Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech.(2008-2010 Batches) (Sem.–2)

ENGINEERING MATHEMATICS – II

Subject Code : AM-102

Paper ID : [A0119]

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

1. Write briefly :

a) Define L.I and L.D vectors.

b) Define Clairaut's equation.

c) Define Cayley Hamilton theorem.

d) What is the physical interpretation of curl $\vec{f}$?

e) Prove that $\nabla \times \left(\phi \vec{f}\right) = \nabla \phi \times \vec{f} + \phi \nabla \times \vec{f}$.

f) State Gauss Divergence theorem.

g) Define continuous density function.

h) Define F-test.

i) If the probability that a new born child is a male is 0.6, find the probability that in a family of 5 children there are exactly three boys.

j) Define semi positive definite matrix.

SECTION-B

2. Using Gauss Jordan Method, find the inverse of the matrix $\begin{bmatrix} 3 & 2 & 4 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{bmatrix}$.

3. Solve the differential equation $(x^2 - y^2)\,dx - xydy = 0$.

4. Solve $(3x+2)^2 \frac{d^2y}{dx^2} + 3(3x+2)\frac{dy}{dx} - 36y = 3x^2 + 4x + 1$.

5. The differential equation for a circuit in which the self inductance and capacitance neutralize each other is $L\frac{d^2i}{dt^2} + \frac{i}{c} = 0$. Find the current i as a function of t given that i is maximum current and $i = 0$ when $t = 0$.

SECTION-C

6. Evaluate $\nabla^2\left(\nabla.\left(\frac{\vec{r}}{r^2}\right)\right)$.

7. Evaluate $\int_c (x^2 + xy)\,dx + (x^2 + y^2)\,dy$ where C is the square formed by the lines $x = \pm 1$, $Y = \pm 1$

8. In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and the standard deviation of the distribution.

9. A random sample of 10 boys had the following I.Q

   70, 120, 110, 101, 88, 83, 95, 98, 107, 100.

   Do these data support the assumption of a population mean I.Q of 100 (at 5%) level of significance, t ($d.f$ = 9) = 2.26.