1 A circle is inscribed in a triangle ABC. It touches the sides AB, BC and AC at the points R, P and Q respectively. If AQ = 4.5 cm, PC = 5.5 cm and BR = 6 cm, then the perimeter of the triangle ABC is

(a) 30.5 cm   (b) 28 cm   (c) 32 cm   (d) 26.5 cm

2. A truck covers a distance of 384 km at a certain speed. If the speed is decreased by 16 km/h, it will take 2 hours more to cover the same distance. 75% of its original speed (in km/h) is:

(a) 45   (b) 54   (c) 48   (d) 42

3. The ratio of the ages of A and B, four years ago, was 4 : 5. Eight years from now, the ratio of the ages of A and B will be 11 : 13. What is the sum of their present ages?

(a) 80 years   (b) 96 years   (c) 72 years   (d) 76 years

4. In $\triangle ABC$, F and E are the points on sides AB and AC, respectively, such that FE $\parallel$ BC and FE divides the triangle in two parts of equal area. If AD $\perp$ BC and AD intersects FE at G, then GD : AG=?

(a) $\sqrt{2}$:1   (b) $\sqrt{2} - 1$:1   (c) 2 $\sqrt{2}$:1   (d) $\sqrt{2} + 1$:1

5. If $4 - 2\sin^2\theta - 5\cos\theta = 0$ $0 < \theta < 90$, then the value of $\sin\theta + \tan\theta$ is

(a) $\frac{3\sqrt{2}}{2}$ (b) $\frac{3\sqrt{3}}{2}$ (c) $3\sqrt{2}$ (d) $2\sqrt{3}$

6. If decreasing 120 by x% gives the same result as increasing 40 by x%, then x% of 210 is what percent less than (x + 20)% of 180?

(a) $33\frac{1}{3}$ (b) 18   (c) $16\frac{2}{3}$ (d) 20

7. If $(5\sqrt{5}\ x^3 - 81\sqrt{3}\ y^3) \div (\sqrt{5}\ x - 3\sqrt{3}\ y) = (Ax^2 + By^2 + Cxy)$ then the value $(6A + B - 15\ C)$ is

(a) 10   (b) 9   (c) 15   (d) 12

8. If a nine-digit number 985x3678y is divisible by 72, then the value of (4x − 3y) is:

(a) 5   (b) 4   (c) 6   (d) 3

9. If $\sin\theta = \frac{p^2-1}{p^2+1}$ then $\cos\theta$ is equal to

(a) $\frac{2p}{p^2+1}$ (b) $\frac{p}{p^2-1}$ (c) $\frac{p}{p^2+1}$ (d) $\frac{2p}{p^2-1}$

10. The ratio of the efficiencies of A, B and C is 2 : 5 : 3. Working together, they can complete a work in 27 days. B and C together can complete 4/9 th part of the work in :

(a) 27 days   (b) 15 days   (c) $17\frac{1}{7}$ days   (d) 24 days

11. The average of twelve number is 42. The average of the last five numbers is 40, and that of the first four numbers is 44. The 6th number is 6 less than the fifth and 5 less than the 7th number. The average of the 5th and the 7th numbers is :

(a) 44   (b) 44.5   (c) 43   (d) 43

12. If x + y + z = 19, x² + y² + z² = 133 and xz = y², then the difference between z and x is:

(a) 5   (b) 3   (c) 6   (d) 4

13. $=\frac{2+tan^2\theta+cot^2\theta}{sec\theta cosec\theta}$

(a) $cot\theta$ (b) $cos\theta sin\theta$ (c) $sec\theta cosec\theta$ (d) $tan\theta$

14. In a circle of radius 10 cm, with centre O, PQ and PR are two chords each of length 12 cm. PO intersects chord QR at the points S. The length of OS is:

(a) 2.8 cm   (b) 2.5 cm   (c) 3.2 cm   (d) 3 cm

15. A sum amount to Rs. 8,028 in 3 years and to Rs. 12,042 in 6 years at a certain rate percent per annum,when the interest is compounded yearly. The sum is :

(a) Rs. 5,352   (b) Rs. 5,235   (c) Rs. 5,325   (d) Rs. 5,253

16. The value of 2 × 3 ÷ 2 of 3 × 2 ÷ (4 + 4 × 4 ÷ of 4 − 4 ÷ 4 × 4) is :

(a) 8   (b) 1   (c) 4   (d) 2

17. After giving two successive discounts, each of x%, on the marked price of an article, total discount is Rs. 259.20. If the marked price of the article is Rs. 720, then the value of x is :

(a) 18   (b) 24   (c) 20   (d) 25

18. A solid cube of volume 13824 cm³ is cut into 8 cubes of equal volumes. The ratio of the surface area of the original cube to the sum of the surface areas of three of the smaller cubes is:

(a) 2 : 3   (b) 4 : 3   (c) 8 : 3   (d) 2 : 1

19. A persons sold an article at a loss of 15%. Had he sold it for Rs. 30.60 more, he would have gained 9%. To gain 10%, he should have sold it for:

(a) Rs. 140.25   (b) Rs. 132   (c) Rs. 130   (d) Rs. 128.40

20. In a $\triangle ABC$, the bisectors of $\angle B$ and $\angle C$ meet at point O, inside the triangle. If $\angle BOC$ = 122°, then the measure of $\angle A$ is :

(a) 64°   (b) 62°   (c) 72°   (d) 68°

21. If $x^4 + x^{-4} = 194$, x > 0, then the value of $(x - 2)^2$ is:

(a) 1   (b) 6   (c) 2   (d) 3

22. The table shows the production of different types of cars (in thousands).

Years / Cars	2012	2013	2014	2015	2016
A	30	35	48	45	56
B	42	48	40	38	56
C	48	36	38	35	44
D	51	24	30	46	54
E	20	42	40	35	43

22. If the date related to the production of cars of type E is represented by a pie chart, then the central angle of the sector representing the data of production of cars in 2013 will be:

(a) 102°   (b) 84°   (c) 70°   (d) 80°

23. What is the ratio of the total production of cars of type A in 2014 and type C in 2013 taken together to the total production of cars of type B in 2016 and type E in 2015 taken together?

(a) 12 : 13   (b) 11 : 12   (c) 10 : 11   (d) 12 : 11

24. The total production of type B cars in 2012, 2014 and 2015 taken together is approximately what percent more than the total production of type A cars in 2013 and 2016 taken together?

(a) 31.9 (b) 33.2

(c) 36.3 (d) 34.4

25. The number of years, in which the production of cars of type B is less than the average production
of type D cars over the years, is :

(a) 4 (b) 1

(c) 3 (d) 2

Q1. Which two signs should be interchanged in the following equation to make it correct?

7 × 3 + 4 – 15 ÷ 5 = 16

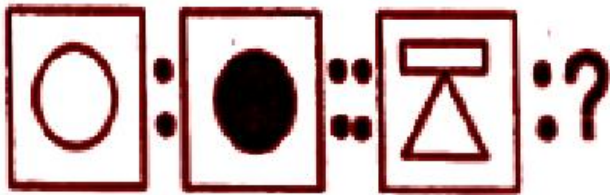(a) ÷ and – (b) × and + (c) ÷ and + (d) ÷ and ×

Q2. Which one of the given responses would be a meaningful order of the following words?

a. Foundation b. Plastering c. Building d. Painting

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

Q3. Select the related figure from the given alternatives.

(a) (b) (c) (d)
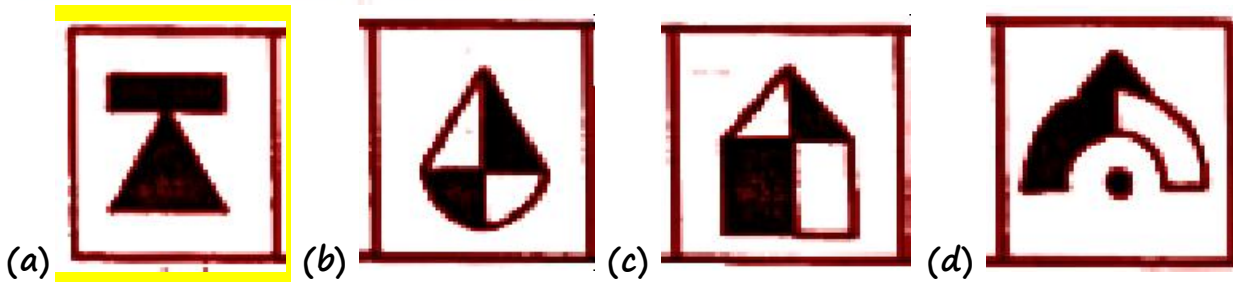
Q4.Three of the following four numbers are like in a certain way and one is different. Pick the odd one out.

