

Time : 3 Hours**Marks : 80**

Instructions :

1. All Questions are Compulsory.
 2. Each Sub-question carry 5 marks.
 3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
 4. Question paper of 80 Marks, it will be converted in to your programme structure marks.
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1. Solve any **four** sub-questions.

- a) A circular water fountain 6.6m in diameter is surrounded by a path of width 1.5m. Find the area of this path. 5
- b) Solve, by Cramer's rule, 5
 $2x - 3y - 10 = 0$ and $5x + 3y - 11 = 0$.
- c) Simplify $\sqrt{3} + \sqrt[3]{81} - \sqrt{27} + 5^3 \cdot \sqrt{3}$ 5
- d) Simplify $\log_5 27 - \log_5 81 + \log_5 243 - \log_5 6 + \log_5 18$. 5
- e) Find the quadratic equation whose roots are $2 \pm i\sqrt{3}$. 5

2. Solve any **four** sub-questions.

- a) If $\sin \theta = \frac{3}{5}$, find the value of $\cos \theta$, $\tan \theta$, $\sec \theta$ and $\operatorname{cosec} \theta$. 5
- b) Show that $\frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$. 5
- c) In a triangle ABC, where sides are 13cm, 14cm, and 15cm. Find the area of a triangle ABC. 5
- d) Write the complex number $\frac{3+i}{5+2i}$ in the form of $a + bi$. 5
- e) The angles of a triangle are in the ratio 1:2:3. Find their measures. 5

3. Solve any **four** sub-questions.

- a) Show that the points A (7,5), B (2, 3) and C (6, -7) are the vertices of a right angled triangle and find it's area. 5
- b) Find the equation of a line passing through (-4, 6) and (8, -3). 5
- c) Find the equation of the circle having the segment joining (3, 4) and (5, 2) as diameter. 5
- d) Find the equation of the tangent and the normal to the circle $x^2 + y^2 = 61$ at (5, 6). 5
- e) Draw the graph for $y = 3x + 4$. 5

4. Solve any **four** sub-questions.

- a) Find a unit vector perpendicular to each of the vector $a = i - j + k$ and $b = 2i + j - 3k$. 5
- b) Find x if the vectors $2i - j + 3k$, $i + j - 3k$ and $3i - xj + 9k$ are coplanar. 5
- c) Find the combinational circuit corresponding to the Boolean expression $(x_1 \cdot x_2) + \bar{x}_3$. 5
- d) Verify Demorgan's Law, $\overline{x + y} = \bar{x} \cdot \bar{y}$ using truth table. 5
- e) A fair die is thrown. Find the probability of score being divisible by 3. 5

