

SECTION I : LOGICAL REASONING

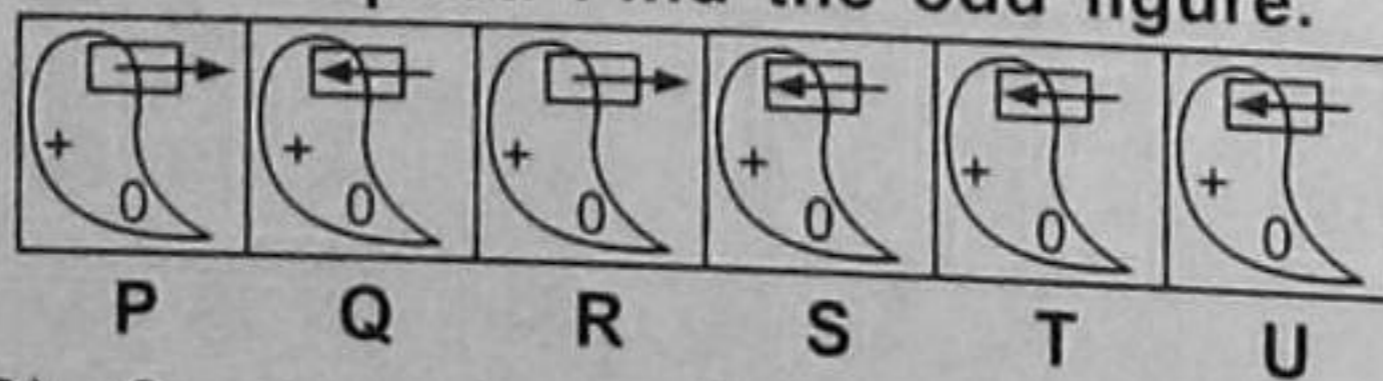
1. Seven basketball players (A, B, C, D, E, F and G) are to be honoured at a special luncheon. The players will be seated on the dias in a row. A and G have to leave the luncheon early and so must be seated at the extreme right. B will receive the most valuable player's trophy and so must be in the centre to facilitate presentation. C and D are bitter rivals and therefore must be seated as far apart as possible. Which of the following cannot be seated at either end?

(A) C (B) D (C) F (D) G

2. If it is possible to make a meaningful word with the second, the sixth, the ninth and the twelfth letters of the word 'CONTRIBUTION', which of the following will be the last letter of that word? If more than one such word can be made, give 'M' as the answer and if no such word is there, give 'X' as the answer.

(A) T (B) O (C) X (D) M

3. The following figures bear some sort of similarity to one another, except which differs from others in some respect. Find the odd figure.



(A) P (B) Q (C) S (D) T

4. There is a Fig. (X), followed by four options which have more complex figures, in one of which Fig. (X) is hidden/embedded in some position. Identify the figure.

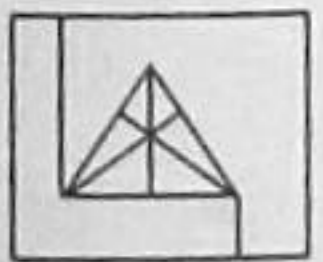
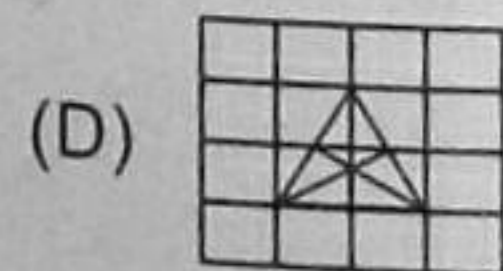
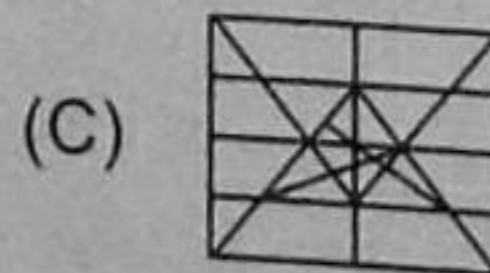
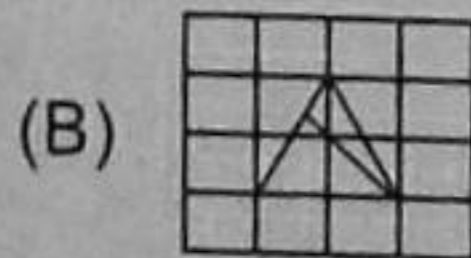
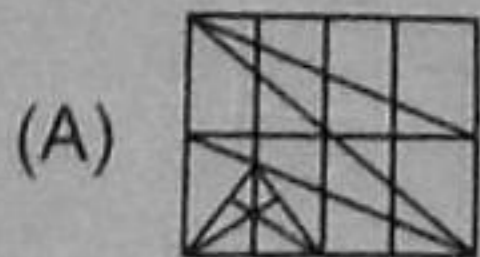


