

No. of Printed Pages : 10

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FAS / Maths (041) / X / Ist Pre-Board Exam., 2024-25

Time : 3 hrs.]

[ M.M. : 80

General Instructions :

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer. (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take  $\pi = 22/7$  wherever required if not stated.
11. Use of calculators is not allowed.

**Section-A**

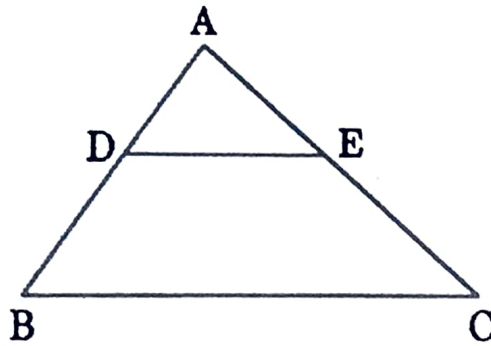
**Section A consists of 20 questions of 1 mark each.**

1. A quadratic polynomial whose one zero is 6 and sum of the zeroes is 0, is :  
(A)  $x^2 - 6x + 2$  (B)  $x^2 - 36$   
(C)  $x^2 - 6$  (D)  $x^2 - 32$ .

F-220

(P.T.O.)

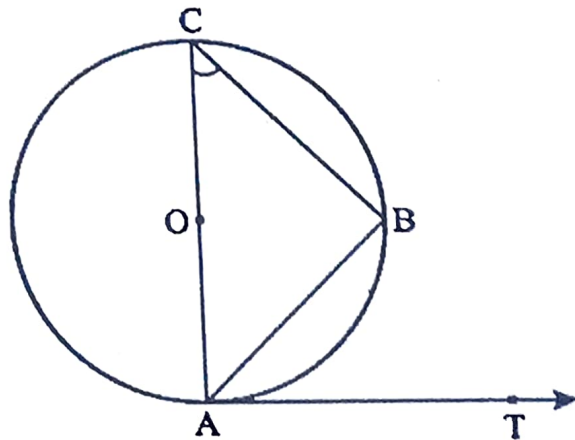
2. If the zeros of a polynomial are 3 and  $-5$ , then they cut the x-axis at \_\_\_\_\_ and \_\_\_\_\_ points.  
(A)  $(8, 0)$  and  $(-4, 0)$       (B)  $(3, -3)$  and  $(-5, 5)$   
(C)  $(-3, 0)$  and  $(5, 0)$       (D)  $(3, 0)$  and  $(-5, 0)$
3. If a pair of linear equations is consistent, then the lines will be :  
(A) always coincident      (B) parallel  
(C) always intersecting      (D) intersecting or coincident
4. The quadratic equation  $2x^2 - \sqrt{5}x + 12 = 0$  has  
(A) real and distinct roots      (B) real and equal roots  
(C) no real roots      (D) more than two real roots
5. The 14th term from the end of the A.P.  $-11, -8, -5, \dots, 49$  is :  
(A) 7      (B) 10      (C) 13      (D) 28
6. In  $\triangle ABC$ ,  $DE \parallel BC$  (as shown in the figure). If  $AD = 4$  cm,  $AB = 9$  cm and  $AC = 13.5$  cm, then the length of  $EC$  is :  
(A) 6 cm      (B) 7.5 cm      (C) 9 cm      (D) 5.7 cm



7. The fourth vertex  $D$  of a parallelogram  $ABCD$  whose three vertices are  $A(-2, 3)$ ,  $B(6, 7)$  and  $C(8, 3)$  is  
(A)  $(0, 1)$       (B)  $(0, -1)$       (C)  $(-1, 0)$       (D)  $(1, 0)$
8.  $AOBC$  is a rectangle whose three vertices are vertices  $A(0, 3)$ ,  $O(0, 0)$  and  $B(5, 0)$ . The length of its diagonal is  
(A) 5      (B) 3      (C)  $\sqrt{34}$       (D) 4

( 3 )

