

### General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) This question paper comprises **four** sections - A, B, C and D. This question paper carries **40** questions. All questions are compulsory.
- (ii) Section A : Question Numbers **1** to **20** comprises of **20** questions of **one** mark each.
- (iii) Section B : Question Numbers **21** to **26** comprises of **6** questions of **two** marks each.
- (iv) Section C : Question Numbers **27** to **34** comprises of **8** questions of **three** marks each.
- (v) Section D : Question Numbers **35** to **40** comprises of **6** questions of **four** marks each.
- (vi) There is no overall choice in the question paper. However, an internal choice has been provided in 2 questions of one mark, 2 questions of two marks, 3 questions of three marks and 3 questions of four marks. You have to attempt **only one of the choices** in such questions.
- (vii) In addition to this, separate instructions are given with each section and question, wherever necessary.
- (viii) Use of calculators is **not** permitted.

### SECTION A

Question numbers 1 to 20 carry 1 mark each.

Choose the correct option in question numbers 1 to 10.

1. If  $(3, -6)$  is the mid-point of the line segment joining  $(0, 0)$  and  $(x, y)$ , then the point  $(x, y)$  is
  - (A)  $(-3, 6)$
  - (B)  $(6, -6)$
  - (C)  $(6, -12)$
  - (D)  $(\frac{3}{2}, -3)$

In the given circle in Figure-1, number of tangents parallel to tangent PQ is



Figure-1

- (A) 0
- (B) many
- (C) 2
- (D) 1

3. The discriminant of the quadratic equation  $4x^2 - 6x + 3 = 0$  is

- (A) 12
- (B) 84
- (C)  $2\sqrt{3}$
- (D) -12

4. For the following frequency distribution :

Class :	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
Frequency :	8	10	19	25	8

The upper limit of median class is

- (A) 15
- (B) 10
- (C) 20
- (D) 25

5. If  $\cos A = \frac{\sqrt{3}}{2}$ ,  $0^\circ < A < 90^\circ$ , then A is equal to

- (A)  $\frac{\sqrt{3}}{2}$
- (B)  $30^\circ$
- (C)  $60^\circ$
- (D) 1

6. The probability of an impossible event is  
(A) 1  
(B)  $\frac{1}{2}$   
(C) not defined  
(D) 0
7. If a pair of linear equations is consistent, then the lines represented by them are  
(A) parallel  
(B) intersecting or coincident  
(C) always coincident  
(D) always intersecting
8. The distance between the points (3, -2) and (-3, 2) is  
(A)  $\sqrt{52}$  units  
(B)  $4\sqrt{10}$  units  
(C)  $2\sqrt{10}$  units  
(D) 40 units
9. 180 can be expressed as a product of its prime factors as  
(A)  $10 \times 2 \times 3^2$   
(B)  $25 \times 4 \times 3$   
(C)  $2^2 \times 3^2 \times 5$   
(D)  $4 \times 9 \times 5$
10. The total surface area of a frustum-shaped glass tumbler is ( $r_1 > r_2$ )  
(A)  $\pi r_1 l + \pi r_2 l$   
(B)  $\pi l (r_1 + r_2) + \pi r_2^2$   
(C)  $\frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$   
(D)  $\sqrt{h^2 + (r_1 - r_2)^2}$

Fill in the blanks in question numbers 11 to 15.

11. If 2 is a zero of the polynomial  $ax^2 - 2x$ , then the value of 'a' is \_\_\_\_\_.

P.T.O.

12. If the radii of two spheres are in the ratio 2 : 3, then the ratio of their respective volumes is \_\_\_\_\_.
13. A line intersecting a circle in two points is called a \_\_\_\_\_.
14. If  $\angle$  (Δ PQR) is zero, then the points P, Q and R are \_\_\_\_\_.
15. All squares are \_\_\_\_\_ . (congruent/similar)

Answer the following question numbers 16 to 20.

16. A coin is tossed twice. Find the probability of getting head both the times.
17. Find the radius of the sphere whose surface area is  $36\pi \text{ cm}^2$ .
18. Find the value of  $x$  so that  $-6, x, 8$  are in A.P.

OR

Find the 11<sup>th</sup> term of the A.P.  $-27, -22, -17, -12, \dots$

19. In Figure-2, the angle of elevation of the top of a tower AC from a point B on the ground is  $60^\circ$ . If the height of the tower is 20 m, find the distance of the point from the foot of the tower.

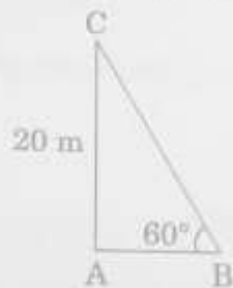


Figure-2

20. Evaluate :

$$\tan 40^\circ \times \tan 50^\circ$$

OR

If  $\cos A = \sin 42^\circ$ , then find the value of A.

### SECTION B

Question numbers 21 to 26 carry 2 marks each.

21. If  $\tan(A + B) = \sqrt{3}$  and  $\tan(A - B) = \frac{1}{\sqrt{3}}$ ,  $0 < A + B \leq 90^\circ$ ,  $A > B$ , then find the values of A and B.

22. A letter is selected at random from the set of English alphabets. What is the probability that it is a vowel?

23. Solve for  $x$ :

$$\sqrt{3}x^2 + 14x - 5\sqrt{3} = 0$$

24. Find the mean for the following distribution:

Classes :	5 - 15	15 - 25	25 - 35	35 - 45
Frequency :	2	4	3	1

OR

The following distribution shows the transport expenditure of 100 employees:

Expenditure (in ₹) :	200 - 400	400 - 600	600 - 800	800 - 1000	1000 - 1200
Number of employees :	21	25	19	23	12

Find the mode of the distribution.

25. Check whether  $6^n$  can end with the digit '0' (zero) for any natural number  $n$ .

OR

Find the LCM of 150 and 200.

26. In Figure-3,  $\Delta ABC$  and  $\Delta XYZ$  are shown. If  $AB = 3$  cm,  $BC = 6$  cm,  $AC = 2\sqrt{3}$  cm,  $\angle A = 80^\circ$ ,  $\angle B = 60^\circ$ ,  $XY = 4\sqrt{3}$  cm,  $YZ = 12$  cm and  $XZ = 6$  cm, then find the value of  $\angle Y$ .

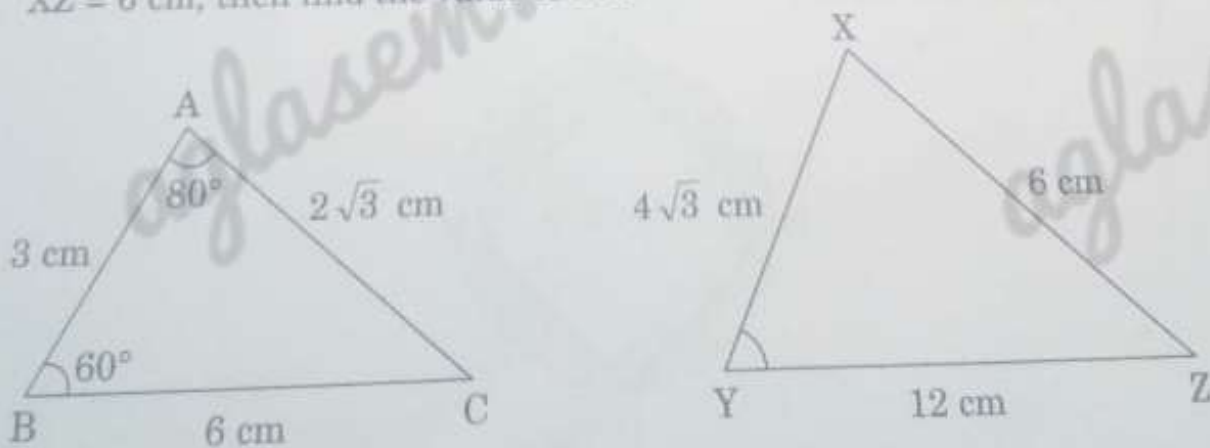


Figure-3



SECTION C

Question numbers 27 to 34 carry 3 marks each

27. Construct a triangle with its sides 4 cm, 5 cm and 6 cm. Then construct a triangle similar to it whose sides are  $\frac{2}{3}$  of the corresponding sides of the first triangle.

OR

Draw a circle of radius 2.5 cm. Take a point P at a distance of 8 cm from its centre. Construct a pair of tangents from the point P to the circle.

28. If the  $n^{\text{th}}$  terms of two A.P's 23, 25, 27, ... and 5, 8, 11, 14, ... are equal, then find the value of  $n$ .
29. In Figure-4, AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If  $OA = 7$  cm, then find the area of the shaded region.

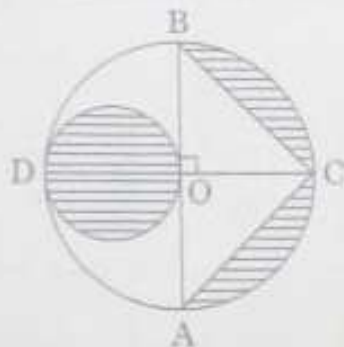


Figure-4

OR

In Figure-5, ABCD is a square with side 7 cm. A circle is drawn circumscribing the square. Find the area of the shaded region.

