



- c)  $\begin{bmatrix} 5 & 4 \\ 9 & 2 \end{bmatrix}$  d)  $\begin{bmatrix} 6 & 13 \\ 9 & 6 \end{bmatrix}$
- (e) Five distinct positive integers are in arithmetic progression with a positive common difference. If their sum is 10020, then the smallest possible value of the last term is **[1]**
- a) 2007 b) 2004  
c) 2006 d) 2002
- (f) The point P(h, k) is reflected in the X-axis, then it is reflected in the origin to P'. If P' has coordinate (-8, 5), then the value of (h, k) is **[1]**
- a) (-8, -5) b) (8, 5)  
c) (5, 8) d) (-5, -8)
- (g) Diagonal AC of a rectangle ABCD is produced to the point E such that AC : CE = 2 : 1, AB = 8 cm and BC = 6 m. The length of DE is **[1]**
- a)  $3\sqrt{17}$  cm b) 15 cm  
c) 13 cm d)  $2\sqrt{19}$  cm
- (h) A sphere of radius a units is immersed completely in water contained in a right circular cone of semi-vertical angle  $30^\circ$  and water is drained off from the cone till its surface touches the sphere. Then, the volume of water remaining in the cone will be **[1]**
- a)  $\frac{5}{3}\pi a^2$  b)  $\frac{5\pi}{3}a^3$   
c)  $\frac{\pi a^3}{3}$  d)  $5\pi a^3$
- (i) Solve the inequation  $\left|\frac{2}{x-4}\right| > 1, x \neq 4$  **[1]**
- a)  $\{x : x \in (2, 4) \cup (4, 6), x \in \mathbb{R}\}$  b)  $\{x : x \in [2, 4) \cup (4, 6], x \in \mathbb{R}\}$   
c)  $\{x : x \in [-2, 4) \cup (-4, 6], x \in \mathbb{R}\}$  d)  $\{x : x \in (-2, 4) \cup (-4, 6), x \in \mathbb{R}\}$
- (j) The probability that the minute hand lies from 5 to 15 min in the wall clock, is **[1]**
- a)  $\frac{1}{6}$  b)  $\frac{5}{6}$   
c)  $\frac{1}{5}$  d)  $\frac{1}{10}$
- (k) The matrices A and B, such that AB = O, but A  $\neq$  O and B  $\neq$  O, are **[1]**
- a)  $A = \begin{bmatrix} -2 & -2 \\ 2 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$  b)  $A = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$   
c)  $A = \begin{bmatrix} -2 & -2 \\ -2 & -2 \end{bmatrix}, B = \begin{bmatrix} -1 & -1 \\ -1 & -1 \end{bmatrix}$  d)  $A = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 1 \\ -1 & -1 \end{bmatrix}$
- (l) Join two points P(2, 2) and O(4, 2) in the point P and rotate the line PQ in anti-clockwise direction at an angle of  $270^\circ$ . Then, the new coordinates of point Q and the area formed by this figure will be **[1]**
- a) (2, 4); 2.94 sq units b) (4, 2); 4.92 sq units  
c) (2, 4); 9.42 sq units d) (4, 2); 9.42 sq units
- (m) If P, Q, S and R are points on the circumference of a circle of radius r, such that PQR is an equilateral triangle and PS is a diameter of the circle. Then, the perimeter of the quadrilateral PQSR will be **[1]**
- a)  $2(\sqrt{3} + 1)r$  b)  $2\sqrt{3} + r$

