1. Answer the question referring to the symbol-letter number sequence given below:

P . 3 # R U 2 + > A P Y B 4

Q . S £ 5 N = F G 8 * D 7 Y

R : O * H T 6 @ C 9 Z K ⊗ 1

What is the difference between the total letters and total symbols, which are used in the series of P, Q and R?

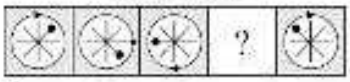
(a) Eight
(b) Nine
(c) Six
(d) Seven

2. In a certain code language, the word HURDY-GURDY is written as GF-GE and HOB-NOB is written as BE-CA. How will the word HUGGER-MUGGER be written in that language?

(a) EI-AG
(b) EI-GA
(c) EF-GA
(d) FF-GA

3. Find the missing figure which will replace the (?) in Problem Figures to complete the series.

Problem Figures



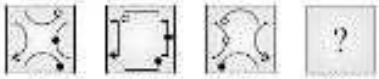
(a)

(b)

(c)

(d)

4. There is a certain relationship between fig. (i) and (iii). Establish the similar relationship between fig. (ii) and (iv) by selecting a suitable figure from the options which will replace the (?) in fig. (iv).



(i) (ii) (iii) (iv)

(a)

(b)

(c)

(d)

5. Select the correct mirror image of the given below combination of letters, if the mirror is placed vertically to the left.

LoGiCaLReAsOnInG

(a) GnInOsAeRlLaCiGoL

(b) GnInOsAeRlLaCiGoL

(c) GnInOsAeRlLaCiGoL

(d) GnInOsAeRlLaCiGoL

6. Shivam and Varun want to visit the museum after their exam. Shivam's exam finishes on 9th April and he is leaving for a holiday on 12th April. Varun's exam will be over by 10th April after which he is free. On which of the following dates can the two definitely meet?

(a) 10th April

(b) Either 10th or 11th April

(c) 11th April

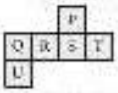
(d) Either 11th or 12th April

7. A, B, C, D, E, F, G and H are sitting around a circle facing the centre. D is second to the left of H, who is third to the left of A. B is fourth to the right of C, who is the immediate neighbour of H. G is not a neighbour of B or C. F is not a neighbour of B. How many of them are sitting between C and B?
(a) Two
(b) Four
(c) Two or Four
(d) Three

8. Introducing a man, a woman says, "His wife is the only daughter of my father". How is the man related to the woman?
(a) Brother
(b) Father-in-law
(c) Maternal uncle
(d) Husband

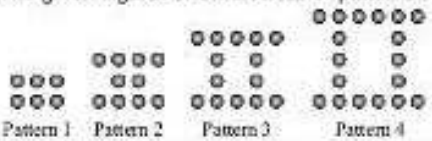
9. P, Q and R are three cities on a map. P is north of Q and $\angle PQR$ is 45° in clockwise direction. In what direction is R from Q?
(a) North-East
(b) North-West
(c) South-East
(d) South-West

10. The given figure shows the net of a cube. Which two faces lie opposite to each other?



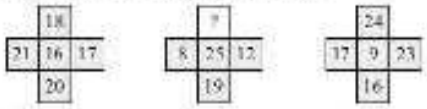
(a) P and Q
(b) P and U
(c) Q and T
(d) S and U

11. The given figures show a series of patterns formed by using circles.



How many more circles are there in Pattern 10 than in Pattern 8?
(a) 4
(b) 6
(c) 8
(d) 10

12. The characters in given figures follows a certain rule row-wise or column-wise. Identify the rule and find the missing number.



(a) 1
(b) 8
(c) 16
(d) 9

13. Read the following information and answer the following question:
(1) Seven students P, Q, R, S, T, U and V take a series of tests.
(2) No two students get the same marks.
(3) V always scores more than P.
(4) P always scores more than Q.
(5) Each time either R scores the highest and T gets the least, or alternatively S scores the highest and U or Q scores the least.
If R gets most, V should be ranked not lower than _____.
(a) Second
(b) Third
(c) Fourth
(d) Fifth

14. If the first half of the English alphabet series are written in reverse order, then which letter should be 8th letter to the left of 14th letter from the right end?
(a) E
(b) G
(c) F
(d) I

15. Which of the following shapes is exactly embedded in Fig. (X)?

Fig. (X)

(a)

(b)

(c)

(d)

