

20. Find the square root of $\frac{400x^4y^{12}z^{16}}{100x^8y^4z^4}$
21. Find the length of the tangent drawn from a point whose distance from the centre of a circle is 5 cm and radius of the circle is 3 cm.
22. If the area of the triangle formed by the vertices A(-1, 2), B(k, -2) and C(7, 4) (taken in order) is 22 sq. units, find the value of k.
23. Find the intercepts made by the following line on the coordinate axes $4x + 3y + 12 = 0$.
24. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$
25. A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball lying on the ground as 60° . Find the distance between the foot of the tower and the ball. ($\sqrt{3} = 1.732$)
26. If the base area of a hemispherical solid is 1386 sq. metres, then find its total surface area?
27. The volumes of two cones of same base radius are 3600 cm^3 and 5040 cm^3 . Find the ratio of heights.
28. A bag contains 5 blue balls and 4 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) blue (ii) not blue.

SEC III

Answer any 10 questions (Q.no 42 compulsory)

10 X 5 = 50

29. Let $A = \{x \in \mathbb{W} | x < 2\}$, $B = \{x \in \mathbb{N} | 1 \leq x < 4\}$ and $C = \{3, 5\}$. Then verify that $(A \cup B) \times C = (A \times C) \cup (B \times C)$
30. Let $A = \{-1, 1\}$, and $B = \{0, 2\}$. If the function $f: A \rightarrow B$ defined by $f(x) = ax + b$ is an onto function? Find a and b.
31. Find the HCF of 396, 504, 636.
32. Find the sum to n terms of the series $5 + 55 + 555 + \dots$
33. $x^4 - 8x^2 + mx^2 + nx + 16$ is a perfect square. Find the values of m and n.
34. If $A = \begin{pmatrix} 1 & -1 & 2 \\ 1 & -1 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -1 \\ 2 & 1 \\ 1 & 3 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$ Show that $(AB)C = A(BC)$.
35. Basic Proportionality Theorem (BPT) or Thales theorem
36. Find the equation of a straight line through the point of intersection of the lines $8x + 3y = 18$, $4x + 5y = 9$ and bisecting the line segment joining the points (5, -4) and (-7, 6).
37. Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).
38. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are 30° and 45° respectively. If the lighthouse is 200 m high, find the distance between the two ships. ($\sqrt{3} = 1.732$)
39. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is h meters and the line joining the ships passes through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}m$.
40. A conical flask is full of water. The flask has base radius r units and height h units, the water poured into a cylindrical flask of base radius xr units. Find the height of water in the cylindrical flask.
41. A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.
42. Three unbiased coins are tossed once. Find the probability of getting atmost 2 tails or atleast 2 heads.

SEC IV

Answer all the questions

2 X 8 = 16

43. A) Draw a triangle ABC of base $BC = 8 \text{ cm}$, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that $BD = 6 \text{ cm}$.
- (Or)
- B) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.
44. A) Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find, (i) y when $x = 3$ and (ii) x when $y = 6$.
- (Or)
- B) Draw the graph of $y = x^2 + x - 2$ and hence solve $x^2 + x - 2 = 0$.