

### SAMPLE QUESTION PAPER

JST201501

Time allowed: 3 hours

Maximum Marks: 90

#### Section – A

1. If tangent PA and PB from a point P to a circle with centre O are inclined to each other at an angle of  $80^\circ$  then find the value of  $\angle POA$
2. If PT is tangent drawn from a point P to a circle touching it at T and O is the centre of the circle, then what will be the value of  $\angle OPT + \angle POT$  ?
3. The tangent of a circle is a special case of secant when the two end points of its corresponding chord.....  
(A) Coincides (B) tangent (C) parallel (D) symmetric
4. Two friends were born in the year 1999. What is the probability that they have the same birth date

#### Section – B

5. Find the roots of the quadratic equation:  $4x^2 - 4px + (p^2 - q^2) = 0$
6. A bicycle wheel of radius 35 cm is making 25 revolutions in 10 seconds. At what speed in km/hr is the cycle moving?
7. Find a point on the x-axis which is equidistant from the points A (-3, 2) and B(5, -2)
8. A card is drawn from a well shuffled pack of 52 cards. Find the probability of getting (i) a red card (ii) a king or queen
9. If the perimeter of a semicircular protractor is 36 cm, find its diameter
10. Two cubes each of volume  $64 \text{ cm}^3$  are joined end to end. Find the surface area of the resultant cuboid.

#### Section – C

11. If the equation  $(1+m^2)n^2x^2 + 2mncx + (c^2 - a^2) = 0$  has equal roots of x, prove that  $c^2 = a^2(1+m^2)$ .
12. A circle with centre O touches the sides of a Quadrilateral ABCD at P, Q, R and S respectively. Prove that the angles, subtended at the centre by a pair of opposite sides of ABCD are supplementary.

13. A toy is in the form of a cone mounted on a hemisphere of diameter 7 cm. If the base radii of both hemisphere and cone is same and the total height of the toy is 15.5 cm, find the volume and total surface area of toy

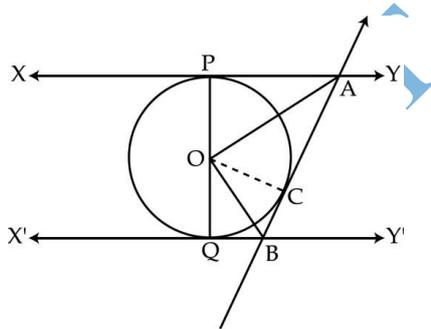
14. The angle of elevation of a jet fighter from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the jet is flying at a speed of 720km/ hr, find the constant height at which the jet is flying.

15. Find the ratio in which the line  $3x+y-9=0$  divides the line segment joining the points A (1, 3) and B (2, 7).

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

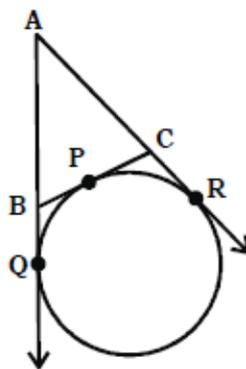
17. The sum of first 8 terms of an A.P. is 140 and sum of first 24 terms is 996. Find the A.P.

18. In figure, XY and X' Y' are two parallel tangents to a circle with centre O and another tangent AB, with point of contact C intersects XY at A and X' Y' at B. Prove that  $\angle AOB = 90^\circ$



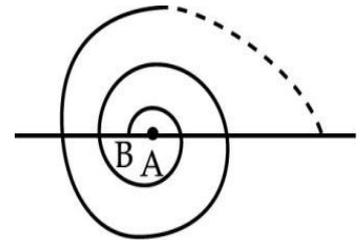
19. Find the ratio in which the line segment joining the points (1, -3) and (4, 5) is divided by x-axis.

20. A circle touches the side BC of a  $\triangle ABC$  at P and AB and AC when produced at Q and R respectively as shown in the figure. Show that:  $AQ = \frac{1}{2}$  (Perimeter of  $\triangle ABC$ ).



21. The difference of two numbers is 5 and the difference of their reciprocals is  $1/10$ . Find the numbers.

22. A spiral is made up of successive semi-circles with centers alternately at A and B starting with A, of radii 1 cm, 2 cm, 3 cm ,.....as shown in the figure. What is the total length of spiral made up of eleven consecutive semicircles? (Use  $\pi = 3.14$ )



23. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2\angle OPQ$

24. At the foot of a mountain the elevation of its summit is  $45^\circ$ , after ascending 1000 m towards the mountain up a slope of  $30^\circ$  inclination, the elevation is found to be  $60^\circ$ . Find the height of the mountain. [Ans: 1365m]

25. In a school, students thought of planting trees in an around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying e.g. a section of class-I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students? What value can you infer from the planting the trees? [VBQ]

26. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest  $\text{cm}^2$

27. A takes 6 days less than B to finish a piece of work. If both A and B together can finish the work in 4 days, find the time taken by B to finish the work.

28. Let ABC be a right triangle in which  $AB = 6 \text{ cm}$ ,  $BC = 8 \text{ cm}$  and  $\angle B = 90^\circ$ . BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle.

29. The king, queen and jack of clubs are removed from a pack of 52 playing cards and then the remaining pack is well shuffled. One card is selected from the remaining cards. Find the probability of getting

(i) a heart (ii) a king (iii) a club (iv) a black card [3/49, 10/49, 1/49]

30. Find the sum of all natural number between 101 to 304 which are divisible by 3 or 5. Find their sum [Hint:  $S_{68} + S_{40} - S_{14} = 19035$ ]

31. Find the area of the shaded design in given fig., where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use  $\pi = 3.14$ )

