SUMMATIVE ASSESSMENT – II, 2014   [JS-20141]

MATHEMATICS /Class – X

Time allowed : 3 hours

Maximum Marks : 90

SECTION–A

Question Numbers 1 to 8 carry 1 mark each

Q1. The values of k for which the quadratic equation $2x^2-kx+k=0$ has equal roots is

(a) 0 only   (b) 0, 4   (c) 8 only   (d) 0,8

Q2. A 4 cm side cube is cut into 1cm side cubes, and then total surface area of all the small cubes is

(A) $64cm_2$ (B) $96cm^2$ (c) $384cm^2$ (D) $216cm^2$

Q3. The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is :

  (A)$\sqrt{7}$ cm   (B) $2\sqrt{7}$ cm   (C)10 cm   (D)5 cm

Q4. To draw a pair of tangents to a circle which are inclined to each other at an angle of 35^0 it is required to draw tangents at the end points of those two radii of the circle, the angle between which is

(a) 105^0 (b) 70^0 (c) 140^0 (d) 145^0

Q5. If a die is thrown once the probability of getting a prime number is

(a) 1/2   (b) 1/3   (c) 1/4   (d) 1/5

Q6. The ordinate of a point is twice its abscissa. If its distance from the point (4,3) is 10 , then the coordinates of the point are

(a) (1,2) or (3,5)   (b) (1,2) or (3,6)   (c) (2,1) or (6,3)   (d) (2,1) or (3,6)

Q7. The ratio in which the line segment joining A(3,4) and B(-2,1) is divided by the y-axis is (a) 1:2 (b) 2:3 (c) 3:2 (d) 2:5

Q8. The given figure shows a sector of a circle of radius 10.5 cm. The perimeter of the sector is

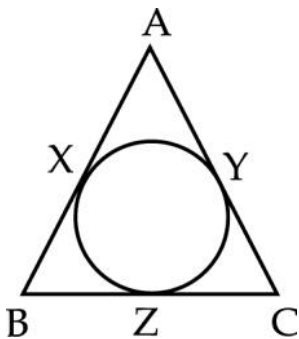(a) 28 cm   (b) 30 cm   (c) 32 cm   (d) 34 cm

SECTION–B

Question Numbers 9 to 14 carry 2 marks each

9. If the equation $kx^2 - 2kx + 6 = 0$ has equal roots, then find the value of k.

10. Which term of the A.P. : 120, 116, 112, ….. is its first negative term. A.P. : 120, 116, 112, …..

12. ABC is an isosceles triangle in which AB AC which is circumscribed about a circle as shown in the figure. Show that BC is bisected at the point of contact.
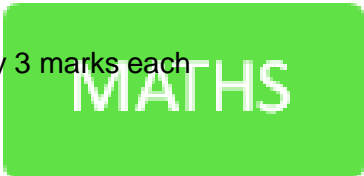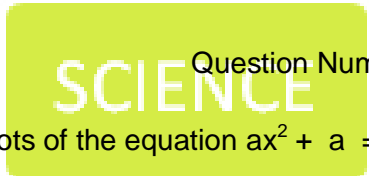

13. If the perimeter of a protractor is 72 cm, calculate its area. (Take 22/7)

14. A metallic sphere of total volume π is melted and recast into the shape of a right circular cylinder of radius 0.5 cm. What is the height of cylinder?

SECTION–C

Question Numbers 15 to 24 carry 3 marks each

15. Find the roots of the equation $ax^2 + a = a^2x + x$

Or, Solve for x : $4\sqrt{3}\, x^2 + 5x - 2\sqrt{3} = 0$

16. Find the area of the quadrilateral ABCD whose vertices are A(1,1), B(7,-3) ,C(12,2) and D(7,21) respectively.

17. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of a 20m high building finds the angle of elevation of the same bird to be 45°. The boy and the girl are on the opposite sides of the bird. Find the distance of the bird from the girl.
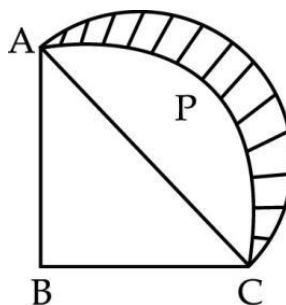
18. If the point (x , y) is equidistant from the points (a + b, b-a) and (a-b , a + b), then prove that b x = a y.

19. Find the sum of the first 25 terms of an AP whose nth term is given by 3n+2.

20. Prove that the intercept of a tangent between a pair of parallel tangents to a circle subtend a right angle at the centre of the circle.

21. One card is drawn from a well shuffled pack of 52 cards. Calculate the probability of getting (i) A king or a queen (ii) Neither a heart nor a red king

22. ABCP is a quadrant of a circle of radius 14 cm. With AC as diameter a semicircle is drawn. Find the area of the shaded region [use π = 22/7)]

23. The ratio of the radii of two spheres is 1:2. The two spheres are melted together to form a cylinder of height which is 12 times its radius . So what is the ratio of the radius of the smaller sphere and the cylinder?

24. If h , c and V respectively are the height, the curved surface area and the volume of cone, then prove that $3Vh^3 - c^2h^2 + 9V^2 = 0$

SECTION–D

Question Numbers 25 to 34 carry 3 marks each

25. The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last terms to the product of the two middle terms is 7:15. Find the numbers.

26. A train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find the usual speed of the train.

27. The in circle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. Show that AF+BD+CE = AE+BF+CD= 1/2 (Perimeter of ΔABC)

28. An open container made up of a metal sheet is in the form of a frustum of a cone of height 7 cm with radii of its lower and upper circular ends as 4 cm and 10 cm respectively. Find the cost of oil which can completely fill the container at the rate of Rs. 50/litre. [use $\pi = 22/7$)]

29. From the top of a tower the angle of depression of an object on the horizontal ground is found to be 60^0. On descending 20 m vertically downwards from the top of the tower, the angle of depression of the object is found to be 30^0. Find the height of the tower .

30. A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to 2/3 of the total height of the building. Find the height of the building, if it contains $67 \frac{1}{21}$ m^3 of air.

31. Prove that the tangent of a circle is perpendicular to the radius at the point of contact.

32. A rectangular sheet of paper of dimensions 44 cm x 18 cm is rolled along its length and a cylinder is formed. Find the volume of the cylinder so formed [use $\pi = 22/7$)]

33. Draw a circle of any convenient radius. Draw a pair of tangents to the circle such that they are inclined to each other at an angle of 90°.

34. If the radii of the circular ends of a conical bucket (in the shape of frustum of cone) which is 45 cm high are 28 cm and 7 cm. Find the capacity of the bucket and its surface area.