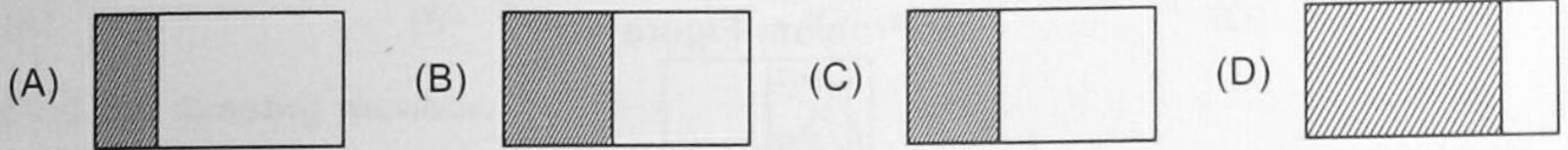
Fig. (X)



5. How many 1's are there in the following sequence which are immediately preceded by 9 but not immediately followed by 7?

7 1 9 1 1 7 1 8 9 1 7 1 2 1 3 1 1 4 5 7 1 3 9 1 7

- (A) One (B) Two (C) Three (D) Four
6. Pointing towards a man in the photograph, Archana said, "He is the son of the only son of my grandfather." How is the man related to Archana?
- (A) Cousin (B) Nephew (C) Brother (D) Son
7. In an competitive examination, 60% students took science based subjects and rest took non-science subjects. If 25% of each group succeeded and shaded portion depicts the successful candidates, which of the following figures shall represent the above situation best?



8. In a row of girls, Chetna is 7th from the right end and Neelam is 15th from the left end. If both of them exchange their positions, then Chetna becomes 20th from the right. How many girls are there in the row?
- (A) 26 (B) 21 (C) 35 (D) 34

9. Six compounds are being tested for possible use in a new anti-poison, "Sweet 'N' Deadly".

- (i) U is sweeter than V and more deadly than Z.
 (ii) V is sweeter than Y and less deadly than Z.
 (iii) W is less sweeter than X and less deadly than U.
 (iv) X is less sweeter and more deadly than U.
 (v) Y is less sweeter and more deadly than U.
 (vi) Z is sweeter than U and less deadly than W.

Which is the sweetest?

