Preboard

Time: 3Hour
M.Marks : 80

BVP/X/Mathematics/2023-24

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 $\pi = 22/7$ wherever required if not stated.

Section A

Section A consists of 20 questions of 1 mark each.

1. The HCF and LCM of 12,21 and 15 respectively, are
(a) 3, 140 (b) 12,420 (c) 3,420 (d) 420,3

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

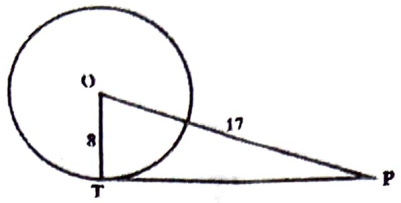
4. If the system of equations $2x + 3y = 5$, $4x + ky = 10$ has infinitely many solutions, then find k.
(a) 4 (b) 3 (c) 6 (d) 8

5. If the common difference of an A.P. is 5, then the value of $a_{18} - a_{13}$ is
(a) 5 (b) 20 (c) 25 (d) 30

6. Find the value of x for which the distance between the points P(3,4) and Q(x,7) is $\sqrt{13}$ units.
(a) 1,-5 (b) -1,5 (c) 1,5 (d) -1,-5

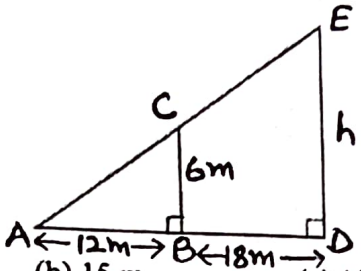
7. Find the coordinates of point A, where AB is the diameter of a circle whose centre is O (2,-3) and B is (1,4).
(a) (2, 10) (b) (3, -10) (c) (3, -1) (d) (1, -7)

8. In the given circle , O is a centre, OT = 8 cm and OP = 17 cm, then the length of the tangent TP will be



(a) 10 cm (b) 14 cm (c) 15 cm (d) 25 cm

9. Find the value of 'h' in the following figure, if Δ ADE ~ Δ ABC.



(a) 12 m (b) 15 m (c) 10 m (d) 8 m

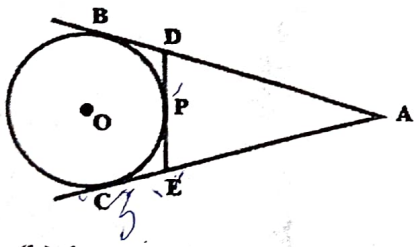
10. If $2\sin 2A = \sqrt{3}$, then A is equal to

(a) 30° (b) 45° (c) 60° (d) none of these

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

(a) 1 (b) ½ (c) 2 (d) 3

12. In the given figure, if AB = 9 cm and CE = 3 cm, then AE =



(a) 11 cm (b) 6 cm (c) 5 cm (d) 3 cm

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. If the median of the data: 6, 7, x-2, x, 17, 20 written in ascending order, is 16. Then x is equal to

(a) 15 (b) 16 (c) 17 (d) 18

19. **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.**

Statement A (Assertion): The volume of a hall, which is 5 times as high as it is broad and 8 times as long as it is high, is 12.8 m^3. The breadth of the hall is 25 cm.
Statement R (Reason): The total surface area of a cuboid of length(l), breadth(b) and height (h) is 2(lb + bh + hl).

(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.

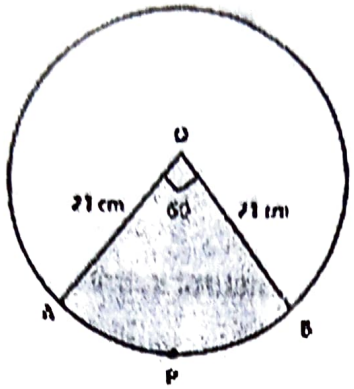
20. **Statement A (Assertion): The 10^{th} term from end of the A.P. 7,10,13,.....,184 is 163.**

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.
(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.

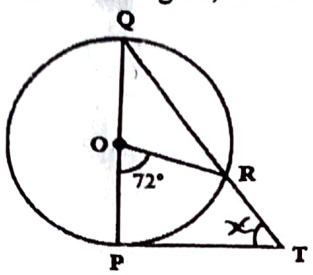
Section B

21. Take any two numbers of your choice 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 figure, if PQ is diameter and PT is tangent, then find x.



