c) the origin (d) None of these

13. If the dimensions of a room are l, b and h, ($\because l \rightarrow$ length, b $\rightarrow$ breadth and h $\rightarrow$ height) then which of the following is the area of its four walls?
(a) 2h(l + b) (b) 2h(l + h)
(c) 2l(h + h) (d) 2h + l + b

14. If [1X 2Y 6Z] is a number divisible by 9, then the least value of X + Y + Z is
(a) 0 (b) 1
(c) 6 (d) 9

15. Which of the following is the multiplicative identity for rational numbers?
(a) 1 (b) −1
(c) 0 (d) None of these

16. The mid-value of a class interval is 42. If the class size is 10, then the upper and lower limits of class are respectively
(a) 37.5 and 47.5 (b) 47 and 37
(c) 37 and 47 (d) 47.5 and 37.5

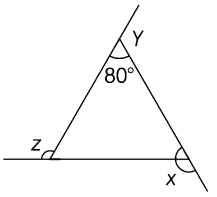
17. The speed of a car is $54\frac{1}{2}$ km/h. The distance travelled by it in $\frac{7}{2}$ h $\frac{35}{2}$ min is
(a) 999/48 km (b) 9929/48 km
(c) 9919/48 km (d) 9919/28 km

18. The ages of A and B are in the ratio of 5 : 7. Four years from now, the ratio of their ages will be 3 : 4. The present age of B is
(a) 20 yr (b) 28 yr
(c) 15 yr (d) 21 yr

19. 36 is divided into parts such that 5 times the first part added to 3 times the second part makes 142. The two parts are
(a) 10 and 26 (b) 12 and 24
(c) 15 and 21 (d) 17 and 19

20. Divide ₹ 1500 into two parts so that 10% of the larger part exceeds 8% of smaller part by ₹ 60. The value of larger and smaller parts are respectively
(a) ₹ 1200 and ₹ 300
(b) ₹ 850 and ₹ 650
(c) ₹ 900 and ₹ 600
(d) ₹ 1000 and ₹ 500

21. The value of x + y + z in the given figure is



(a) 180° (b) 270°
(c) 360° (d) 720°

22. If an exterior angle of a regular polygon is of measure 12°, then the number of its sides is
(a) 12 (b) 18
(c) 22 (d) 30

23. The smallest whole number by which 44 should be multiplied so as to make it a perfect square, is
(a) 4 (b) 11 (c) 6 (d) 5

24. There are 12321 workers in a factory. They stand in such a way that the number of workers in each row is equal to the number of rows. How many workers stand in each row?
(a) 111 (b) 121
(c) 131 (d) 141

25. Cubical boxes of volume 15625 cm^3 each are put in a cubical store of side 2.5 m. How many such boxes can be put in the store?
(a) 100 (b) 250
(c) 500 (d) 1000

26. If $a^2 + \frac{1}{a^2} = 27$, then the value of $a - \frac{1}{a}$ is
(a) ± 4 (b) ± 3
(c) ± 6 (d) ± 5

27. If the sum of the lengths of bases of a trapezium is 12 cm and area is 14.1 cm^2, then its altitude will be
(a) 2.35 cm (b) 4.70 cm
(c) 9.40 cm (d) 1 cm

28. If the length, width and height of a cuboid are 4.2 m, 3 m and 1.1 m respectively, then its capacity (in litres) will be
(a) 12860 (b) 13860
(c) 14860 (d) 15860

29. A road roller is 350 cm long and its diameter is 84 cm. It takes 500 complete revolutions to travel road. The area covered by it (in m^2) will be
(a) 4620 (b) 6420
(c) 2460 (d) 4260

30. A solid cuboidal piece of wood measures $3m \times 2.5m \times 8$ cm. Find the weight of the piece if 1 cubic cm of wood weighs 9 gm.
(a) 4500 kg (b) 5000 kg
(c) 5400 kg (d) 5600 kg

31. A well was dug with 14 m inner diameter and was 8 m deep. The earth dug out of it was evenly spread out on a rectangular plot of size 10 m × 8 m. Find the raise in the height of the plot.
(a) 15.6 m (b) 15.4 m
(c) 15 m (d) 15.5 m

32. If $5^{3x+4} = 25 \times 5^{4x-1}$, then the value of x is
(a) -3 (b) -5 (c) 5 (d) 3

33. Sum of the digits of a two-digit number is 9. If 9 is subtracted from the number, then the digits interchange their places. The original number is
(a) 81 (b) 54 (c) 72 (d) 45

34. You are given the multiplication of two numbers as below

$$\begin{array}{r} 5\,A\,3 \\ \times\, B\,2 \\ \hline 1\,C\,4\,6 \\ +\,2\,D\,9\,2\,\times \\ \hline E\,1\,F\,G\,6 \end{array}$$

The values of the letters A, B, C, D, E, F and G are
(a) A = 2, B = 4, C = 0, D = 0, E = 2, F = 9, G = 6
(b) A = 7, B = 4, C = 1, D = 0, E = 2, F = 0, G = 6
(c) A = 2, B = 4, C = 1, D = 0, E = 2, F = 0, G = 6
(d) A = 7, B = 4, C = 0, D = 9, E = 2, F = 9, G = 6

35. From a pack of 52 playing cards, one card is drawn at random. The probability of the drawn card being a black ten or a king is
(a) 5/26 (b) 3/26 (c) 3/13 (d) 2/13

36. A spider is climbing a wall. It climbs up 5 cm, falls back 3 cm, climbs up another 4 cm, falls back 6 cm and climbs up another 5 cm. How far the spider has climbed from its strating point?
(a) 5 cm (b) 6 cm (c) 4 cm (d) 23 cm

37. What will be the amount and compound interest on ₹ 5000 in 3 yr, if the rate of interest is 4% for the first year, 3% for the second year and 2% for the third year?
(a) ₹ 5436.12 and ₹ 436.12
(b) ₹ 5563.12 and ₹ 563.12
(c) ₹ 5063.12 and ₹ 63.12
(d) ₹ 5463.12 and ₹ 463.12

38. The smallest square number which is divisible by each one of the numbers 8, 9, 10, is
(a) 2600 (b) 3600
(c) 2900 (d) 3900

39. If 25% of a number is less than 18% of 650 by 19, then find the number.
(a) 293 (b) 329
(c) 239 (d) 392

40. If the cost price is 25% of selling price, then the profit percentage is
(a) 300% (b) 305%
(c) 350% (d) 355%

41. Area of a rectangle whose length is 4ab and breadth is $6b^2$ is
(a) 24ab (b) $24ab^2$
(c) $24ab^3$ (d) $24ab^4$

42. The total surface area of a cone having its slant height 9 dm, and diameter of its base as 24 dm, is
(a) 792 sq dm (b) 729 sq dm
(c) 279 sq dm (d) 297 sq dm

43. A cube of side 4 cm contains a sphere touching its side. Then the volume of the gap in between is
(a) 30 cu cm (b) 30.48 cu cm
(c) 30.84 cu cm (d) 31 cu cm

44. A chord of a circle is of length 6 cm and it is at a distance of 4 cm from the centre. Find the radius of the circle.
(a) 3 cm (b) 4 cm
(c) 5 cm (d) 6 cm

45. The mean of 40 observations was 160. It was detected on rechecking that the value of 165 was wrongly copied as 125 for computation of mean. Find the correct mean.
(a) 161 (b) 159
(c) 166 (d) 111

46. If $x + y = 12$ and $xy = 27$, then the value $x^3 + y^3$ is
(a) 756 (b) 765 (c) 567 (d) 576

47. In what time will a sum of money doubled itself at $6\frac{1}{4}\%$ per annum on simple interest?
(a) 13 yr (b) 14 yr (c) 15 yr (d) 16 yr

48. In a ΔABC, E is the mid-point of median AD. Then, the area of ΔBED is
(a) Area of ΔABC (b) 0
(c) $\frac{1}{2}$(area of ΔABC) (d) $\frac{1}{4}$(area of ΔABC)

49. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. Find the ratio of surface areas of the balloon in the two cases.
(a) 1 : 4 (b) 1 : 2 (c) 4 : 1 (d) 2 : 1

50. Two isosceles triangles have equal vertical angles and their areas in the ratio 25 : 36. Find the ratio of their corresponding heights.
(a) 4 : 5 (b) 5 : 6
(c) 6 : 7 (d) 5 : 7

Section II English

51. They will ask you a lot of questions at the interview. The sentence, when converted into the passive voice, would read as
(a) You are asked a lot of questions at the interview.
(b) You were being asked a lot of questions at the interview.
(c) You will be asked a lot of questions at the interview.
(d) You are being asked a lot of questions at the interview.

