SECTION - A

Question numbers 1 to 10 carry 1 mark each. For each of the questions 1 to 10 four alternative choices have been provided of which only one is correct. You have to select the correct choice.

1. If $\frac{1}{2}$ is the root of the equation $x^2 + kx - \frac{5}{4} = 0$ then the value of k is :

(A) 2 (B) -2 (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

2. The common difference of an A.P. in which $a_{25} - a_{12} = -52$ is :

(A) 4 (B) -4 (C) -3 (D) 3

3. If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then the length of each tangent is equal to :

(A) $\frac{3\sqrt{3}}{2}$ cm (B) $2\sqrt{3}$ cm (C) $3\sqrt{3}$ cm (D) 6 cm

4. In Fig. 1, AB is a chord of a circle with centre O, AC is a tangent at A, making an angle of 80° with AB. Then $\angle AOB$ is equal to :

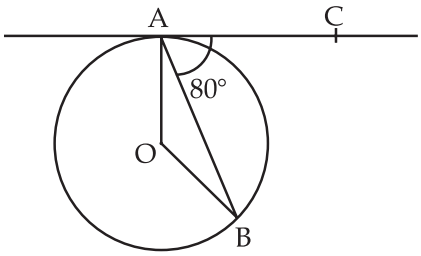

Fig.1

(A) 80° (B) 50° (C) 100° (D) 160°

5. In Fig. 2, AB, AC, PQ are tangents, if AB = 5 cm, then perimeter of ΔAPQ is :

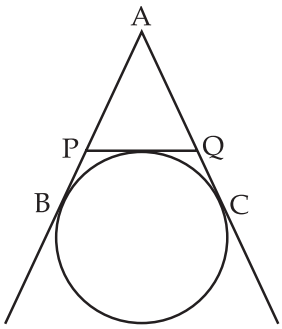

Fig. 2

(A) 10 cm (B) 15 cm (C) 12.5 cm (D) 20 cm

6. In Fig. 3, PQ and PR are the tangents to the circle with center O such that $\angle QPR = 50°$. Then $\angle OQR$ is equal to :

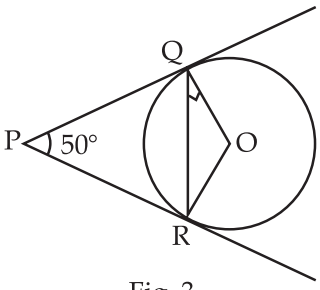

Fig. 3

(A) 25° (B) 30° (C) 40° (D) 50°

7. The volume of a largest sphere that can be cut from cylindrical log of wood of base radius 1 m and height 4 m is :

(A) $\frac{8}{3}\pi m^3$ (B) $\frac{10}{3}\pi m^3$ (C) $\frac{16}{3}\pi m^3$ (D) $\frac{4}{3}\pi m^3$

8. Total surface area of a cube is 216 cm^2, it's volume is :

(A) 216 cm^3 (B) 144 cm^3 (C) 196 cm^3 (D) 212 cm^3

9. The angle formed by the line of sight with the horizontal, when the point being viewed is above the horizontal level is called :

(A) vertical angle (B) angle of depression
(C) angle of elevation (D) obtuse angle

10. If an event cannot occur then its probability of occuring is

(A) 1 (B) $\frac{2}{3}$ (C) $\frac{1}{2}$ (D) 0

SECTION - B

Question number 11 to 18 carry 2 marks each.

11. Solve : $2x - \frac{3}{x} = 1$

12. Calculate how many multiples of 7 are there between 100 and 300.

13. From and external point T, tangent PT is drawn to a circle whose center is O. If OT = 29 cm and PT = 21 cm, determine the radius of the circle.

14. What will be the increase in area of circle if its radius is increased by 40% ?

15. The radius of the wheels of a Bus is 70 cm, how many revolutions per minute must a wheel make in order to move at a speed of 66 km/h ?

16. What point on x axis is equidistant from the points A(7, 6) and B(−3, 4) ?

17. In what ratio does the point $\left(\frac{1}{2}, 6\right)$ divide the line segment joining the points (3, 5) and (−7, 9) ?

18. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of red ball, find the number of blue balls in the bag.

OR

A card is drawn at random from a well shuffled pack of playing cards. Find the probability of getting a red face card.

SECTION - C

Question numbers 19 to 28 carry 3 marks each.

