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Total No. of Pages : 02

Total No. of Questions : 09

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

MATHEMATICS-III

Subject Code : BTCS-402

Paper ID : [A1184]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION 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 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

1. Write short notes on :

- (a) Prove that the Fourier series for an even periodic function shall consist of cosine terms only.
- (b) Find the Laplace transform of $f(x) = C$ (constant) by using the definition of the Laplace transform.
- (c) Form the partial differential equation by eliminating the arbitrary function from $Z = f(x^2 - y^2)$.
- (d) If $w = \log z$, find $\frac{dw}{dz}$ and determine where w is non-analytic.
- (e) The probability that a pen manufactured by a company will be defective is $1/10$. If 12 such pens are manufactured, find the probability that exactly 2 will be defective.
- (f) Find the inverse Laplace transform of $\frac{s^2 - 3s + 4}{s^3}$.
- (g) What are the mean and variance of the standard normal distribution ?
- (h) Give an example of a periodic function which has no fundamental period.

- (i) What are the two types of errors in hypothesis testing ?
 (j) Define standard error of a sampling distribution.

SECTION-B

2. If $w = u + iv$ an analytic function of a complex variable z and

$$v = x^2 - y^2 + \frac{x}{x^2 + y^2}, \text{ determine the function } u.$$

3. Solve the following system of linear equations by Gauss Jordan method :

$$x + y + z = 9$$

$$2x - 3y + 4z = 13$$

$$3x + 4y + 5z = 40$$

4. If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2,000 individuals more than two will get a bad reaction.
 5. In a city A, 20% of a random sample of 900 school boys had a certain disease. In another city B, 18.5% of a random sample of 1600 school boys had the same disease. Is the difference between the proportions significant ?

6. Find the Laplace transform of $\frac{1-e^t}{t}$.

SECTION-C

7. Solve partial differential equation

$$\frac{\partial^3 z}{\partial x^3} - 2 \frac{\partial^3 z}{\partial x^2 \partial y} = 2e^{2x} + 3x^2y.$$

8. Using modified Euler's method, find an approximate value of y when

$$x = 0.3, \text{ given that } \frac{dy}{dx} = x + y \text{ and } y = 1 \text{ when } x = 0.$$

9. Expand e^{-x} as a Fourier series in the interval $(-d, d)$.