SUBJECT: MATHEMATICS

BLUE PRINT : SA-II CLASS X

Unit/Topic	MCQ (1 mark)	Short answer (2 marks)	Short answer (3 marks)	Long answer (4 marks)	Total
Algebra Quadratic Equations & Arithmetic Progression	1(1)	4(2)	6(2)	12(3)	**23(8)**
Geometry Circles & Construction	-	6(3)	3(1)	8(2)	**17(6)**
Trigonometry Heights & Distances	-	-	-	8(2)	**08(2)**
Probability	1(1)	-	3(1)	4(1)	**08(3)**
Coordinate Geometry	1(1)	-	6(2)	4(1)	**11(4)**
Mensuration Areas related to Circles & Surface Areas and Volumes	1(1)	2(1)	12(4)	8(2)	**23(8)**
Total	4(4)	12(6)	30(10)	44(11)	**90(31)**

MARKING SCHEME FOR SA – II

SECTION	MARKS	NO. OF QUESTIONS	TOTAL
VSA	1	4	04
SA – I	2	6	12
SA – II	3	10	30
LA	4	11	44
GRAND TOTAL			**90**

General Instructions:
1. All questions are compulsory.
2. Question paper is divided into four sections: Section A consists 4 questions each carry 1 marks, Sections B consists 6 questions each carry 2 marks, Sections C consists 10 questions each carry 3 marks and Sections D consists 11 questions each carry 4 marks.
3. There is no overall choice.
4. Use of Calculator is prohibited.

SECTION – A

1. If the equation $(a^2 + b^2)x^2 – 2b(a + c)x + b^2 + c^2 = 0$ has equal roots then find the relation between a, b and c.

2. Find the distance of the point P(4, –3) from the origin.

3. Two dice are thrown together. Find the probability that the Sum of the numbers on the top of the dice is 12.

4. A cylinder, a cone and a hemisphere are of the same base and of the same height. Find the ratio of their volumes .

SECTION – B

5. Solve the equation: $36x^2 - 12ax + (a^2 - b^2) = 0$

6. Find the sum of all natural numbers less than 100 which are divisible by 6.

7. XP and XQ are tangents from X to the circle with O and R is a point on the circle. Prove that XA + AR = XB + BR.

8. A solid metallic hemisphere of radius 8 cm is melted and recasted into a right circular cone of base radius 6 cm. Determine the height of the cone.

9. The consecutive vertices of a parallelogram ABCD are A(1, 2), B(1, 0) and C(4, 0). Find the fourth vertex D.

10. A circle touches all the four sides of a quadrilateral ABCD with AB = 6 cm, BC = 7cm and CD = 4 cm. Find AD.

SECTION – C

11. Find a point P on the *y*-axis which is equidistant from the points A(5, – 2) and B(– 3, 2). Also find the area of ∆PAB.

12. If A(–5, 7), B(– 4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

13. Find the positive values of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots.

14. A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm, respectively. Find the capacity and surface area of the bucket.

15. Find the area of the shaded region in below figure, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.
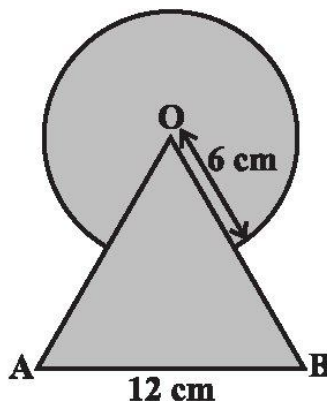
16. If 10th times the 10th term of an AP is equal to 15 times the 15th term, show that its 25th term is 0.

17. ΔPQR circumscribes a circle of radius r such that angle Q = 90^0, PQ = 3 cm and QR = 4 cm. Find r.

18. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.

19. A hemispherical tank full of water is emptied by a pipe at the rate of $\frac{25}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = \frac{22}{7}$)

20. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

SECTION – D

21. Find the coordinates of the circumcentre of a triangle whose vertices are A(8, 6), B(8, –2) and C(2, –2). Also, find its circumradius.

22. A two digit number is such that the product of its digits is 35. When 18 is added to the number, the digits interchange their places. Find the number.

23. A motorboat whose speed is 15 km/hr in still water, goes 30 km downstream and comes back in a total time of 4 hours 30 minutes. Find the speed of the stream.

24. If the pth, qth and rth terms of an AP is a, b, c respectively, then show that
a(q – r) + b(r – p) + c(p – q) = 0.

25. Prove that "The lengths of tangents drawn from an external point to a circle are equal."

26. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle$ABC = 60°. Then construct a triangle whose sides are $\dfrac{3}{4}$ of the corresponding sides of the triangle ABC.

27. Five cards—the ten, jack, queen, king and ace of diamonds, are removed from the well-shuffled 52 playing cards. One card is then picked up at random. Find the probability of getting (a) neither a heart nor a king (b) neither an ace nor a king

28. A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank to her field, which is 10m in diameter and 2m deep. If water flows through the pipe at the rate of 3km/hr, in how much time will the tank be filled?

29. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top and is to be distributed to the poor children during summer season. Find the number of such cones which can be filled with ice cream. Which values are being reflected by such an action?

30. At a point on level ground, the angle of elevation of a vertical tower is found to be such that its tangent is $\dfrac{5}{12}$. In walking 192 m towards the tower, the tangent of the angle of elevation is $\dfrac{3}{4}$. Find the height of the tower.

31. An aeroplane flying horizontally $1000\sqrt{3}$ m above the ground, is observed at an angle of elevation 60^0 from a point on the ground. After a flight of 10 seconds, the angle of elevation at the point of observation changes to 30^0. Find the speed of the plane in m/s.

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