OR

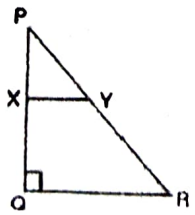
If O is the centre of the circle, PQ is a chord and the tangent PR at P makes an angle 50° with PQ. then find $\angle POQ$.

24. If $\tan A = 1/\sqrt{3}$, then find the value of $7 \sin^2 A + 3 \cos^2 A$

OR

Find the value of $\text{cosec}^2 30° + \sin^2 60° - \frac{3}{4} \tan^2 30°$

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. Calculate the lengths of PR and QR.



Section C

26. Justify the statement that $2\sqrt{5} - 3$ 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.

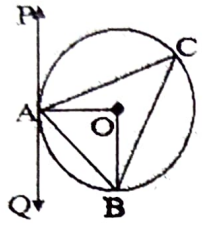
Or

Solve for x and y: $\frac{x+1}{2} + \frac{y-1}{3} = 8, \frac{x-1}{3} + \frac{y+1}{2} = 9$ Obtain the zeroes of the quadratic polynomial $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ and verify the relationship between its zeroes and coefficients.

29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Verify that $\angle PTQ = 2\angle OPQ$.

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. Two customers are visiting a particular shop in the same week (Monday to Saturday). Each is equally likely to visit the shop on any one day as on another. What is the probability that both will visit the shop

(i) on the same day ?

(ii) on different days?

(iii) on two consecutive days?

Section D

31. 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 rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find the length and breadth of the park.

32. 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

33. 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 $\sqrt{149} = 12.2$)

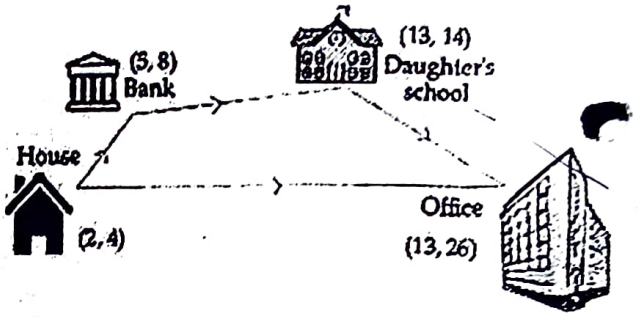
Or

A tent is in the shape of a right circular cylinder up to a height of 3 m and conical above it. The total height of the tent is 13.5 m and radius of base is 14 m. Find the cost of cloth required to make the tent at the rate of ₹80 per m^2

34. 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

35. Ayush starts walking from his house to office. Instead of going to the office directly, he goes to a bank first, from there to his daughter's school and then reaches the office.(Assume that all distances covered are in straight lines). If the house is situated at (2, 4), bank at (5, 8), school at (13,14) and office at (13, 26) and coordinates are in km.



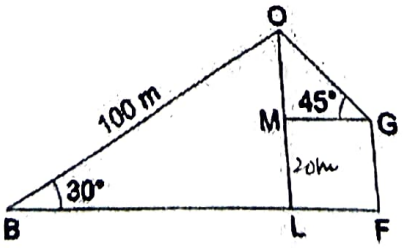
1. What is the distance between house and bank?
2. What is the distance between house and office?

OR

What is the mid point of bank and office?

3. Are the diagonals same in length?

36. A boy is standing on the ground and spots a hot air balloon at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of a 20 m high building, observes the elevation of the same hot air balloon is 45°. The boy and the girl are on the opposite sides of the hot air balloon.



1. Find the distance of hot air balloon from the ground.
2. Find the length of MO.
3. Find the distance between the hot air balloon and the girl.

Or

If B and G are two object and the eye of an observer is at point O, then find the line of sight. Also find the length of BL.

38. Your friend Veer wants to participate in a 200 m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds.

1. Form an A.P. for the given situation.
2. What is the minimum number of days he needs to practice till his goal is achieved ?
3. If nth term of an A.P is given by $a_n = 2n + 3$, then find the common difference of A.P.

Or

Find the value of x, for which $2x$, $x+10$, $3x+2$ are three consecutive terms of an A.P.