52. The phrase <u>in cold blood</u> means
(a) indifferently (b) cruelly
(c) thoughtlessly (d) deliberately

53. The workers went out of the factory ..... to hold a protest rally. (Choose the correct word to fill in the blank)
(a) en masse (b) en route
(c) impasse (d) de facto

54. <u>To put up with</u> means
(a) to close (b) to prolong
(c) to tolerate (d) to forget

55. Fill in the blank with a possessive pronoun from the options given below.
Mani declared that the book was not .....
(a) our (b) his (c) your (d) hers

56. The correctly punctuated sentence is
(a) Mina said, wheres' Kishore?
(b) Mina said where's kishore?
(c) Mina said, "Where's Kishore?"
(d) Mina said, "Wheres' kishore!"

57. 'To let the cat out of the bag' means
(a) To jump out of a problem
(b) Have a pet animal
(c) To feel extremely happy
(d) Reveal something that was kept a secret before

58. Choose the correct order to make the sentence below meaningful.
Month (1)/ while (2)/ Mumbai (3)/ Last (4)/ it (5)/ in (6)/ happened (7)/ living (8)/ I was (9)
(a) 1 8 9 2 7 5 6 3 4 (b) 1 2 3 4 5 6 7 8 9
(c) 5 7 8 9 2 4 3 6 1 (d) 5 7 2 9 8 6 3 4 1

59. The adjective form of 'Advantage' is
(a) advantageous (b) advantaging
(c) advantage (d) advantagement

60. The active voice of — 'He had not been invited by us' is
(a) We had been invited by us.
(b) We had invited by him.
(c) We had not invited him.
(d) We had not invited by us.

61. Identify the tense in the sentence given below.
When I arrived, Ram had just left.
(a) Present perfect (b) Present continuous
(c) Past perfect (d) Past continuous

62. The synonym of the 'Splendid' is
(a) Shortage (b) Insignificant
(c) Impressive (d) Excess

63. The word 'brittle' means
(a) not easily breakable (b) easily breakable
(c) easily understandable (d) easily portable

Directions (Q. Nos. 64 and 65) *Find out the part containing error in the given statement.*

64. He is one of the talented student in our class.
(a) He is one of the (b) talented student
(c) in our class (d) no error

65. The thief was taken to the nearby police station.
(a) The thief was (b) taken to the
(c) nearby police station (d) no error

Directions (Q. Nos. 66 and 67) *Fill in the blank by choosing the appropriate preposition from the given options.*

66. They have gone ..... an excursion.
(a) to (b) for (c) with (d) on

67. The team rebelled ..... the captain
(a) upon (b) over (c) with (d) against

Directions (Q. Nos. 68 and 69) *Choose the correct option if the given statements are changed into comparative degree.*

68. Silver is one of the most useful metals.
(a) Silver is useful to any other metal.
(b) Silver is useful than any other metal.
(c) Silver is more useful than all other metals.
(d) Silver is more useful than most of the metals.

69. Learning Italian is not as difficult as learning Japanese.
(a) Learning Japanese is more difficult to learning Italian.
(b) Learning Italian is not difficult learning Japanese.
(c) Learning Japanese is more difficult than learning in Italian.
(d) Learning Japanese is more difficult than learning Italian.

70. The adjective form of 'apathy' is
(a) apathetically (b) apathical
(c) apathetic (d) pathetic

71. The noun form of 'Proud' is
(a) proudy (b) pride
(c) proudly (d) proudliness

Directions (Q. Nos. 72-74) *Read the following passage and answer the questions that follow.*

Books are by far, the most lasting product of human effort. Temples crumble into ruins. Pictures and statues decay, but books survive. Time does not destroy the great thoughts which are as fresh today as when they first passed through the author's mind ages ago. The only effect of time has been to throw out the bad products, for nothing in literature can survive long unless it is really good and of lasting value. Books introduce us to the best society; they bring us into the presence of the greatest minds that have ever lived, we hear what they said and did; we see them as if they were really alive, we sympathise with them, enjoy with them and grieve with them.

72. According to the passage, books live forever because
(a) They have productive value.
(b) Time does not destroy great thoughts.
(c) They are in printed form.
(d) They have the power to influence people.

73. According to the passage, temples, pictures and statues belong to the same category because
(a) All of them are beautiful.
(b) All of them are substantial.
(c) All of them are likely to decay.
(d) All of them are fashioned by men.

74. Books introduce us into the best society as
(a) They give us a glimpse of the greatest minds.
(b) They take us to the world of imagination.
(c) They instill in us the qualities of the greatest minds.
(d) They introduce us to elite class of the society.

75. Radha, 'I won't buy a new car'. (Choose the correct word to fill in the blank).
Radha said that she ..... buy a new car.
(a) won't (b) will (c) wouldn't (d) would

Section III General Science

76. Ramesh was cooking potato curry on a chulha. To his surprise he observed that the copper vessel was getting blackened from outside. It may be due to
(a) Proper combustion of fuel
(b) Improper cooking of potato curry
(c) Improper combustion of the fuel
(d) Burning of copper vessel

77. When a Copper vessel is exposed to moist air for long, it acquires a dull green coating. The green material is a mixture of
(a) Copper oxide and Copper carbonate
(b) Copper hydroxide and Copper carbonate
(c) Copper oxide and Copper nitrate
(d) Copper hydroxide and Copper nitrate

78. The places meant for conservation of biodiversity in their natural habitat are
(i) Zoological garden
(ii) Botanical garden
(iii) Sanctuary
(iv) National Park
(a) i & ii (b) ii & iii
(c) iii & iv (d) i & iv

79. The same force F acts on four different objects having the areas given below, one by one. In which case the pressure exerted will be the maximum?
(a) 20 m^2 (b) 50 m^2 (c) 100 m^2 (d) 10 m^2

80. Before playing the orchestra in a musical concert, a sitarist tries to adjust the tension and pluck the strings suitably. By doing so he is adjusting
(a) intensity of sound only
(b) amplitude of sound only
(c) frequency of the sitar string with the frequency of other musical instruments
(d) loudness of sound

81. *Rhizobium* bacteria
(a) help in digestion
(b) help in nitrogen fixation
(c) cause diseases
(d) All of the above

82. The metal which is stored in kerosene
(a) phosphorus (b) magnesium
(c) sodium (d) calcium

83. Poor conductors are
(a) plastics (b) clothes
(c) wood (d) all of these

84. There are following zones of a flame
(a) two (b) three
(c) four (d) no any zone

85. Force of friction always acts on moving objects and its direction shall be
(a) on any direction
(b) along the direction of motion
(c) perpendicular to the direction of motion
(d) opposite to the direction of motion

86. The stage of the embryo in which all the body parts can be identified is
(a) foetus (b) zygote
(c) infant (d) None of these

87. Diabetes is due to the malfunctioning of
(a) adrenal gland (b) pituitary gland
(c) heart (d) pancreas

88. Naphthalene balls are obtained from
(a) carbon (b) coke
(c) coal tar (d) coal gas

89. John accidentally placed his hand over a flame and immediately pulled it back. He felt the sensation of heat and reacted due to the action of
(a) nerve cells (b) blood cells
(c) skin surface (d) nucleus of cells

90. A purple coloured non-metal forms a brown solution in alcohol which is applied on wounds as an antiseptic. Name of the non-metal is
(a) phosphorous (b) carbon
(c) sulphur (d) iodine

91. Given below are the harmful effects of weeds on crop plants. Choose the correct combination of statements.
(i) They interfere in harvesting
(ii) They help crop plants to grow healthy
(iii) They compete with crop plants for water, nutrients, space and light
(iv) They affect plant growth.
(a) i, iii, iv (b) iii, iv
(c) Only iii (d) i, ii, iii, iv

92. Which of the following groups contain all synthetic substances ?
(a) Nylon, terylene, wool
(b) PVC, polythene, bakelite
(c) Cotton, polycot, rayon
(d) Acrylic silk, wool

93. Which of the following statement is true about endemic species ?
(a) They are found exclusively in a specific habitat
(b) Endemic species can never become endangered
(c) They are only found in zoos and botanical gardens
(d) They are not affected by the destruction of their habitat

94. Identify the correct statement about cells.
(a) All the cells have nucleus
(b) Cells of an organ have similar structure
(c) Cells of a tissue have similar structure
(d) Shape of all types of cells is round

95. Aquatic animals in which fertilization occurs in water are said to be
(a) viviparous without fertilization
(b) oviparous with external fertilization
(c) viviparous with internal fertilization
(d) oviparous with internal fertilization

96. The light from sun takes 500 s to reach the earth. Assuming that the speed of light is 300000 kms^{-1}, What is the distance between the sun and the earth?
(a) 100 million km (b) 150 million km
(c) 1500 million km (d) 15 million km

97. Which of the following is not an application of chemical effect of an electric current ?
(a) Electroplating of metals
(b) Purification of metals
(c) Decomposition of elements
(d) Decomposition of compounds

98. An earthquake of magnitude '6' on Richter scale has
(a) ten times more destructive energy than an earthquake of magnitude '4'
(b) hundred times more destructive energy than an earthquake of magnitude '4'
(c) thousand times more destructive energy than an earthquake of magnitude '4'
(d) one and half times more destructive energy than an earthquake of magnitude '4'

99. Which of the following statements is correct regarding rods and cones in the human eye ?
(a) Cones are sensitive to dim light
(b) Cones are sensitive to bright light
(c) Rods are sensitive to bright light
(d) Rods can sense colour

100. Suppose a new planet is discovered between Uranus and Neptune, its time period of revolution around the sun would be
(a) less than that of Neptune
(b) more than that of Neptune
(c) equal to that of Neptune of Uranus
(d) less than that of Uranus

Section IV Social Science

101. Who was the founder of the 'Brahmo Sabha'?
(a) Annie Besant
(b) Bala Gangadhar Tilak
(c) Raja Ram Mohan Roy
(d) Eswar Chandra Vidyasagar

102. Child Marriage Restraint Act was passed in the year
(a) 1829 (b) 1909
(c) 1919 (d) 1853

103. What is a population pyramid?
(a) A graphical presentation of the age, sex composition of a population.
(b) When the population density of an area is so high that people live in tall buildings.
(c) Pattern of population distribution in large urban areas.
(d) Pattern of population distribution in rural areas.

104. Which age group of India is guaranteed free education by the constitution?
(a) 6-14 years (b) 5-13 years
(c) 7-14 years (d) 6-12 years

105. Who wrote the book Poverty and Un-British Rule in India?
(a) Dadabhai Naoroji (b) Badruddin Tyabji
(c) Pherojshah Mehta (d) Bipin Chandrapal

106. The Chairman of the Drafting committee of Indian Constitution was
(a) Sardar Patel (b) Dr BR Ambedkar
(c) Dr Rajendra Prasad (d) JL Nehru

107. By the late of 18th century, East India Company was trying to expand the cultivation of
(a) opium (b) indigo
(c) cotton (d) tea

108. EVMs were used for the first time in the ..... general elections.
(a)2001 (b) 2002
(c) 2003 (d) 2004

109. There are ..... elected members in Rajya Sabha.
(a) 543 (b) 272
(c) 233 (d) 260

110. Minerals that lie at shallow depths are taken out by removing the surface layer, this is known as
(a) Open-cast mining (b) Shaft mining
(c) Drilling (d) All of these

111. The complainant has a ..... right to get a free copy of the FIR from the police.
(a) fundamental (b) legal
(c) political (d) economic

112. Which article of the Constitution states that untouchability has been abolished
(a) Article 14 (b) Article 15
(c) Article 16 (d) Article 17

113. The Marathi newspaper Kesari was edited by
(a) Bipin Chandrapal
(b) Bal Gangadhar Tilak
(c) Sarojini Naidu
(d) Lala Lajpat Rai

114. The difference between the birth rate and the death rate is called the
(a) natural growth rate (b) normal growth rate
(c) actual growth rate (d) None of the above

115. Dandi March was against the
(a) Salt Tax
(b) Purna Swaraj
(c) Non co-operation movement
(d) Simon commission

116. The British East India Company got a charter from Queen Elizabeth I in
(a) AD 1600 (b) AD 1599
(c) AD 1601 (d) AD 1700

117. Delhi Renaissance refers to the period from
(a) AD 1830-1857 (b) AD 1857-1885
(c) AD 1825-1857 (d) None of these

118. Woods Dispatch of 1854 refers to
(a) Educational Reform (b) Financial Reform
(c) forest Reform (d) None of these

119. The leader of the ruling party in Lok Sabha is
(a) The Prime Minister
(b) The President
(c) The Vice-President
(d) The Leader of Opposition

120. As per which article of the Indian Constitution every arrested person is guaranteed Fundamental Rights
(a) Article 20 (b) Article 21
(c) Article 23 (d) Article 22

121. Which of the following gas was released in Bhopal Gas Tragedy?
(a) Methyl Isocyanate (b) Ethyl Isocyanate
(c) Methyl Alchohol (d) Ethyl Alchohol

122. Which one of the following is a leading producer of Copper in the world?
(a) Bolivia (b) Chile
(c) Ghana (d) Zimbabwe

123. Identify the state with 'Lowest Literacy' as per census 2011.
(a) Bihar (b) Haryana
(c) Rajasthan (d) Gujarat

124. The total number of Anglo-Indians nominated to the Lok Sabha is
(a) 8 (b) 6
(c) 4 (d) 2

125. Which one of the following countries has the highest percentage of forest land?
(a) Australia (b) India
(c) France (d) Japan

Paper II

Directions (Q.Nos. 126-128) *In the given series, find the next missing term / number.*

126. MNOABCPQRDEFST??
(a) GK (b) UV
(c) GH (d) UG

127. AZ, CX, EV, ?
(a) HT (b) HU
(c) GS (d) GT

128. YX, UTS, ONML,?
(a) FEDCB (b) GFEDC
(c) IHGFE (d) HGFED

Directions (Q.Nos. 129-131) *Choose the letters group that best represents a relationship similar to the one expressed in the original pair of letters group.*

129. MONKEY : XDJMNL :: TIGER :?
(a) QDFHS (b) SDFHS
(c) SHFDQ (d) UJHFS

130. MAD is to JXA as RUN is to
(a) ORK (b) OSQ
(c) PRJ (d) UXQ

131. Kilometer is the Distance as Poundal is to
(a) Density (b) Acceleration
(c) Momentum (d) Force

Directions (Q.Nos. 132 and 133) *Which number complete the second pair in the same way as the first pair.*

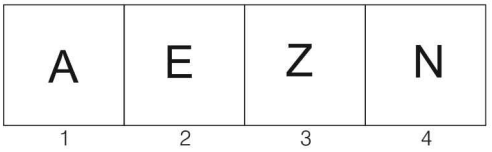
132. 20 : 11 :: 102 : ?
(a) 49 (b) 52
(c) 61 (d) 98

133. 13 : 25 :: 48 : ?
(a) 95 (b) 97
(c) 109 (d) 105

134. Tiff is to Battle as Frugal is to
(a) Sprint (b) Vague
(c) Miserly (d) Vital

135. A is 40 m South-West of B. C is 40 m South-East of B. Then C is in which direction of A?
(a) East (b) West
(c) North-East (d) South

136. Choose the figure, which is different from others.



(a) 1 (b) 2
(c) 3 (d) 4

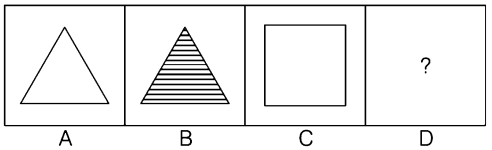
137. If ENGLAND is written as 1234526 and FRANCE is written as 785291. How is GREECE coded?
(a) 381191 (b) 831191
(c) 832252 (d) 835545

138. Which word can't be formed by using the letters of the INTELLIGENCE word?
(a) TILLAGE (b) INCITE
(c) GENTLE (d) NEGLECT

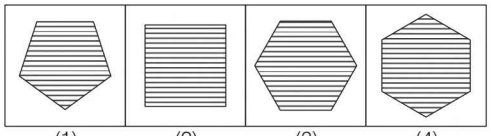
139. If + means ÷, ÷ means −, − means ×, × means +, then $12+6/3-2\times8=?$
(a) 2 (b) 4
(c) 8 (d) 5

140. Select the figure from the answer set that what come in the place of questions mark (?).

Question figures



Answer figures



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

(a) 1 (b) 2 (c) 3 (d) 4

141. A cube painted blue on all the faces is cut into 125 cubes of equal size. Then, how many cubes are not painted on any face?
(a) 8 (b) 16 (c) 27 (d) 54

142. If 1st October is Sunday, then 1st November will be
(a) Tuesday (b) Friday
(c) Wednesday (d) Thursday

143. Find the missing number in the box.

0	3	8
15	24	35
48	?	80

(a) 64 (b) 63
(c) 66 (d) 84

144. Which one set of letters when sequentially placed at the places in the given letter series shall complete it?
ac_cab_baca_aba_aca_
(a) acbcc (b) aacbc
(c) babbb (d) bcbba

Directions (Q.Nos. 145-148) *In each of the following questions, find the word which cannot be made from the letters of the given word.*

145. REPUBLICAN
(a) CLIP (b) PURE
(c) ANKLE (d) BANE

146. ESTRANGE
(a) GENERATE (b) SERGEANT
(c) REAGENTS (d) GREAT

147. ADMINISTRATOR
(a) ADMIT (b) NEST
(c) MANTA (d) ROAD

148. SOCIALISATION
(a) SCOUT (b) CLASS
(c) LIAISON (d) ASSOCIATION

Directions (Q.Nos. 149 and 150) *Choose the letters group that best represents a relationship similar to the one expressed in the original pair of letter groups.*

149. If LONDON is coded as MPOEPO. What code is needed for DELHI?
(a) DEHLI (b) EFIMJ
(c) HLDEI (d) EFMIJ

150. PNS : OOT :: DBH:?
(a) PPI (b) BBI
(c) CCI (d) DDB

Answers

1	(b)	2	(a)	3	(a)	4	(a)	5	(c)	6	(d)	7	(a)	8	(d)	9	(d)	10	(b)
11	(b)	12	(a)	13	(a)	14	(a)	15	(a)	16	(b)	17	(c)	18	(b)	19	(d)	20	(d)
21	(c)	22	(d)	23	(b)	24	(a)	25	(d)	26	(d)	27	(a)	28	(b)	29	(a)	30	(c)
31	(b)	32	(d)	33	(b)	34	(a)	35	(b)	36	(a)	37	(d)	38	(b)	39	(d)	40	(a)
41	(c)	42	(a)	43	(b)	44	(c)	45	(a)	46	(a)	47	(d)	48	(d)	49	(a)	50	(b)
51	(c)	52	(b)	53	(a)	54	(c)	55	(b)	56	(c)	57	(d)	58	(d)	59	(a)	60	(c)
61	(c)	62	(c)	63	(b)	64	(b)	65	(d)	66	(d)	67	(d)	68	(c)	69	(d)	70	(c)
71	(b)	72	(b)	73	(c)	74	(a)	75	(c)	76	(c)	77	(b)	78	(c)	79	(d)	80	(c)
81	(b)	82	(c)	83	(d)	84	(b)	85	(d)	86	(a)	87	(d)	88	(c)	89	(a)	90	(d)
91	(b)	92	(b)	93	(a)	94	(c)	95	(b)	96	(b)	97	(c)	98	(b)	99	(b)	100	(a)
101	(c)	102	(*)	103	(a)	104	(a)	105	(a)	106	(b)	107	(b)	108	(d)	109	(c)	110	(a)
111	(b)	112	(d)	113	(b)	114	(a)	115	(a)	116	(a)	117	(a)	118	(a)	119	(a)	120	(d)
121	(a)	122	(b)	123	(a)	124	(d)	125	(d)	126	(d)	127	(d)	128	(b)	129	(a)	130	(a)
131	(d)	132	(b)	133	(a)	134	(c)	135	(a)	136	(b)	137	(a)	138	(a)	139	(b)	140	(b)
141	(c)	142	(c)	143	(b)	144	(b)	145	(c)	146	(a)	147	(b)	148	(a)	149	(d)	150	(c)

Hints & Solutions

1. (b) Given, face value of each share = ₹10

$\therefore$ Face value of 600 shares = 600×10

$= ₹\ 6000$

$\therefore$ Income from 16% dividend = 16% of 6000

$= \frac{16 \times 6000}{100}$

$= ₹\ 960$

2. (a) Given, radius of solid gold ball (r_2) = 7 cm

And diameter of wire = 0.2 cm

radius of wire (r_1) $= \frac{0.2}{2}$

$= 0.1$ cm

Volume of metal used in wire

= Volume of the solid gold ball

$\pi r_1^2 h = \frac{4}{3}\pi r_2^3$

[where, h = length of wire]

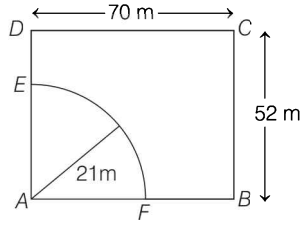
$\pi(0.1)^2 h = \frac{4}{3}\pi(7)^3$

$h = \frac{4 \times 7 \times 7 \times 7}{3 \times 0.1 \times 0.1}$

$= \frac{4}{3} \times 343 \times 100$

$= 45733.33\text{ cm} = 457.33\text{ m}$

3. (a) Let EAFPE be a sector in the rectangular field ABCD and horse can graze in the sector EAFPE.



$\Rightarrow$ Length of the rope = 21 m = Radius of the sector EAFPE

Now, in figure ABCD,

$\angle A = 90^\circ$

$\therefore$ Area of the sector EAFPE $= \frac{90^\circ}{360^\circ} \times \pi r^2$

$= \frac{1}{4} \times \pi(21)^2$

$= \frac{22}{7} \times \frac{1}{4} \times 21 \times 21$

$= 346.5$

Hence, horse can graze 346.5 sq m area.

4. (a) Let the speed of the stream = x km/h

When the racing boat is going downstream its speed is (34.5 + x) km/ h and while going upstream, then its speed is (34.5 – x) km/ h.

According to the question,

$\frac{66}{34.5 + x} = \frac{110}{60}$

$\Rightarrow \quad 110(34.5 + x) = 66 \times 60$

$\Rightarrow \quad 34.5 + x = 36$

$\therefore \quad x = 36 - 34.5$

$= 1.5$ km/h

Hence, speed of the stream is 1.5 km/h.

5. (c) Value of $10001^2 = 10001 \times 10001$

$= 100020001$

6. (d) With the help of a ruler and a compass, we can construct the angles, 90°, 60°, 45°, 22.5°, 30° etc and its bisector of an angle.

So, it is not possible to construct an angle of 40°.

7. (a) When interest is calculated half-yearly, then time period is twice as much as the number of given years.

8. (d) Let the number = x

Then, its cube = x^3 ... (i)

If number is doubled = 2x, then

Its cube = $(2x)^3$

$= 8x^3$ ... (ii)

From Eqs. (i) and (ii), we get

New cube is 8 times the cube of given number.

9. (d) Cube root of $\frac{-64}{343} = \sqrt[3]{\frac{-64}{343}} = \frac{-4}{7}$

10. (b) $\left[\left(\frac{1}{2}\right)^{-1} + \left(\frac{2}{3}\right)^2 - \left(\frac{3}{4}\right)^0\right]^{-2}$

$= \left[2 + \frac{4}{9} - 1\right]^{-2} \qquad \left[\because a^{-m} = \frac{1}{a^m}\right]$

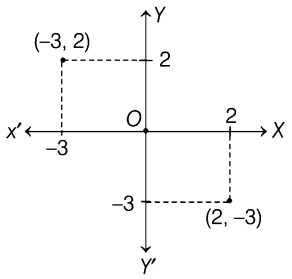
$$= \left[\frac{18 + 4 - 9}{9}\right]^{-2}$$

$$= \left[\frac{13}{9}\right]^{-2} = \left[\frac{9}{13}\right]^{2} = \frac{81}{169}$$

11. (b) Given expression $= x^3 - 225x$

$$= x(x^2 - 225)$$
$$= x(x^2 - 15^2)$$
$$= x(x + 15)(x - 15)$$
$$[\because a^2 - b^2 = (a + b)(a - b)]$$

12. (a) On the cartesian plane points $(-3, 2)$ and $(2, -3)$ represent different points.



13. (a) According to the question,

l = length, b = breadth, h = height

Area of four walls $= 2h(l + b)$

14. (a) According to the question,

Given, number = 1X2Y6Z

If it is divisible by 9, then its sum must be divisible by 9.

$$= 1 + X + 2 + Y + 6 + Z$$
$$= 9 + X + Y + Z$$

So, for the least value, X + Y + Z must be 0, so that sum is divisible by 9.

$\therefore X + Y + Z = 0$

15. (a) Let 'e' be the multiplicative identity of any rational number 'a', then $a \times e = a = e \times a$

$$\Rightarrow \quad e = 1$$

16. (b) Let the upper value and lower value of class interval be x and y respectively.

Then, according to the question,

$$\frac{x + y}{2} = 42$$

$$\Rightarrow \quad x + y = 84 \qquad \ldots (i)$$

$$\because \quad y = x - 10$$

$$\therefore \quad x + x - 10 = 84$$

$$\Rightarrow \quad 2x = 94$$

$$\therefore \quad x = 47$$

and $\quad y = 47 - 10 = 37$

17. (c) According to the question,

Speed of a car $= 54\frac{1}{2}$

$$\Rightarrow \quad = \frac{109}{2} \text{ km/h}$$

Now, time $= \frac{7}{2}$ h $\frac{35}{2}$ min

$$= \frac{7}{2} + \frac{35}{2 \times 60}$$
$$= \frac{7}{2} + \frac{7}{24}$$
$$= \frac{84 + 7}{24} = \frac{91}{24} \text{h}$$

Distance = Speed × Time

$$= \frac{109}{2} \times \frac{91}{24}$$
$$= \frac{9919}{48} \text{ km}$$

18. (b) According to the question,

$$\frac{A}{B} = \frac{5}{7}$$

$$\Rightarrow \quad 7A = 5B \qquad \ldots (i)$$

After 4 yr,

$$\frac{A + 4}{B + 4} = \frac{3}{4}$$

$$\Rightarrow \quad 4A + 16 = 3B + 12$$

$$\Rightarrow \quad 4A - 3B = -4 \qquad \ldots (ii)$$

From Eqs. (i) and (ii), we get

$$\Rightarrow \quad 4 \times \frac{5B}{7} - 3B = -4$$

$$\Rightarrow \quad \frac{20B - 21B}{7} = -4$$

$$\Rightarrow \quad -B = -28$$

$$\Rightarrow \quad B = 28 \text{ yr}$$

19. (d) Let first part = A

And second part = B

Then, $\quad 5A + 3B = 142 \qquad \ldots (i)$

And $\quad A + B = 36 \qquad \ldots (ii)$

From Eqs. (i) and (ii), we get

$$5A + 5B = 36 \times 5$$
$$\underline{5A + 3B = 142}$$
$$2B = 38$$
$$\Rightarrow \quad B = 19$$

From Eq. (ii), we get

$$A + 19 = 36$$
$$A = 17$$

Hence, the two parts are 17 and 19 respectively.