- (A) Z (B) W (C) X (D) Y

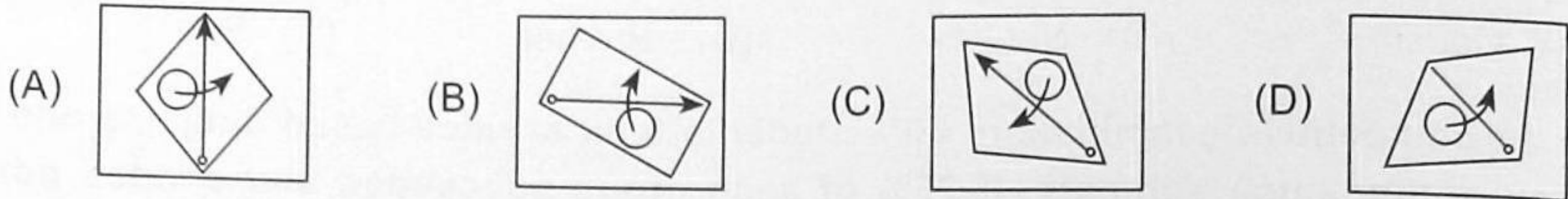
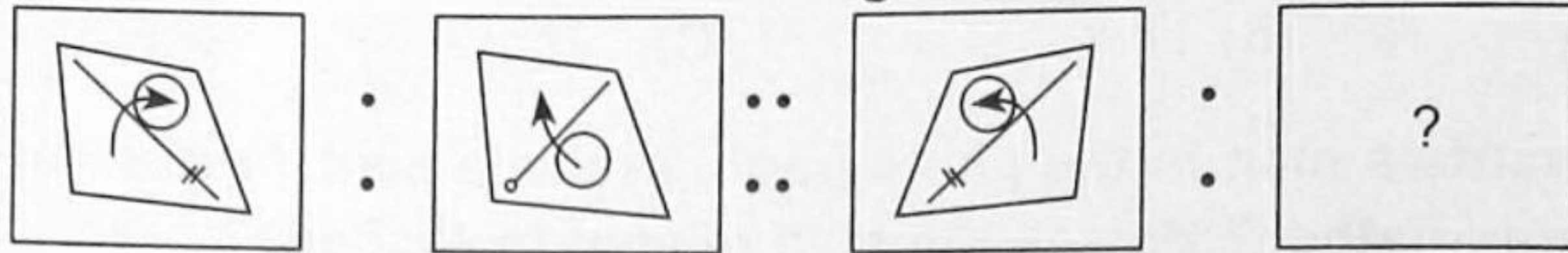
10. Find out the correct letter pair from the given options which follows the same relationship among the group of letters given below.

POLITE : ETILOP :: _____ : _____

- (A) ELPMIS : SIMPLE (B) DRAOB : BOARD
 (C) CHART : TRAHC (D) WOMEN : WOMAN

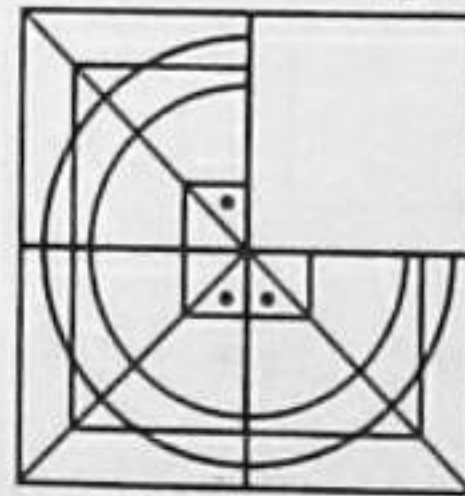
11. Find the relationship in the first set (2 figures) of Problem Figures. Based on the same relationship find the suitable figure from answer figure to fit in the blank space in following question.

Problem Figures



12. Select the figure from the answer figure which fits into the blank space in the incomplete portion of Problem Figure so that the original pattern is complete.

