

No. of Printed Pages : 10

Roll No.12.....

FAS / Mathematics Standard / X / IInd Pre-Board Exam., 2024-25

Time : 3 hrs.]

[M.M. : 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)
7. All Questions are compulsory. However, an internal choice of 2 Qs of 5 marks, 2 Qs 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. If one root of the equation $ax^2 + bx + c = 0$ is three times the other, then $b^2 : ac =$
(a) 3:1 (b) 3:16
(c) 16:3 (d) 16:1
2. Quadratic equation whose roots are the reciprocal of the roots of the equation $ax^2 + bx + c = 0$ is
(a) $ax^2 + cx + b = 0$ (b) $cx^2 + bx + a = 0$
(c) $cx^2 - bx + a = 0$ (d) $cx^2 + bx - a = 0$
3. If $217x + 131y = 913$ and $131x + 217y = 827$, then $x+y$ is equal to :
(a) 5 (b) 6
(c) 7 (d) 8

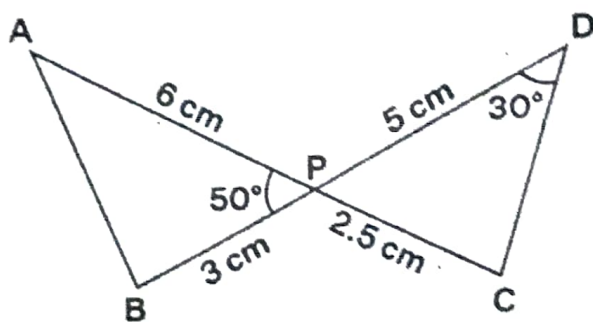
4 The value of k for which the system of equations $3x - ky = 7$ and $6x + 10y = 3$ is inconsistent, is :

- (a) -10 (b) -5
(c) 5 (d) 7

5 If in $\triangle ABC$ and $\triangle DEF$, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar when :

- (a) $\angle B = \angle E$ (b) $\angle A = \angle D$
(c) $\angle B = \angle D$ (d) $\angle A = \angle F$

6 In Fig, two line segments AC and BD intersect each other at the point P such that $PA = 6$ cm, $PB = 3$ cm, $PC = 2.5$ cm, $PD = 5$ cm, $\angle APB = 50^\circ$ and $\angle CDP = 30^\circ$. Then, $\angle PBA$ is equal to



- (a) 50° (b) 30°
(c) 60° (d) 100°

7 If $\tan \theta = 5/2$ then $\frac{4 \sin \theta + \cos \theta}{4 \sin \theta - \cos \theta}$ is equal to :

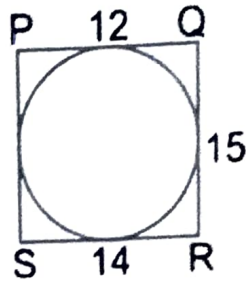
- (a) $\frac{11}{9}$ (b) $\frac{3}{2}$ (c) $\frac{9}{11}$ (d) 4

