SECTION - A

Question numbers 1 to 10 carry 1 mark each. Each question has been provided with four answer choices, of which only one is correct. You have to select the correct choice.

1. The positive root of $\sqrt{3x^2 + 6} = 9$ is :

(A) 3 (B) 4 (C) 5 (D) 7

2. The next term of the A.P. $\sqrt{27}$, $\sqrt{48}$, $\sqrt{75}$, ... is :

(A) $\sqrt{105}$ (B) $\sqrt{107}$ (C) $\sqrt{108}$ (D) $\sqrt{147}$

3. In Fig. 1, measure of $\angle$ QSR is :

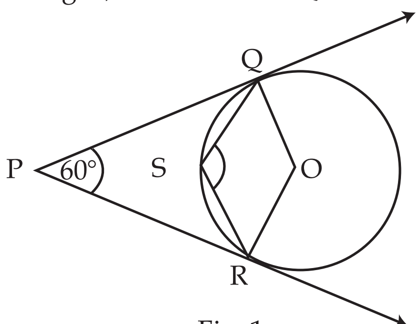

Fig. 1

(A) 60° (B) 100° (C) 110° (D) 120°

4. In Fig. 2, AP = 2 cm, BQ = 3 cm and RC = 4 cm, then the perimeter of ΔABC (in cm) is

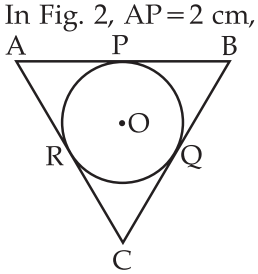

Fig. 2

(A) 16 (B) 18 (C) 20 (D) 21

5. In Fig. 3, two circles with centres A and B touch each other externally at k. The length of PQ (in cm) is

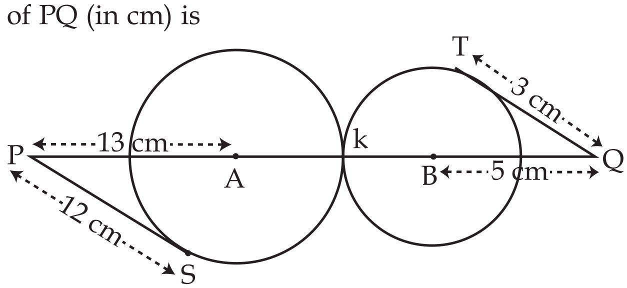

Fig. 3

(A) 18 (B) 20 (C) 24 (D) 27

6. In drawing a triangle, it is given that AB = 3 cm, BC = 2 cm and AC = 6 cm. It is not possible to draw the triangle as :

(A) AB < AC (B) AB > BC
(C) AC > AB + BC (D) AB < AC + BC

7. If the circumference of a circle of radius 'r' and the perimeter of a square of side 'a' are equal, then the ratio of area of the circle to that of the square is :

(A) $4 : \pi$ (B) $\pi : 4$ (C) $\pi^2 : 16$ (D) $\pi^2 : 4$

8. If the radii of circular ends of frustum of a cone are 20 cm and 12 cm and its height is 6 cm, then the slant, height of frustum (in cm) is :

(A) 10 (B) 8 (C) 12 (D) 15

9. A tree casts a shadow 4 m long on the ground, when the angle of elevation of the sun is 45°. The height of the tree (in metres) is :

(A) 3 (B) 4 (C) 4.5 (D) 5.2

10. The probability of getting a prime number in single throw of a dice is :

(A) zero (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{1}{4}$

SECTION - B

Question numbers 11 to 18 carry 2 marks each.

11. For what value of k, the quadratic equation $9x^2 + 8kx + 16 = 0$ has equal roots ?

12. 8th term of an A.P. is 37 and its 12th term is 57. Find the A.P.

13. In Fig. 4, O is the centre of two concentric circles of radii 6 cm and 4 cm. PQ and PR are tangents to the two circles from an external point P. If PQ = 10 cm, find the length of PR (upto one decimal place).

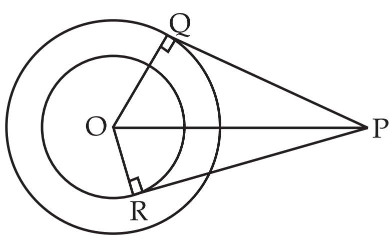

Fig. 4

14. The circumference of a circle exceeds its diameter by 16.8 cm. Find the circumference of the circle. (Take $\pi = \frac{22}{7}$)

15. The volume of a right circular cylinder of height 7 cm is $567\,\pi$ cm^3. Find its curved surface area. (Take $\pi = \frac{22}{7}$)

16. Find points on the x-axis, which are at a distance of 5 units from the point A (5, −3).

17. Show that the points (a, b + c), (b, c + a) and (c, a + b) are collinear.

OR

Prove that the points (0, 0), (5, 5) and (− 5, 5) are the vertices of a right angled isosceles triangle.

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

SECTION - C

Question numbers 19 to 28 carry 3 marks each.