9. The value of  $\theta$  for which  $2 \sin^2 \theta = \frac{1}{2}$ ;  $0^\circ \leq \theta \leq 90^\circ$  is :  
 (A)  $30^\circ$                       (B)  $60^\circ$                       (C)  $45^\circ$                       (D)  $90^\circ$
10. A bridge, in the shape of a straight path across a river, makes an angle of  $60^\circ$  with the width of the river. If the length of the bridge is 100 m, then the width of the river is:  
 (A) 50 m                      (B) 173.2 m                      (C) 43.3 m                      (D) 100 m
11. If radii of two concentric circles are 4 cm and 5 cm, then the length of each chord of one circle which is tangent to the other circle is  
 (A) 3 cm                      (B) 9 cm                      (C) 6 cm                      (D) 1 cm
12. In Fig., AB is a chord of the circle and AOC is its diameter such that  $\angle ACB = 50^\circ$ . If AT is the tangent to the circle at the point A, then  $\angle BAT$  is equal to  
 (A)  $65^\circ$                       (B)  $50^\circ$                       (C)  $60^\circ$                       (D)  $40^\circ$



13. Two identical solid hemispheres of equal base diameter 10 cm are stuck together along their bases. The total surface area of the combination is:  
 (A)  $400\pi \text{ cm}^2$                       (B)  $200 \pi \text{ cm}^2$   
 (C)  $300 \pi \text{ cm}^2$                       (D)  $100 \pi \text{ cm}^2$
14. The minute hand of a clock is 84 cm long. The distance covered by the tip of the minute hand from 10:10 am to 10.25 am is:  
 (A) 44 cm                      (B) 88 cm  
 (C) 132 cm                      (D) 176 cm

15. Using empirical formula, the mode of a distribution whose mean is 12 and median is 15 is:

(A) 13.5            (B) 21            (C) 6            (D) 14

16. For the following distribution, the sum of the upper limits of the median class and modal class is:

Class	0-5	5-10	10-15	15-20	20-25
frequency	10	15	12	20	9

(A) 15            (B) 25            (C) 30            (D) 35

17. A number X is chosen from the numbers 1, 2, 3 and a number Y is chosen from the numbers 1, 4, 9. Then  $P(XY \leq 9)$  is:

(A)  $7/9$             (B)  $5/9$             (C)  $2/3$             (D)  $1/3$

18. A dice is rolled twice. The  $P(\text{getting sum of the two numbers to be } > 10)$  is:

(A)  $1/9$             (B)  $1/6$             (C)  $7/12$             (D)  $1/12$

**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 (A):** The number  $5^n$  cannot end with the digit 0, where n is a natural number.
- Reason (R):** Prime factorisation of 5 has only two factors, 1 and 5.
20. **Assertion (A):** If the circumference of a circle is 176 cm, then the diameter is 28 cm.

**Reason (R):** Circumference =  $2\pi r$ , where r is the radius of the circle.

**Section-B**

Section B consists of 5 questions of 2 marks each.

21. Prove that  $3 + 5\sqrt{2}$  is an irrational number, given that  $\sqrt{2}$  is an irrational number.

OR

21. Find the HCF and LCM of 288, 360 and 384 by prime factorization method.

22. If the point A (2, -4) is equidistant from P (3, 8) and Q (-10, y), find the values of y.

23. In what ratio does x-axis divide the line segment joining the points (-4, -6) and (-1, 7).

24. If  $\tan 3x = \sin 45^\circ \cdot \cos 45^\circ + \sin 30^\circ$ , find the value of x.

25. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of drawing (i) a red king (ii) a queen or a jack.

OR

25. The probability of selecting a blue marble at random from a jar that contains only black, blue and green marbles is  $1/5$ . The probability of selecting a black marble at random from the same jar is  $1/4$ . If the jar contains 11 green marbles, find the total number of marbles in the jar.

**Section-C**

Section C consists of 6 questions of 3 marks each.