Mathematical Reasoning

16. Simplify: $\dfrac{\left(\frac{2}{3}\times\left(-\frac{5}{4}\right)\right)+\left(\left(-\frac{10}{3}\right)\times\frac{5}{2}\right)-\left(\left(-\frac{16}{3}\right)\times\left(-\frac{55}{32}\right)\right)}{\frac{3}{2}\times\left(\left(-\frac{9}{14}\right)\times\left(-\frac{1}{7}\right)\right)}$

(a) $\frac{1082}{81}$

(b) $-\frac{1082}{81}$

(c) $-133\frac{7}{81}$

(d) $133\frac{7}{81}$

17. Mohit wins if he picks up a face card from the given cards. Find the probability of Mohit's winning.

(a) 5/7
(b) 1/7
(c) 2/7
(d) 6/7

18. Find the square root of $21\frac{2797}{3364}$.

(a) $4\frac{33}{58}$

(b) $4\frac{39}{58}$

(c) $4\frac{29}{57}$

(d) $4\frac{27}{52}$

19. Find the value of z.

$$z+6.1=\frac{0.5(z-0.4)}{0.35}-\frac{0.6(z-2.71)}{0.42}$$

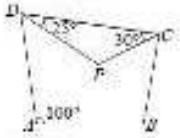
(a) −2.8

(b) 2.8

(c) 4.2

(d) −3.41

20. In the given figure, if PC and PD are the bisectors of $\angle BCD$ of $\angle ADC$ respectively, then find $\angle ABC$.



(a) 205°

(b) 180°

(c) 300°

(d) 150°

21. Which of the following is INCORRECT for an exterior angle of a regular polygon with n sides

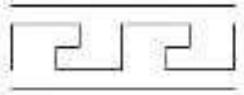
(a) All exterior angles of a polygon add upto 360°.

(b) Exterior angle = 180° − Interior angle

(c) $n=\frac{360^\circ}{\text{Exterior angle}}$

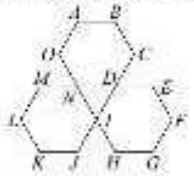
(d) Each exterior angle $=\frac{(n-2)\times 180^\circ}{n}$

22. The order of rotational symmetry in the given figure _____ is.



(a) 4
(b) 2
(c) 1
(d) Infinitely many

23. If the given figure is made up of 3 identical regular polygons, then find



(i) ∠ABN
(ii) ∠DIN
(iii) ∠IOC

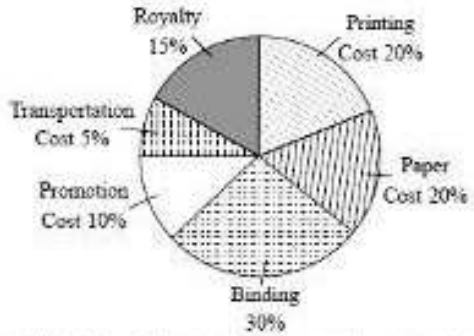
	(i)	(ii)	(iii)
(a)	120°	60°	120°
(b)	100°	60°	120°
(c)	120°	60°	60°
(d)	120°	80°	100°

24. To reduce a rational number in its standard form, we divide its numerator and denominator by their _____
(a) L.C.M
(b) H.C.F
(c) Product
(d) Multiple

25. If $2^{1998} - 2^{1997} - 2^{1996} + 2^{1995} = K.2^{1995}$, then the value of K is _____.
(a) 1
(b) 2
(c) 3
(d) 4

26. The points P, Q, R and S lie on a straight line. The ratio of the length of PQ to the length of QR is 3 : 4 and the ratio of the length of PR to the length of RS is 2 : 1. Find the ratio of the length of QR to the length of PS.
(a) 7 : 19
(b) 10 : 21
(c) 21 : 8
(d) 8 : 21

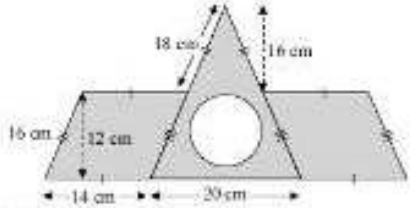
27. Study the pie-chart and answer the question based on it.
VARIOUS EXPENDITURES (IN PERCENTAGE) INCURRED IN PUBLISHING A BOOK



Which of the following two expenditures together have a central angle of 108°?
(a) Binding and Transportation
(b) Printing and Paper
(c) Royalty and Promotion
(d) Promotion and Paper

