

## General Instructions:

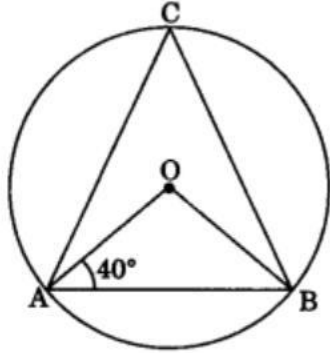
1. This question paper contains 38 questions.
2. This question paper is divided into 5 sections A, B, C, D and E.
3. In Section A, Questions 1 – 18 are multiple choice questions (MCQs) and question number 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In Section B, Questions 21 – 25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions 26 – 31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions 32 – 35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question number 36 – 38 are case study based questions, carrying 4 marks each with sub parts of the values 1, 1 and 2 marks each respectively.
8. All questions are compulsory. However, an internal choice in 2 questions 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  $\pi = \frac{22}{7}$ , wherever required if not stated.
11. Use of calculators is not allowed.

## Section – A

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

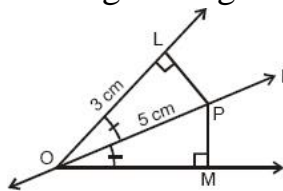
1. The rational number between  $\sqrt{2}$  and  $\sqrt{3}$  is:  
a.  $\sqrt{2} \times \sqrt{3}$     b.  $\sqrt{5}$     c.  $\sqrt{4}$     d.  $6^{\frac{1}{4}}$
2. Circles having the same centre and different radii are called \_\_\_\_ circles.  
a. concentric    b. chord    c. diameter    d. cyclic
3. If  $(x + 2)$  is a factor of the polynomial  $x^2 - kx + 14$ , then the value of  $k$  is:

- a.  $-9$       b.  $9$       c.  $-2$       d.  $14$
4. The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratios of the surface area of the balloon in the two cases is:
- a.  $1 : 4$       b.  $1 : 3$       c.  $2 : 3$       d.  $2 : 1$
5. In the given figure, O is the centre of the circle. If  $\angle OAB = 40^\circ$  and C is the point on the circle, then the value of  $\angle ACB$  is:



- a.  $50^\circ$       b.  $77^\circ$       c.  $85^\circ$       d.  $60^\circ$
6. All right angles are equal. This is which of Euclid's postulate:
- a. Euclid's postulate 4  
b. Euclid's postulate 1  
c. Euclid's postulate 5  
d. Euclid's postulate 3
7. If in a parallelogram its diagonals bisect each other and are equal, then it is a:
- a. square      b. rectangle      c. rhombus      d. parallelogram
8. The value of the polynomial  $5x - 4x^2 + 3$ , when  $x = -1$  is:
- a.  $-6$       b.  $6$       c.  $2$       d.  $-2$
9. Equation of the line passing through the origin is:
- a.  $7y - x = 0$       b.  $x + y = 0$       c.  $-2x + y = 0$       d.  $-3x + 2y = 0$

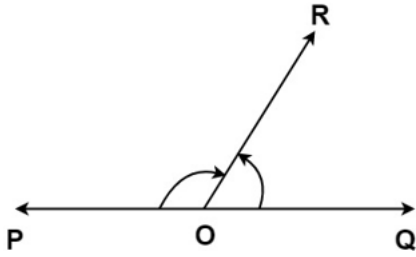
10. In the given figure, the length of PM is:



- a.  $4$  cm      b.  $6$  cm      c.  $3$  cm      d.  $2$  cm
11. Three angles of a quadrilateral are  $75^\circ$ ,  $90^\circ$  and  $75^\circ$ . The fourth angle is:

- a.  $90^\circ$       b.  $95^\circ$       c.  $105^\circ$       d.  $120^\circ$