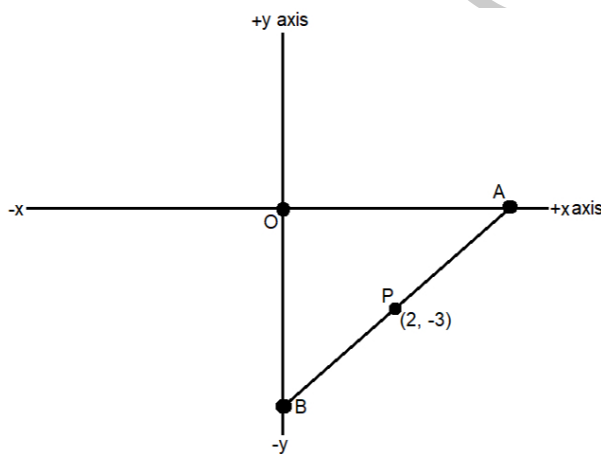
- c)  $2r$  d)  $2\sqrt{3}r$
- (n) If the ratio of mode and median of a certain data is 6 : 5, then the ratio of its mean and median is [1]
- a) 10 : 9 b) 9 : 10
- c) 10 : 8 d) 8 : 10
- (o) **Assertion (A):** Let the positive numbers a, b, c be in A.P., then  $\frac{1}{bc}, \frac{1}{ac}, \frac{1}{ab}$  are also in A.P. [1]
- Reason (R):** If each term of an A.P. is divided by abc, then the resulting sequence is also in A.P.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false. d) A is false but R is true.

2. **Question 2** [12]

- (a) Mr. Gupta opened a recurring deposit account in a bank. He deposited ₹ 2,500 per month for 2 years. [4]  
At the time of maturity, he got ₹67,500. Find:
- i. the total interest earned by Mr. Gupta
- ii. the rate of interest per annum.
- (b) Find the mean proportional of  $(a^4 - b^4)^2$  and  $[(a^2 - b^2)(a - b)]^2$ . [4]
- (c) Show that:  $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$  [4]

3. **Question 3** [13]

- (a) A cloth having an area of  $165 \text{ m}^2$  is shaped into the form of a conical tent of radius 5 m. [4]
- i. How many students can sit in the tent, if a student on an average occupies  $\frac{5}{7} \text{ m}^2$  on the ground?
- ii. Find the volume of the cone.
- (b) A and B are two points on the X and Y-axes, respectively. P(2, -3) is the mid-point of AB. Find the [4]



- i. coordinate of A and B.
- ii. slope of line AB.
- iii. equation of line AB
- (c) Use graph paper for this question. Take 1 cm = 1 unit on both x and y axis. [5]
- i. Plot the following points on your graph sheets. A (-4, 0), B (-3, 2), C (0, 4), D (4, 1) and E (7, 3)
- ii. Reflect the points B, C, D and E on the x-axis and name them as B', C', D' and E' respectively
- iii. Join the points A, B, C, D, E, E', D', C', B' and A in order.
- iv. Name the closed figure formed.

**Section B**

**Attempt any 4 questions**

4. **Question 4** [10]

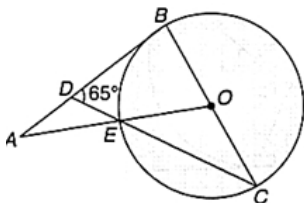
- (a) A shopkeeper bought an article with market price ₹1200 from the wholesaler at a discount of 10%. [3]  
 The shopkeeper sells this article to the customer on the market price printed on it. If the rate of GST is 6%, then find:  
 i. GST paid by the wholesaler.  
 ii. Amount paid by the customer to buy the item.
- (b) The product of two successive multiples of 4 is 28 more than the first multiple. Find them. [3]
- (c) A survey regarding the heights (in cm) of 51 boys of class X of a school was conducted and the following data was obtained [4]

Heights (in cm)	Number of boys
Less than 140	4
Less than 145	11
Less than 150	29
Less than 155	40
Less than 160	46
Less than 165	51

Find the median height.

5. **Question 5** [10]

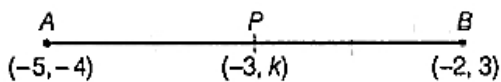
- (a) Construct a  $2 \times 2$  matrix, whose elements are given by  $a_{ij} = i \cdot j$ . [3]
- (b) In the following figure, O is the centre of the circle and AB is a tangent to it at point B, if  $\angle BDC = 65^\circ$ , Find  $\angle BAO$ . [3]



- (c) The polynomials  $3x^3 - ax^2 + 5x - 13$  and  $(a + 1)x^2 - 7x + 5$  leaves the same remainder when divided by  $(x - 3)$ . Find the value of a. [4]

6. **Question 6** [10]

- (a) Find the ratio in which the point  $(-3, k)$  divides the line segment joining the points  $(-5, -4)$  and  $(-2, 3)$ . [3]  
 Also, find the value of k.