20. (d) Let two parts are A and B.

Then, according to the question,

$$10\% \text{ of } A = 8\% \text{ of } B + 60$$
$$\Rightarrow \frac{10}{100} \times A - \frac{8}{100} B = 60$$
$$\Rightarrow \quad 10A - 8B = 6000 \quad \ldots \text{(i)}$$
$$\text{And} \quad A + B = 1500 \quad \ldots \text{(ii)}$$

From Eqs. (i) and (ii), we get

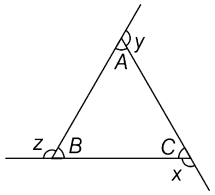
$$10A - 8B = 6000$$
$$\underline{10A + 10B = 15000} \quad [\because \text{multiply by 10 in Eq. (ii)}]$$
$$-18B = -9000$$
$$\Rightarrow \quad B = 500$$

From Eq. (ii), we get

$$A + 500 = 1500$$
$$\Rightarrow \quad A = 1000$$

Hence, the larger and smaller parts are ₹1000 and ₹ 500 respectively.

21. (c) According to the question,



$$A + y = 180^\circ \quad [\text{straight line angle}]$$
$$B + z = 180^\circ \quad [\text{straight line angle}]$$
$$C + x = 180^\circ \quad [\text{straight line angle}]$$
$$\Rightarrow A + B + C + x + y + z = 540^\circ$$
$$180^\circ + x + y + z = 540^\circ$$

[$\because$ sum of all three angles of a triangle is 180°]

$$\therefore \quad x + y + z = 540^\circ - 180^\circ = 360^\circ$$

22. (d) Given,

Exterior angle of a regular polygon $= 12^\circ$

$$\text{Number of sides} = \frac{360^\circ}{\text{Exterior angle}} = \frac{360^\circ}{12^\circ} = 30$$

23. (b) Given number = 44

2	44
2	22
11	11
	1

$$44 = 2 \times 2 \times 11 = 2^2 \times 11$$

Hence, to make '44' a perfect square, we have to multiply it with 11.

24. (a) Given, total number of workers = 12321

Let number of rows = x

According to the question,

Number of workers in each row

$$= \text{Number of rows} = x$$

Now, $\quad x \times x = \text{Total workers} = 12321$

$$\Rightarrow \quad x^2 = 12321$$
$$\therefore \quad x = 111$$

Hence, 111 workers stand in each row.

25. (d) $\because$ Volume of a cubical box $= a^3$

Given, volume of cubical boxes $= 15625 \text{ cm}^3$

$\therefore$ Volume of cubical store $= (2.5 \text{ m})^3$

$$= 15.625 \text{ m}^3$$
$$= 15.625 \times (100)^3 \text{ cm}$$
$$= 15625000 \text{ cm}^3$$

Number of box can be put in the store

$$= \frac{\text{Volume of cubical store}}{\text{Volume of cubical boxes}}$$
$$= \frac{15625000}{15625} = 1000$$

26. (d) Given, $a^2 + \frac{1}{a^2} = 27$

$$\Rightarrow a^2 + \frac{1}{a^2} - 2 = 27 - 2$$
$$\Rightarrow \quad \left(a - \frac{1}{a}\right)^2 = 25$$
$$\therefore \quad a - \frac{1}{a} = \sqrt{25} = \pm 5$$

27. (a) Let the bases of a trapezium are a and b.
Let altitude of trapezium = h
Given, sum of bases a and b = 12 cm
And area of trapezium = 14.1 cm^2

$\therefore$ area of trapezium $= \frac{a+b}{2} \times h$

$\Rightarrow$ $14.1 = \frac{12}{2} \times h = 6 \times h$

$\Rightarrow$ $\frac{14.1}{6} = h$

$\therefore$ $h = 2.35$ cm

28. (b) Given, length (l), width (w) and height (h) of a cuboid are 4.2 m, 3 m and 1.1 m respectively.

$\because$ Volume of cuboid $= l \times w \times h$

$= 4.2\text{ m} \times 3\text{ m} \times 1.1\text{ m}$

$= 13.86\ m^3$

$\because$ $1\ m^3 = 1000$ L

Hence, its capacity $= 13.86 \times 1000$ L

$= 13860$ L

29. (a) $\because$ Area covered by the roller in one revolution $= 2\pi rh$

$\therefore$ Total distance covered in 500 revolutions

$$= 500 \times 2 \times \frac{22}{7} \times \frac{84}{2} \times 350$$

$$= 500 \times 22 \times 84 \times 50$$

$$= 46200000\ cm^2$$

$$= \frac{46200000}{100 \times 100}\ m^2 = 4620\ m^2$$

30. (c) Volume of cuboidal piece
$= 3 \times 2.5 \times 8 \times 10000 = 600000\ cm^3$

$\because$ Weight of 1 cm^3 = 9 gm

$\therefore$ Weight of 600000 $cm^3 = 9 \times 600000$ gm

$$= \frac{5400000}{1000}\text{ kg} = 5400\text{ kg}$$

31. (b) According to the question,
Volume of cylinder = Volume of cuboid
Where, cylinder = well that was dug out
cuboid = soil that was spreaded over the rectangular plot

$\pi r^2 h = l \times b \times h$

$\Rightarrow$ $\frac{22}{7} \times \left(\frac{14}{2}\right)^2 \times 8 = 10 \times 8 \times h$

$\Rightarrow$ $\frac{22}{7} \times 7 \times 7 \times 8 = 10 \times 8 \times h$

$\therefore$ $h = \frac{154}{10} = 15.4$ m

32. (d) Given, $5^{3x+4} = 25 \times 5^{4x-1}$

$\Rightarrow$ $5^{3x+4} = 5^2 \times 5^{4x-1}$

$\Rightarrow$ $5^{3x+4} = 5^{2+4x-1}$

On comparing exponents both sides, we get

$3x + 4 = 2 + 4x - 1$

$\Rightarrow$ $3x + 4 = 4x + 1$

$\Rightarrow$ $4x - 3x = 4 - 1$

$\Rightarrow$ $x = 3$

33. (b) Let the digits be x and y.

Then, $x + y = 9$ ... (i)

Now, original number is $10x + y$.

According to the question,

$(10x + y) - 9 = 10y + x$

$\Rightarrow 10x + y - 10y - x = 9$

$\Rightarrow$ $9x - 9y = 9$

$\Rightarrow$ $x - y = 1$ ... (ii)

From Eqs. (i) and (ii), we get

$$\begin{array}{r} x + y = 9 \\ x - y = 1 \\ \hline 2y = 8 \end{array}$$

$\Rightarrow$ $y = 4$

On substituting y = 4 in Eq. (i), we get

$x = 9 - 4 = 5$

So, original number $= 10x + y = 10 \times 5 + 4 = 54$

34. (a) Given,

$$\begin{array}{r} 5\ A\ 3 \\ \times\ B\ 2 \\ \hline 1\ C\ 4\ 6 \\ +\ 2\ D\ 9\ 2\ \times \\ \hline E\ 1\ F\ G\ 6 \end{array}$$

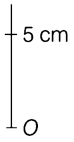
From option (a), put A = 2, B = 4, C = 0, D = 0, E = 2, F = 9, G = 6

$$\begin{array}{r} 5\ \textcircled{2}\ 3 \\ \times\ \textcircled{4}\ 2 \\ \hline 1\ \textcircled{0}\ 4\ 6 \\ 2\ \textcircled{0}\ 9\ 2\ \times \\ \hline \textcircled{2}\ 1\ \textcircled{9}\ \textcircled{6}\ 6 \end{array}$$

These values satisfy the multiplication. Hence, option (a) is the correct answer.

35. (b) Required probability $= \frac{6}{52} = \frac{3}{26}$

36. (a) Let a spider started climbing from point O.