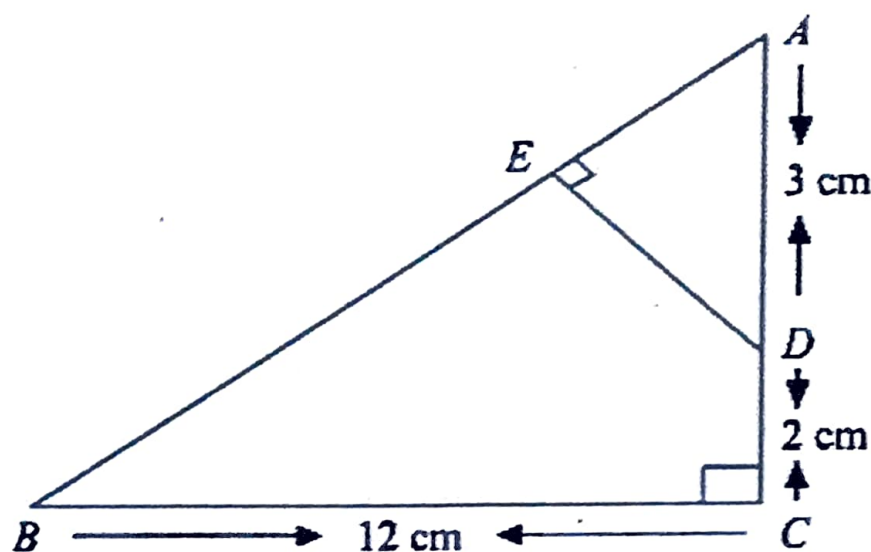
26. Ravish runs a book shop at school in Gurgaon. He received 480 chemistry books, 192 physics books and 672 Mathematics books of class XI. He wishes to average these books in minimum numbers of stacks such that each stack consists of the books on only one subject and the number of books in each stack is the same.

(i) Find the number of books in each stack

(ii) Find the total number of stacks.

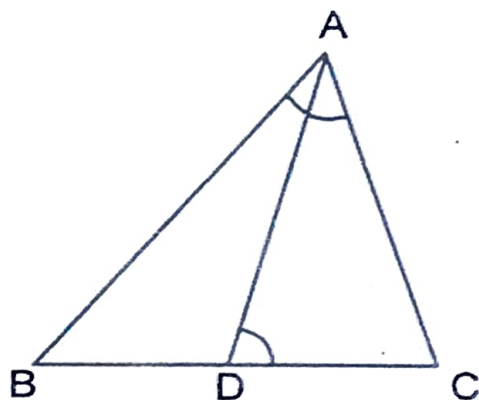
27. If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $x^2 + 6x + 9$ , then form a polynomial whose zeroes are  $-\alpha$  and  $-\beta$ .

28. The area of a right angled triangle is  $600 \text{ cm}^2$ . If the base of the triangle exceeds the altitude by  $10 \text{ cm}$ , find the dimensions of the triangle.
29. In Fig.,  $\triangle ABC$  is right angled at  $C$  and  $DE \perp AB$ . Prove that  $\triangle ABC \sim \triangle ADE$  and hence find the lengths of  $AE$  and  $DE$ .



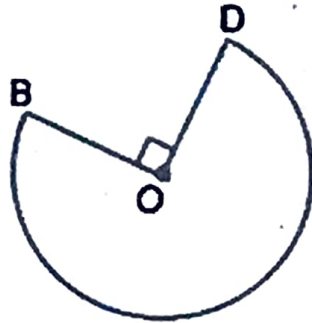
OR

29.  $ABC$  is a triangle and  $D$  is a point on the side  $BC$ . If  $BC = 12 \text{ cm}$ ,  $BD = 9 \text{ cm}$  and  $\angle ADC = \angle BAC$ , then find the length of  $AC$ .



30. Prove that :
- $$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

31. The shape of the top of a table in a restaurant is that of a sector of a circle with centre  $O$  and  $\angle BOD = 90^\circ$ . If  $BO = OD = 70$  cm, find:
- the area of the top of the table
  - the perimeter of the table.



OR

31. Four cows are tethered at four corners of a square plot of side 50 m, so that they just cannot reach one another. What area will be left ungrazed?

