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Total No. of Pages: 02
Total No. of Questions: 09

B.TECH (CSE, IT) (Sem.-4th)
MATHEMATICS-III
Subject Code: CS-204
Paper ID: [A0495]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. Section-A is compulsory consisting of ten question carrying two marks each.
2. Section-B contains five questions carrying five marks each and student has to attempt any four questions.
3. Section-C contains three questions carrying and student have to attempt any two questions.

SECTION-A

Q.1.

2x10=20

(a) Find the limit $\lim_{x \rightarrow 5} \frac{x-5}{x^2-25}$

(b) Find the limit $\lim_{x \rightarrow 3^-} \frac{|4x-12|}{x-3}$

(c) Find $\lim_{x \rightarrow 2^+} f(x)$; where $f(x) = \begin{cases} x^2 8x + 15 & \text{if } x \leq 2 \\ 4x + 7 & \text{if } x > 2 \end{cases}$

(d) Suppose $f(t) = \begin{cases} t & \text{if } t \leq 3 \\ A + \frac{t}{2} & \text{if } t > 3 \end{cases}$ find a value of A such that the function $f(t)$ is continuous for all t.

(e) $f(x) = |x-3|$, Find continuously and differentiability of the $f(x)$?

(f) What is centre of mass?

(g) What is movement of inertia?

(h) What is the role of conformal mapping?

(i) Write laplace equation and explain all variables and constants.

(j) State and explain Inverse Fourier Transformation.

SECTION-B

Q.2. Evaluate $\lim_{x \rightarrow 0} \frac{\sin x}{x}$

Q.3. Determine whether the $f(x) = 1 + \sqrt[3]{x^2}$

Satisfies condition of Mean Value Theorem for the interval $[-1, 1]$

Q.4. Find the volume under the portion of the surface $z = 2 - x^2 - y^2$ that lies above the square
 $0 \leq x \leq 1, 0 \leq y \leq 1$

Q.5. Evaluate $I = \int_1^2 \int_0^\pi (3 + \sin \theta) d\theta dr$

Q.6. State and prove that Cauchy's integral theorem?

SECTION-C

Q.7. Determine all the numbers c which satisfy the value theorem for the following function.

$f(x) = x^3 + 2x^2 - x$ on $[-1, 2]$

Q.8.(a) Find the area of surface generated by rotating the curve

$y = e^x, 0 \leq x \leq 1$, about the x -axis.

(b) Discuss the scope of boundary value problem in wave equation.

Q.9.(a) Find $L^{-1} \left[\frac{1}{s(s^2 + 1)} \right]$

(b) Given $\frac{dy}{dx} = xy$ with $y(1) = 5$ Find the solution for the interval $[1, 1.5]$ using step size $h = 0.1$

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