

SAMPLE PAPER (SA-II)

Mathematics-x

Time- 3 hours

Maximum Marks:80

General instruction:

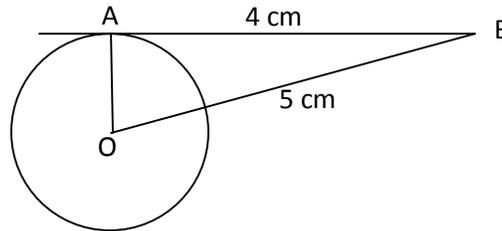
- (i) All questions are compulsory.
- (ii) The question paper consists of 34 questions divided into four section – A, B, C and D. Section A comprises of 10 questions of 1 mark each, Section B comprises of 8 questions of 2 marks each, Section C comprises of 10 questions of 3 marks each and Section D comprises of 6 questions of 4 marks each.
- (iii) Question numbers 1 to 10 in section A are multiple choice question where you are to select one correct option out of the given options.
- (iv) There is no overall choice. However, internal choice has been provided in 1 question of 2 marks, 3 questions of 3 marks each and 2 questions of 4 mark each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of calculator is not permitted.

Section-A

Question number 1 to 10 carry 1 mark each.

1. If the equation $5x^2 + 3x - 4k = 0$ has two distinct real roots, then which of the following is true?
A. $k < -\frac{9}{80}$ B. $k = -\frac{9}{80}$
C. $k > -\frac{9}{80}$ D. $k \leq -\frac{9}{80}$
2. The sum of roots of a quadratic equation is $\frac{5}{6}$ and the product of its roots is $\frac{7}{8}$. The quadratic equation is _____.
A. $6x^2 - 5x + 7 = 0$ B. $6x^2 + 5x + 7 = 0$
C. $6x^2 - 4x + 7 = 0$ D. $6x^2 - 5x + 7 = 0$
3. An AP 14, 18, 22, ... contains 25 terms. The sum of its 25th and 15th terms is _____.
A. 132. B. 124. C. 128 D. 136.
4. If the nth term of an AP is $3n+1$, then the value of S_n is _____.
A. $\frac{n}{2}[3n - 1]$ B. $\frac{n}{2}[3n + 5]$ C. $\frac{n}{2}[n+5]$ D. $\frac{n}{2}[5n + 3]$
5. The ratio in which the line segment joining the points (2, -4) and (-3, 6) is divided by Y-axis is _____.
A. 5 : 2 B. 3 : 2 C. 2 : 3 D. 1 : 4
6. Area of the triangle formed by P(2, 1), Q(6, 1) and R(2, 4) is _____ sq. unit.
A. 12 B. 6 C. 22 D. 18
7. From the top of a pole of height 80m, the angles of depression of the top and bottom of a tower are seen as 30° and 45° respectively. The distance between foot of the pole and foot of the tower is _____.
A. 70 m B. 80 m C. 71 m D. 73 m

8. In the given figure, O is the centre of the circle. If AB = 4 cm, OB = 5 cm, then radius of the circle is _____ cm.



- A. 4 cm B. 3 cm C. 2 cm D. 3.5 cm
9. The two sectors of a circle have the central angles as 120° and 150° respectively. Then the ratio between the areas of the two sectors is _____.
- A. 3 : 5 B. 4 : 5 C. 5 : 6 D. 3.5 : 5.1
10. A solid sphere of radius r is melted and cast into the shape of a solid cone of height r . The radius of the base of the cone is _____.
- A. $2r$ B. $3r$ C. $2r^2$ D. $3r^2$

Section-B

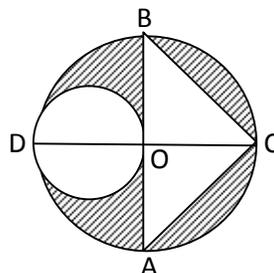
Question number 11 to 18 carry 2 marks each

11. Solve the equation
 $10x^2 + 3bx + a^2 - 7ax - b^2 = 0$
12. Show that the points $(a, b+c)$, $(b, c+a)$ and $(c, a+b)$ lie on the straight line.
13. A letter is chosen at random from the English alphabets. Find the probability that it is
 i. a vowel ii. a letter of the word 'JAGANNATH'.
14. Show that $x = -2$ is a solution of the equation $3x^2 + 13x + 14 = 0$.
15. If the 10th term of an A.P. is 47 and its first term is 2, find the sum of its first 15 terms.
16. Prove that the tangents drawn at the end points of diameter of a circle are parallel.
17. If a ladder is leaning against the building of height 25m makes angle 30° with horizontal line. Then find the length of the ladder.
18. A metal sphere of radius 21cm is melted, and converted into a wire of uniform cross-section area. If the radius of the wire is 7cm, then find the length of the wire.

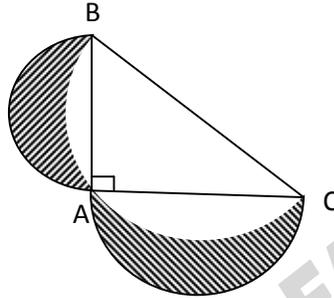
SECTION-C

Question number 19 to 28 carry 3 marks each

19. In the figure below, 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 = 14cm, find the area of the shaded region.



20. Draw a circle of radius 6 cm. From a point P, 10 cm from the centre of the circle, draw a pair of tangents to the circle. Measure the length of each tangent segment.
21. If the point (x, Y) is equidistant from the points $A(3,6)$ and $B(-3, 4)$, prove that $3x + y - 5 = 0$.
22. In the given figure $AB = 3\text{cm}$ and $AC = 4\text{cm}$ and $\angle A = 90^\circ$, Semicircles are drawn on AB, AC and BC as diameters. Find the area of the shaded region.



23. If $(3, 0)$, $(2, a)$ and $(b, 6)$ are the vertices of a ΔABC whose centroid is $(2, 5)$, find the values of a and b .
24. 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 a red ball, find the number of blue balls in the bag.

Or

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 drawn card is neither an ace nor a king.

25. The length of the hypotenuse of a right triangle exceeds the length of the base by 2 cm and exceeds twice the length of the altitude by 1 cm. find the length of each side of the triangle.
26. A well with 7 m inside diameter is dug 22.5 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.

Or

A Turki cap is shaped like the frustum of a cone. If its radius on the open side is 10 cm, radius of the upper base is 4 cm and its slant height is 15 cm, find the area of the material used for making it.

27. Length of a string between kite and point on the ground is 90 m. if the string makes an angle α with the level ground and $\tan \alpha = \frac{15}{8}$, find the height of the kit. There is no slack in the string.

Or

The angle of elevation of a jet plane from a point P on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the jet plane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the jet plane.

28. The p th term of an A.P. is $\frac{1}{7}(2p - 1)$. Find the sum of its first n terms.

SECTION – D

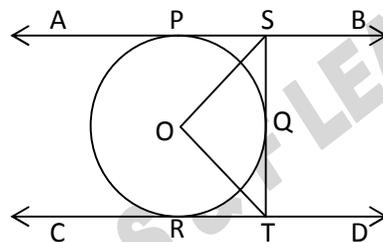
Question number 29 to 34 carry 4 marks each

29. The angry Arjun carried some arrows for fighting with Bheeshm. With half the arrows he cut down the arrows thrown by Bheeshm on him and with six other arrows he killed the charioteer of Bheeshm. With one arrow each he knocked down respectively the rath, flag and bow of Bheeshm. Finally with one more than four times the square root of arrows he laid Bheeshm unconscious on an arrow-bed. Find the total number of arrows Arjun had.

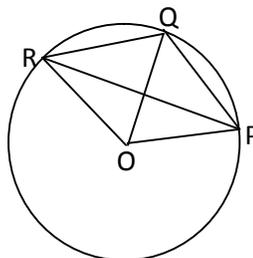
Or

A peacock is sitting on the top of a pillar, which is 9 m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake, the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught?

30. In the figure below, AB and CD are two parallel tangents to a circle with centre O. ST is the tangent segment between two parallel tangents touching the circle at Q. show that $\angle SOT = 90^\circ$.



31. A solid is in the form of a right circular cone mounted on a hemisphere. The radius of the hemisphere is 3.5 cm and the height of the cone is 4 cm. The solid is placed in a cylindrical tub full of water in such a way that the whole solid is submerged in water. If the radius of the cylinder is 5 cm and its height is 10.5 cm, find the volume of water left in the cylindrical tub.
32. In the figure below, OPQR is a rhombus, three of whose vertices lie on the circle with centre O. if the area of the rhombus is $32\sqrt{3} \text{ cm}^2$, find the radius of the circle.

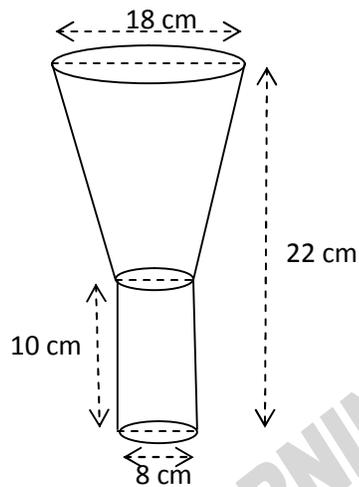


33. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.

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Or

An oil funnel made of the tin sheet consists of a 10 cm long cylindrical portion attached to a frustum of a cone. If its total height is 22 cm, diameter of cylindrical portion is 8 cm and the diameter of the top of the funnel is 18 cm, find the area of the tin sheet required to make the funnel.



34. If the sum of first p terms of an A.P. is q and the sum of first q terms is p , then show that the sum of first $(p + q)$ terms is $-(p + q)$.