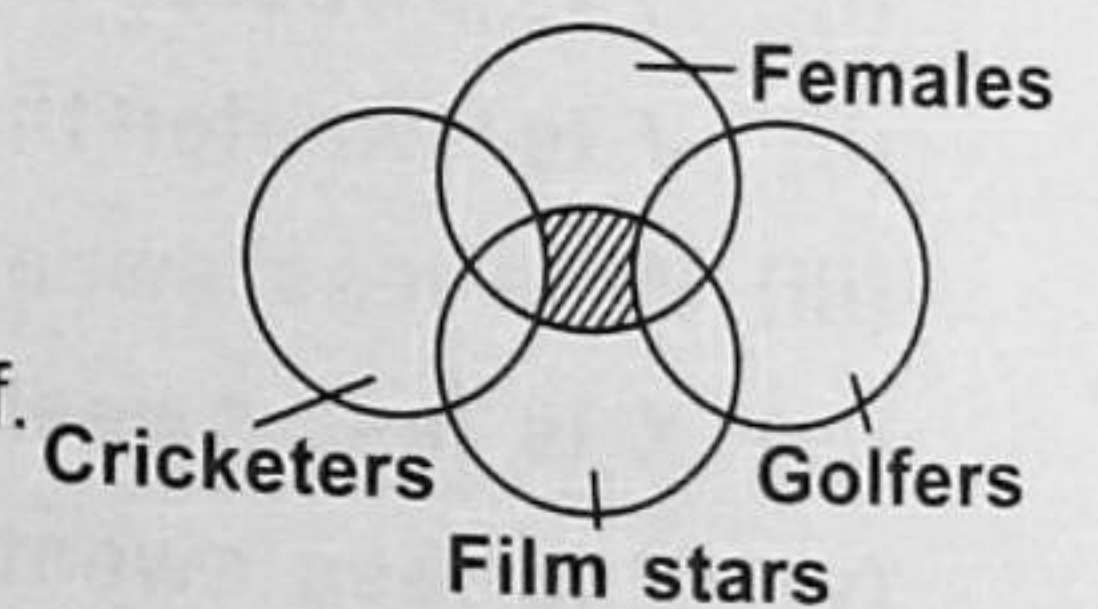
Problem Figure



13. If 'SELDOON' means 'NOODLES', what does 'SPUOS' means?
 (A) DOMED (B) BOMED (C) TOMED (D) SOUPS

14. The shaded portion depicts _____.

- (A) A group of female film star.
 (B) A group of film stars who are neither cricketers nor golfers.
 (C) A group of female film stars who neither play cricket nor golf.
 (D) None of these



15. Bhavika and Sunaina starts walking simultaneously towards each other from two places 100 m apart. After walking 30 m, Bhavika turns left and goes 10 m, then she turns right and goes 20 m and then turns right again and comes back to the road on which she had started walking. If both Bhavika and Sunaina walk with the same speed, what is the distance between them at this point of time?

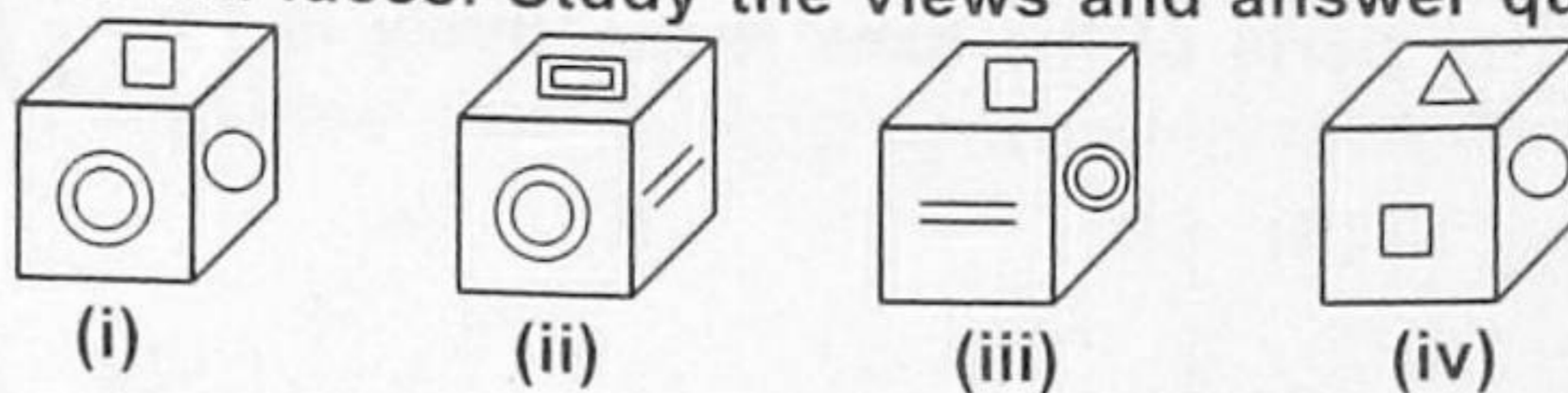
- (A) 70 metres (B) 40 metres (C) 10 metres (D) 20 metres

16. Determine the pattern and find the missing number.

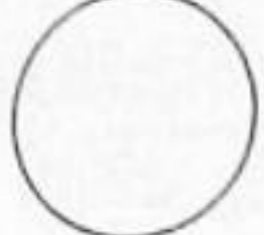
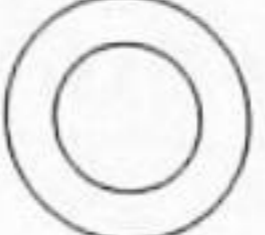
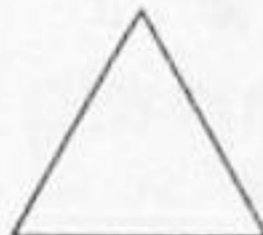
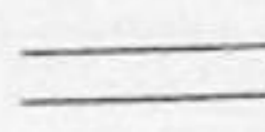
4 5 7 ? 19

- (A) 56 (B) 66 (C) 17 (D) 11

17. In the following diagram there are four views of a single wooden cube having various markings on its all the six faces. Study the views and answer question that follow.



