

TML012/EE/20070813

Applied Mathematics - I

Time : 180 minutes

Marks : 100

Instructions for the students :

1. All questions are compulsory.
2. "Long Answer type Question (LAQ)" is a supply type question of 20 marks, which require typical answer of about 60-80 lines in about 32-40 minutes.
3. "Short Answer type Question (SAQ)" is a supply type question of 5 marks, which require typical answer of about 15-20 lines in about 08-10 minutes.
4. Use of non-programmable type of scientific calculator is allowed.
5. Draw neat diagrams wherever necessary.
6. Assume suitable data if necessary.

Q. No.	Question (Q)	Question Marks
Long Answer type Questions (LAQ's)		
1.	(a) For what values of 'k' are the roots of equation $(k-1)x^2 + (k-1)x + k^2 = 0$ equal Suppose $T_4 = 3$ and $T_9 = \frac{32}{81}$. Find the first three terms of G.P.	10 10
2.	(a) Prove that $\sin^6 A + \cos^6 A = 1 - 3\sin^2 A \cos^2 A$ (b) Write $(\sqrt{3} + i)^6$ in the form of $a + bi$	10 10
3.	(a) Solve graphically the following equations $x + 2y = 4$ and $2x - 3y = 1$ (b) Find the equation of the locus of a point such that the sum of the squares of its distances from the points (3, 0) and (0, -4) is 12.	10 10
4.	(a) Two fair dice are rolled. Find the probability that the score is 8. (b) Verify distributive law $x \cdot (y + z) = (x \cdot y) + (x \cdot z)$ using truth table.	10 10
Short Answer type Questions (SAQ's)		
5.	Simplify $\log_5 27 - \log_5 81 + \log_5 243 - \log_5 6 + \log_5 18$	5
6.	Show that $\frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$	5
7.	Find the equation of the circle having centre (3, 4) and radius 4.	5
8.	Find x if vector $2xi + 5j - 3k$ and $3i - 6j - 2k$ are perpendicular.	5