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B.Tech.(CSE) (2011 Batch) / (IT) (2011 Onwards) (Sem.-4)

MATHEMATICS - III Subject Code : BTCS-402 Paper ID : [A1184]

Time: 3 Hrs. Max. Marks: 60

#### **INSTRUCTIONS TO CANDIDATES:**

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

## **SECTION-A**

# Q1. Solve the following:

- a) If  $f(x) = |\sin x|$ ,  $-\pi < x < \pi$ , then coefficient  $a_0$  of the Fourier series expansion is....
- b) Evaluate  $L \{te^{-4t} \sin 3t\}$ .
- c) Evaluate  $L^{-1}\left\{\cot^{-1}\frac{s}{a}\right\}$
- d) Solve the PDE  $pqz = p^2(qx + p^2) + q^2(py + q^2)$
- e) Find the particular integral of the equation  $(D^2 + 4DD' 5D'^2)$   $z = \sin(2x+3y)$
- f) Difference between Direct and Iterative methods of solving simultaneous linear equations is...
- g) Give the name of any three Predictor-Corrector methods.
- h) Six dice are thrown 729 times, how many times do you expect at least three dice to show a five or six?
- i) Five coins are tossed 3200 times. What is the approximate probability of getting 5 heads two times?
- j) Find the regular function whose imaginary part is  $v = e^x \sin y$ ?

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### **SECTION-B**

- Q2) Using Laplace Transform, Evaluate  $\int_{0}^{\infty} \frac{\cos at \cos bt}{t} dt$
- Q3) Solve the following system of equations using the Gauss Jacobi Method:

$$2x + y + 6z = 9$$
;  $8x + 3y + 2z = 13$ ;  $x + 5y + z = 7$ .

- Q4) 500 articles were selected at random out of a batch containing 10,000 articles, and 30 were found to be defective. How many defective articles would you reasonably expect to have in the whole batch?
- Q5) Using Modified Euler's method, Obtain a solution of

$$\frac{dy}{dx} = x + \left| \sqrt{y} \right|, y(0) = 1$$
, for the range  $0 \le x \le 0.4$  in steps of 0.2.

Q6) Fit a binomial distribution to the following data and test for goodness of fit at the level of significance 0.05:

<i>x</i> :	0 1	2	3	4	5
<i>y</i> :	38 144	342	287	164	25

# SECTION-C

- Q7) Obtain the Fourier series for the function  $f(x) = |\sin x|, -\pi < x < \pi$ .
- Q8) Solve the PDE  $x^2 (z y)p + y^2 (x z)q = z^2(y x)$ .
- Q9) If f(z) is a regular function of z, prove that,  $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |f(z)|^2 = 4 |f'(z)|^2$ .

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