19. Find the value of k for which the quadratic equation $(k+4)x^2+(k+1)x+1=0$ has equal roots.

OR

Find the roots of the equation $4x^2+4\sqrt{3}\,x+3=0$.

20. If the sum of all the terms of an A.P. 1, 4, 7, 10, ..., x. is 287, find x.

OR

The sum of the first three terms of an A.P. is 33. If the product of the first and the third term exceeds the second term by 29, find the A.P.

21. In fig.4, triangle ABC is isosceles in which AB = AC, circumscribed about a circle. Prove that base is bisected by the point of contact.

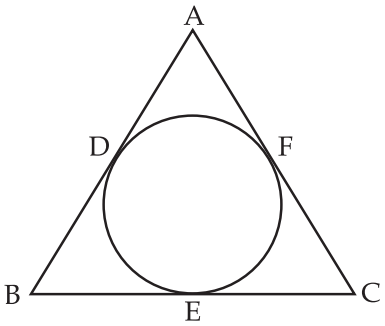

Fig. 4

22. Draw a triangle ABC, in which BC = 6.5 cm, angle B = 45° and angle A = 105°. Then construct a triangle whose sides are $\frac{3}{4}$ times the corresponding sides of ABC.

23. In a circle of radius 12 cm, an arc subtends an angle of 60° at the centre. Find

(i) Area of sector formed by the arc

(ii) Area of the segment formed by the corresponding chord.

24. Water in a canal 30 dm wide and 12 dm deep, is flowing with a velocity of 20 km/h, how much area it will irrigate in 30 minutes if 9 cms of standing water is desired ?

OR

A well with 7 m inside diameter is dug 22 m deep, earth taken out of it has been spread all round it to a width of 10.5 m to form an embankment. Find the height of the embankment so formed.

25. A person standing on the bank of the river observes that the angle subtended by a tree on the opposite bank is 60°, when he retreats 20 m from the bank he finds the angle to be 30°, find the height of the tree.

26. Show that the points P(0, −2), Q(3, 1), R(0, 4) and S(−3, 1) are the vertices of a square. PQRS.

27. The points A(2, 9), B(a, 5) and C(5, 5) are the vertices of a triangle ABC, right angled at B. Find the value of a and hence the area of triangle ABC.

28. Two dice are thrown together. Find the probability that the product of the numbers on the top of the dice is

(i) 6 (ii) 12 (iii) 7

SECTION - D

Question numbers 29 to 34 carry 4 marks each.

29. A person has a rectangular garden whose area is 100 sq m. He fences three sides of the garden with 30 m barbed wire. On the fourth side, the wall of his house is constructed; find the dimensions of the garden.

OR

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.

30. Kartik repays his total loan of Rs. 1,18,000 by paying every month starting with the first instalment of 1000, if he increases the instalment by Rs. 100 every month. What amount will be paid by him in the 30^{th} instalment ? What amount of loan does he still have to pay after the 30^{th} instalment ?

31. In Fig. 5, *l* and m are two parallel tangents to the circle with center O at A and B, the tangent at C makes an intercept DE between *l* and m. Prove that angle DOE is 90°.

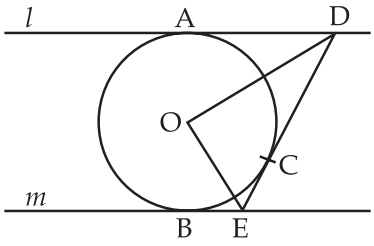

Fig. 5

32. Find the area of the shaded region in Fig.6, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.

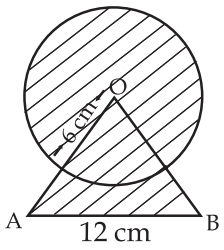

Fig. 6

OR

In Fig.7, find the area of the shaded design, where ABCD is a square of side 10 cm and semi circles are drawn with each side of the square as diameter. (use $\pi = 3.14$)

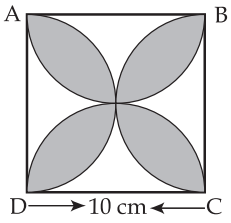

Fig. 7

33. A milk container is made of a metal sheet in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk which the container can hold when fully filled at Rs. 20 per litre.

34. The angle of elevation of a cloud from a point 200 m above the lake is 30° and the angle of depression of its reflection in the lake is 60°, find the height of the cloud above the lake.