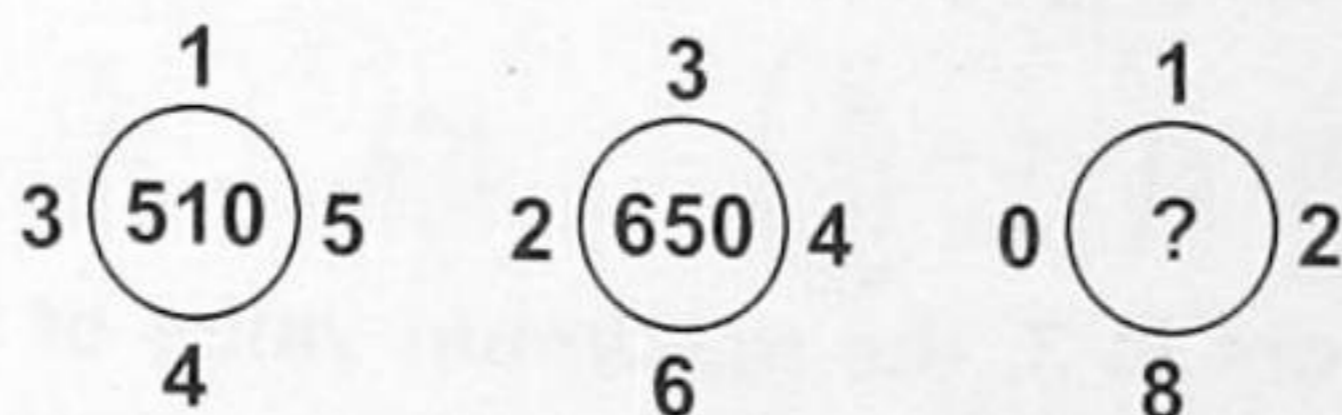
Which symbol is at the bottom of view (iv)?

- (A)  (B)  (C)  (D) 

18. P, Q, R, S, T and U are six members of a family. Out of six members, three are male members. There are two married couples among them. R is the father of P and U, and T is the mother of R. P is the granddaughter of Q, then which of the following pairs is one of the married couples?

- (A) TU (B) QS (C) TQ (D) PU

19. Find the missing number.



- (A) 660 (B) 670 (C) 610 (D) 690

20. Find the water-image of the given below combination.

DK17C

- (A) DKJΔC (B) DKJΔC (C) C71KD (D) CΔJKD

SECTION II : MATHEMATICAL REASONING

21. If N be the set of all natural numbers, consider $f : N \rightarrow N$ where $f(x) = 2x$, $\forall x \in N$, then f is _____.

- (A) One-One Onto (B) One-One Into (C) Many-One Onto (D) None of these

22. If $2p + 3q + 4r = 15$, then the maximum value of $p^3q^5r^7$ is _____.

- (A) 2180 (B) $\frac{5^4 \cdot 3^5}{2^{15}}$ (C) $\frac{5^5 \cdot 7^7}{2^{17} \cdot 9}$ (D) 2285

23. If $\begin{vmatrix} 1+a & 1 & 1 \\ 1+b & 1+2b & 1 \\ 1+c & 1+c & 1+3c \end{vmatrix} = 0$, where $a \neq 0$, $b \neq 0$, $c \neq 0$, then $a^{-1} + b^{-1} + c^{-1}$ is _____.

- (A) 4 (B) -3 (C) -2 (D) -1

24. A letter is taken out at random from 'ASSISTANT' and another is taken out from 'STATISTICS'. The probability that they are the same letters, is _____.