In first instance, a spider climbed 5 cm and falls back 3 cm.

Total distance covered = 5 − 3 = 2 cm

Again climbed 4 cm and falls 6 cm.

Total distance covered = 2 + 4 − 6

= 0 [at starting point]

Now, spider climbed another 5 cm.

At last, a spider is 5 cm from the starting point.

37. (d) Given that, P = ₹ 5000, $R_1 = 4\%$, $R_2 = 3\%$, $R_3 = 2\%$, A = ?, CI = ?

$$\because \quad A = P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right)$$

$$= 5000\left(1+\frac{4}{100}\right)\left(1+\frac{3}{100}\right)\left(1+\frac{2}{100}\right)$$

$$= 5000 \times \frac{26}{25} \times \frac{103}{100} \times \frac{51}{50}$$

$$= \frac{26 \times 103 \times 51}{25}$$

$$= 5463.12$$

Now, CI = A − P

= 5463.12 − 5000 = 463.12

38. (b) LCM of 8, 9, 10 = $\underline{2 \times 2} \times 2 \times \underline{3 \times 3} \times 5 = 360$

Since, 2 and 5 are not in pairs. So multiply by 2 and 5 to make it a perfect square.

∴ Required number = 360 × 2 × 5

= 3600

Hence, the smallest square number divisible by 8, 9, 10 = 3600.

39. (d) Let the number be x.

According to the question,

$$25\% \text{ of } x = 18\% \text{ of } 650 - 19$$

$$\Rightarrow \quad \frac{25}{100} \times x = \frac{18}{100} \times 650 - 19$$

$$\Rightarrow \quad \frac{x}{4} = 117 - 19$$

$$\Rightarrow \quad x = 98 \times 4$$

$$\Rightarrow \quad x = 392$$

40. (a) According to the question,

$$CP = 25\% \text{ of } SP$$

$$CP = \frac{25}{100} \times SP = \frac{SP}{4}$$

$$\Rightarrow \quad \frac{SP}{CP} = \frac{4}{1}$$

$$\therefore \text{ Profit\%} = \frac{SP - CP}{CP} \times 100 = \frac{4-1}{1} \times 100$$

∴ Profit = 300%

41. (c) Given, length of rectangle (l) = 4ab

And breadth (b) = $6b^2$

∴ Area of a rectangle = l × b

= 4ab × $6b^2$ = $24ab^3$

42. (a) Given, slant height of a cone (l) = 9 dm

And diameter (d) = 24 dm

$$\text{radius (r)} = \frac{24}{2} = 12 \text{ dm}$$

Total surface area = Curved surface area + Area of base

$$= \pi rl + \pi r^2$$

$$= \pi r(l + r)$$

$$= \pi \times 12(9 + 12)$$

$$= \frac{22}{7} \times 12 \times 21$$

$$= 792 \text{ sq dm}$$

43. (b) Let length of each side of a cube = a

Given that, a = 4 cm

∴ Volume of a cube = 4 × 4 × 4 = 64 cm^3

[∵ Volume of cube = a^3]

As the sphere touches the sides of the cube, then diameter of the sphere = 4 cm

∴ Radius (r) = 4 / 2 = 2 cm

$$\text{Volume of the sphere} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(2)^3$$

Volume of the gap = Volume of cube − Volume of the sphere

$$= 64 - \frac{4}{3}\pi(2)^3$$

$$= 64 - \frac{4}{3} \times \frac{22}{7} \times 8$$

$$= 64 - 33.52$$

$$= 30.48 \text{ cu cm}$$

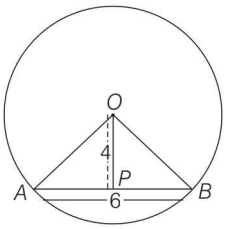
44. (c) Given that, chord AB = 6 cm

And $OP = 4$ cm

In ΔOPA,

$$\angle P = 90^\circ,$$

$$AP = \frac{AB}{2} = \frac{6}{2} = 3 \text{ cm}$$



By Pythagoras theorem,

$$OA^2 = OP^2 + AP^2$$
$$= 4^2 + 3^2$$
$$= 16 + 9 = 25$$

$\Rightarrow$ $OA = 5$ cm

$\because$ OA and OB are radius of a circle.

$\therefore$ Radius = 5 cm

45. (a) Given that,

Total number of observations = 40

$$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Total number of observations}}$$

Incorrect sum of all observations $= 160 \times 40$
$= 6400$

Correct sum of all observations
$= 6400 - 125 + 165 = 6440$

$\therefore$ Correct mean $= \frac{6440}{40} = 161$

46. (a) Given, $x + y = 12$ and $xy = 27$

Now, $(x + y)^2 = 12^2$

$\Rightarrow$ $x^2 + y^2 + 2xy = 144$

$\Rightarrow$ $x^2 + y^2 + 2 \times 27 = 144$

$\Rightarrow$ $x^2 + y^2 = 144 - 54$

$\Rightarrow$ $x^2 + y^2 = 90$

$[\because a^3 + b^3 = (a + b)(a^2 + b^2 - ab)]$

$\therefore$ $x^3 + y^3 = (x + y)(x^2 + y^2 - xy)$
$= 12(90 - 27)$
$= 12 \times 63 = 756$

47. (d) Given that, $r = 6\frac{1}{4}\% = \frac{25}{4}\%$

Let principal = ₹ P

Sum of money doubled in t time.

$\because$ $SI = 2P - P$

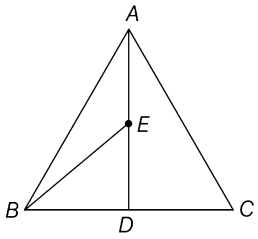
$\Rightarrow$ $SI = \frac{P \times r \times t}{100}$

$\Rightarrow$ $P = \frac{P \times 25 \times t}{100 \times 4}$

$\Rightarrow$ $t = 16$

$\therefore$ Time (t) = 16 yr

48. (d) In ΔABC, AD is median and E is the mid-point of AD.



In ΔABC,

Area of ΔABD = Area of ΔADC ... (i)

In ΔABD, BE is the median.

$ar(\Delta ABE) = ar(\Delta BED)$ ... (ii)

Now, $ar(\Delta ABD) = 2ar(\Delta BED)$ ... (iii)

$ar(\Delta ABC) = ar(\Delta ABD) + ar(\Delta ADC)$
$= 2ar(\Delta ABD)$ [by using Eq. (i)]

From Eq. (iii), we get

$ar(\Delta ABC) = 2 \times 2\, ar(\Delta BED)$

So, $ar(\Delta BED) = \frac{1}{4} ar(\Delta ABC)$

$\therefore$ Area of $\Delta BED = \frac{1}{4}$ area of ΔABC

49. (a) Given,

Radius of ballon before inflated, R = 7 cm

Radius of ballon after inflated, r = 14 cm

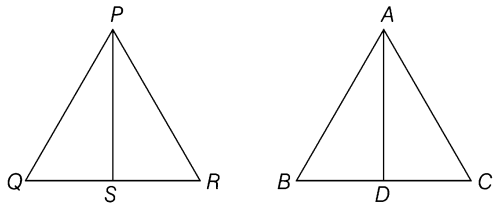
$\therefore$ $\frac{\text{Surface area of sphere before inflated}}{\text{Surface area of spherical ballon after inflated}}$

$$= \frac{4\pi R^2}{4\pi r^2} = \frac{7 \times 7}{14 \times 14} = \frac{1}{4}$$

$\therefore$ Ratio of surface areas = 1 : 4.

50. (b) ∵ Two isosceles triangles are ΔPQR and ΔABC.

They have equal vertical angles and their heights are PS and AD.



In two isosceles triangles

$$\frac{\text{Area of } \Delta PQR}{\text{Area of } \Delta ABC} = \frac{PS^2}{AD^2}$$

So, $$\frac{25}{36} = \left(\frac{PS}{AD}\right)^2 \Rightarrow \frac{PS}{AD} = \frac{5}{6}$$

∴Ratio of their heights = 5 : 6.

51. (c) 'You will be asked a lot of questions at the interview' is the correct passive voice sentence. Its structure is 'object + helping verb + be + V_3 or past participle + subject'.

52. (b) The phrase 'in cold blood' means 'without feeling or with cruel intent'. So 'cruelly' is the correct answer.

e.g. The whole family was murdered in 'cold blood'.

53. (a) 'en masse' is the correct word to be filled in the blank. The word 'en masse' means in a group or all together.

54. (c) The correct meaning of the phrase 'to put up with' is 'to tolerate'.

e.g. I don't know how Raman 'puts up with' their constant complaining.

55. (b) 'His' is the correct possessive pronoun to fill the given blank.

56. (c) Mina said, "Where's Kishore?" is correctly punctuated sentence with appropriate punctuation marks like comma, inverted commas, question mark etc.

57. (d) The idiom 'to let the cat out of the bag' means to reveal something that was kept a secret before'.

e.g. My mother 'let the cat out of the bag' and told everyone that her daughter was engaged.

58. (d) In the given options, 5 7 2 9 8 6 3 4 1 is the correct order. The sentence will be 'It happened while I was living in Mumbai last month'.

59. (a) Adjective form of 'advantage' is 'advantageous' and it means involving or creating favourable circumstances that is beneficial.

60. (c) 'We had not invited him' is the correct active voice of the given sentence.

Its structure is, 'subject + had+not+V_3 +object'.

61. (c) The tense of the given sentence is Past perfect tense. This tense is used to show that something happened before another action in the past. In this sentence action of Ram's leaving had already happened before another action I arrived.

62. (c) 'Splendid' means very good, excellent. So, the correct synonym of the splendid is 'Impressive'.

63. (b) The word 'brittle' means 'easily breakable'. e.g. My sister was diagnosed as having 'brittle' bones.

64. (b) 'talented student' is incorrect in the given sentence. When we use 'one of the', we are referring to more than one object or person. So, we should use plural nouns one of the 'talented students' is correct structure.

65. (d) The given sentence is grammatically correct, it has no error.

66. (d) In Preposition 'on' will be used in the blank. Here, this preposition is used to specify an action and denotes purpose.

67. (d) 'Against' is the correct preposition to be used here. When we do something against someone or oppose them, we use this preposition.

68. (c) 'Silver is more useful than all others metals' is correct sentence in comparative degree as 'most' has been replaced by comparative degree 'more' to compare with other metals.

69. (d) 'Learning Japanese is more difficult than learning Italian', is the correct comparative degree sentence, as it showing comparison.

70. (c) 'Apathetic' is the correct adjective form of apathy. But it should be used with any other noun such as apathetic behaviour or apathetic audience.

71. (b) 'Pride' is noun form of adjective proud. Pride means a feeling of deep pleasure or satisfaction.

72. (b) Books live forever as time can destroy building, people etc but great thoughts cannot be destroyed, which are written down in books and passed from one generation to other.

73. (c) According to the passage temples, pictures and statues belong to same category as with time all of them are likely to decay. They cannot last forever.

74. (a) Books introduce us into the best society as they give us a glimpse of the greatest minds. The thoughts of great minds are stored in books forever.

75. (c) 'would not' is the correct verb to be filled in the blank as principal clause verb 'Radha said' is in Past tense. So, we will use 'would not' which is past tense form of verb 'will not'.

76. (c) It may be due to improper combustion of the fuel i.e. incomplete combustion.
When the combustion of fuel takes place under insufficient supply of oxygen, it is called 'incomplete combustion'.
Incomplete combustion of fuel releases many hydrocarbons resulting in blackening of cooking utensils.

77. (b) The green material or coating on copper vessel is a mixture of copper hydroxide and copper carbonate $[CuCO_3 \cdot Cu(OH)_2]$ which occurs due to corrosion of copper in the presence of moist air.

$$2\,Cu(s) + \underbrace{CO_2(g) + O_2(g) + H_2O(l)}_{\text{moist air}} \longrightarrow \underset{\text{Green coating}}{CuCO_3 \cdot Cu(OH)_2}$$

78. (c) Wildlife Sanctuaries and National Parks are places meant for the conservation of biodiversity in their natural habitat (i.e., *in situ*). Zoological and Botanical gardens are places that conserve the species outside their natural habitat (i.e. *ex situ*).

79. (d) The force F acts on four different body having area $20\ m^2$, $50\ m^2$, $100\ m^2$ and $10\ m^2$.

As we know pressure $p = \frac{\text{Force (F)}}{\text{Area (A)}}$

Hence, if area will be minimum then exerted pressure will be maximum.

So, $p_{max} = \frac{F}{(A)_{min}}$ $[\because A_{min} = 10\ m^2]$

As $10\ m^2$ area is minimum out of four, then pressure will be maximum.

80. (c) Before playing the orchestra in a musical concert, a sitarist tries to adjust the tension and pluck the string suitably by doing so, he is adjusting frequency of the sitar string with the frequency of other musical instruments. Because if it is not done so, the sound will be unpleasent to listen.

81. (b) *Rhizobium* are symbiotic bacteria found in the root nodules of leguminous plants. They help in fixing free atmospheric nitrogen into soluble form that can be easily absorbed by the plant.

82. (c) The metal which is stored in kerosene is sodium. It is kept in kerosene to prevent it from coming in contact with O_2 and moisture.
Sodium is highly reactive metal, i.e., it reacts with air to form sodium oxide (Na_2O) and water to form sodium hydroxide (NaOH) with hydrogen (H_2).

83. (d) Poor conductors does not have free electron to pass the current. They oppose electric current and do not conduct electricity at all. Materials such as plastic, wood, clothes, rubber etc are poor conductors.

84. (b) Flame is actually a glowing gaseous, the hot part of fire and has three zones
(i) Inner most zone : It has lowest temperature.
(ii) Middle zone : It is yellow luminous area formed due to the partial combustion of fuel.
(iii) Outermost zone : It is the hottest zone of flame. It is blue, non-luminous area formed due to the complete combustion of fuel.

85. (d) Force of friction always acts on moving objects and its direction shall be opposite to the direction of motion. The frictional force always acts between two surfaces, opposes the relative motion of the two surfaces. The direction of the force of friction is such that it opposes the direction of motion.

86. (a) The developing young in the womb, in its later stages is known as 'foetus'. All the body structures are in the recognizable form in this stage.

Zygote is the fertilized egg and infant is a newborn baby.

87. (d) Diabetes is caused due to malfunctioning of pancreas and Insulin hormone is secreted by the β-cells of pancreas. This hormone stimulates the conversion of glucose to glycogen in the cells. Undersecretion of insulin leads to diabetes mellitus, which is associated with high blood sugar level.

88. (c) Naphthalene ($C_{10}H_8$) balls are obtained from coal tar. It is a polynuclear hydrocarbon. It is used as a germicide and moth repellent.

89. (a) John pulls back his hands immediately away from the flame due to reflex action. Such an action is possible by neural pathway (nerve cells) called reflex arc. It is an automatic response to a stimulus that does not need a conscious thought.

90. (d) The non-metal, which is described in question is iodine. Iodine is employed as tincture, i.e. a solution of 2-3% iodine in alcohol and water. Iodine and iodoform both are powerful antiseptics. Iodoform is used in powder form for wounds.

91. (b) Weeds are unwanted plants in the cultivated field. They compete with the crop plants for water, food, space and light and affect plant growth.

92. (b) PVC (Polyvinyl chloride), polythene and bakelite are synthetic substances. They are man-made polymers. Such polymers have high tensile strength. They are extensively used in our daily life as well as in industries.

93. (a) Endemic species are those species that are unique to a defined geographical location or habitat type. For example, Lemur of the Madagascar.

94. (c) A group of cells that are similar in structure and work together to achieve a particular function is called **tissue**.

95. (b) In aquatic animals, the fertilization of eggs occurs outside their body in water, they are said to be oviparous animals (which reproduce by laying eggs) with external fertilization. In external fertilization, the sperm of a male fertilize the egg outside the female's body.

96. (b) Given,

The light from sun takes time, T = 500 s

Speed of light = $300000\,\text{kms}^{-1}$

The distance between sun and earth,

d = Speed × Time

$= 300000\frac{\text{km}}{\text{s}} \times 500\text{s} = 150\,\text{million km}$

97. (c) Decomposition of element cannot be done by applying electric current into its constituents form. The passage of an electric currents through a conducting liquid causes chemical reactions. The resulting effects are called chemical effects of an electric currents. Electroplating of metals, purification of metals and decomposition of compounds are applications of chemical effects.

98. (b) Magnitude of one earthquake is 6 and another is 4.

Difference between them is = 6 – 4 = 2

So, stronger earthquake shakes 100 times as hard as the milder one, hence '6' on Richter scale has hundred times more destructive energy than an earthquake of magnitude '4'.

99. (b) There are two types of photoreceptor cells in the human eye *viz* rods and cones. The daylight vision is the function of cones, whereas twilight vision is the function of rods.

Thus, cones are sensitive to bright light.

100. (a) As we know that, the time period is directly proportional to the distance $\left(T = 2\pi\sqrt{\frac{l}{g}}\right)$ from the Sun, so the new planet discovered between Uranus and Neptune will have less time period than the Neptune and greater than the Uranus.

101. (c) Brahmo Sabha was founded on 20th August, 1828 in Calcutta by Raja Ram Mohan Roy.

102. (*) Child Marriage Restraint Act was passed on 28th September, 1929 in the Imperial Legislative Council of India. According to this act, the age of marriage for girls was fixed at 14 years and boys at 18 years.