12. In the given figure, which pair do  $\angle POR$  and  $\angle ROQ$  form?



- a. reflex angle  
b. complementary  
c. linear  
d. vertically opposite

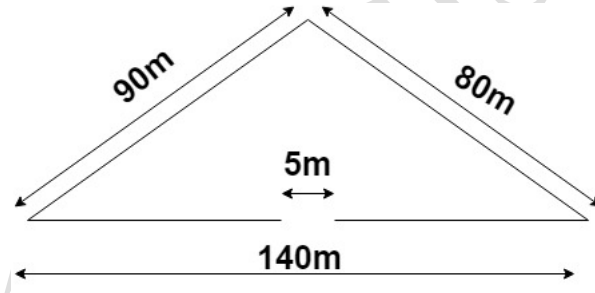
13. The sides of a triangle are 122 m, 22 m and 120 m respectively. The area of the triangle is:

- a. 1320 sq. m    b. 1300 sq. m    c. 1400 sq. m    d. 1420 sq. m

14. If  $x = 2 + \sqrt{3}$ , then the value of  $\frac{1}{x}$  is:

- a.  $\frac{1}{2+\sqrt{3}}$       b.  $2 - \sqrt{3}$       c.  $\sqrt{3}$       d.  $\frac{1}{2-\sqrt{3}}$

15. A triangular garden has sides 90 m, 140 m and 80 m. A fence is to be put all around the garden. What will be the total cost of fencing at the rate of ₹ 15 per metre if a 5 m wide space is to be left on the side for a gate opening?

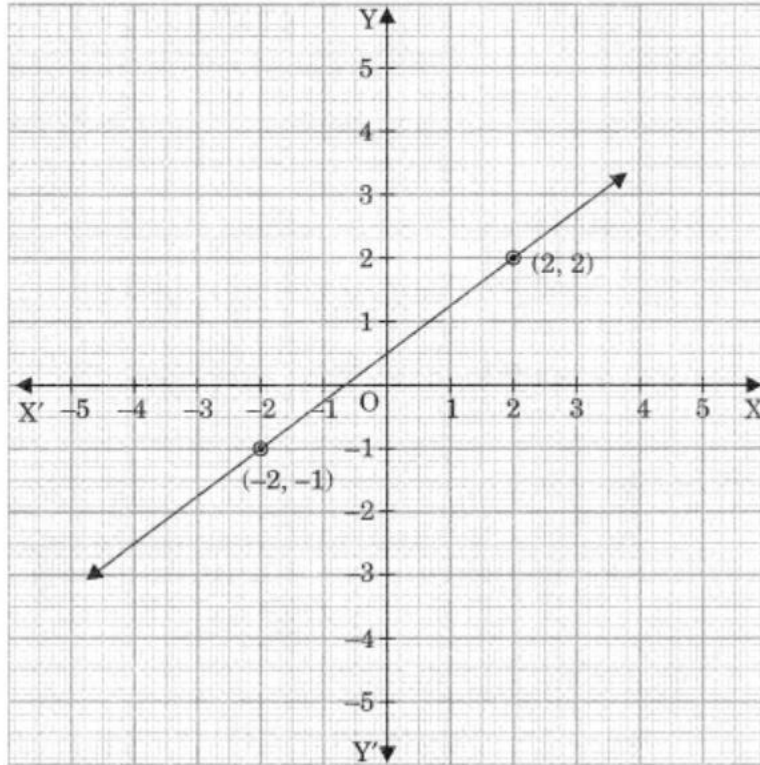


- a. ₹ 4525    b. ₹ 4975    c. ₹ 4575    d. ₹ 4230

16. The linear equation  $3x - 11y = 10$  has:

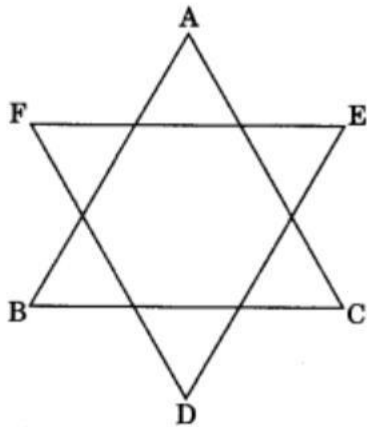
- a. unique solution  
b. two solutions  
c. infinitely many solutions  
d. no solution

17. Which equation does the given graph represent?



- a.  $y - x = 0$
- b.  $6x + 3y = 0$
- c.  $7x + y = 0$
- d.  $3x - 4y = -2$

18. In the given figure,  $\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = k$  right angles, then the value of  $k$  is:



- a. 8
- b. 5
- c. 3
- d. 4

Directions:

19. Assertion (A): According to Euclid's first axiom – "Things which are equal to the same thing are also equal to one another."

