I. **Four alternatives are given for each of the following incomplete statement or question. Choose the correct alternative and write the complete answer along with its letter of alphabet.**   **1 x 8 = 8**

1. On expressing 140 as a product of its prime factors we get
    (A) 5 x 4 x 7   (B) 2^2 x 5 x 7   (C) 14 x 5 x 2   (D) 2 x 5^2 x 7

2. The sum of the first 20 natural numbers is
    (A) 201   (B) 205   (C) 210   (D) 300

3. The degree of the polynomial $p(x) = x^3 - 4x^5 - 2x + 7$ is
    (A) 3   (B) 4   (C) 5   (D) 7

4. The discriminant of the quadratic equation $ax^2 + bx + c = 0$ is
    (A) $b^2 + 4ac$ (B) $bx + c$ (C) $ax^2 + bx$ (D) $b^2 - 4ac$

5. $Sin(90^0 - \theta)$ is equal to
    (A) $\cos \theta$ (B) $\operatorname{cosec} \theta$ (C) $\tan \theta$ (D) $\cot \theta$

6. The value of $(\sin 30^0$ x $\cos 60^0)$ is
    (A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) $\frac{3}{4}$ (D) 1

7. In the given figure if 'O' is the centre of the circle, then the measure of ∠OMN is
    (A)30^0 (B) 45^0 (C) 60^0 (D) 90^0

8. If the area of the circle is $616cm^2$, then the area of its one quadrant is
    (A)$154cm^2$ (B) $308cm^2$ (C) $462cm^2$ (D) $510cm^2$
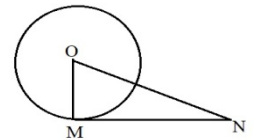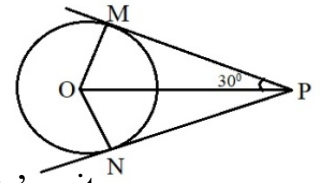
II.   **Answer the following questions.**   **1 x 8 = 8**

9. If 455 = 42 x 10 + 35 is applied to Euclid's division algorithm a = bq + r, then what is the remainder?

10. How many solutions do the pair of linear equations has, if the lines represented by them are coincident?

11. What is the probability of an impossible event?

12. If the ratio of the areas of two similar triangles is 121 : 169, then find the ratio of their corresponding sides.

13. Write the product of the zeros of the polynomial $p(x) = x^2 + 7x + 12$.

14. Express the equation $3x^2 = 5x - 11$ in the standard form of quadratic equation.

15. In the figure 'O' is the centre of the circle. If $\angle MPO = 30^0$, then write the measure of $\angle MON$

16. Write the formula used to find the volume of a sphere of radius 'r' units.

III. Answer the following questions. $\qquad$ **2 x 8 = 16**

17. Prove that $5 + \sqrt{3}$ is an irrational number.
18. Find the 30th term of the Arithmetic progression 5, 9, 13, ... using formula.
19. Solve the given pair of linear equations by Elimination method:
    $2x + y = 8$
    $3x - y = 7$
20. Solve the equation $x^2 + 3x - 5 = 0$ using quadratic formula.

(OR)

  Find the discriminant of the equation $x^2 + 4x + 4 = 0$ and hence write the nature of its roots.

21. Two identical coins are tossed simultaneously. Find the probability of getting atleast one head. $\qquad$ **(OR)**

  A cubical die whose faces are numbered from 1 to 6 is rolled once. Find the probability of getting a prime number on its top face.

22. Find the distance between the points R(3, 5) and M(7, 6) using distance formula.
23. Draw a circle of radius 4cm and construct two tangents to it from a point 9cm away from the centre of the circle.
24. In the given figure in ΔABC, $AD \perp BC$.
    If $\angle BAC = \angle ADC$, then Prove that $CA^2 = BC. CD$
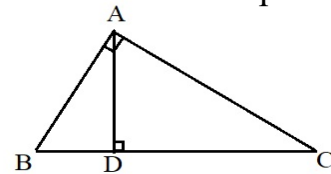
IV. Answer the following questions. $\qquad$ **3 x 9 = 27**

25. Divide the polynomial $p(x) = 3x^3 + x^2 + 2x + 5$ by the polynomial
    $g(x) = x^2 + 2x + 1$ and find the quotient q(x) and remainder r(x).
26. A train travels 360km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

(OR)

  Sum of the areas of two squares is $468m^2$. If the difference of their perimeters is 24m, find the side of the two squares.