103. (a) Population pyramid shows the distribution of various age groups in a population. It is a graphical presentation of the age and sex composition of a population. It forms the shape of a pyramid when the population is growing. Males are shown on the left side and females on the right.

104. (a) As per Article 21-A, the Constitution of India provides free and compulsory education to all the children in the age group of 6-14 years. It is a fundamental right and falls under Right of Children to Free and Compulsory Education (RTE) Act, 2009.

105. (a) Dadabhai Naoroji, also called Grand Old Man of India, wrote the book 'Poverty and Un-British Rule in India'. In this book, he brought attention to the draining of India's wealth into Britain. The book was published in 1901.

106. (b) The Drafting Committee was set up on 29th August, 1947 to prepare a draft of the Indian Constitution. Dr. B.R. Ambedkar was the chairman of the drafting committee.

107. (b) The East India Company tried to expand the cultivation of indigo in Bengal. Indigo was in high demand by the European cloth makers.

108. (d) EVMs or Electronic Voting Machines were manufactured in 1989-90. They were used for the first time in general elections in 2004 and for the legislative assembly elections in 1998.

109. (c) The Rajya Sabha also called Council of States have 245 seats. Out of this, 233 members are elected by the members of state and territorial legislatures. Remaining 12 members are appointed by the President of India.

110. (a) Open-cast mining is also called open pit or open cut mining. It is a mining technique in which minerals are extracted by removing the top surface of the Earth. This technique is used to extract minerals that lie at shallow depths.

111. (b) FIR is the First Information Report which is registered by the police. Under Section 154(2) of the Code of Criminal Procedure, 1973, the complainant has a legal right to get a free copy of the FIR from the police.

112. (d) Article 17 of the Constitution states that untouchability is not only operative but also an offence punishable by law.

113. (b) Marathi newspaper Kesari was founded in 1881 by Lokmanya Bal Gangadhar Tilak. The newspaper published articles about the Indian National Freedom Movement. Bal Gangadhar Tilak was the editor of this newspaper.

114. (a) The natural growth rate of population refers to the difference between the birth rate and the death rate in a country during a given period of time.

115. (a) Dandi March or Salt March was against the taxes taken by Britishers on salt production. This march was undertaken by Mahatma Gandhi along with his 78 supporters. They produced salt from the seawater in the coastal village of Dandi.

116. (a) Merchants of London established the East India Company to do spice trade with India. This company was granted a formal charter to do trade by Queen Elizabeth I of England in the year AD 1600.

117. (a) The period from AD 1830-1857 is called Delhi Renaissance. This period depicts the revival of art, creativity, artistic attitude and learning.

118. (a) Woods Dispatch was the document on educational reform designed by Charles Wood. Wood suggested that primary colleges must adopt Vernacular languages, high school must adopt Anglo-Vernacular language and at college level, education should be given in english language.

119. (a) Ruling party is the party that gets/wins maximum seats in the Lok Sabha to prove their majority. The ruling party members appoint a leader among them who is referred as Prime Minister.

120. (d) As per Article 22(2) of the Indian Constitution every arrested person is guaranteed Fundamental Rights.

121. (a) In December, 1984, the pesticide plant at Union Carbide India Limited in Bhopal (Madhya Pradesh) released a poisonous gas Methyl Isocyanate. This incident is regarded as the worst Industrial Tragedy or Bhopal Gas Tragedy.

122. (b) The leading producers of copper in the world is Chile that is located in South America continent. The country produced an estimated 5.33 million metric tonnes of copper in 2017. Second largest producer, of copper is Peru and third is China.

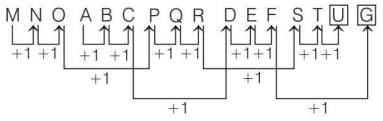
123. (a) Bihar has the 'Lowest Literacy' rate in India (61.80%) among all the states as per census 2011 while Kerala has the highest literacy rate in India (94.0%).

124. (d) As per Article 331 of the Constitution, the President has been empowered to nominate two members of the Anglo–Indian community to Lok Sabha if in his opinion, the community is not represented adequately.

The Lok Sabha consists of not more than 552 members of which 530 represents states, 20 represents UTs and 2 are nominated from Anglo-Indian community.

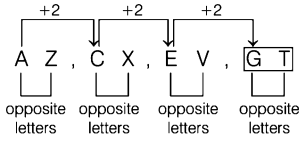
125. (d) Among the given options, Japan has highest percentage of forest land, i.e. 36.7%.

126. (d) The pattern of the series is,



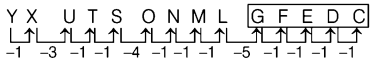
$\therefore$? ? = U G

127. (d) The pattern of the series is,

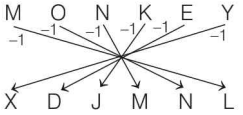


$\therefore$? = GT

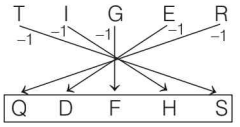
128. (b) The pattern of the series is,



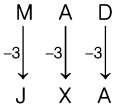
129. (a) As,



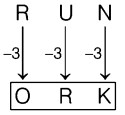
Similarly,



130. (a) As,



Similarly,



131. (d) As, 'kilometer' is the measuring unit of 'distance'. Similarly, 'Poundal' is the measuring unit of 'force'.

132. (b) As, $\frac{20}{2} = 10 + 1 = 11$

Similarly, $\frac{102}{2} = 51 + 1 = \boxed{52}$

$\therefore$? = 52

133. (a) As, $13 \times 2 = 26 - 1 = 25$

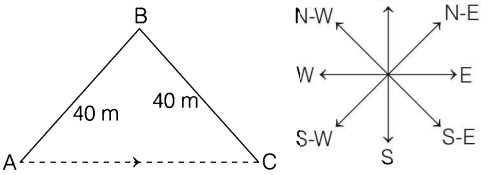
Similarly, $48 \times 2 = 96 - 1 = \boxed{95}$

$\therefore$? = 95

134. (c) Tiff has same meaning as Battle.

Similarly, Frugal has same meaning as Miserly.

135. (a) According to the question,



$\therefore$ C is in East direction with respect to A.

136. (b) In the given figures, figure (2) is different.

Except figure (2), all have three lines, where, as figure (2) has four lines.

137. (a) As, the given codes are

A	C	D	E	F	G	L	N	R
5	9	6	1	7	3	4	2	8

Hence, code for G R E E C E = 3 8 1 1 9 1

138. (a) Word TILLAGE cannot be formed by using letters of INTELLIGENCE. As INTELLIGENCE does not have letter 'A'.

139. (b) According to the question,

$+ \Rightarrow \div$

$\div \Rightarrow -$

$- \Rightarrow \times$

$\times \Rightarrow +$

Given expression $12 + 6 / 3 - 2 \times 8$

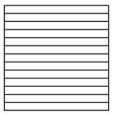
By interchanging signs

$= 12 \div 6 - 3 \times 2 + 8$

$= 2 - 6 + 8$

$= 4$

140. (b) Answer figure (2) will complete the series.



141. (c) According to the question,

Number of small cubes $= 125$

$$n = \sqrt[3]{125} = 5$$

Number of such cubes whose no side is painted $= (n-2)^3$

$= (5-2)^3$

$= (3)^3$

$= 27$

142. (c) According to the given question,

1st October = Sunday

As, next Sunday will be on = 1st October + 7

$= 8$

Similarly, next coming Sundays will be on $= 15, 22, 29$

So, 30th October = Monday

31st October = Tuesday

1st November = Wednesday

143. (b) As, Row 1 $\Rightarrow 0 + 3 = 3,\ 3 + 5 = 8$

Row 2 $\Rightarrow 15 + 9 = 24,\ 24 + 11 = 35$

Similarly, Row 3 $\Rightarrow 48 + 15 = 63,\ 63 + 17 = 80$

$\therefore \quad ? = 63$

144. (b) From option (b)

ac<u>a</u>c/ab<u>a</u>b/aca<u>c</u>/aba<u>b</u>/aca<u>c</u>

$\Rightarrow$ aacbc

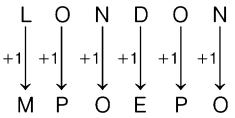
145. (c) From the letters of the given word, ANKLE cannot be formed, as word REPUBLICAN does not have 'K'.

146. (a) From the letters of the given word, GENERATE cannot be formed, as ESTRANGE does not have three E's.

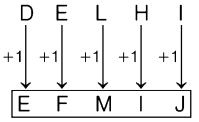
147. (b) From the letters of the given word, NEST cannot be formed, as ADMINISTRATOR does not have 'E'.

148. (a) From the letters of the given word, SCOUT cannot be formed, as SOCIALISATION does not have letter 'U'.

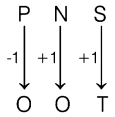
149. (d) As,



Similarly,



150. (c) As,



Similarly,