

Total No. of Questions: 09

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

MATHEMATICS – III

M Code: 56605

Subject Code: BTCS-402

Paper ID: [A1184]

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 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. a) Find Fourier series to represent $f(x) = x^2 - 2$ when $-2 \leq x \leq 2$.
b) Find Laplace transformation of $\sin 2t \cos 3t$.
c) State first shifting theorem for Laplace transformation.
d) Solve $2p + 3q = 1$.
e) Define analytic function.
f) Find all the values of $(-1)^{1/4}$.
g) Check whether function $f(z) = \sqrt{|xy|}$ is regular at origin.
h) Sample of sizes 10 and 14 were taken from two normal populations with standard deviations 3.5 and 5.2. The sample means were found to be 20.3 and 18.6. Test whether the means of two populations are the same at 5% level.
i) What are the applications of F-test.
j) Form the differential equation of all circles of radius a.

SECTION B

2. Find the Fourier cosine series of function $f(x) = \begin{cases} x^2, & 0 \leq x \leq 2 \\ 4, & 2 \leq x \leq 4 \end{cases}$

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

4. Using Gauss seidal iteration method to solve the system of equations

$$\begin{aligned} 10x - 2y - z - w &= 3, & -2x + 10y - z - w &= 15, & -x - y + 10z - 2w &= 27, \\ & & & & -x - y - 2z + 10w &= -9 \end{aligned}$$

5. Find the mean of binomial distribution.

6. A sample of 100 dry battery cells tested to find the length of life produced the following results mean = 12 hrs. $\sigma = 3$ hrs. Assume that the data to be normally distributed, what % age of battery cells are expected to have life.

- a) more than 15 hrs
- b) less than 6hrs
- c) between 10 and 14hrs.

SECTION C

7. Find all values of z such that $\sin hz = e^{\frac{i\pi}{3}}$.

8. Solve $\frac{dy}{dx} = y - \frac{2x}{y}$, $y(0) = 1$ in range $0 \leq x \leq 0.2$ using Euler and modified Euler method.

9. A coin was tossed 400 times and head turned up 216 times. Test the hypothesis that coin is unbiased.