8 If the area of a sector of a circle is $7/20$ of the area of the circle, then the sector angle is equal to :

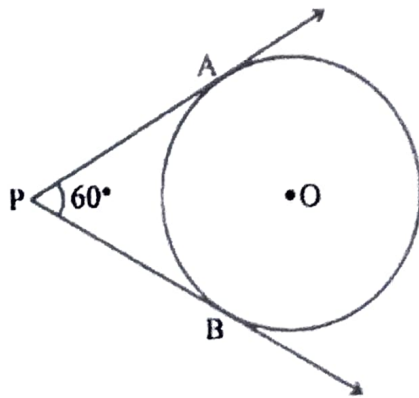
- (a) 110° (b) 130°
(c) 100° (d) 126°

- 9 The tops of two poles of height 20m and 14m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then the length of the wire is :
- (a) 12 m (b) 10 m
(c) 8 m (d) 6 m
- 10 The point on the x- axis nearest to the point $(-4, -5)$ is :
- (a) $(0, 0)$ (b) $(-4, 0)$
(c) $(-5, 0)$ (d) $(\sqrt{41}, 0)$
- 11 A card is drawn from a well shuffled deck of playing cards. The probability of getting red face card is :
- (a) $3/13$ (b) $1/2$
(c) $3/52$ (d) $3/26$
- 12 The radius of the base of a right circular cone and the radius of a sphere are each 5 cm in length. If the volume of the cone is equal to the volume of the sphere then the height of the cone is
- (a) 5 cm (b) 20 cm
(c) 10 cm (d) 4 cm
- 13 If $k + 7$, $2k - 2$ and $2k + 6$ are three consecutive terms of an A.P., then the value of k is :
- (a) 15 (b) 5
(c) 17 (d) 1
- 14 The probability of $x^2 < 4$ if $x = -3, -2, -1, 0, 1, 2, 3$ is :
- (a) $2/7$ (b) $6/7$
(c) $4/7$ (d) $3/7$
- 15 The point on x-axis which is equidistant from the points $(5, -3)$ and $(4, 2)$ is :
- (A) $(4.5, 0)$ (B) $(7, 0)$
(C) $(0.5, 0)$ (D) $(-7, 0)$

- 16 A quadrilateral PQRS is drawn to circumscribe a circle.
If $PQ = 12$ cm, $QR = 15$ cm and $RS = 14$ cm, then find the length of SP is



- (a) 15 cm (b) 14 cm
(c) 12 cm (d) 11 cm
- 17 In the given figure, PA and PB are two tangents drawn to the circle with centre O and radius 5 cm. If $\angle APB = 60^\circ$, then the length of PA is :



- (a) $\frac{5}{\sqrt{3}}$ cm (b) $5\sqrt{3}$ cm
(c) $\frac{10}{\sqrt{3}}$ cm (d) 10 cm
18. Using empirical relationship, the mode of a distribution whose mean is 7.2 and the median 7.1, is :
- (a) 6.2 (b) 6.3
(c) 6.5 (d) 6.9

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. **Assertion** : Two players, Sania and Ashnam play a tennis match. The probability of Sania winning the match is 0.79 and that of Ashnam winning the match is 0.21.

Reason : The sum of probabilities of two complementary events is 1.

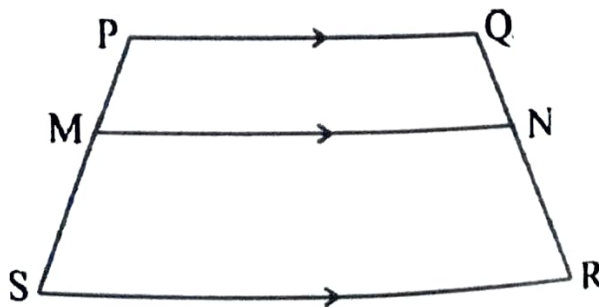
20. **Assertion** : HCF of any two consecutive even natural numbers is always 2.

Reason : Even natural numbers are divisible by 2.

SECTION-B

21. PQRS is a trapezium with $PQ \parallel SR$. If M and N are two points on the non-parallel sides PS and QR respectively, such that MN is parallel to PQ, then show that 2

$$\frac{PM}{MS} = \frac{QN}{NR}$$



22. The sum of the first 12 terms of an A.P. is 900. If its first term is 20 then find the common difference and 12th term. 2

OR

(6)

The sum of first n terms of an A.P. is represented by $S_n = 6n - n^2$. Find the common difference.

23. Two dice are rolled together bearing numbers 4, 6, 7, 9, 11, 12. Find the probability that the product of numbers obtained is an odd number. 2

24. If $\cos(A + B) = \frac{1}{2}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$ where $0 \leq A + B \leq 90^\circ$, then find the value of $\sec(2A - 3B)$. 2

OR

If $x = p \sec \theta + q \tan \theta$ and $y = p \tan \theta + q \sec \theta$, then prove that

$$x^2 - y^2 = p^2 - q^2.$$

25. Find the H.C.F and L.C.M of 480 and 720 using the Prime factorisation method. 2

SECTION-C

26. Four bells toll at an interval of 8, 12, 15 and 18 seconds respectively. All the four begin to toll together. Find the number of times they toll together in one hour excluding the one at the start. 3

27. If α, β are zeros of quadratic polynomial $2x^2 + 5x + k$, find the value of k such that $(\alpha + \beta)^2 - \alpha\beta = 21/4$ 3

