

## PART-A

### Section-I

Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Find the HCF of 96 and 404.

OR

What is the relation between HCF and LCM of two numbers ?

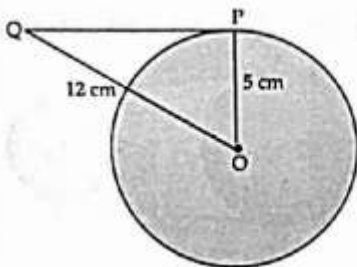
2. Show that equation  $2x^2 - 7x + 6$  has 2 as a root.

3. Find the fourth vertex  $D$  of a parallelogram  $ABCD$  whose three vertices are  $A(-2, 3)$ ,  $B(6, 7)$  and  $C(8, 3)$  respectively.

OR

Find the distance of a point  $(x, y)$  from origin.

4. A tangent  $PQ$  at a point  $P$  of a circle of radius 5 cm meets a line through the centre  $O$  at a point  $Q$  so that  $OQ = 12$  cm. Find length of  $PQ$ .



5. Evaluate  $9 \sec^2 A - 9 \tan^2 A$

OR

If  $\operatorname{cosec} \theta - \cot \theta = \frac{1}{3}$ , then find the value of  $\operatorname{cosec} \theta + \cot \theta$ .

6. Find the area of the circle that can be inscribed in a square of side 6 cm.

7. The shape of a gilli, in the gilli-danda game (see in Figure) is a combination of which geometri figures?



8. Consider the following frequency distribution of the heights of 60 students of a class.

Heights (in cm)	No. of students
150-155	15
155-160	13
160-165	10
165-170	8
170-175	9
175-180	5

Find the upper limit of the median class.

9. If LCM and HCF of two rational numbers are same, then what can you say of these numbers.

10. The pair of equations  $x = a$  and  $y = b$  graphically represents which type of lines.

11. Find the sum of first 8 multiples of 3.

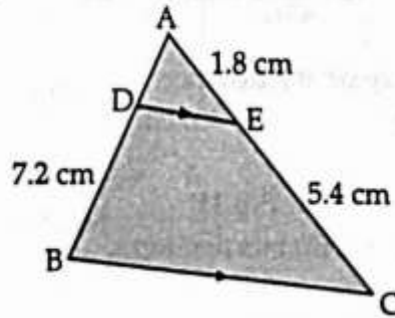
OR

Find the 21<sup>st</sup> term of the A.P.  $-4\frac{1}{2}, -3, -1\frac{1}{2}, \dots$

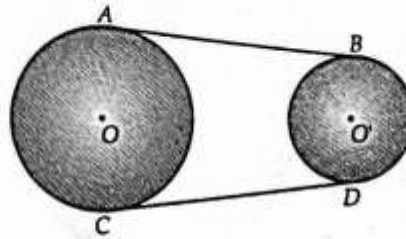
12. Are two triangles having corresponding sides equal are similar.

OR

In Figure,  $DE \parallel BC$ . Find the length of side  $AD$ , given that  $AE = 1.8$  cm,  $BD = 7.2$  cm and  $CE = 5.4$  cm.



13. In the fig,  $AB$  and  $CD$  are common tangents to two circles of unequal radii. Prove that  $AB = CD$ .



14. The diameters of two circles with centre  $A$  and  $B$  are 16 cm and 30 cm respectively. If area of another circle with centre  $C$  is equal to the sum of areas of these two circles, then find the circumference of the circle with centre  $C$ .

15. Three cubes of iron whose edges are 3 cm, 4 cm and 5 cm respectively are melted and formed into a single cube, what will be the edge of the new cube formed?

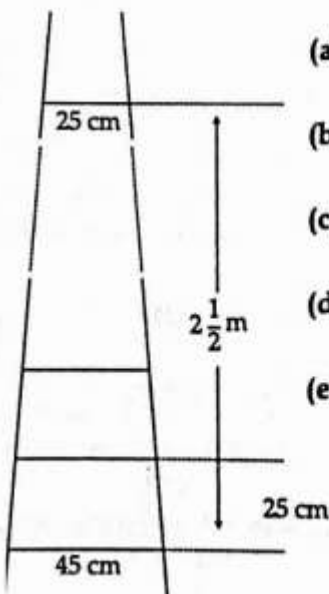
16. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apples in the heap?