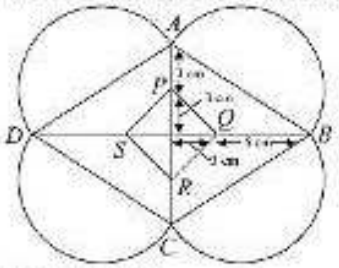
28. Sonu's grandmother is 80 years old and Sonu is 20 years old. How many years ago was his grandmother 7 times as old as Sonu?
(a) 8 years
(b) 10 years
(c) 12 years
(d) 15 years

29. Calculate the perimeter and area of the given figure respectively, if radius of circle is 7 cm.



(a) 144 cm, 462 cm^2
(b) 156 cm, 562 cm^2
(c) 122 cm, 294 cm^2
(d) 140 cm, 394 cm^2

30. A design has been drawn on a tile. ABCD and PQRS both are in the shape of a rhombus. Find the total area of semi-circles drawn on each side of rhombus ABCD.



(a) 142.843 cm^2
(b) 128.973 cm^2
(c) 39.286 cm^2
(d) 157.14 cm^2

31. Which of the following values are equal?

(P) 1^4
(Q) 4^0
(R) 0^4
(S) 4^1
(a) P and Q
(b) Q and R
(c) P and R
(d) P and S

get (a) $8y^2 + 16y + 124$
(b) $9y^2 + 72y + 144$
(c) $72y^2 + 9y + 144$
(d) $18y^2 + 4y + 164$

33. If the distance travelled by a car in one hour is 210 km, then the distance travelled by the same car with the same speed in 60 seconds is _____.
(a) 4500 m
(b) 3160 m
(c) 3500 m
(d) 4230 m

34. To construct a unique rectangle, the minimum number of measurements required is _____.
(a) 4
(b) 3
(c) 2
(d) 1

35. Which of the following shows distributive property of multiplication over addition for rational numbers?
(a) $-\frac{3}{4}\times\left\{\frac{1}{3}+\left(-\frac{5}{7}\right)\right\}=\left[-\frac{3}{4}\times\frac{1}{3}\right]+\left[-\frac{3}{4}\times\left(-\frac{5}{7}\right)\right]$
(b) $-\frac{3}{4}\times\left\{\frac{1}{3}+\left(-\frac{5}{7}\right)\right\}=\left[-\frac{3}{4}\times\frac{1}{3}\right]-\left[-\frac{5}{7}\right]$
(c) $-\frac{3}{4}\times\left\{\frac{1}{3}+\left(-\frac{5}{7}\right)\right\}=\frac{1}{3}+\left[-\frac{3}{4}\right]\times\left(-\frac{5}{7}\right)$
(d) $-\frac{3}{4}\times\left\{\frac{1}{3}+\left(-\frac{5}{7}\right)\right\}=+\left[\frac{1}{3}+\left(-\frac{5}{7}\right)\right]\frac{3}{4}$

36. Tanya and Priya left Town P and travelled in opposite directions to Town Q and Town R respectively at 7:30 a.m. Tanya was travelling at a speed of 68 km/hr while Priya was travelling at a speed of 52 km/hr. How far apart are they at 9:30 a.m.?
(a) 320 km
(b) 230 km
(c) 136 km
(d) 240 km

37. During a mass drill exercise, 6250 students of different schools are arranged in rows such that the number of students in each row is equal to the number of rows. In doing so, the instructor finds out that 9 children are left out. Find the number of children in each row.
(a) 46
(b) 79
(c) 85
(d) 69

38. ₹ 350 is divided among P, Q and R in the ratio 2 : 5 : 3. Find the amount of money that the child with the largest share got.
(a) ₹175
(b) ₹180
(c) ₹145
(d) ₹160

39. Garima has 150 picture cards. Tarun has 110 picture cards. How many cards must Garima give to Tarun so that Tarun will have 4 times as many cards as Garima?
(a) 100
(b) 140
(c) 82
(d) 98

40. The digit in the tens place of a two digit number is 3 more than the digit in the units place. Let the digit at units place be b. Then the number is _____.
(a) 11b + 30
(b) 10b + 30
(c) 11b + 3
(d) 10b + 3

paid by him in terms of x.

(a) $x^2 + 8x + 16$

(b) $8x^2 + 16x + 12$

(c) $6x^2 + 2x + 14$

(d) $8x^2 + x + 16$

42. There are 86,400 seconds in a day. How many days long is a second? Express your answer in scientific notation upto 3 decimal places.