27. Find the ratio in which the line segment joining the points A(2, 3) and B(10, 7) is divided by the point P(8, 6). $\qquad$ **(OR)**

  Find the value of 'p' for which the points (3, p), (4, 2), (5, 3) are collinear.

28. Prove that $(1 + \cot\theta - \csc\theta)(1 + \tan\theta + \sec\theta) = 2$

(OR)

  Prove that $\dfrac{\sin\theta}{1+\cos\theta} + \dfrac{1+\cos\theta}{\sin\theta} = 2\csc\theta$

29. Find the mean for the following frequency distribution table.

Class Interval	Frequency(f_i)
10 – 20	2
20 – 30	4
30 – 40	5
40 – 50	6
50 – 60	3
	$\sum f_i = 20$

(OR)

Calculate the mode for the following frequency distribution table.

Class interval	Frequency
50 – 60	8
60 – 70	7
70 – 80	12
80 – 90	5
90 – 100	7

30. Prove that, "the lengths of tangents drawn from an external point to a circle are equal".

31. Construct a triangle with sides 6cm, 7cm and 8cm. Then construct another triangle whose sides are $\frac{3}{5}$ of the corresponding sides of the first triangle.

32. In the figure ABCD is a rectangle of length 12cm and breadth 10cm. With 'A' as centre an arc of length 11cm is drawn as shown in the figure. Find the area of the shaded region.
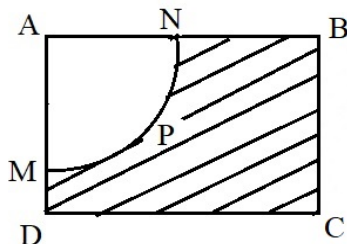
33. During a medical survey the heights of 55 students of a class were recorded as follows. Draw "less than type" Ogive for this data.

Height(in cm)	Number of Students
Less than 140	5
Less than 145	10
Less than 150	30
Less than 155	40
Less than 160	50
Less than 165	55

V.   Answer the following questions.   **4 x 4 = 16**

34. In an arithmetic progression with positive common difference, the sum of the third and seventh terms is 6 and their product is 8. Find the sum of the first sixteen terms of this arithmetic progression.

(OR)

The sum of four consecutive numbers in an Arithmetic progression is 32 and the ratio of the product of the first and last terms to the product of two middle terms is 7 : 15. Find the numbers.

35. Two ships are there on the sea on either side of a light house in such a way that the ships and the light house are in the same straight line. The angles of depression of two ships as observed from the top of the light house are 60^0 and 45^0. If the height of the light house is 300m, find the distance between the two ships. (Take $\sqrt{3}$ = 1.73).
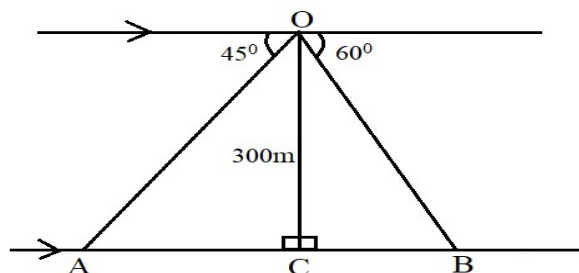
36. Prove that "if in two triangles, the corresponding angles are equal, then their corresponding sides are proportional and hence the triangles are similar."

37. Find the solution of the following pair of linear equations by graphical method.

$$2x + y = 8$$
$$x + y = 5$$

VI.   Answer the following question.   **5 x 1 = 5**

38. From a solid cylinder of height is 2.4m and diameter 1.4m, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid.