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

SAMPLE QUESTION PAPER   JST201504

**Time allowed: 3 hours**   **Maximum Marks: 90**

Section – A

1. For what values of 'k',the given equation hai real and equal roots, $(k-12)x^2+2(k-12)x+2=0$ [Ans. K=12,14]

2. The minute hand of a clock is 12 cm long. Find the area of the face of the clock described by the minute hand in 35 minutes.   [Ans. 264m2]

3. Find the probability of getting 53 Fridays in a leap year.   [2/7]

4. If p(-1,1) is the midpoint of the line segment joining A (-3 , 6) and B (1, b+4) , then what is the value of b

Section – B

5. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of the larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank

6. Find the sum of all three digit natural numbers which are multiples of 7 [Ans.70336]

7. The incircle of triangle ABC touches the sides BC, CA and AB at D, E and F respectively. Prove that AB+BD+CE = AE+CD+BF

8. Determine the ratio in which the point P(– 6,a) divides the join of A(- 3 , - 1) and B(- 8,9) . Also find the value of a.

9. A lotus is 2m above the water in a pond. Due to wind the lotus slides on the side and only the stem completely submerges in the water at a distance of 10m from the original position. Find the depth of water in the pond.

Hint:
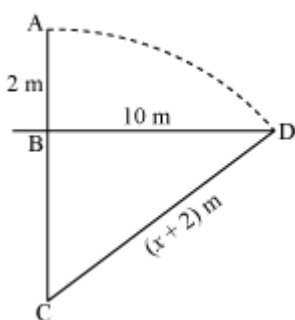
Let the depth of the pond BC be x m. ∴CA = CD = (x + 2) m

In right ∆BCD, $CD^2 = BC^2 + BD^2$; $\Rightarrow (x + 2)^2 = x^2 + (10)^2 \Rightarrow x^2 + 4x + 4 = x^2 + 100 \Rightarrow 4x = 96 \Rightarrow x = 24$

Thus, the depth of the pond is 24 m

10. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x

Section – C

11. If 7 times the 7th term is equal to 11 times the 11th term of an A.P. Find its 18th term.

12. A hemispherical depression is cut out from one face of a cubical wooden block such that the diameter 'l' of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid.

13. A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is $60°$ and from the same point the angle of elevation of the top of the pedestal is $45°$. Find the height of the pedestal.

14. Out of a number of Saras birds, one forth the number are moving about in lotus plants, 1/9 th coupled(along) with ¼ as well as 7 times the square root of the number move on a hill; 56 birds remain in vakula trees. What is the total number of birds.

15. Draw a right triangle ABC in which AC = AB = 4.5 cm and angle = 90 degree. Draw a triangle similar to triangle to ABC with its sides equal to 5/4th of the corresponding sides of angle ABC.

16. Prove that the tangents drawn at the ends of a chord of circle make equal angles with the chord.

17. A man in a boat rowing away from a light house 100 m high takes 2 minutes to change the angle the angle of elevation of the top of the light house from 60degree to 45 degree. Find the speed of the boat.

18. Find the sum of first 25 items of an A.P whose nth term is given by an =7 – 3n.

19. Cards marked with numbers 5, 6, 7, ……., 30 are placed in a box and mixed thoroughly and one card is drawn at random from the box. What is the probability that the number on the card is (i) a prime number ? (ii) a multiple of 3 or 5 ? (iii) neither divisible by 5 nor by 10 ?

20. A charity trust decided to build an anti disaster hall having a carpet area of 210 sq.m. If the length is 1 more than twice its breadth, construct the quadratic Equation to solve for the length and breadth ? What value do you imbibe from this act?

Section – D

21. A right triangle whose sides are 15cm and 20 cm, is made to revolve about its hypotenuse. Find the volume and total surface area of the double cone so formed. (Use $\pi = 3.14$). (Ans 3768cm3, 318.8cm2)

22. A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel.

23 If the sum of the first n terms of an AP is $4n - n^2$, what is the first term ? What is the sum of first two terms? What is the second term? Similarly, find the 3rd, the 10th and the nth terms

24. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be 1/27 of the volume of the given cone, at what height above the base is the section made? (Ans = 20cm)

25. The two opposite vertices of a square are (–1, 2) and (3, 2). Find the coordinates of the other two vertices

26. ABCD is a quadrilateral such that <A = 90 deg. A circle with centre O, touches the side AB, BC, CD and AD at E, F, G, H respectively. If CD = 30cm , AD= 15 cm and CF = 20 cm . Find the radius of circle? [r = 5cm]
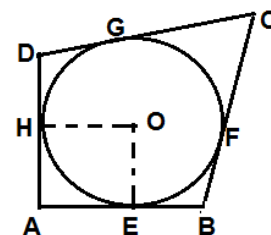
27. The angle of elevation of the top of a tower from two points' p and q at a distance of 4m and 9m respectively from the base of the tower and in the same straight line with it are 60 degrees and 30 degrees .prove that the height of the tower is 6m

28. The line segment joining the points A (2, 1) and B(5, - 8) is trisected at the points P and Q where P is nearer to A. If point P lies on the line 2x- y+ k = 0, find the value of k.

29. ABC is a right angled triangle, right angled at A. A circle is inscribed in it. The lengths of the two sides containing the right angle are 12 cm and 5 cm. Find the radius of the incircle.

30. The angle of elevation of the top of a tower from a point A on the ground is 30°. On moving a distance of 20 metres towards the foot of the tower to a point B, the angle of elevation increases to 60°.Find the height of the tower and the distance of the tower from the point A.

31. A circle is completely divided into n sectors in such a way that the angles of the sectors are in arithmetic progression. If the smallest-of these angles is 8° and the largest 72°, calculate n and the angle in the fourth sector.

[Hint: Let the common difference of the A.P. be x ; The smallest angle = 8° $\Rightarrow a = 8$ And the largest is 72°

$\Rightarrow a_n = 72 \Rightarrow a + (n - 1)d = 72 \Rightarrow 8 + (n - 1)d = 72 \Rightarrow (n - 1) d = 72 - 8 = 64$ ... (1)

We know that sum of all the angles of a circle is 360°

$S_n = n/2[(2a + (n-1)d] = 360 \Rightarrow S_n = n/2[(2 \times 8 + 64] = 360 \Rightarrow n = 9$

Putting the value of n in equation (1) we get $(9 - 1) d = 64 \Rightarrow d = 8$

Now angle in fourth sector = $a_4 = a + (4 - 1) d \Rightarrow a + 3d = 8 + 3 \times 8 = 8 + 24 = 32$

∴ The value of n = 9 and angle in fourth sector is 32°