(a)153 (b)121 (c)81 (d)169

Q5. If RASH is coded as 819118 and DAWN is coded as 142314, then how will PALM be coded as?
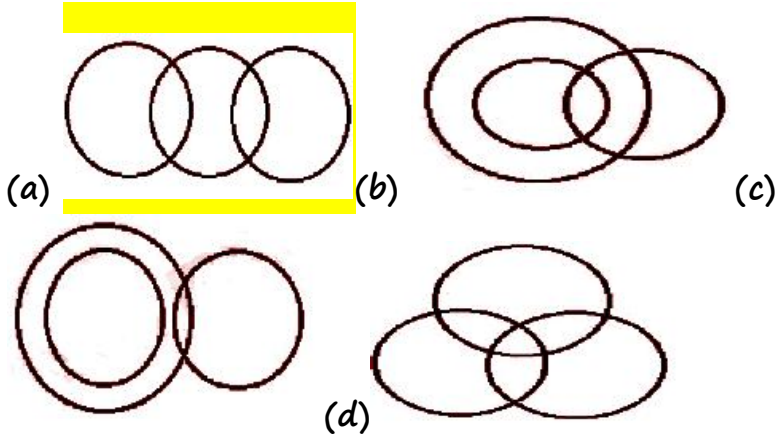
(a) 1214131 (b) 1312116 (c) 1311456 (d) 1231453

Q6.Select the number pair in which the two numbers are related in the same way as are the two numbers of the followingnumber-pair.

7 : 42

(a) 6 : 32 (b) 5 : 24 (c) 8 : 56 (d) 9 : 76

Q7. Select the venn diagram that best illustrates the relation between the following classes.

Bus, Car and Brake

(a)   (b)   (c)

(d)

Q8. In a code language, RELATION is written as OPJUBMFS. How will SECTOR be written in that language?

(a)SPUEGB (b)RBDQNS (c)SPUDFT (d)RDBSNQ

Q9. Pointing to a girl, Mihir said "She is the only daughter of my grandfather's only child". How is the girl related to Mihir?

(a) Daughter (b) Niece

(c) Sister (d) Data inadequate

Q10. Which number will replace the question mark (?) in the following series?
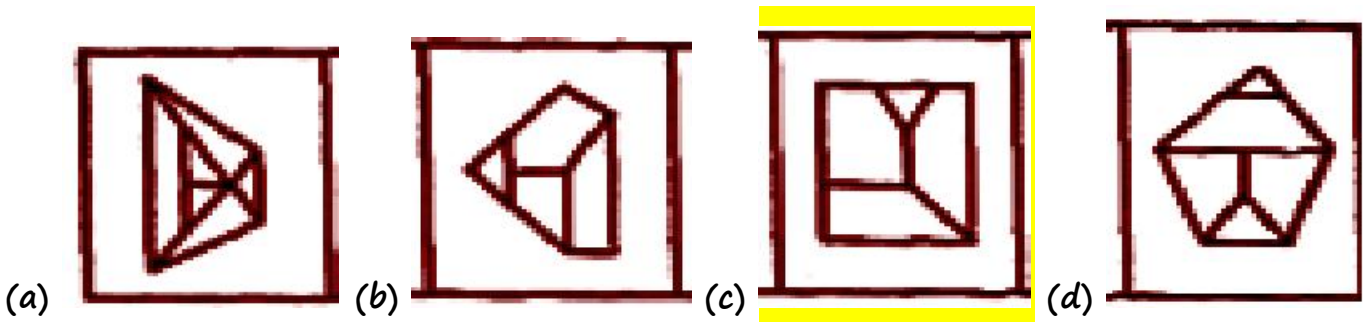
3, 7, 15, 27, 47, ?

(a)77 (b)79 (c)63 (d)71

Q11. Select the word-pair in which the two words are related in the same way as are the two words in the following word-pair.

(a)Cholera : Epidemic

(b)Old age : Senility

(c)Audition : Hearing

(d)Vision : Blindness

Q 12. Select the option in which the given figure is embedded?

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

Q13. Two positions of a dice are shown. When 4 is at the bottom, what number will be on the top ?