Reason (R): If  $AB = PQ$  and  $PQ = XY$ , then  $AB = XY$ .

20. Assertion (A): The polynomial  $p(x) = 5x - \frac{1}{2}$  is a linear polynomial.

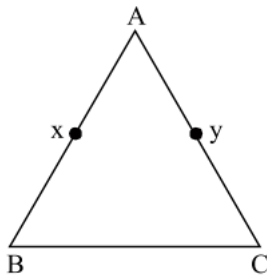
Reason (R): The general form of a linear polynomial is  $ax + b$ .

### Section – B

Section B consist of 5 questions of 2 marks each.

21. Prove that two lines perpendicular to the same line are parallel to each other.

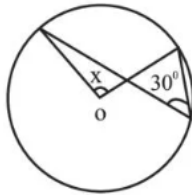
22. In the given figure,  $AX = AY$ ,  $AB = AC$ , show that  $BX = BY$ .



OR

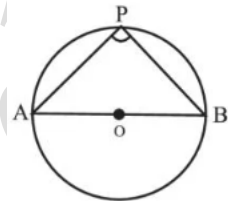
Write Euclid's first postulate.

23. Find the value of  $x$  in the given figure.



OR

In the given figure, AOB is the diameter of a circle with centre O and P is any point on the circle. Find the value of  $\angle APB$ .



24. A hemispherical tank has inner radius 2.8 m. Find its capacity in litres.

25. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

### Section – C

Section C consists of 6 questions of 3 marks each.

26. If  $32^{2x-1} = 4 \times 8^{x-5}$ , then find the value of  $x$ .

**OR**

Evaluate:  $\frac{2^{38}+2^{37}+2^{36}}{2^{39}+2^{38}+2^{37}}$

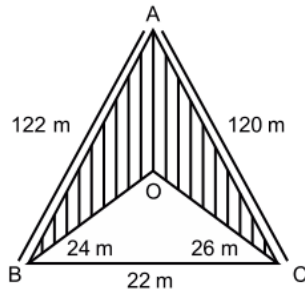
27. If the polynomial  $ax^3 + 4x^3 + 3x - 4$  and  $x^3 - 4x + a$  leave the same remainder when divided by  $(x - 3)$ , find the value of  $a$ .

**OR**

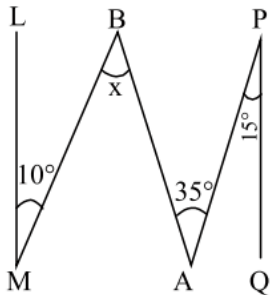
If  $x = \frac{4}{3}$  is a root of the polynomial  $f(x) = 6x^3 - 11x^2 + kx - 20$ , find the value of  $k$ .

28. If the total number of legs in a herd of deer and cranes is 40, represent this situation in the form of a linear equation in two variables.

29. Find the area of the shaded region in the given figure.



30. In the given figure,  $QP \parallel ML$ , find the value of  $\angle x$ .



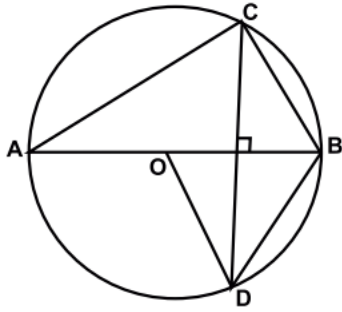
31. Find three solutions for the equation  $x + 6y = 12$ .

### Section – D

**Section D consists of 4 questions of 5 marks each.**

32. If  $a + b + c = 0$ , then find the value of  $\frac{(b+c)^2}{bc} + \frac{(a+c)^2}{ca} + \frac{(a+b)^2}{ab}$ .

33. In the given figure, O is the centre of the circle,  $BD = OD$  and  $CD \perp AD$ . Find the value of  $\angle CAB$ .



**OR**

AC and BD are chords of a circle that bisect each other. Prove that:

- (i) AC and BD are diameters.
- (ii) ABCD is a rectangle.

34. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cone is to be painted and the cost of painting is 12 per  $\text{m}^2$ , what will be the cost of painting all of these cones?