19. Solve for x :

$$\frac{4}{x} - 3 = \frac{5}{2x+3},\ x \neq 0, -\frac{3}{2}$$

OR

Solve for x :

$$\frac{x+1}{x-1} + \frac{x-2}{x+2} = 3\ ;\ x \neq 1, -2$$

20. Which term of the A.P. 3, 15, 27, 39, ... will be 132 more than its 60th term ?

21. In Fig. 5, a quadrilateral ABCD circumscribes a circle, Prove that AB + DC = AD + BC.

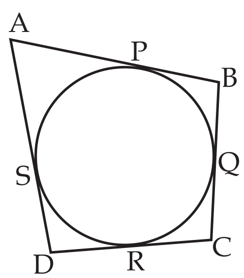

Fig. 5

OR

In Fig. 6, PT and PS are tangents to a circle from a point P such that PT = 5 cm and $\angle$ TPS = $60°$. Find the length of chord TS.

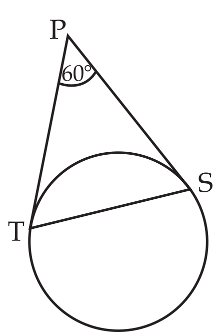

Fig. 6

22. Construct a triangle ABC, in which base BC = 6 cm, $\angle B = 60°$ and $\angle BAC = 90°$. Then construct another triangle whose sides are $\frac{3}{4}$ of the corresponding sides of ΔABC.

23. In Fig. 7, AB is a diameter of the circle with centre O and OA = 7 cm. Find the area of the shaded region. (Use $\pi = \frac{22}{7}$)

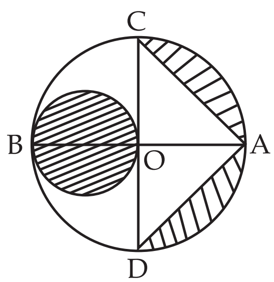

Fig. 7

24. The internal and external radii of a hollow spherical shell are 3 cm and 5 cm respectively. If it is melted to form a solid cylinder of height $10\frac{2}{3}$ cm, find the diameter of the cylinder.

OR

A cylindrical copper rod of diameter 1 cm and length 8 cm is drawn into a cylindrical wire of length 18 m and of uniform thickness. Find the thickness of the wire.

25. The angle of elevation of the top of a tower at a point on the ground is 45°. After going 40 m towards the foot of the tower, the angle of elevation of the top of tower changes to 60°. Find the height of the tower. (Use $\sqrt{3} = 1.73$)

26. Find the value of p so that the points with coordinates (3, 5), (p, 6) and $\left(\frac{1}{2}, \frac{15}{2}\right)$ are collinear.

27. The base BC of an equilateral triangle ABC lies on y-axis. The co-ordinates of the point C are (0, −3). If origin is the mid-point of BC, find the coordinates of points A and B.

28. From a well shuffled pack of 52 cards, two black kings and two black jacks are removed. From the remaining cards, a card is drawn at random. Find the probability that the drawn card is not a king.

SECTION - D

Question numbers 29 to 34 carry 4 marks each.

29. 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. A sum of Rs. 700 is to be used for giving 7 cash prizes to students of a school for their academic performance. If each prize is Rs. 20 less than its preceding prize, find the value of each of the prizes.

OR

In an A.P., prove that $a_{m+n} + a_{m-n} = 2\,a_m$, where a_n denotes n th term of the A.P.

31. Prove that the lengths of tangents drawn from an external point to a circle are equal.

32. In Fig. 8, find the area of the shaded region (Take $\pi = \frac{22}{7}$)

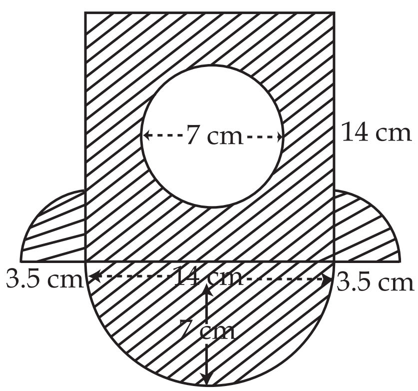

Fig. 8

OR

In fig. 9, AC = BD = 7 cm and AB = CD = 1.75 cm. Semicircles are drawn as shown in the figure. Find the area of the shaded region. [Take $\pi = \frac{22}{7}$]

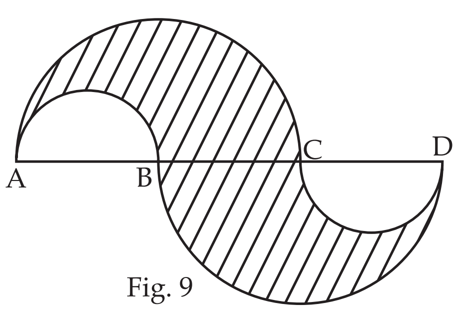

Fig. 9

33. A vessel in the form of a hemispherical bowl is full of water. Its water is emptied in to a cylinder. The internal radii of bowl and the cylinder are $10\frac{1}{2}$ cm and 7 cm respectively. Find the height of water in the cylinder.

34. From a window, 60 m high above the ground, of a house in a street, the angles of elevation and depression of the top and foot of another house on the opposite side of the street are 60° and 45° respectively. Show that the height of the opposite house is $60\ (1+\sqrt{3})$ metres.

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AGYAT GUPTA
(M.Sc.B.Ed.M.Phill)
89- LAXMI BAI COLNY
DIRECTOR (TARGET MATHEMATICS)
09425109601(P) 0751- 2630601