(i)   (ii)
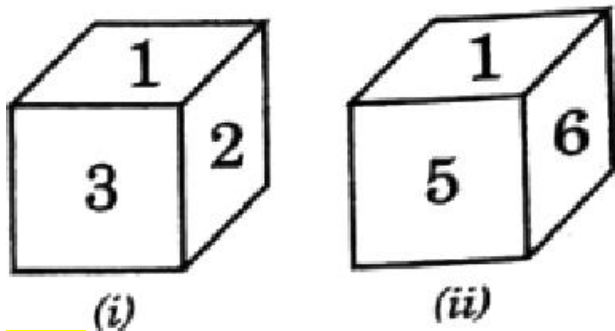
(a) 1 (b) 2 (c) 5 (d) 6

Q 14. Three of the following four letter-clusters are alike in a certain way and one is different. Pick the odd one out.
(a) BEHK (b) FGHI (c) LNPR (d) ORTW

Q15. Select the combination of letters that when sequentially placed in the gaps of the given letter series will complete the series.
q_qpq_qr_pqqq_qp_q
(a) rqqpr (b) rqpqr (c) rqqrq (d) qrqpq

Q16. Directions : In the following question, two statements are given followed by four conclusions I, II III and IV. You have to consider the two statements to be true even if they seem to be at variance from commonly known facts. You have to decide which of the given conclusions, if any, follow from the given statements.
Statements
1. All peacocks are lions.
2. Some tigers are peacocks.
Conclusions:

I. Some lions are not tigers.

II. All tigers are lions.

III. Some tigers are lions.

IV. All peacocks are tigerS.

(a) Only conclusion III follows

(b) Only conclusion IV follows

(c) Only conclusion I follows

(d) Only conclusion II follows

Q17. Select the option that is related to the third letter cluster in the same way as the second letter cluster is related to the first letter cluster.

BCZE : YXAV :: CDEB : ?

(a) XWVU (b) WVUX (c) WVXU (d) XWVY

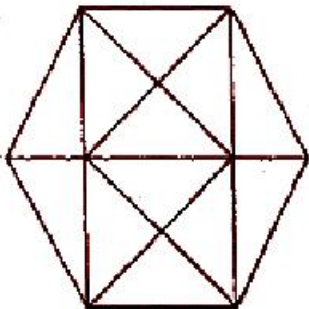Q18. Select the set in which the numbers are related in the same way as they are numbers of the following set.

(10 , 16 , 24)

(a)15, 17, 18 (b)14, 26, 22 (c)18, 23, 34 (d)19, 12 , 15

Q19. Three of the following four words are alike in a certain way and one is different. Pick the odd word out.

(a) Vayudoot   (b) Pushkar

(c) Indian Airlines (d) Air India
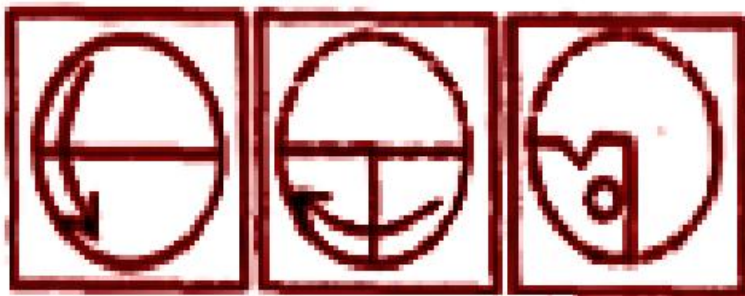
Q20. How many triangles are there in the following figure?

(a) 20 (b) 24 (c) 28 (d) 32

Q21. In the following question which of the answer figures is exactly the mirror image of the question figure when the mirror is held at XY?

(a)　　　　　　(b)　　　　　　(c)　　　　　　(d)

Q22. A paper is folded and cut as shown in the following figures. How will it appear when unfolded?

(a)　　　　　　(b)　　　　　　(c)　　　　　　(d)

Q23. Select the word-pair in which the two words are related in the same way as are the two words in the following word pair.

Novelty: Oldness:: Newness: ?

(a) Model　　　　　　(b) Antiquity

(c) Discovery   (d) Culture

Q24. Select the set in which the numbers are related in the same way as are the numbers of the following set.

(3, 7, 15)

(a) 2, 6, 10 (b) 4, 8, 18 (c)5,9,17 (d)7,12,19

Q25. A man is facing East, then he turns left and goes 10 m, then turns right and goes 5 m, then goes 5 m to the South and from there 5 m to West. In which direction is he from his original place?

(a) East   (b) West

(c) North   (d) South