

SUMMATIVE ASSESSMENT – II
CLASS X (2015-16)
MATHEMATICS MODEL PAPER

TIME: 3HRS

MARKS: 90

General Instructions:

- (i) All questions are compulsory.
- (ii) The question paper contains 31 questions divided into four sections A, B, C and D. Section – A comprises of 4 questions of 1 mark each; Section – B comprises of 6 questions of 2 marks each; Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 11 questions of 4 marks each.
- (iii) There is no overall choice. However, internal choices have been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.
- (iv) **USE OF CALCULATOR IS PROHIBITED**

SECTION A

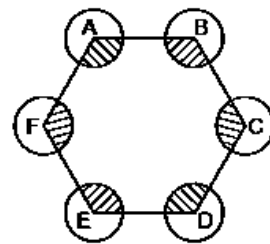
(Each question carries 1 mark)

- 1. If $2x + 1$, $3x + 2$, $4x + 3$ are in A.P., then find the value of 'x'.
- 2. If angle between two radii of a circle is 120° , then find the angle between the tangents at the ends of the radii.
- 3. If the ratio of height of a tower and the length of its shadow on the ground is $1 : \sqrt{3}$, then what will be the angle of elevation of the sun?
- 4. If the points $(0, 0)$, $(1, 2)$ and (x, y) are collinear then find the relation between x and y .

SECTION B

(Each question carries 2 marks)

- 5. Find the sum of 1st five multiples of five.
- 6. Solve the following equation by the method of factorization, $x^2 - (\sqrt{2} + 1)x + \sqrt{2} = 0$
- 7. If one of the roots of the equation $3a^2x^2 + 8abx + 4b^2 = 0$ is $-\frac{2b}{a}$, find the other root.
- 8. A pair of tangents PX and PY are drawn from an external point P to a circle with centre O. If $\angle XPY = 60^\circ$ and $PX = 8$ cm, find the radius of the circle.
- 9. In the figure ABCDEF is a regular hexagon. Circles with same radius 'r' are drawn with the different vertices A, B, C, D, E and F. Find the area of shaded portion.
- 10. A sphere and a cone have equal diameter and equal volume. What is the ratio of the radius of the sphere to the height of the cone?



OR

The surface area of a sphere is 616cm^2 , find its radius.

SECTION C

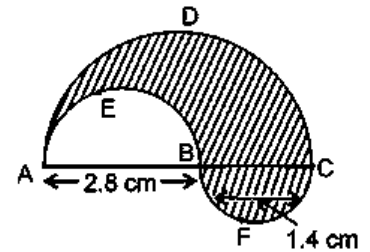
(Each question carries 3 marks)

- 11. Find the sum of first 25 terms of an AP, whose nth term is given by $T_n = (7 - 3n)$.
- 12. One year ago, the age of a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages.

OR

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

13. In the figure, find the perimeter of shaded region, where ADC, AEB and BFC are semicircles on diameters AC, AB and BC respectively.
14. Draw a circle of radius 3 cm. From a point on the concentric circle of radius 5 cm, construct the pair of tangents to the circle and measure their lengths.



OR

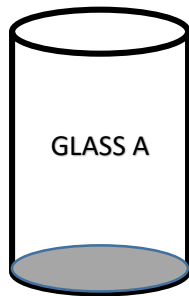
At a point X on the circle of radius 'r' unit, draw a tangent, without using the centre of the circle.

15. The angle of elevation of the top of a tower from the two points on the ground at distances 'a' metres and 'b' metres from the base of tower and in the same straight line are complementary. Prove that the height of the tower is \sqrt{ab} metres.
16. What is the probability of getting a sum of 8, when two dice are thrown simultaneously.
17. The mid-point of the line segment joining points A(2a, 4) and B(-2, 3b) is C(1, 2a + 1). Find the value of a and b.

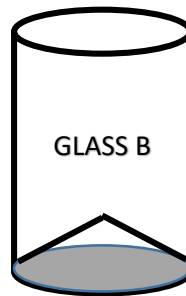
OR

If P(x, y) is any point on the line segment joining the points A(a, 0) and B(0, b), then show that $\frac{x}{a} + \frac{y}{b} = 1$.

18. Check whether A(a, a), B(-a, -a) and C(-a $\sqrt{3}$, a $\sqrt{3}$) are collinear or not collinear.
19. Ramesh, a juice seller has set up his juice shop. He has two types of glasses of inner diameter 5cm to serve the customers. The height of the glass is 10cm. (Use $\pi = 3.14$)



A glass with plane bottom



A glass with conical bottom of height 1.5 cm

He decided to to serve with glass A.

- Find out the difference in the capacity of the two glasses.
 - By choosing glass "A", which value is depicted by Ramesh?
20. A solid metallic sphere of diameter 21 cm is melted and recast into a number of smaller cones each of diameter 7 cm and height 3 cm. Find the number of cones so formed.

SECTION D

(Each question carries 4 marks)

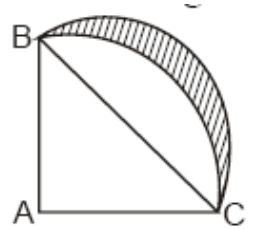
21. The sum of the first 7 terms of an A.P. is 49 and that of first 17 terms is 289. Determine the A.P. and find its sum of first n terms.
22. Two taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.
23. Prove that the length of tangents drawn from an external point to a circle are equal.
Two concentric circles are of radii 5cm and 3cm. Find the length of chord of the larger circle which touches the smaller circle.
24. Construct a triangle ABC, in which base BC = 6 cm, $\angle B = 60^\circ$ and $\angle BAC = 80^\circ$. Then construct another triangle whose sides are $\frac{2}{3}$ rd of the corresponding sides of ΔABC .

25. The angle of depression of the top and the bottom of an 8m tall building from the top of a multi-storeyed building are 30° and 45° , respectively. Find the height of multistoreyed building and the distance between the two buildings.

OR

The angle of elevation of a cloud from a point 60 m above the lake is 30° and the angle of depression of its reflection in the lake is 60° . Find the height of the cloud above the lake.

26. A dice and a coin are thrown simultaneously. Find the probability of obtaining a head and an even number. Draw a sample space when two dice are thrown simultaneously.
27. Derive a formula to find out the centroid of a triangle. Using this, if the coordinates of the vertices of a triangle are $(1, 1)$, $(2, -3)$ and $(3, 4)$, find its centroid.
28. If the points $A(6, 1)$, $B(8, 2)$, $C(9, 4)$ and $D(p, 3)$ are the vertices of a parallelogram, taken in order, find the value of p . Also find the length of both the diagonals.
29. In the figure, ABC is a quadrant of a circle of radius 14 cm and a semi circle is drawn with BC as diameter. Find the area of shaded region.
30. A milkman has a bucket in the shape of frustum with the radii of the ends 28cm and 7 cm and height 45cm. Find the total cost of milk at rate of Rs 40.00 per litre when milk is filled upto the brim.



OR

The slant height of the frustum of a cone is 5 cm. If the difference between the radii of its two circular ends is 4 cm, find the height of the frustum.

31. A metallic cube of 10cm edge is surmounted by a cone of largest base and height equal to its edge. Find the volume and total surface area of the object.

Prepared by: *Arif Ali Ansari*