SUMMATIVE ASSESSMENT – II, 2015, MATHEMATICS, Class – X

SAMPLE QUESTION PAPER   JST201502

Time allowed: 3 hours   **Maximum Marks: 90**
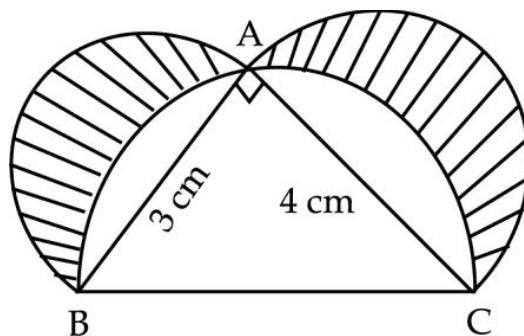
Section – A

1. If A (5, -1),B(-3, -2) and C(-1,8) are the vertices of triangle ABC, What will be the length of the median through A

2. From the top of a cliff 20 m high the angle of elevation of a tower is found to be equal to the angle of depression of the foot of the tower. Find the height of the tower

3. If the equation $kx^2 + 4x + k = 0$ has two equal roots, then find the value of K

4. One coin is tossed thrice. what will be the probability of getting neither 3 heads nor 3 tails

Section – B

5. Which term of the AP : 121, 117, 113, . . ., is its first negative term?

6. The nth term of an A.P., cannot be $n^2 + 1$. Justify your answer

7. A circle is inscribed in a square of side x cm and another circle is circumscribing the square. Is it true to say that area of the outer circle is two times the area of the inner circle? Give reasons for your answer

8. A card is drawn at random form a well shuffled deck of 52 cards. Find the probability of getting:

(i) A king (ii) a king of red suit

9. Find the value of m for which the point with coordinates (3, 5), (m, 6) and (1/2, 15/2) are collinear.

10. In two concentric circles, prove that a chord of a larger circle which is tangent to smaller circle is bisected at the point of contact

Section – C

11. Solve for x : $9x^2 - 9(a+b)x + [2a^2+5ab+2b^2] = 0$.

12. In an AP, the sum of first ten terms is -150 and the sum of its next ten terms is - 550. Find the AP.

13. A canal is 300 cm wide and 120 cm deep. The water in the canal is following with a speed of 20 km/h. How much area will it irrigate in 20 minutes if 8 cm of standing water is desired?

14. The angles of depression of the top and bottom of a building 60 metres high as observed from the top of a tower are 30° and 60°, respectively. Find the height of the tower and also the horizontal distance between the building and the tower.

15. If (1,2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find the values of x and y.

16. Find the sum of all three digits number which leaves the remainder 2 when divided by 5.

17. If the sum of first n terms of an AP is- $Sn = 3n^2 + 2n$, find the nth term.
[We know that, tn = $S_n - S_{n-1}$ = $(3n^2 + 2n) - (3(n-1)^2 + 2(n-1))$ = $(3n^2 + 2n) - (3n^2 - 6n + 3 + 2n - 2)$ = 6n + 2]

18. Draw a circle of radius 6 cm. From a point 10 cm away from its centre. Construct the pair of tangents of the circle and measure their length.

19. ABC is a triangle right angled at A. Semicircles are drawn on AB, AC and BC as diameters. Find the area of the shaded region.

20. Prove that The tangent at any point of a circle is perpendicular to the radius through the point of contact

Section – C

21. The interior of building is in the form of a cylinder of diameter 4 cm and height 3.5 m, surmounted by a cone of the same base with vertical angle as a right angle. Find the surface area (curved) and volume of the interior of the building.

22. An AP consists of 37 terms. The sum of three middlemost terms is 225 and sum of last three terms is 429. Find AP.

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

24. A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards him. If it takes 12 minutes for the angle of depression to change from 30 degree to 45 degree, how soon after this, will the car reach the tower? Give your answer to the nearest second.

25. A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed?

26. The mid-points D, E, F of the sides AB, BC and CA respectively of a triangle ABC are (3, 4), (8, 9), and (6, 7). Find the coordinates of the vertices of the triangle.

28. If the point (x,y) is equidistant from the points $(2p + q, 2q -p)$ and $(2p – q, p+ 2q)$, prove that $q x= p y$.

29. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T . Find the length TP.   [20/3]

30. Prove that the angle between two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre.

31. 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 1/16 cm, find the length of the wire.