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

SAMPLE QUESTION PAPER   JST201505

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

Section – A

1. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?

2. Find the distance between the point A(a cosθ ,a sinθ) and B(-a sinθ , a cosθ)   [√2 a]

3. If the root of the quadratic equation $x2 + kx + 12$ are in ratio 1: 3. then find the value of k [± 8]

4. A triangle ABC is drawn to circumscribe a circle. If AB = 13cm, BC= 14cm and AE = 7cm, then find AC [15m]

Section – B

5. The sum of length, breadth and height of a cuboid is 21 cm and the length of its diagonal is 12 cm. Find the surface area of the cuboid. [297cm^2]

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

7. Two A. P.'s have the same common difference. The difference between their 100th terms is 100. What is the difference between their 1000th terms?   [100]

8 998 tickets of a lottery were sold and there are 8 prizes on these tickets. If Sahil has purchased one ticket, what is the probability of winning a prize?   [4 / 499]

9. The perimeters of the ends of the frustum of a cone are 48 cm and 36 cm. if the height of the frustum be 11cm, find its volume.   [1554$cm3$]

10. 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?   [1 cm]
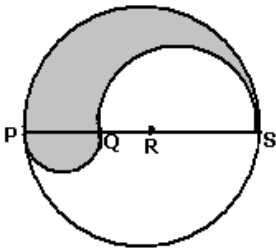
Section – C

11. A motor boat takes 2 hours more to cover a distance of 30 km upstream than it takes to cover the same distance downstream. If the speed of the stream is 2km/hr, find the speed of the boat in still water?   (8km/h)

12. 50 circular plates, each of radius 7 cm and thickness ½ cm are placed one above another to form a solid right circular cylinder. Find the total surface area and the volume of the cylinder so formed. [1408 sq cm]

13. P Q is a chord of length 8 cm of a circle of radius 5 cm. The tangent at P & Q intersect at a point T. Find the length of TP. [TP = 20 / 3 Cm]

14. If centre of circle passing through (a,–8), (b,–9) and (2,1) is (2,–4), find the value of a and b. [a = 5,-1 b = 2]

15. Prove that the parallelogram circumscribing a circle is a rhombus

16. Lead spheres of diameter 6cm are dropped into a cylindrical beaker containing some water and are completely submerged. If the diameter is 18cm and the water rises by 40cm, find the number of lead spheres dropped in the water.   (Ans = 90)

OR, The largest sphere is carved out of a cube of edge p units. Find the volume.

17. Water is flowing at the rate of 5km per hour through a pipe of diameter 14cm into a rectangular tank which is 25m long and 22m wide. Determine the time in which the water level rises by 21cm

18. Construction a tangent to a circle of radius 3 cm from a point out side the circle without using its centre.

19. A well whose diameter is 4m, has been dug 18m deep and the earth taken out is used to form an embankment 8m wide around it. Find the height of the embankment

20. A bag contains 5 red balls, 8 white balls, 4 green balls and 7 black balls. If one ball is drawn at random, find the probability that it is: (i) black (ii) red (iii) not green.

Section – D

21. Draw any quadrilateral ABCD. Construct another quadrilateral similar to the quadrilateral A'B'C'D' with each side equal to (4/5)th of the corresponding side of quadrilateral ABCD. Write the steps of construction also.

22. A bag contains 18 ball out of which x are red. (i) if one bal is drawn at randomly what is the probability that it is a red ball? (ii) if 2 more balls are put into the bag , the probability of drawing red ball will be 9/8 times that of the probability of red ball coming in part (iii) Find the value of x   [x/18, $\frac{x+2}{20}$, x]

23. if m times the mth term of an AP is equal to n times the nth term . Show that (m+n)th term of the AP is zero

23 A boy is standing on the ground and is flying a kite which is attached to a 150-m-long string at an angle of elevation of 30°. Another boy is standing on the roof of a 25 m-high building and is flying his kite at an elevation of 45°. Both the boys are on opposite sides of both the kites. Find the length of the string (in metres), correct to two decimal places, that the second boy must have so that the two kites meet.   [70.7m]

24. PQRS is a diameter of a circle of radius 6cm. The lengths PQ, QR and RS are equal. Semi circles are drawn on PQ and QS as diameters. Find the perimeter and area of the region so obtained.   [37.71cm^2]

25. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60 degree

27. if PAB is a secant to a circle intersecting the circle at A and B and PT is a tangent , then prove that PA x PB=PT^2

28. Two circles intersect each other at P and Q. A is any point on the line PQ; AB and AC are tangent from A to the circles, Prove that AB = AC

29. The angle of elevation of a jet fighter from a point A on the ground is 60^0. After a flight of 15seconds, the angle of elevation changes to 300. If the jet is flying at a speed of 72^0 km/hour, find the constant height at which the jet is flying.

[1500√3]

30. In figure OP is equal to diameter of the circle. AP and PB are two tangents to the circle. AB is a secant to the circle. Prove that triangle ABP is an equilateral triangle
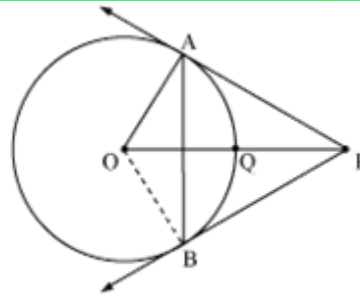
PA is a tangent to the circle

∴ OA ⊥ PA ⇒ ∠OPA = 90°

In ΔOPA, $\sin \angle OPA = \dfrac{OA}{OP} = \dfrac{r}{2r}$

⇒ $\sin \angle OPA = \dfrac{1}{2} = \sin 30°$

[Given OP is the diameter of the circle]

⇒ ∠OPA = 30°

Similarly, it can be proved that ∠OPB = 30°.

Now, ∠APB = ∠OPA + ∠OPB = 30° + 30° = 60°

In ΔPAB, PA = PB [lengths of tangents drawn from an external point to a circle are equal]

⇒∠PAB = ∠PBA ...(1) [Equal sides have equal angles opposite to them]

∠PAB + ∠PBA + ∠APB = 180° [Angle sum property]

⇒∠PAB + ∠PAB = 180° – 60° = 120° [Using (1)]

⇒2∠PAB = 120°

⇒∠PAB = 60° ...(2)

From (1) and (2)

∠PAB = ∠PBA = ∠APB = 60°

∴ ΔPAB is an equilateral triangle

31. The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle BD is tangent to the smaller circle touching it at D. Find the length of AD   [19cm]