CLASS X
SAMPLE PAPER
MATHEMATICS

Time: 3hrs **Max.Marks: 90**

Section-A

1. If 3x-2, 11 and 5x are in A.P find 'x'.
2. If 5 is a root of the equation $5x^2 - px + 10 = 0$, find 'p'.
3. A tangent of length 12 cm is drawn to a circle of radius 5 cm from a point P away from the centre. Find the distance of P from the centre.
4. A person standing on top of a building-10 m high-observes the angle of elevation of the top of a tower to be 45^o. If the building is at a distance of 50 m from the tower on the same horizontal plane, find the height of the tower.

Section-B

5. Draw a line segment AB = 7cm and divide it in the ratio 2 : 3.
6. If (4,y) is equidistant from the points (2,5) and (6,3) find 'y'.
7. In what ratio y-axis divides the line joining points (-4,6) and (3,8).
8. Two coins tossed together. What is the probability of getting utmost two heads?
9. A bag contains 20 cards marked with odd numbers 1,3,5 and so on. One card is drawn at random. What is the probability that the drawn card bears (i) a prime number (ii) a multiple of 9 on it?
10. Calculate the area enclosed by two concentric circles of radii 7 cm and 3.5 cm.

Section-C

11. Find the value of 'k' for which the equation $(6-k)x^2 + (2k-2)x + 3k+1 = 0$ is a perfect square.
12. A factory produces 900 units in its third year and 1700 units in 7^{th} year. Find the number units produced in ten years.
13. Largest side of a right triangle is 4cm less than 3 times the shortest side. The third side is 2 cm less than the largest side. Find the lengths of the sides of the triangle.

14. Midpoints of sides of a triangle are (-1,4), (1,-2) and (6,0). Find the coordinates of the vertices of the triangle.
15. Prove that the tangents drawn to a circle from an exterior point are equal and subtend equal angles at the centre.
16. In two concentric circles show that chords of outer circle that are tangents to the inner circle are equal.

17. A man standing on the bank of a river observes angle of elevation of the top of a tree directly opposite to him on the other bank to be α. After walking 'a' metres away from the bank the angle of elevation changes to β. Show that the height 'h' of the tree is given by $h = \frac{a tan\alpha tan\beta}{tan\alpha - tan\beta}$.

18. An equilateral triangle of side 6 cm is inscribed in circle of radius 7 cm. Find the area of three segments formed.

19. A well of diameter 3.5 m is dug to a depth 14 m. Earth taken out is piled to form a cone of same radius. Find the slant height of cone.

20. A cube of edge 7 cm has a hemispherical top. Find the surface area of the solid.

Section-D

21. Angle of elevation of the top of a hill from a point on the ground is 45^o. After walking one km towards the top at an inclination of 30^o, the angle of elevation of the top of the hill was found to be 60^o. Find the height of the hill. (√3=1.73).
22. A good natured shop keeper offers a colour TV set worth Rs. 45,000 at Rs.5000 cash down payment and the rest in ten equal instalments.. If the interest at 5% is charged on the outstanding balance-the entire amount of interest so earned is given away to an orphanage to provide medical facilities- find the interest. What value doe the man's gesture reflect?
23. An Officer on tour has Rs.1200 for his expenses. If he extends his tour by 5 days he has to cut down on his daily expenses by Rs.12. Find the duration of tour.

24. Some mango plants are planted in a line at a distance of 20 m from each other. A gardener has to water these plants one by one drawing water from a well 10 m away from the first plant in doing so if he covers a distance of 8 km find the number of plants.
25. A building is in the form of a cylinder surmounted by a hemispherical dome. If the total height of the building is $\frac{3}{2}$ times the internal diameter of the building and it contains $1047\frac{13}{21}$ m^3 of air find the height of the building.
26. A 60^o-set square whose sides making right angle measure 16 cm and 12 cm is rotated along its hypotenuse. Find the volume of the double cone so formed.
27. A metallic bucket in the form of frustum of a cone rests on a cylindrical base of height 7 cm . If the total height of the bucket is 47 cm and its radii of top and bottom are 45cmand 15 cm respectively find the area of metallic sheet used to make the bucket.(keep your answers correct up to two places of decimal.)
28. A bag contains 10whiteballs, 18 Blue balls and some green balls. By adding 6 more green balls the probability of drawing Blue and Green balls become equal. Find the number of green balls and original probability of drawing white ball.
29. Find a point on x-axis that forms a triangle of area 21 square units with the points (2,-3) and (4,5).
30. Construct a ΔPQR given PQ = 3.5 cm, QR = 5 cm and PR = 6 cm. and construct a ΔP'Q'R with scale factor 7/5.
31. A circle touches side BC of ΔABC at D and AB produced and AC produced at P & Q. Prove that (i) Perimeter of ΔABC = 2AP (ii) AB + BD = AC + CD.