Section-D

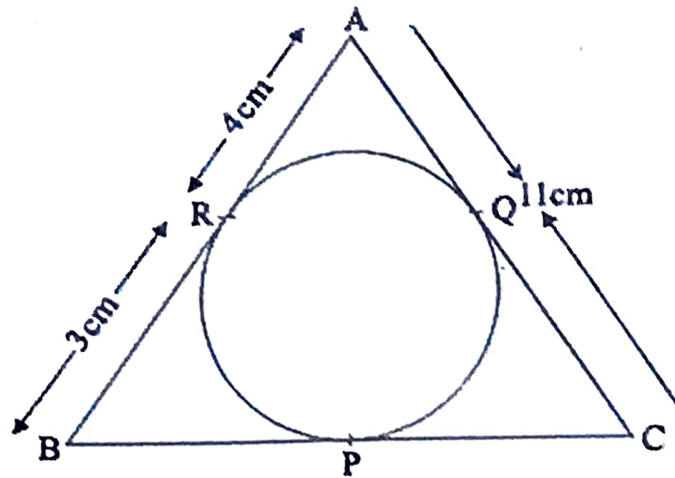
Section D consists of 4 questions of 5 marks each

32. Solve the pair of linear equations graphically:  $4x - 5y - 20 = 0$  and  $3x + 5y - 15 = 0$ . Also find the area of the triangle formed by the lines representing the above equations and the y-axis.

OR

32. The sum of the numerator and denominator of a fraction is 3 less than twice the denominator. If the numerator and denominator are decreased by 1, the fraction becomes  $\frac{1}{2}$ . Determine the fraction.
33. A person observed the angle of elevation of the top of a tower as  $30^\circ$ . He walked 50 m towards the foot of the tower along level ground and found the angle of elevation of the top of the tower as  $60^\circ$ . Find the height of the tower.

34. Prove that the lengths of tangents drawn from an external point to a circle are equal. Using the above result, find the length of BC, given that,  $\Delta ABC$  is circumscribing a circle.



35. The median of the following data is 32.5. Find the values of x and y, if the sum of all frequencies is 40.

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No. of students	x	5	9	12	y	3	2

OR

35. Find the mean and mode of the following distribution:

Amount (in ₹)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
No. of students	8	16	36	34	6

Section-E

Section E consists of 3 case study based questions of 4 marks each.

36. A rental company charges an initial rent of ₹ 500 per month, with a monthly increase of ₹ 30.

Based on the above, answer the following questions:

- Determine the rent paid in the 7<sup>th</sup> month.
- Calculate the total rent paid in 6 months.

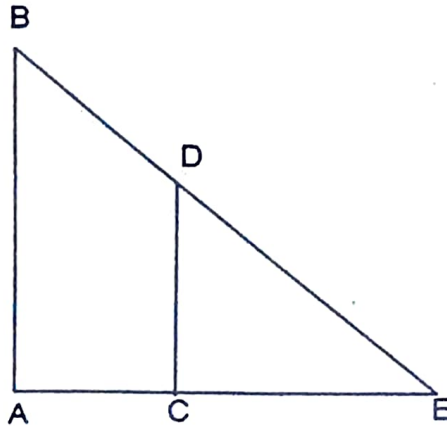


(iii) (a) Find the number of months if the total rent paid is ₹ 6350.

OR

(b) In which month will the rent be ₹ 1490.

Two trees are standing parallel to each other. The bigger tree 8 m high, casts a shadow of 6 m.



Based on the above information answer the following questions.

- (i) If  $AB$  and  $CD$  are the two trees and  $AE$  is the shadow of the longer tree, then state whether  $\triangle AEB \sim \triangle CED$ , give reason.
- (ii) If the ratio of the height of two trees is  $3 : 1$ , then find the length of the shadow of the smaller tree.
- (iii) (a) Find the distance of point  $B$  from  $E$ .

OR

(b) If  $ED = x + 2$ ,  $BD = x$ ,  $EC = 5x + 4$  and  $AC = 3x$ , find  $x$ .

A circus tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of cylindrical part is 9 m and 30 m respectively and height of conical part is 8 m with same diameter as that of the cylindrical part.



( 10 )

Based on the above information answer the following questions:

- (i) Find the slant height of the conical part.
- (ii) Find the area of the canvas used in making the tent
- (iii) (a) Find the cost of the canvas bought for the tent at the rate ₹200 per sq  $m$ , if 30 sqm canvas was wasted during stitching.

OR

- (b) Find the volume of air in the tent.