## Section-II

Case study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

17. Case Study based-1 :

A ladder has rungs 25 cm apart. (see the figure below). The rungs decrease uniformly in length from 45 cm at the bottom to 25 cm at the top. The top and the bottom rungs are  $2\frac{1}{2}$  m apart.



(a) The top and bottom rungs are apart at a distance:

- (i) 200 cm      (ii) 250 cm      (iii) 300 cm      (iv) 150 cm

(b) Total number of the rungs is:

- (i) 20      (ii) 25      (iii) 11      (iv) 15

(c) The given problem is based on AP, find its first term.

- (i) 25      (ii) 45      (iii) 11      (iv) 13

(d) What is the last term of AP?

- (i) 25      (ii) 45      (iii) 11      (iv) 13

(e) What is the length of the wood required for the rungs?

- (i) 385      (ii) 538      (iii) 532      (iv) 382

**Q18. Case Study based-2 :**

Reema mother's is making a table cover for a round table. Reema painted a design on it.

It has six equal designs as shown in the given figure. The radius of the cover is 28 cm. (us  $\sqrt{3} = 1.73$ )



- (a) Find  $\angle AOB$ .  
 (i)  $60^\circ$  (ii)  $70^\circ$  (iii)  $30^\circ$  (iv)  $65^\circ$
- (b) Find area of  $\Delta AOB$ .  
 (i)  $332 \text{ cm}^2$  (ii)  $322 \text{ cm}^2$  (iii)  $333 \text{ cm}^2$  (iv) none of the
- (c) Find area of sector OAPB.  
 (i)  $\frac{1232}{3} \text{ cm}^2$  (ii)  $\frac{1232}{3} \text{ cm}^2$  (iii)  $\frac{1223}{3} \text{ cm}^2$  (iv)  $\frac{1223}{5} \text{ cm}^2$
- (d) Find area of a design APBA.  
 (i)  $411 \text{ cm}^2$  (ii)  $414 \text{ cm}^2$  (iii)  $465 \text{ cm}^2$  (iv)  $455 \text{ cm}^2$
- (e) Find the cost of making the designs at the rate of ₹ 0.35 per  $\text{cm}^2$ .  
 (i) 160 (ii) 163 (iii) 164 (iv) 161

**Q19. Case Study based-3 :**

A game of chance consists of spinning an arrow which comes of rest pointing at one of the 2, 3, 4, 5, 6, 7, 8 (see figure) and these are equally likely outcomes.



- (a) What are the total possible outcomes?  
 (i) 8 (ii) 1 (iii) 36 (iv) 4
- (b) What is the probability that spinning arrow will point at 8?  
 (i)  $\frac{1}{8}$  (ii)  $\frac{1}{2}$  (iii)  $\frac{3}{4}$  (iv) 1
- (c) What is the probability that spinning arrow will point at a number greater than 2?  
 (i)  $\frac{1}{8}$  (ii)  $\frac{1}{2}$  (iii)  $\frac{3}{4}$  (iv) 1
- (d) What is the probability that spinning arrow will point at an odd number?  
 (i)  $\frac{1}{8}$  (ii)  $\frac{1}{2}$  (iii)  $\frac{3}{4}$  (iv) 1
- (e) What is the probability that spinning arrow will point at a number less than 9?  
 (i)  $\frac{1}{8}$  (ii)  $\frac{1}{2}$  (iii)  $\frac{3}{4}$  (iv) 1

**Q20. Case Study based-4 :**

**Environmental awareness program**

A survey was conducted by a group of students as a part of their environmental awareness programme, in which they collected the following data regarding the number of plants in 20 houses in a locality.

- (a) Estimate the mean number of plants per house.  
 (i) 8.1 (ii) 8.2 (iii) 8 (iv) none of these
- (b) What is the upper limit of modal class?  
 (i) 8 (ii) 10 (iii) 12 (iv) 14
- (c) Which method did you find best for finding the mean?  
 (i) Assumed Mean Method (ii) Step Deviation Method  
 (iii) Direct Method (iv) none of these
- (d) Sum of lower limits of median and modal class is  
 (i) 10 (ii) 12 (iii) 20 (iv) 16
- (e) Mean of upper limits of median and modal class is  
 (i) 10 (ii) 12 (iii) 20 (iv) 16

## PART-B

### Section-III

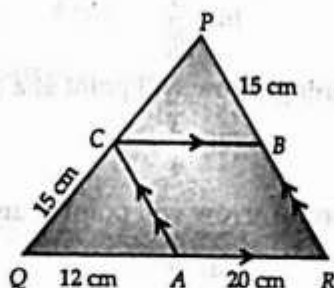
All questions are compulsory. In case of internal choices, attempt any one.