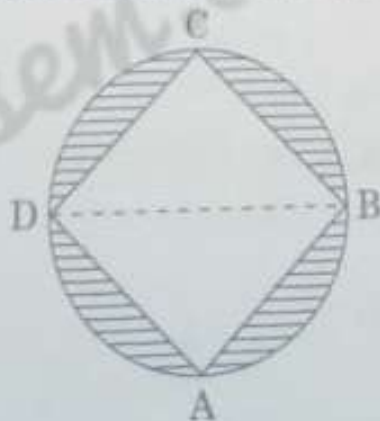
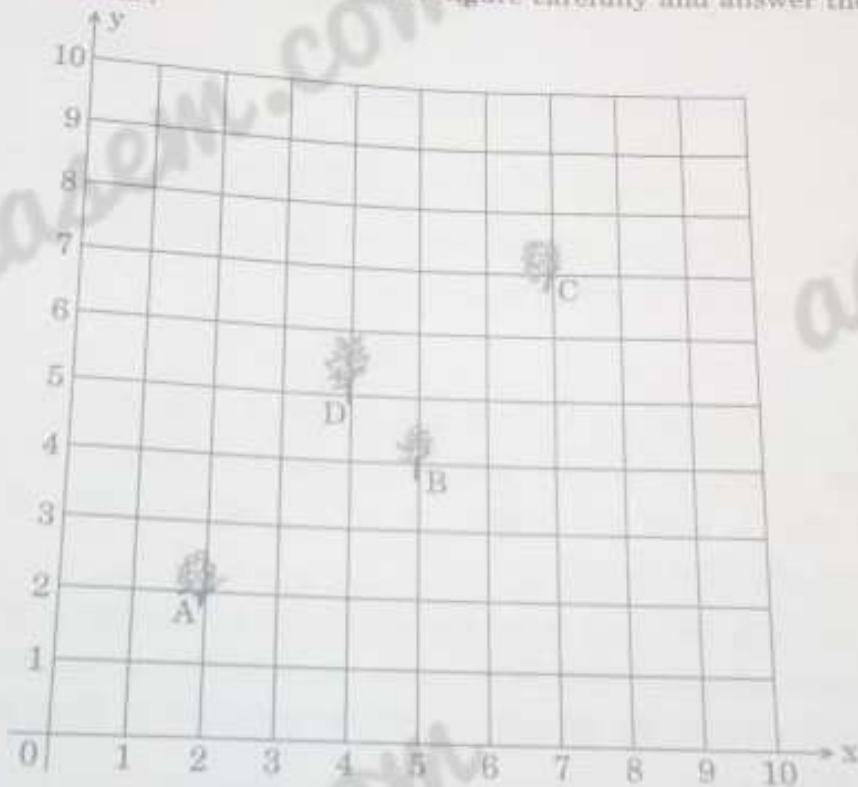


Figure-5

30. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

31. Krishna has an apple orchard which has a  $10\text{ m} \times 10\text{ m}$  sized kitchen garden attached to it. She divides it into a  $10 \times 10$  grid and puts soil and manure into it. She grows a lemon plant at A, a coriander plant at B, an onion plant at C and a tomato plant at D. Her husband Ram praised her kitchen garden and points out that on joining A, B, C and D they may form a parallelogram. Look at the below figure carefully and answer the following questions :



(i) Write the coordinates of the points A, B, C and D, using the  $10 \times 10$  grid as coordinate axes.

(ii) Find whether ABCD is a parallelogram or not.

32. Prove that :

$$\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$$

33. Prove that  $\sqrt{3}$  is an irrational number.

34. The difference between two numbers is 26 and the larger number exceeds thrice of the smaller number by 4. Find the numbers.

Solve for x and y: **OR**

$$\frac{2}{x} + \frac{3}{y} = 13 \quad \text{and} \quad \frac{5}{x} - \frac{4}{y} = -2$$

### SECTION D

Question numbers 35 to 40 carry 4 marks each.

35. Two water taps together can fill a tank in  $9\frac{3}{8}$  hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

**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.

36. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, then find the radius and slant height of the heap.

37. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are  $30^\circ$  and  $45^\circ$ , respectively. If the bridge is at a height of 10 m from the banks, then find the width of the river. (Use  $\sqrt{3} = 1.73$ )

38. Draw a 'less than' ogive for the following frequency distribution :

Classes :	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Frequency :	7	14	13	12	20	11	15	8



- 5<sup>th</sup> If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.

OR

In Figure-6, in an equilateral triangle ABC,  $AD \perp BC$ ,  $BE \perp AC$  and  $CF \perp AB$ . Prove that  $4(AD^2 + BE^2 + CF^2) = 9AB^2$ .

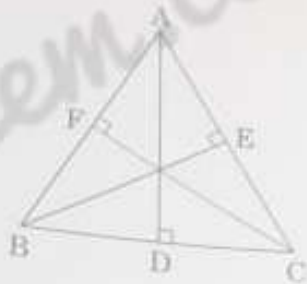


Figure-6

6. Find other zeroes of the polynomial

$$p(x) = 3x^4 - 4x^3 - 10x^2 + 8x + 8,$$

if two of its zeroes are  $\sqrt{2}$  and  $-\sqrt{2}$ .

OR

Divide the polynomial  $g(x) = x^3 - 3x^2 + x + 2$  by the polynomial  $x^2 - 2x + 1$  and verify the division algorithm.