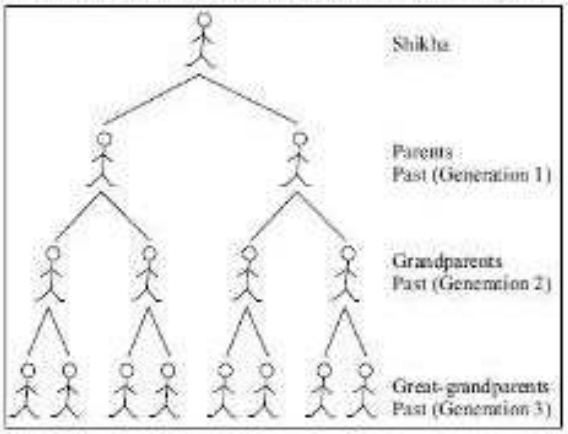
(a) 1.157×10^{-5}

(b) 1.234×10^{-5}

(c) 1.157×10^{-5}

(d) 1.432×10^{-4}

43. While studying her family's history, Shikha discovers records of ancestors 12 generations back. She wonders how many ancestors she had in the past 12 generations. She starts to make a diagram to help her figure this out. The diagram soon becomes very complex.



Find an equation for the number of ancestors in a generation n.

(a) 2n

(b) n+2

(c) 2^n

(d) $\frac{n}{2}$

44. One fruit salad recipe requires $\frac{1}{2}$ cup of sugar. Another recipe for the same fruit salad requires 2 tablespoons of sugar. If 1 tablespoon is equivalent to $\frac{1}{16}$ cup, how much more sugar does the first recipe require?

(a) $\frac{4}{5}$ cup

(b) $\frac{6}{5}$ cup

(c) $\frac{3}{8}$ cup

(d) $\frac{5}{8}$ cup

45. Ananya took part in a race. She ran 1.7 km, jogged for $1\frac{2}{3}$ hours and walked the remaining 300 m of the race. If the total distance of the race was 17 km, find her jogging speed.

(a) 8 km/hr

(b) 12 km/hr

(c) 7 km/hr

(d) 9 km/hr

Achievers Section

46. Identify P, Q and R.

P

Q

R

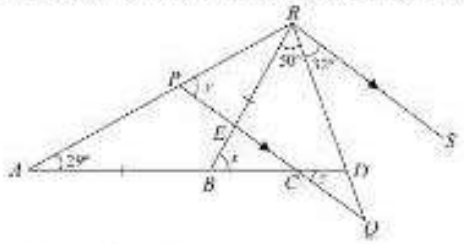
(a) Rectangle prism	Square prism	Triangular pyramid
(b) Rectangular Pyramid	Square prism	Triangular prism
(c) Rectangular Pyramid	Square prism	Cuboid
(d) Square prism	Rectangular prism	Triangular pyramid

47. Match the following:

Column – I	Column - II
(a) Line Graph	(i) Shows continuous changes in data over periods of time.
(b) Circle Graph	(ii) Compare parts of a whole.
(c) Histogram	(iii) Shows the frequency of data divided into equal groups.

(a) (a) → (i), (b) → (iii), (c) → (ii)
(b) (a) → (iii), (b) → (ii), (c) → (i)
(c) (a) → (i), (b) → (ii), (c) → (iii)
(d) (a) → (ii), (b) → (i), (c) → (iii)

48. In the given figure (not drawn to scale), BA = BR and PQ is parallel to RS. Find x, y and z.



	x	y	z
(a)	58°	69°	40°
(b)	58°	40°	30°
(c)	48°	59°	70°
(d)	69°	40°	58°

49. A dice is rolled once. What is the probability that the number will be
(a) A factor of 36 (b) odd (c) Less than 1

	(a)	(b)	(c)
(a)	$\frac{5}{6}$	$\frac{1}{4}$	$\frac{1}{6}$
(b)	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{6}$
(c)	$\frac{2}{3}$	$\frac{1}{3}$	0
(d)	$\frac{5}{6}$	$\frac{1}{2}$	0

50. Fill in the blanks:

(i) ___P__ is the multiplicative identity of rational numbers.

(ii) There are __Q ____ rational numbers between two given rational numbers.

(iii) Rational numbers are not associative for __R ____.

	P	Q	R
(a)	0	infinite	division
(b)	1	infinite	division
(c)	1	finite	subtraction
(d)	0	infinite	addition