- (A) 1/45 (B) 13/90 (C) 19/90 (D) none of these

25. The equation of circle which passes through the origin and cuts off intercepts 5 and 6 from the positive parts of the axes respectively is $\left(x - \frac{5}{2}\right)^2 + (y - 3)^2 = \lambda$, where λ is _____.
- (A) $61/4$ (B) $6/4$ (C) $1/4$ (D) 0
26. The derivative of $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ with respect to $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$ is _____.
- (A) 0 (B) 1 (C) $\frac{1}{1-x^2}$ (D) $\frac{1}{1+x^2}$
27. The values of x so that $[1 \ x \ 1] \begin{bmatrix} 1 & 3 & 2 \\ 0 & 5 & 1 \\ 0 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ x \end{bmatrix} = 0$ is/are _____.
- (A) ± 2 (B) 0 (C) $\frac{-7 \pm \sqrt{35}}{2}$ (D) $\frac{-9 \pm \sqrt{53}}{2}$
28. The set of values of x in $(-\pi, \pi)$ which satisfies $|4\sin x - 1| < \sqrt{5}$ is _____.
- (A) $\left(-\frac{\pi}{10}, \frac{\pi}{10}\right)$ (B) $\left(-\pi, -\frac{\pi}{10}\right)$ (C) $\left(-\frac{\pi}{10}, \frac{3\pi}{10}\right)$ (D) none of these
29. The sum of two numbers is 3, the maximum value of the product of the first and the square of second is _____.
- (A) 4 (B) 1 (C) 3 (D) 0
30. For any three non-zero vectors \vec{r}_1, \vec{r}_2 and \vec{r}_3 , $\begin{vmatrix} \vec{r}_1 \cdot \vec{r}_1 & \vec{r}_1 \cdot \vec{r}_2 & \vec{r}_1 \cdot \vec{r}_3 \\ \vec{r}_2 \cdot \vec{r}_1 & \vec{r}_2 \cdot \vec{r}_2 & \vec{r}_2 \cdot \vec{r}_3 \\ \vec{r}_3 \cdot \vec{r}_1 & \vec{r}_3 \cdot \vec{r}_2 & \vec{r}_3 \cdot \vec{r}_3 \end{vmatrix} = 0$, then which of the following is false?
- (A) All the three vectors are parallel to one and the same plane
 (B) All the three vectors are linearly dependent
 (C) This system of equation has a non-trivial solution
 (D) All the three vectors are perpendicular to each other
31. The function $f(x) = 1 - x^3 - x^5$ is decreasing for _____.
- (A) $1 \leq x \leq 5$ (B) $x \leq 1$ (C) $x \geq 1$ (D) All values of x
32. Consider the following statements :
- The equation of the parabola whose focus is at the origin is $y^2 = 4a(x + a)$.
 - The line $lx + my + n = 0$ will touch the parabola $y^2 = 4ax$, if $ln = am^2$.
- Which of these is/are correct?
- (A) Only (1) (B) Only (2) (C) Both (A) and (B) (D) None of these
33. If $\sin^{-1}\alpha + \sin^{-1}\beta + \sin^{-1}\gamma = \frac{3\pi}{2}$, then $\alpha\beta + \alpha\gamma + \beta\gamma$ is equal to _____.
- (A) 1 (B) 0 (C) 3 (D) -3

34. Tangents at any point on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ cut the axes at A and B respectively. If the rectangle OAPB (where O is the origin) is completed, then locus of point P is given by _____.

- (A) $\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$ (B) $\frac{a^2}{x^2} + \frac{b^2}{y^2} = 1$ (C) $\frac{a^2}{y^2} - \frac{b^2}{x^2} = 1$ (D) $\frac{a^2}{y^2} + \frac{b^2}{x^2} = 1$

35. Domain of $f(x) = \sin^{-1}[2 - 4x^2]$ ([.] denotes the greatest integer function) is _____.

- (A) $[-1, 1]$ (B) $(-2, 2)$
 (C) $\left[-\frac{\sqrt{3}}{2}, 0\right) \cup \left(0, \frac{\sqrt{3}}{2}\right]$ (D) None of these

36. The value of the integral $\int_{1/n}^{(an-1)/n} \frac{\sqrt{x}}{\sqrt{a-x} + \sqrt{x}} dx$ is _____.

- (A) $\frac{a}{2}$ (B) $\frac{na+2}{2n}$ (C) $\frac{na-2}{2n}$ (D) $\frac{na}{2}$