- (b) If  $\sqrt{3} \tan \theta = 3 \sin \theta$ , then find the value of  $\sin^2 \theta - \cos^2 \theta$  [3]
- (c) Let S be the sum, P be the product and R be the sum of reciprocals of n terms in a GP. Prove that  $p^2 R^n = S^n$ . [4]

7. **Question 7** [10]

- (a) Five years ago, a woman's age was the square of her son's age. After ten years, her age will be twice that of her son's age. Find [5]

- i. the age of the son, five years ago
- ii. the present age of the woman

(b) The marks obtained by 120 students in a test are given below:

[5]

Marks	Number of Students
0 - 10	5
10 - 20	9
20 - 30	16
30 - 40	22
40 - 50	26
50 - 60	18
60 - 70	11
70 - 80	6
80 - 90	4
90 - 100	3

Draw an ogive for the given distribution on a graph sheet.

(Use suitable scale for ogive to estimate the following)

- i. the median.
- ii. the number of students who obtained more than 75% marks in the test.
- iii. the number of students who did not pass the test, if minimum marks required to pass is 40.

8. **Question 8**

[10]

(a) In a game, the entry fee is ₹ 5. The game consists of tossing a coin 3 times. If one or two heads show, Sweta gets her entry fee back. If she tosses 3 heads, she receives double the entry fee. Otherwise, she will loss. For tossing a coin three times, find the probability that she

[3]

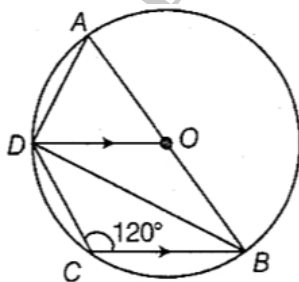
- i. losses the entry fee
- ii. gets double entry fee
- iii. just gets her entry fee

(b) A hemispherical bowl of diameter 7.2 cm is filled completely with chocolate sauce. This sauce is poured into a inverted cone of radius 4.8 cm. Find the height of the cone.

[3]

(c) In the given figure, AB is a diameter of the circle with centre O, DO || CB and  $\angle DCB = 120^\circ$ .

[4]



Calculate

- i.  $\angle DAB$
- ii.  $\angle DBA$

iii.  $\angle DBC$

iv.  $\angle ADC$

Also, show that  $\triangle AOD$  is an equilateral triangle.

9. **Question 9**

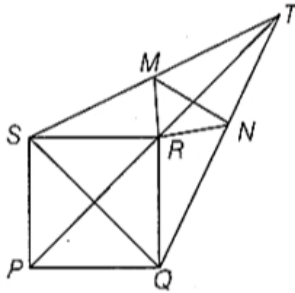
[10]

(a) One-third of a bamboo pole is buried in mud, one-sixth of it is in water and the part above the water is greater than or equal to 3 units. Find the length of the shortest pole. [3]

(b) If the mode of the following series is 54, then find the value of  $f$ . [3]

Class interval	0-15	15-30	30-45	45-60	60-75	75-90
Frequency	3	5	$f$	16	12	7

(c) In the given figure,  $T$  is the exterior point on the diagonal  $PR$  of a parallelogram  $PQRS$ .  $SR$  produced meets  $OT$  at  $N$  and  $QR$  produced meets  $ST$  at  $M$ . Prove that  $MN \parallel SQ$ . [4]



10. **Question 10**

[10]

(a) Arrange the ratios  $2 : 3$ ,  $17 : 21$ ,  $11 : 14$  and  $5 : 7$  in descending order of magnitude. [3]

(b) Construct a tangents to a circle of radius 1.8 cm from a point on the concentric circle of radius 2.8 cm and measure its length. [3]

(c) The shadow of a vertical tower on a level ground increases by 10 m, when the altitude of the sun changes from  $45^\circ$  to  $30^\circ$ . Find the height of the tower correct to two decimal places. [4]