THIRD TERM EXAMINATION

MATHEMATICS
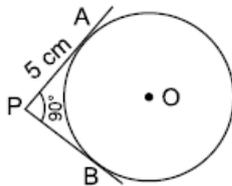
(Class X)

(Application of trigonometry, Circles, Areas related to Circle, Surface Area and Volume, Probability)

Question Paper

SECTION-A **(10x1=10)**

1) In the figure, the pair of tangents PA and PB drawn from an external point P to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm. The radius of the circle is:

    (a) 10 cm   (b) 7.5 cm   (c) 5 cm   (d) 2.5 cm

    (b)

2) A race track is in the form of a ring whose inner and outer circumferences are 437 m and 503 m respectively. The width of the track is:

    (a) 10.5 m   (b) 20.5 m   (c) 21 m   (d) 30 m

3) The probability of getting a bad egg from a lot of 400 eggs is 0.035. The number of bad eggs in the lot is

    (a) 7   (b) 14   (c) 21   (d) 28

4) A cone, a hemisphere and a cylinder stand on equal bases and have the same height. The ratio of their volumes is:

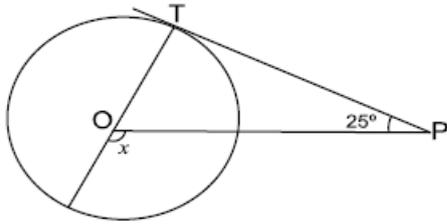   (a) 3: 2: 1   (b) 1: 3: 2   (c) 2: 3: 1   (d) 1: 2: 3

5) If the area of a sector of a circle of radius 6 cm is 9π cm, then the angle subtended at the centre of the circle is:

    (a) 30°   (b) 60°   (c) 90°   (d) 120°

6) A ladder 15 m long just reaches the top of a vertical wall. If the ladder makes an angle of 60 with the wall, the height of the wall_____

7) In the figure, if PT is a tangent of the circle with centre O and ∠TPO = 25°, then the measure of *x* is

_____

8) The king, Queen and Jack of clubs are removed from a deck of 52 playing cards and then well shuffled. One card is selected from the remaining cards. What is the probability of getting a heart?

9) The dimensions of a box are 12 cm × 4 cm × 3 cm. Find the length of the longest rod which can be placed in this box.

10) Three unbiased coins are tossed together. Find the probability of getting either all heads or all tails.

SECTION-B   **(5x2=10)**

11) From a point on the ground, the angles of elevation of the bottom and top of a transmission tower fixed at the top of 20 m high building are 45° and 60° respectively. Find the height of the transmission tower

12) A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact are of lengths 8 cm and 6 cm respectively. If area of ΔABC is 84 cm^2, then find the sides AB and AC.

13) A chord of a circle of radius 28 cm subtends an angle 90° at the centre of the circle. Find the area of the minor segment and major sector.

14) A box contains 17 cards numbered 1, 2, 3, ... 16, 17. A card is drawn at random from the box. Find the probability that the number on the drawn card is.
(a) prime (b) divisible by 3

15) A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder of same radius. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

16) Two dice are thrown simultaneously. Find the probability of getting:

(a) same number on both dice.

(b) different numbers on both the dice.

17) In the figure, a circle touches the side BC of triangle ABC at P and touches AB and AC produced at Q and R respectively. Show that AQ = 1/2(Perimeter of ΔABC).
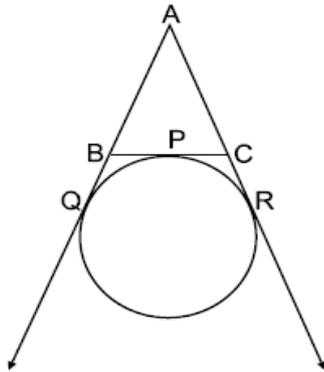

18) Three horses are tethered with 7 m long ropes at the three corners of a triangular field having sides 20 m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses. Also, find the area of the plot which remains ungrazed.

19) Right circular cylinder having diameter 12 cm and height 15 cm is full of ice-cream. This ice-cream is to be filled in cones of height 12 cm and diameter 6 cm having a hemispherical shape on the top. Find the number of such cones which can be filled with ice-cream

20) In the figure, *l* and *m* are two parallel tangents at A and B. The tangent at C makes an intercept DE between *l* and *m*. Prove that DE subtends a right angle at the centre of the circle.
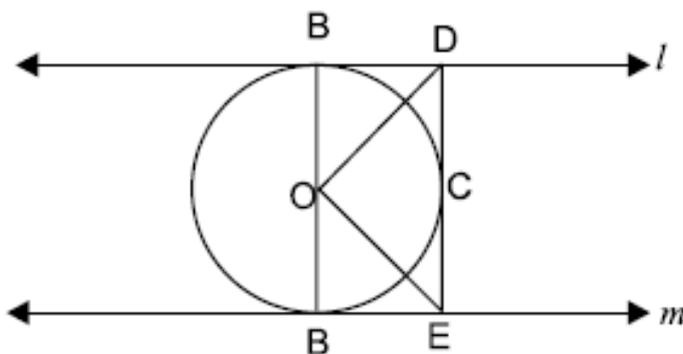
21)A circle is inscribed in an equilateral triangle ABC is side 12 cm, touching its side see the figure. Find the radius of the inscribed circle and the area of the shaded part. (Use $\sqrt{3} = 1.73$ and $\pi = 3.14$)
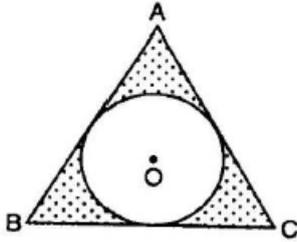
SECTION-D (3x4=12)

22) An aircraft is flying at a constant height with a speed of 360 km/hour. From a point on the ground, the angle of elevation at an instant was observed to be 45°. After 20 seconds, the angle of elevation was observed to be 30°. Determine the height at which the aircraft is flying.(Use $\sqrt{3} = 1.73$)

23) 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.

24) Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.