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Roll No.

Total No. of Questions : 09

B.Tech.(3DAnimation & Graphics) (2012 Onwards) B.Tech.(CSE/IT) (2012 Batch) (Sem.–3) MATHEMATICS – III

## Subject Code : BTAM-302

Paper ID : [A2143]

Time: 3 Hrs.

Max. Marks : 60

Total No. of Pages : 02

## **INSTRUCTIONS TO CANDIDATES :**

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

- 1. Write briefly :
  - a) Find Laplace transform of  $\sin h \frac{t}{2} \sin \frac{\sqrt{3}t}{2}$ .
  - b) If  $L^{-1} \{F(s)\} = f(t)$  then show that  $L^{-1} \left\{ \frac{1}{s} F(s) \right\} = \int_{0}^{t} f(x) dx$ .
  - c) Form the partial differential equation by eliminating the functions from the relation z = yf(x) + xg(y).
  - d) Solve the given linear PDE  $\sqrt{p} + \sqrt{q} = x + y$ .
  - e) State the necessary condition for a complex function to be analytic.
  - f) Determine a, b, c, d such that the function

 $f(z) = (x^2 + axy + by^2) + i(cx^2 + dxy + y^2)$  is analytic.

- g) Define diagonally dominant system of linear equations with example.
- h) For the given ODE  $y' = y \frac{2x}{y}$ , y(0) = 1 find y(0.1) using Euler's method.
- i) If the sum of mean and variance of a binomial distribution is 4.8 for five trails, find the distribution.
- j) Show that in a Poisson distribution with unit mean, mean deviation about mean is 2/e times the standard deviation.

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#### **SECTION-B**

2. Obtain Fourier series of the function  $f(x) = x^2$ ,  $-\pi \le x \le \pi$  and hence show that  $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots = \frac{\pi^2}{6}$ .

3. Using Laplace transform evaluate 
$$\int_{0}^{\infty} e^{-t} \frac{\sin^2 t}{t} dt$$
.

- 4. Solve the linear PDE  $(x^2 y^2 z^2)p + 2xyq = 2xz$ .
- 5. Prove that  $u = x^2 y^2 2xy 2x + 3y$  is harmonic and find a function v(x, y) such that the function f(z) = u + iv is analytic.
- 6. Solve the given system of linear equations using Gauss-Seidal method

$$2x + 17y + 4z = 35$$
,  $28x - 4y - z = 32$ ,  $x + 3y + 10 = 24$ .

# SECTION-C

- 7. i) Let f (t) be piecewise continuous on [0, ∞), be of exponential order and periodic T. Then L[f(t)] = 1/(1-e^{-sT}) ∫\_0^T e^{-st} f(t)dt, s > 0.
  ii) Solve (2D<sup>2</sup> 5DD' + 2D'<sup>2</sup>)z = 5 sin (2x + y)
- 8. i) By using Power method calculate the dominant eigen values and corresponding Eigen value of  $\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ .
  - ii) Given y' = y x, y(0) = 2, find y(0.1) and y(0.2) using Runge-Kutta method of fourth order.
- 9. i) In a Normal distribution, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution?
  - ii) A manufacturer claims that only 4% of his products supplied by him are defective. A random sample of 600 products contains 36 defectives. Test the claim of the manufacturer.