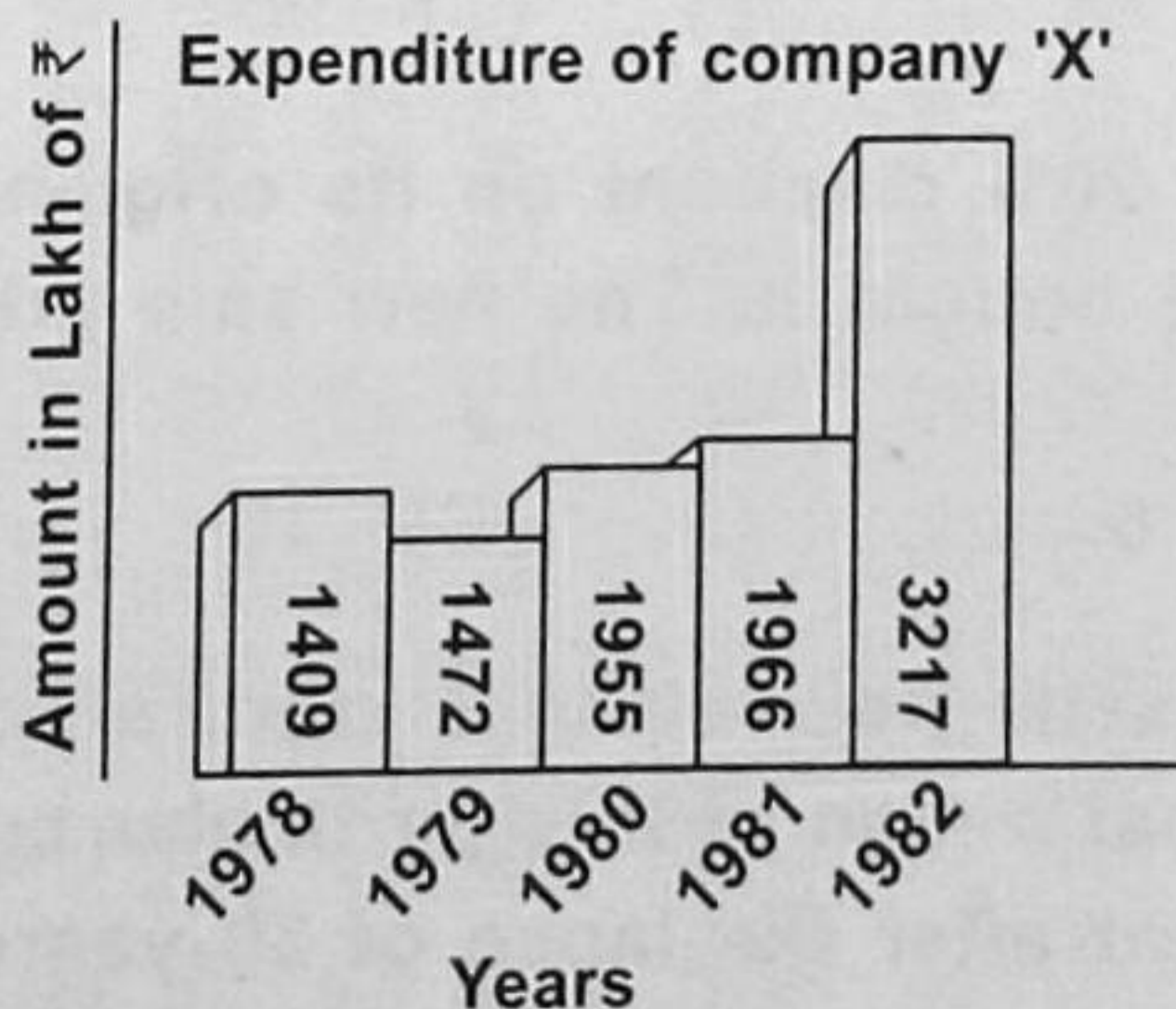
37. The solution of differential equation $y - x \frac{dy}{dx} = a \left(y^2 + \frac{dy}{dx} \right)$ is _____.

