

Cheating Replaces Learning

Preboard

Time Allowed: 3 Hrs.

BVP/X/Maths/2025-26

Maximum Marks: 80

General Instructions:

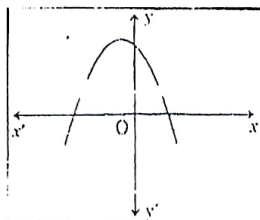
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each).

SECTION A

Q1. If the prime factorization of 2520 is $2^3 \times 3^a \times b \times 7$, then the value of $a + 2b$ is:

- a) 12 b) 10 c) 9 d) 7

Q2. The graph of a polynomial $y = f(x)$ is shown in the figure. The number of zeros of the polynomial are:



- a) 0 b) 1 c) 2 d) 3

Q3. The pair of linear equations $3x + qy = 7$ and $px + 10y = 15$ have no solutions, then value of pq is:

- a) 10 b) 30 c) 45 d) 15

Q4. The empirical relation between three measures of central tendency i.e. mean, mode and median is:

- a) $3 \text{ median} - 2 \text{ mean} = \text{mode}$ b) $3 \text{ median} - 2 \text{ mode} = \text{mean}$
 c) $3 \text{ mean} - 2 \text{ mode} = \text{median}$ d) $3 \text{ mean} - 2 \text{ median} = \text{mode}$

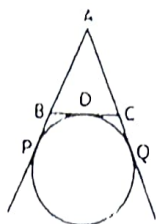
Q5. If $\theta = 30^\circ$, then the value of $4\cos^3\theta - 3\cos\theta$ is:

- a) $\cos 30^\circ$ b) $\cos 60^\circ$ c) $\cos 90^\circ$ d) $\cos 0^\circ$

Q15. The ratio in which (8,6) divides the line segment joining the points (5, 3) and (10,8) is:

- a) 3 : 2 b) 4 : 1 c) 2 : 3 d) 1 : 4

Q16. In the given figure, if the perimeter of $\triangle ABC$ is 12 cm, then AP is:



- a) 6 cm b) 10 cm c) 8cm d) 12cm

Q17. The difference between upper limit of modal class and lower limit of median class for the given distribution is:

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	9	15	10	3

- a) 10 b) 20 c) 30 d) 40

Q18. A quadrilateral ABCD is drawn to circumscribe a circle. If $BC = 7$ cm, $CD = 4$ cm and $AD = 3$ cm, then the length of AB is:

- a) 3 cm b) 4 cm c) 6 cm d) 7 cm

DIRECTIONS: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option:

- (A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
- (B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- (C) Assertion (A) is true but reason (R) is false.
- (D) Assertion (A) is false but reason (R) is true.

Q19. Assertion (A): 6^n can end with the digit 0 for any natural number n.

Reason (R): Any positive integer ending with the digits 0 or 5 is divisible by 5 and so its prime factorization must contain the prime 5.

Q20. Assertion(A): If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A = 1$

Reason (R): $\sin^2 A + \cos^2 A = 1$

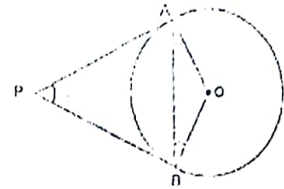
SECTION B

Q21. Find the value of k for which the equation $x^2 + k(2x + k - 1) + 2 = 0$ has real and equal roots.

Q22. A) Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

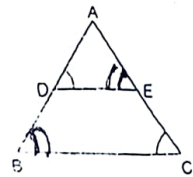
Or

B) In the given fig., PA and PB are tangents to the circle with centre O. If $\angle APB = 60^\circ$, find $\angle OBA$.



Q23. p and q are zeros of the polynomial $2x^2 + 5x - 4$ without finding the actual values of p and q , evaluate $(1-p)(1-q)$. Show the calculation.

Q24. In the given figure, if $\frac{AD}{BD} = \frac{AE}{CE}$ and $\angle ADE = \angle ACB$, then prove that both $\triangle ABC$ and $\triangle ADE$ are isosceles triangles. -1



Q25. A) If $A = 30^\circ$, verify that $\cos 2A = \frac{1 - \tan^2 A}{1 + \tan^2 A}$

Or

B) Find the value of

$$\frac{3 \tan 30^\circ + 5 \cos^2 60^\circ - \frac{3}{2} \sec 30^\circ}{5 \cos^2 45^\circ}$$

SECTION C

Q26. A charitable trust donates 28 different books of Mathematics, 16 different books of Science and 12 different books of Social Science to poor students. Each student is given maximum number of books of only one subject of their interest and each student gets equal number of books.

- Find the number of books each student got.
- Find the total number of students who got books.

Q28. Prove that

$$\frac{\sin\theta}{\cot\theta + \operatorname{cosec}\theta} - \frac{\sin\theta}{\cot\theta - \operatorname{cosec}\theta} = 2$$

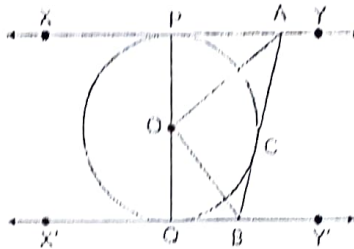
Q29. A) A sector is cut from a circle of radius 21 cm. The central angle of the sector is 150° . Find the length of the arc and the area of the sector.

Or

B) Find the perimeter of the shaded region in the given figure if APB and CPD are semicircles and ABCD is a square of side 14cm.



Q29. XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C, is intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90^\circ$.



Q30. A) Students of a class are made to stand in rows. If 4 students are extra in a row, there would be two less rows. If 4 students are less in a row there would be four rows more. Find the total number of students in the class.

