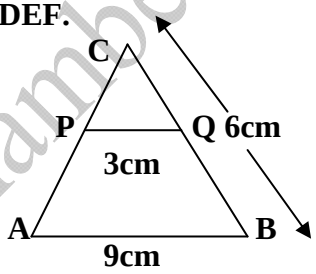
Test Paper

Time : 3Hr **MM-80**

Section – A

1. **Find the value of 'k' for which the polynomial $x^4 + 10x^3 + 25x^3 + 15x + k$ is exactly divisible by $x+7$.**
2. **For what value of k, the following system of equations has system is inconsistent**
   2x + ky = 11 ; 5x – 7y = 5
3. **Find the value of p for which each of the following quadratic equations has two equal roots. $4x^2 – 5x + p = 0$**
4. **Write the first three terms of the sequence defined by $a_n = n(n+2)$**
5. **Express the number 0.3 in the form of $\frac{p}{q}$.**
6. **Find the probability of getting a 'King' or 'Queen' in a drawn of one card, from well-shuffled pack of playing cards.**
7. **Find the value of $\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ$**
8. **Find the coordinates of the centroid of the triangle whose vertices are A(-1, 0), B(5,-2) and C(8,2).**
9. **ABC and DEF are two similar triangles such that BC = 4 cm, EF = 5 cm and area of ΔABC = 64 cm. Find the area of ΔDEF.**
10. **In the figure PQ|| AB. Find the length of CQ.**



Section – B

11. **Find the ratio in which the line segment joining the points (1, -3) and (4, 6) is divided by the x-axis.**

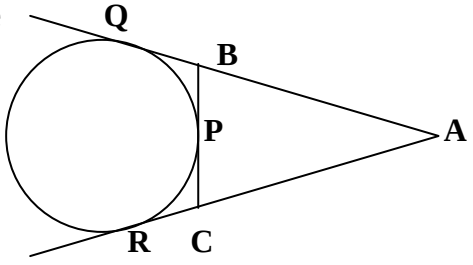
    OR

    Find the value(s) of x if the points (2x, 2x), (3, 2x+1) and (1, 0) are collinear.

12. **Without using Trigonometrical tables, find the value of**
$$\frac{\tan 50^\circ + \sec 50^\circ}{\cot 40^\circ + \operatorname{cosec} 40^\circ} + \cos 40^\circ \operatorname{cosec} 50^\circ$$

13. **Find the value of k for which the following system of linear equations has infinite solution.**
    x + (k+1) y = 5 ; (k+1) x + 9y = 8k – 1

14. **In the given figure a circle touches the side BC of ΔABC at P and touches AB and AC produced at Q and R respectively. If AQ = 5cm , find the perimeter of ΔABC.**



15. The vertices of a triangle are $(1, 2\sqrt{3})$ (3, 0) and (-1, 0). Is the triangle equilateral, isosceles or scalene

Section – C

16. The given distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches.

Run Scored	3000-4000	4000-5000	5000-6000	6000-7000	7000-8000	8000-9000	9000-10000	10000-11000
No. of Batsmen	4	18	9	7	6	3	1	1

Find the mode of the data.

17. Derive The Section formula

18. Draw the graph of the following system of equations.

x + 3y = 6 ; 2x – 3y = 12

Also, find the value of p if 5x + 4y = p.

19. Solve the equation for x . $ab\,x^2 + (b^2 - ac)\,x - bc = 0$

20. Find the sum of 3+11+19+……..+803.

21. The internal and external diameters of a hollow hemispherical shell are 6cm and 10cm respectively. It is melted and recast into a solid cone of base diameter 14cm. Find the height of cone so formed.

22. Prove that

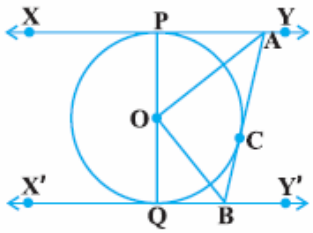
$$\frac{1}{\sec\theta - \tan\theta} - \frac{1}{\cos\theta} = \frac{1}{\cos\theta} - \frac{1}{\sec\theta + \tan\theta}$$

OR

Prove that $\dfrac{\tan\theta}{1-\cot\theta} + \dfrac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta$

23. Draw a pair of tangents to a circle of radius 6cm which are inclined to each other at 60°.

24. n the figure, XY and X'Y' are two parallel tangents to a circle with center O. AB is the tangent segment between two parallel tangents touching the circle at C. Show that $\angle AOB = 90^\circ$



OR

Prove that the sum of the squares of the sides of a rhombus is equal to sum of the squares on its diagonals.

25. prove the identity $\dfrac{\cos ec\,A}{\cos ec\,A - 1} + \dfrac{\cos ec\,A}{\cos ec\,A + 1} = 2\sec^2 A$

OR

Evaluate $\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\cos 38^\circ \cos ec\, 52^\circ}{\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 55^\circ}$

Section - D

26. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares any two corresponding sides.
Using the above theorem, find the corresponding altitude of the other triangle If the areas of two similar triangles are 100 cm^2 and 49 cm^2 respectively, and the altitude of the bigger triangle is 5 cm.

27. A solid is in the form of right circular cone mounted on a hemisphere. The radius of the hemisphere is 3.5cm and height of the cone is 4cm. The solid is placed in a cylindrical tub, full of water, in such a way that the whole solid is submerged in water. If the radius of the cylinder is 5cm and its height is 10.5cm find the volume of water left in the cylindrical tub.

OR

A bucket is in the form of a frustum of a cone with a capacity of 12308.8cm^3 of water. The radii of the top and bottom circular ends are 20cm. and 12cm. respectively. Find the height of the bucket and the area of the metal sheet used in making. (Use $\pi = 3.14$)

28. A piece of cloth costs Rs. 200. if the piece were 5m longer, and each meter of cloth costed available Rs.2 less , the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per meter.

29. The angle of elevation of a jet plane from a point P on the ground is 60°. After a flight of 15secs. the angle of elevation changes to 30°. If the jet plane is flying at a constant height of $1500\sqrt{3}\,m$. Find the speed of the plane.

OR

A man standing on the deck of a ship which is 10m above water level, observes the angle of elevation of the top of the hill as 60° and the angle of depression of the base of the hill as 30°, calculate the distance of the hill from the ship and the height of the hill.

30. The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

C.I.	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
f	2	5	x	12	17	20	y	9	7	4