- (A) $(x+a)(x+ay) = cy$ (B) $(x+a)(1-ay) = cy$
 (C) $(x+a)(1-ay) = cx$ (D) $x+a = \frac{cy}{1+ay}$

38. The equation of the plane in which the lines $\frac{x-5}{4} = \frac{y-7}{4} = \frac{z+3}{-5}$ and $\frac{x-8}{7} = \frac{y-4}{1} = \frac{z-5}{3}$ lie, is _____.

- (A) $17x - 47y - 24z + 172 = 0$ (B) $17x + 47y - 24z + 172 = 0$
 (C) $17x + 47y + 24z + 172 = 0$ (D) $17x - 47y + 24z + 172 = 0$

DIRECTION (39 & 40) : Expenditures of company 'X', are mounting year after year. Based on the figures, answer the following questions.



39. In 1978, total expenditure was ₹ 1409 lakhs which increased to ₹ 1955 in 1980. The percentage rise in 2 years is _____.

- (A) 4 % (B) 6 % (C) 5 % (D) None of these

40. The percentage increase in expenditure between 1980-81 is _____.
(A) -1% (B) 1% (C) 2% (D) None of these

SECTION III : EVERYDAY MATHEMATICS

41. A man running round a race course notes that the sum of the distances of two flag posts from him is always 10 m and the distance between the flag posts is 8 m. The area of the path he encloses (in square metres) is _____.
(A) 15π (B) 12π (C) 18π (D) 8π
42. A father with 8 children takes them 3 at a time to the zoological gardens, as often as he can without taking the same 3 children together more than once. The number of times he will go the garden, is _____.
(A) 336 (B) 112 (C) 56 (D) 48
43. A ladder leans against a wall at an angle α to the horizontal. Its foot is pulled away through a distance a_1 , so that it slides a distance b_1 down the wall and rests inclined at angle β with the horizontal. Its foot is further pulled away through a_2 , so that it slides a further distance b_2 down the wall and is now inclined at an angle γ . If $a_1 a_2 = b_1 b_2$, then _____.
(A) $\alpha + \beta + \gamma$ is greater than π (B) $\alpha + \beta + \gamma$ is equal to π
(C) $\alpha + \beta + \gamma$ is less than π (D) Nothing can be said about $\alpha + \beta + \gamma$
44. In a class of 100 students, the average amount of pocket money is ₹ 35 per student. If the average is ₹ 25 for girls and ₹ 50 for boys, then the number of girls in the class is _____.
(A) 20 (B) 40 (C) 60 (D) 80
45. David got two and a half times as many marks in English as in History. If his total marks in the two subjects are 140, the marks obtained by him in English are _____.
(A) 40 (B) 75 (C) 90 (D) 100
46. Peter bought an item at 20% discount on its original price. He sold it with 40% increase on the price he bought it. The new sale price is by what percent more than the original price?
(A) 7.5 (B) 8 (C) 10 (D) None of these
47. An insurance salesman sells policies to 5 men, all of identical age and in good health. The probability that a man of this particular age will be alive after 30 years is $\frac{2}{3}$. The probability that after the lapse of 30 years all the five persons will be alive, is _____.
(A) $\frac{1}{16}$ (B) $\frac{16}{81}$ (C) $\frac{32}{243}$ (D) None of these

48. Gas is being pumped into a spherical balloon at the rate of $30 \text{ ft}^3/\text{min}$. Then, the rate at which the radius increases when it reaches the value 15 ft, is _____.
- (A) $\frac{1}{30\pi} \text{ ft/min}$ (B) $\frac{1}{15\pi} \text{ ft/min}$ (C) $\frac{1}{20} \text{ ft/min}$ (D) $\frac{1}{15} \text{ ft/min}$
49. There are 100 families in a society. If 40 families buy newspaper *A*, 30 families buy newspaper *B*, 30 families buy newspaper *C*, 10 families buy newspaper *A* and *B*, 8 families buy newspaper *B* and *C*, 5 families buy newspaper *A* and *C*, 3 families buy newspaper *A*, *B* and *C*, then the number of families who do not buy any newspaper, is _____.
- (A) 20 (B) 80 (C) 0 (D) None of these
50. A man completes $\frac{5}{8}$ of a job in 10 days. At this rate, how many more days will it take him to finish the job?
- (A) 5 (B) 6 (C) 7 (D) $7\frac{1}{2}$