**OR**

The diameter of the moon is approximately one – fourth the diameter of the earth. Find the ratio of their surface areas and what fraction is the volume of the moon of the volume of the earth.

35. If  $x = 9 - 4\sqrt{5}$ , then find the value of:

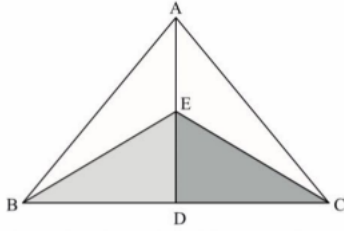
- (i)  $x^2 + \frac{1}{x^2}$
- (ii)  $x^2 - \frac{1}{x^2}$

### Section – E

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

36. Rangoli is an art that originates from in the Indian subcontinent, in which patterns are created on the floor or tabletop using materials such as powdered limestone, red ochre, dry rice flour, coloured sand, quartz powder, flower petals and coloured rocks.

During a Diwali festival Ananya made a geometrical Rangoli as shown below.



On measuring the dimensions, it was found that AB and AC were equal and BE and CE were also equal.

- (i) Which side is common in triangles AEB and AEC?
- (ii) Are triangles ABE and ACF congruent?
- (iii) Show that  $\angle BED = \angle CED$ .

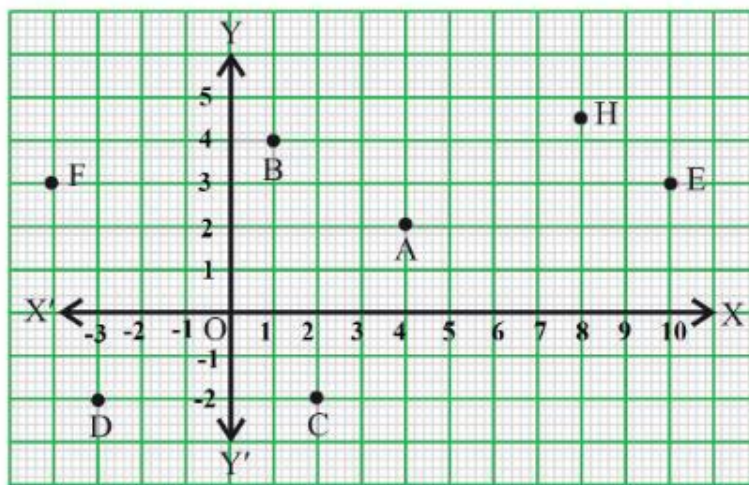
**OR**

Write the RHS congruence rule.

37. Sports in schools have immense benefits for both children and for educational systems. The benefits can be presented in terms of children's development in a number of domains: physical, lifestyle, affective, social and cognitive so every school provides a playground and sports activities to the students.

Rita is a good sports person and takes part in sports activities. The positions of different students in the playground are represented by different points in Cartesian plane as shown in the graph given below:

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Based on the information above, answer the following questions:

- (i) What are the coordinates of point B?



- (ii) In which quadrant does point F lie?
- (iii) Find the distance between points C and D.

**OR**

If a point is present on  $x - axis$ , what will be its ordinate and if the point is on  $y - axis$ , what will be its abscissa?

38. Small neon lamps are widely used as visual indicators in electronic equipment and appliances, due to their low power consumption, long life, and ability to operate on main power.



The following table gives the lifetimes of 400 neon lamps.

Lifetime (in hours)	Number of lamps
300 – 400	14
400 – 500	56
500 – 600	60
600 – 700	86
700 – 800	74
800 – 900	62
900 – 1000	48

- (i) How many lamps have a lifetime of more than 700 hours?
- (ii) What is the class mark for the class 500 – 600?
- (iii) While drawing the histogram for the above data lifetime should be taken along \_\_\_\_\_ axis and the number of lamps should be taken along \_\_\_\_\_ axis.

**OR**

Which interval has the maximum frequency and which has the minimum frequency?

If a point lies on  $x - axis$ , what will be its ordinate and if the point lies on  $y - axis$ , what will be its abscissa.?

39. Small neon lamps are most widely used as visual indicators in electronic equipment and appliances, due to their low power consumption, long life and ability to operate on mains power.



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