Or

B) Solve the following pair of linear equations graphically;

$$2x - y = 1 \text{ and } 3x + 2y = 12$$

Q31. Two coins are tossed simultaneously. Find the probability of getting

- (i) at least one tail (ii) at most two tails (iii) at least two tails

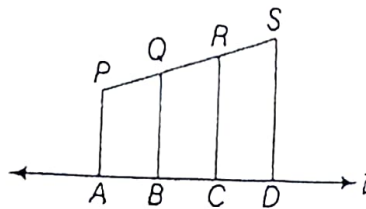
SECTION D .

Q32. A) A plane left 30 minutes late than its schedule time and in order to reach its destination 1500 km away in time it had to increase its speed by 250km/h from the usual speed. Find its usual speed.

Or

B) The length of a rectangle exceeds its width by 10 cm, If the area of the rectangle is 39 cm^2 , then find the dimensions of the rectangle and also find its perimeter.

Q33. In the figure, PA, QB, RC and SD are all perpendicular to a line l , $AB = 6 \text{ cm}$, $BC = 9 \text{ cm}$, $CD = 12 \text{ cm}$ and $SP = 36 \text{ cm}$. Find PQ, QR and RS.



Q34. A) From a solid cylinder of height 14 cm and base diameter 7cm, two equal conical holes each of radius 3 cm and height 4cm are cut off from both bases. Find the surface area of remaining solid.

Or

B) In a cylindrical vessel of radius 10 cm, containing some water, 9000 small spherical balls are dropped which are completely immersed in water which raises the water level. If each spherical ball is of radius 0.5 cm, then find the rise in the level of water in the vessel.

Q35. If the median of the distribution given below is 28.5. Find the values of x and y and hence find the mean also.

Class interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
Frequency	5	x	20	15	y	5	60

SECTION E

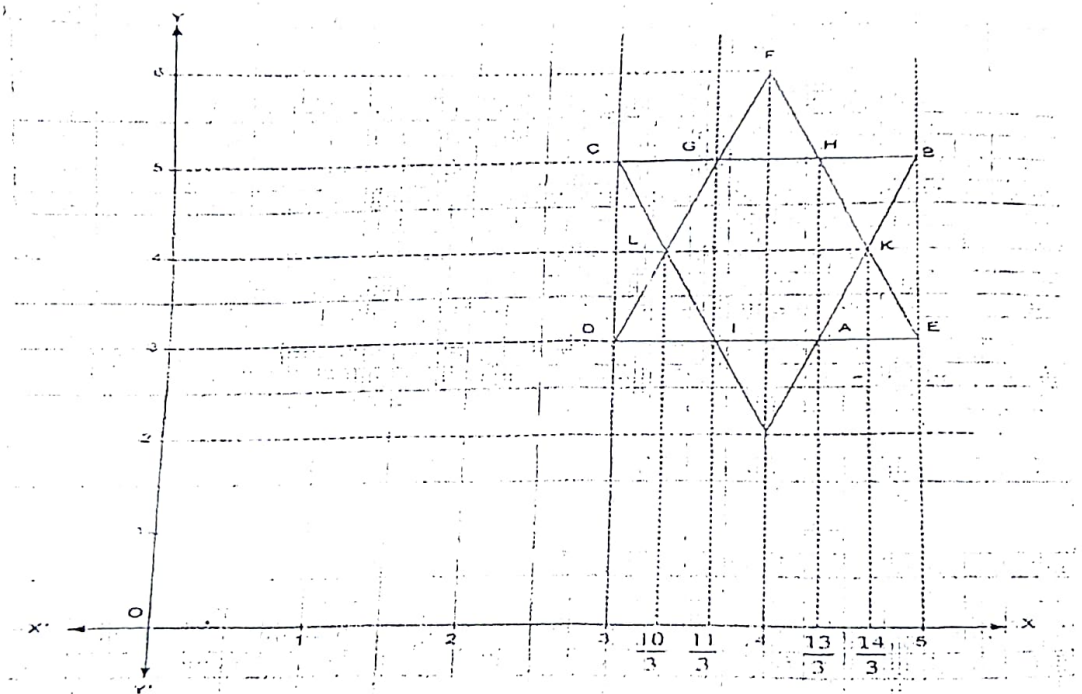
Q36. Computer Animations: The animation on a new computer game initially allows the hero of the game to jump a (screen) distance of 10 inch over traps and obstacles.

Each successive jump is limited to $\frac{3}{4}$ inch less than the previous one.
Based on the above information, answer the following the questions:



- i) Find the length of the 7th jump. (1)
- ii) Find the length of the 9th jump. (1)
- iii) Find the total distance covered after seven jumps. (2)

Q37. To beautify a city, the government plans and draw designs on side walls of road, so that when people move out, the place looks pleasing to the people, also they keep artistic view under consideration. On one of the walks, the following figure was spotted which was drawn on graph.



Based on above, answer the following questions:

- i) What are the coordinates of midpoint of BC? (1)
- ii) What is distance between I and H? (1)
- iii) a) What is the distance between F and D? (2)

or

- b) What are the coordinates of a point which divides LH in the ratio 1:2?

Q38. A boy is standing at the top of a lighthouse of height 100m and observes that two boats approaching to lighthouse from opposite sides. Boy found that the angle of depression of both the boats are 45° and 30° . [use $\sqrt{3} = 1.73$]

On the basis of above information answer the following questions:

- i). Draw a labelled diagram of the situation (1)
- ii) Find the distance of the boat from the lighthouse whose angle of depression is 45° . (1)
- iii) a) What is the distance between both the boats? (2)

Or

b) If the angle of depression of boats become 60° and 45° , then find the distance between the boats.

