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Mathematics Mock Test X – S. A. II March 2011

Section A MCQ's 1 Mark Each

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1.   If the equation $kx^2 + 4x + k = 0$ has two equal roots, then
(a) k = ±2   (b) k = 0   (c) k = 2   (d) none of these

2.   If the sum of n terms of an A.P., is $2n^2 + 4n$, then its nth term is
(a) 4n + 2   (b) 4n + 5   (c) 10n – 4   (d) none of these

3.   If tangents TA and TB from a point T to a circle with center O are inclined to each
 other at an angle of 70° then $\angle$TOA is equal to
(a)80°   (b) 70°   (c) 55°   (d) 50°

4.   To divide a line segment AB in the ratio 5:3, first a ray AX is drawn so that$\angle$ BAX is an
acute angle and then at equal distances points are marked on the ray AX such that the
minimum number of these points is
(a)12   (b) 11   (c)   10   (d) 8

5.   If the circumference and area of a circle are numerically equal, then diameter of the
circle is
(a)2x   (b) 2   (c)   4   (d) 4x

6.   The number of solid spheres, each of diameter 2 cm that could be moulded to form a
solid metal cylinder of height 45 cm and diameter 4 cm is
(a)14   (b) 15   (c)   135   (d) none of these

7.   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. The height of the tower is
 (a)40 m   (b) 60 m   (c) 90 m   (d) none of these

8.   If the distance between the points (5, r) and (1, 0) is 5, then r is
 (a)5   (b) -5   (c) 0   (d) ± 3

9.   The area of a triangle with vertices A(4, 0), B(7,0) and C(9, 5) is
(a)14 sq. units   (b) 28 sq. units   (c) 17.5 sq. units   (d) none of these

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

(a) $\sqrt{50}$ units   (b) $\sqrt{60}$ units   (c) $\sqrt{62}$ units   (d) $\sqrt{65}$ units

Section B 2 Marks Each

11.   Does there exist a equation whose coefficients are rational but both of its roots are irrational? Justify your answer.

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

13.   AB is a chord of the circle and AOC is its diameter such that $\angle$ ACB = 50°. If AT is the tangent to the circle at the point A, then $\angle$ BAT is equal to 50°. Justify your answer.

14.   Write 'True' or 'False' and give reason for your answer for the following: A pair of tangents can be constructed from a point P to a circle of radius 6 cm situated at a distance of 5 cm from the centre.

15.   Is it true that the distance travelled by a circle wheel of diameter x cm in one revolution is 2 π x cm? Why?

16.   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.

17.   Write 'True' or 'False' and justify you answer for the following:
A spherical steel ball is melted to make 10 new identical balls. Then, the radius of each new ball is $\frac{1}{10}$ th radius of the original ball.

18.   A hemisphere is cut out from the top of the cylinder with radius equal to the radius of cylinder. Taking radius as r and height of cylinder as h. find total surface area of solid.

For Answers

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Section C 3 Marks Each

19. Solve the following quadratic equation: $\dfrac{1}{x-2} + \dfrac{1}{x-4} = \dfrac{4}{3}$, $(x \ne 2, 4)$

20. A bag contains cards which are numbered from 2 to 100. A card is drawn at random from the bag. Find the probability that it bears
     (i) a two digit number   (ii) a number which is a perfect square

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

22. Construct a triangle ABC in which BC=9 cm, $\angle$B=60° and AB=6 cm. then construct another triangle whose sides are $\dfrac{2}{3}$ of the corresponding sides of $\triangle$ABC.

23. 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.

24. Two tangents PA and PB are drawn to a circle with centre O from an external point P. prove that $\angle$APB=2 $\angle$OAB.

25. A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole as observed from a point A on the ground is 60° and angle of depression of point A from the top of the tower is 45°.Finf the height of the tower. [Take $\sqrt{3}$ =1.73].

26. A coin is tossed 3 times. List the possible outcomes. Find the probability of getting at least 2 heads.

27. 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.

28. 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?

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29. 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.

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

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

32. 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.

33. 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?

34. 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.

For Answers

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