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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (CSE/CE/IT/ECE/Civil/ME/EIE/EEE/EE) (Sem.-1)
ENGG. MATHEMATICS/ENGG. MATHEMATICS-I/APPLIED
MATHEMATICS-I
Subject Code : AM-101
M.Code : 54001

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A**I. Write short notes on :**

- a) Give the formula for curvature of parametric curves.
- b) Give the formula for centre of gravity.
- c) If $u = e^{xyz}$, then find $\frac{\partial u}{\partial x}$.
- d) If $u = yx^2$, $x = at^2$, $y = 2at$, then find $\frac{dz}{dt}$.
- e) Write Taylor's series for a function of two variables.
- f) Give the standard equation of paraboloid.
- g) Give the expression of Beta function.
- h) Write the formula for integral test for convergence of infinite series.
- i) Find the modulus of $(-1+i\sqrt{3})(1+i)$.
- j) Find the value of u , if $u + iv = \cos \left(\alpha + \frac{\pi}{4}i \right)$.

SECTION-B

2. Write complete steps for the tracing of any Cartesian curve.
3. Find the area bounded by the curve $a^4 y^2 = x^4 (a^2 - x^2)$.
4. If $u = \sin^{-1} \left(\frac{x^2 y^2}{x + y} \right)$, the using Euler's theorem prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 3 \tan u$.
5. Find the equations of tangent and normal to the curve $y = 2x^2 - 4x + 5$ at $(3, 11)$.

SECTION-C

6. Find the equation of sphere through the points $(2, 0, 1)$, $(1, -5, -1)$, $(0, -2, 3)$ and $(4, -1, 2)$.
7. Evaluate the integral $\int_1^2 \int_{-\sqrt{2-y}}^{\sqrt{2-y}} 2x^2 y^2 dx dy$.
8. Test the convergence of the series $\sum \frac{(n+1)!}{3^n}$.
9. Simplify $\left(1 + \sin \frac{\pi}{8} + i \cos \frac{\pi}{8} \right)^8 \cdot \left(1 + \sin \frac{\pi}{8} - i \cos \frac{\pi}{8} \right)^{-8}$ using De-Moivre's theorem.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.