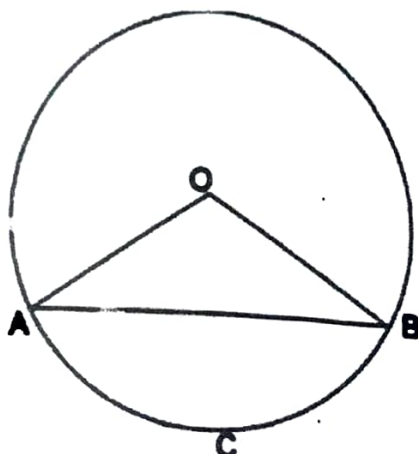
28. Find the solution of $2x - 3y + 6 = 0$ and $2x + 3y - 18 = 0$ graphically. 3

29. In a rectangular park of dimensions 50 m \times 40 m, a rectangular pond is constructed so that the area of grass strip of uniform width surrounding the pond would be 1184 m². Find the length and breadth of the pond. 3

OR

One fourth of a herd of camel was seen in the forest. Twice the square root of the herd had gone to the mountains and the remaining 15 camels were seen on the bank of the river. Find the total number of camels.

30. The perimeter of sector OACB of the circle centred at O and of radius 24cm, is 73.12 cm. 3



- Find the central angle $\angle AOB$
31. Prove the following identity: 3
- $$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

OR

If $\sec \theta = x + \frac{1}{4x}$, prove that $\sec \theta + \tan \theta = 2x$ or $1/2x$

SECTION-D

32. The mean of the following distribution is 53. Find the missing frequencies f_1 and f_2 : 5

Classes	0-20	20-40	40-60	60-80	80-100	Total
Frequency	15	f_1	21	f_2	17	100

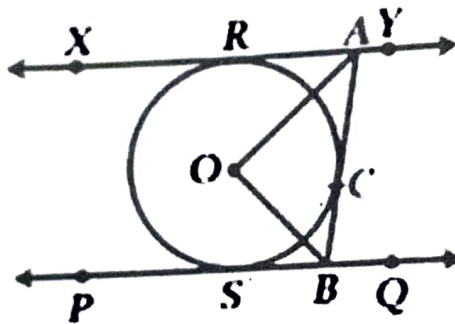
OR

The lengths of 40 leaves of plant are measured correct to the nearest millimetre and the data is given

Length in mm	118-126	127-135	136-144	145-153	154-162	163-171	172-180
Number of leaves	3	5	9	12	5	4	2

Find the median length of leaves.

33. A metallic cylinder has radius 3cm and height 5cm. To reduce its weight, a conical hole is drilled in the cylinder. The conical hole has a radius of $\frac{3}{2}$ cm. and its depth is $\frac{8}{9}$ cm. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in the conical shape. 5
34. In given figure, XY and PQ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and PQ at B. Prove that $\angle AOB = 90^\circ$ 5



35. As observed from the top of a 75 m high lighthouse from the sea level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships (Use $\sqrt{3} = 1.732$) 5

OR

A boy whose eye level is 1.35 m from the ground, spots a balloon moving with the wind in a horizontal line at some height from the ground. The angle of elevation of the balloon from the eyes of the boy at an instant is 60° . After 12 seconds, the angle of elevation reduces to 30° . If the speed of the wind is 3m/s then find the height of the balloon from the ground. (Use $\sqrt{3} = 1.73$)

SECTION-E

36. Your elder brother wants to buy a car and plans to take a loan from a bank for his car. He repays his total loan of Rs 1,18,000 by paying every month starting with the first instalment of Rs 1000. If he increases the instalment by Rs 100 every month, answer the following:



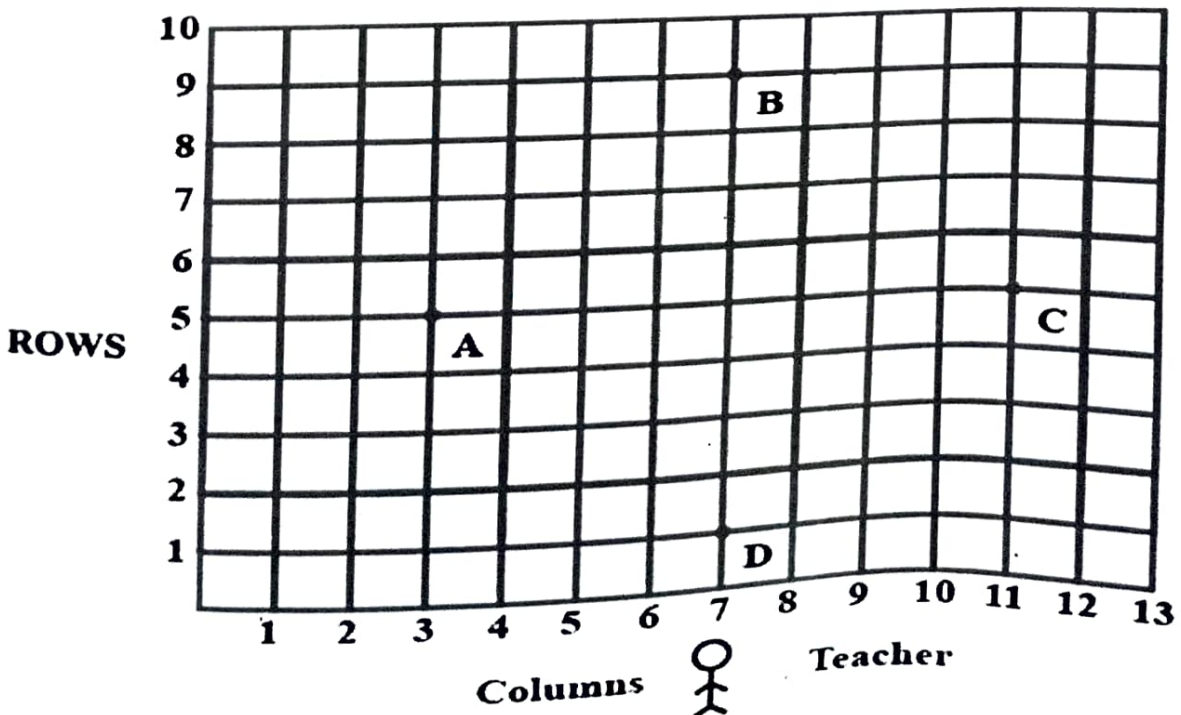
- (i) The amount paid by him in 30th installment is..... 1
- (ii) What amount does he still have to pay after the 30th installment? 1
- (iii) If total installments are 40 then the amount paid in the last installment? 2

OR

The ratio of the 1st installment to the last installment is.....

37. **Case Study-2**

Students of a DAV school are standing in rows and columns in their playground for a drill practice. A, B, C and D are the positions of four students as shown in figure:



(10)

On the basis of above information, answer the following questions

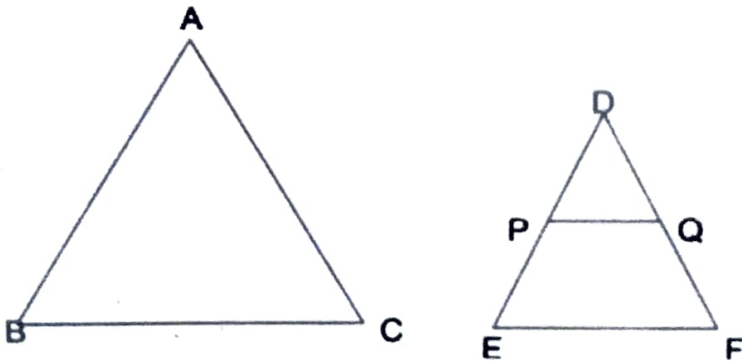
- (i) Find the mid point of BD. 1
- (ii) If the point P divides the line segment AC in the ratio 1:2, then find coordinate of P. 2

OR

Find the position of Jaspal standing in such a way that he is equidistant from each of the four students A,B,C and D.

- (iii) Find the distance between A and D. 1

38. Triangle is a very popular shape used in interior designing. The picture given above shows a cabinet designed by a famous interior designer. Here the largest triangle is represented by $\triangle ABC$ and smallest one with shelf is represented by $\triangle DEF$. PQ is parallel to EF.



- (i) Show that $\triangle DPQ \sim \triangle DEF$. 1
- (ii) If $2AB = 5DE$ and $\triangle ABC \sim \triangle DEF$ then show that perimeter of $\triangle ABC$ | perimeter of $\triangle DEF$ is constant. 2

OR

- (ii) If AM and DN are medians of similar triangles ABC and DEF respectively then prove that $\triangle ABM \sim \triangle DEN$.

- (iii) If $DP = 50$ cm and $PE = 70$ cm then find $\frac{PQ}{EF}$. 1