21. The length, breadth and height of a room are 8 m 50 cm, 6 m 25 cm and 4 m 75 cm respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.
22. Two different dice are thrown together. Find the probability that the product of the number appeared is less than 18.

OR

[AI] A game consists of tossing a coin 3 times and noting the outcome each time, if getting the same result in all the tosses is a success, find the probability of losing the game.

[AI] 23. In the given figure,  $CB \parallel QR$  and  $CA \parallel PR$ . If  $AQ = 12$  cm,  $AR = 20$  cm,  $PB = CQ = 15$  cm, calculate  $PC$  and  $BR$ .



[AI] 24. If  $\sqrt{3} \sin \theta - \cos \theta = 0$  and  $0^\circ < \theta < 90^\circ$ , find the value of  $\theta$ .

25. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apples in the heap?
26. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?

### Section-IV

All questions are compulsory. In case of internal choices, attempt any one.

27. If  $\alpha$  and  $\beta$  are the zeroes of polynomial  $P(x) = 3x^2 + 2x + 1$ , find the polynomial whose zeroes are  $\frac{1-\alpha}{1+\alpha}$

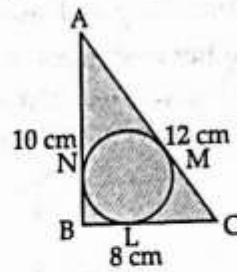
and  $\frac{1-\beta}{1+\beta}$ .

OR

If the zeroes of the quadratic polynomial  $x^2 + (a+1)x + b$  are 2 and -3, then find the value of  $a$  and  $b$ .

28. A fraction becomes  $\frac{1}{3}$  when 2 is subtracted from the numerator and it becomes  $\frac{1}{2}$  when 1 is subtracted from the denominator. Find the fraction.
29. Solve for  $x$ :  $x^2 + 5x - (a^2 + a - 6) = 0$
30. Divide 56 in four parts in A.P. such that the ratio of the product of their extremes (1<sup>st</sup> and 4<sup>th</sup>) to the product of middle (2<sup>nd</sup> and 3<sup>rd</sup>) is 5 : 6.

- [AI]** 31. In the given figure a circle is inscribed in a  $\triangle ABC$  having sides  $BC = 8$  cm,  $AB = 10$  cm and  $AC = 12$  cm. Find the length  $BL$ ,  $CM$  and  $AN$ .



**[AI]** 33. Prove that  $\frac{\cos^3 \theta + \sin^3 \theta}{\cos \theta + \sin \theta} + \frac{\cos^3 \theta - \sin^3 \theta}{\cos \theta - \sin \theta} = 2$ .

OR

The radii of two concentric circles are 13 cm and 8 cm.  $AB$  is a diameter of the bigger circle and  $BD$  is a tangent to the smaller circle touching it at  $D$  and intersecting the larger circle at  $P$  on producing. Find the length of  $AP$ .

32. The co-ordinates of the vertices of  $\triangle ABC$  are  $A(7, 2)$ ,  $B(9, 10)$  and  $C(1, 4)$ . If  $E$  and  $F$  are the mid-points of  $AB$  and  $AC$  respectively, prove that  $EF = \frac{1}{2} BC$ .

### Section-V

All questions are compulsory. In case of internal choices, attempt any one.

34. The sum of squares of two consecutive even numbers is 340. Find the numbers.

OR

- [AI]** A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.
- 35 **[AI]** The angle of elevation of an airplane from a point on the ground is  $60^\circ$ . After a flight of 30 seconds the angle of elevation becomes  $30^\circ$ . If the airplane is flying at a constant height of  $3000\sqrt{3}$  m, find the speed of the aeroplane.
36. Water is flowing at the rate of 5 km/hour through a pipe of diameter 14 cm into a rectangular tank of dimensions  $50\text{ m} \times 44\text{ m}$ . Find the time in which the level of water in the tank will rise by 7 cm.