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X-C

Cheating Replaces Learning

Preboard

Time: 3Hour
M.Marks : 80

BVP/X/Mathematics/2024-25

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 01 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) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E .
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

Section A

Section A consists of 20 questions of 1 mark each.

1. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is:
(a)10 (b) 100 (c) 504 (d) 2520

2. If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 4 and -3, then a-b is
(a)12 (b) 10 (c) 7 (d) 1

3. The nature of roots of the quadratic equation $5x^2 - 3x - 2 = 0$ is:
(a)No real roots (b) 2 equal real roots (c) 2 distinct real roots (d) More than 2 real roots

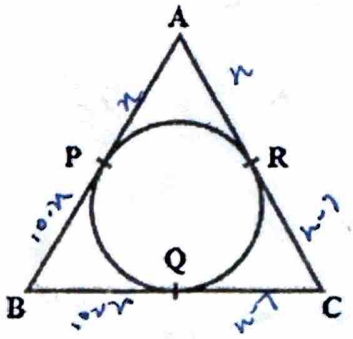
4. The condition for which the pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where a,b are integers, if:
(a)$a = b$ (b) $3a = 2b$ (c) $2a = 3b$ (d) $ab = 6$

5. 15^{th} term of the A.P. x-7, x-2, x+3,..... is:
(a)x+63 (b) x+73 (c) x+83 (d) x+53

6. What is the ratio in which the line segment joining (2, - 3) and (5, 6) is divided by x-axis?
(a)1:2 (b) 2:1 (c) 2:5 (d) 5:2

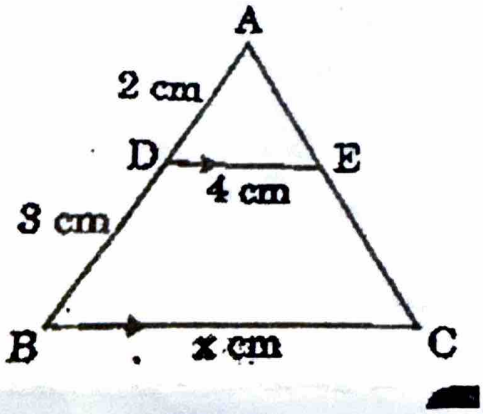
7. The perpendicular bisector of the line segment joining the points A (1,5) and B(4,6) cuts the y-axis at:.
(a)(0, 13) (b) (0, -13) (c) (0, 12) (d) (13, 0)

8. In the given figure , AB = BC = 10 cm. If AC = 7 cm, then the length of BP is:



(a)3.5 cm (b) 7 cm (c) 6.5 cm (d) 5 cm

9. In the given figure, DE || BC. The value of x is:



(a) 6 (b) 12.5 m (c) 10 (d) 8

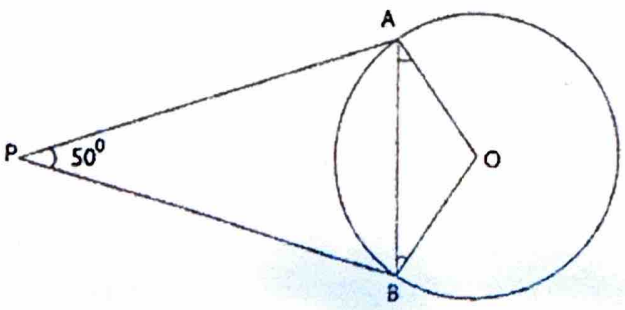
10. If $2\cos 3A = \sqrt{3}$, $0 < A < 20°$ then A is equal to

(a) 15° (b) 10° (c) 0° (d) 12°

11. If $\sin A + \sin^2 A = 1$, then the value of the expression ($\cos^2 A + \cos^4 A$) is

(a)I (b) ½ (c) 2 (d) 3

12. In the given figure, if PA and PB are tangents to the circle with centre O such that ∠APB =50°, then ∠OAB is equal to:



(a) 25° (b) 30° (c) 40° (d) 50°

13. Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is not a perfect square number.

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

14. A card is drawn from a well shuffled pack of cards. The probability that it will be a black queen is

(a) $\frac{1}{13}$ (b) $\frac{1}{26}$ (c) $\frac{3}{13}$ (d) $\frac{4}{13}$

15. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 42 cm and the total height of the vessel is 30 cm. Find the inner surface area of the vessel.

(a) 3500 cm^2 (b) 3800 cm^2 (c) 3960 cm^2 (d) 3900 cm^2

16. Find the area of a quadrant of a circle, whose radius is r cm.

(a) $2\pi r^2$ cm^2 (b) $2\pi r$ cm^2 (c) πr^2 cm^2 (d) $\frac{1}{4}\pi r^2$ cm^2

17. The angle of elevation of the sun when the length of a shadow of a vertical pole is equal to its height is

(a) 30° (b) 45° (c) 60° (d) 90°

18. Which one of the following is the correct relationship between Mean, Median and Mode?

(a) Mode = 2 Median – 3 Mean (b) Mode = Median – 2 Mean
(c) Mode = 2 Median – Mean (d) Mode = 3 Median – 2 Mean

DIRECTION: 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.

19. Statement A (Assertion): If three cubes each of side 5 cm are joined end to end, the total surface area of the resulting cuboid is 350 cm^2.

Statement R (Reason): Volume of cuboid having dimensions l, b and h is lbh cubic units.

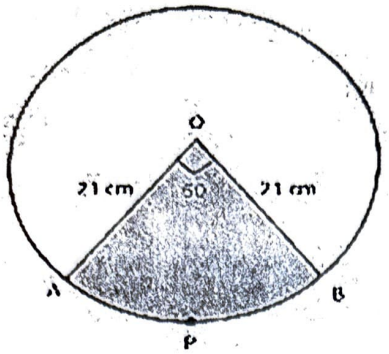
20. Statement A (Assertion): The 10^{th} term from end of the A.P. 7,10,13,……,184 is 163.

Statement R (Reason): In an A.P. with first term a, common difference d and last term l, the n^{th} term from the end is l - (n-1) d.

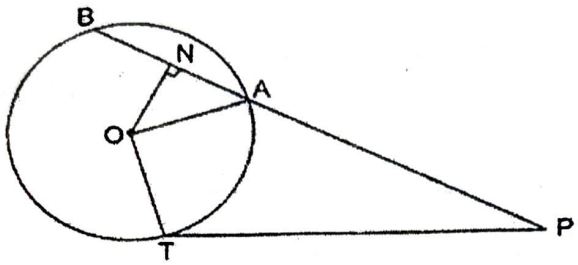
Section B

21. Take any two numbers of two digit and find their H.C.F. by prime factorisation and hence find their L.C.M.

22. Find the area of minor sector of a circle if radius of circle is 21 cm and $\angle AOB = 60°$.

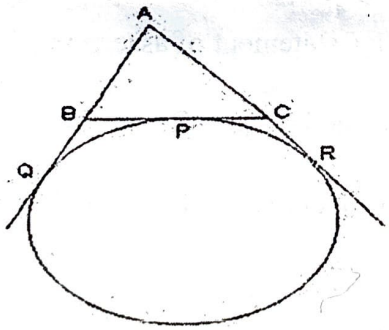


23. In the given figure, PT is tangent to the circle centered at O. ON is perpendicular to chord AB. Prove that $PA * PB = PN^2 - AN^2$



OR

A circle is touching the side BC of a ΔABC at the point P and touching AB and AC produced at points Q and R respectively. Prove that $AQ = \frac{1}{2}$ (Perimeter of ΔABC)

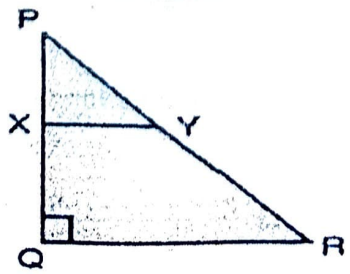


24. Prove that: $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2 \operatorname{cosec} A$

OR

Find the value of $2(\cos^4 60° + \sin^4 30°) + (\tan^2 60° + \cot^2 30°)$

25. In the given figure, PQR is a triangle, right angled at Q. If XY || QR, PQ = 6 cm, PY = 4 cm and PX : XQ = 1:2. Compare the lengths of PR and QR.



Section C

26. Justify the statement that $5\sqrt{5} - 2$ is an irrational number.

27. If $\tan A + \sin A = m$, $\tan A - \sin A = n$, then verify that $m^2 - n^2 = 4\sqrt{mn}$.

28. The sum of the digits of a two digit number is 8 and number formed by reversing the digits is less than the given number by 18. Find the number.

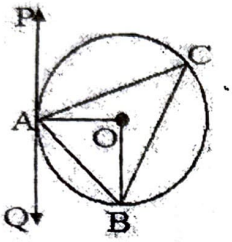
Or

Two people are 16 km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hours. They had walked in the same direction with same speeds as before, they would have met in 8 hours. Find their walking speeds.

29. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents P and Q intersect at a point T. Find the length TP.

Or

PAQ is a tangent to the circle with centre O at a point A as shown in the figure. If $\angle OBA = 35°$, then find the value of $\angle ACB$ and $\angle QAB$.



30. The angle of elevation of a cloud from a point 60 m above a lake is 30° and the angle of depression of the reflection of cloud in the lake is 60°. Find the height of the cloud.

31. If α and β are zeroes of polynomial $4x^2 + 3x + 7$, then find a polynomial whose zeroes are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

Section D

32. Solve the following system of linear equations graphically:

$$x - y = 1$$
$$2x + y = 8$$

Shade the area bounded by these two lines and y-axis. Also, determine this area.

Or

A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the journey, what was its first average speed?

33. The median of the following data is 525. Find the values of x and y if total frequency is 100.

Class interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	x	12	17	20	Y	9	7	4

34. A solid toy is in the form of a hemisphere surmounted by a right circular cone of same radius. The height of the cone is 10 cm and the radius of the base is 7 cm. Determine the volume of the toy. Also find the area of the coloured sheet required to cover the toy. (Use $\sqrt{149} = 12.2$)

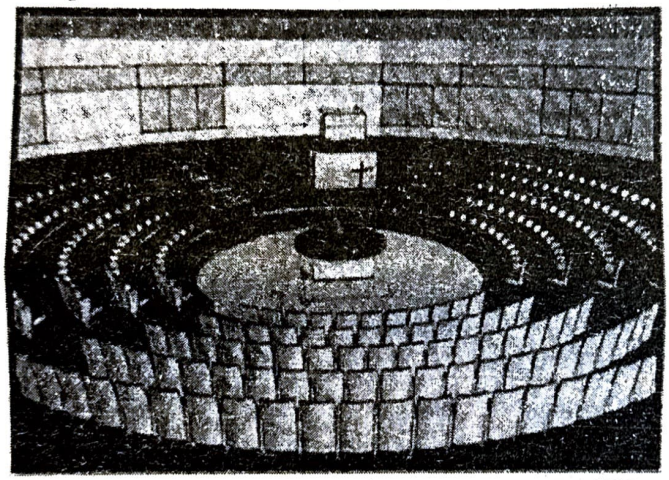
Or

Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively decided to provide place and the canvas for 1500 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.8 m and height 3.5 m and the upper part is conical with the same base radius, but of height 2.1 m. If the canvas used to make the tents costs ₹120 per m^2, find the amount shared by each school to set up the tents.

35. Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.

Section E

36. The school auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.



(i) If the first circular row has 30 seats, how many seats will be there in 10^{th} row?

(ii) For 1500 seats in the auditorium, how many rows need to be there?

OR

If 1500 seats are to be arranged in the auditorium, how many seats are still left to be put after 10^{th} row?

(iii)If there were 17 rows in the auditorium, how many seats will be there in the middle row?

37. A middle school decided to run the following spinner game as a fund-raiser on Christmas Carnival

Making Purple: Spin each spinner once. Blue and red make purple. So, if one spinner shows Red (R) and another Blue (B), then you 'win'. One such outcome is written as ' RB '.

Based on the above, answer the following questions:

(i) List all possible outcomes of the game.

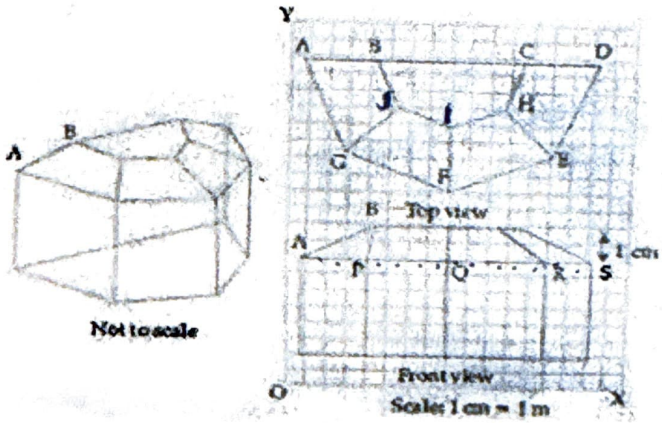
(ii) Find the probability of 'Making Purple'

(iii) a) For each win, a participant gets ₹10, but if he/she loses, he/she has to pay ₹ 5 to the school, If 99 participants played, calculate how much fund could the school have collected.

OR

(b) If the same amount of ₹ 5 has been decided for winning or losing the game, then how much fund had been collected by school? (Number of participants = 99)

38. The diagrams show the plans for a sun room. It will be built onto the wall of a house. The four walls of the sunroom are square clear glass panels. The roof is made using - Four clear elass panels, trapezium in shape, all the same size - One tinted glass panel, half a regular octagon in shape.



Based on the above, answer the following:

(i) REFER TO TOP VIEW

Find the mid-point of the segment joining the points $J(6,17)$ and $I(9,16)$.

(ii) REFER TO FRONT VIEW

Find the distance between the points A and S.

(iii) REFER TO FRONT VIEW

Find the co-ordinates of the point which divides the line segment joining the points A and B in the ratio 1:3 intemally.

Or

REFER TO FRONT VIEW

If a point (x,y) is equidistant from Q(9,9) and S(17,9), then find the value of x.

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