



GIET UNIVERSITY, GUNUPUR – 765022
 B. Tech (Third Semester Regular) Examinations, December – 2023
22BBSBS23001 – Engineering Mathematics - III
 (Chemical,Civil,ECE,EEE,Mech)

Time: 3 hrs

Maximum: 70 Marks

Answer all questions**(The figures in the right hand margin indicate marks)****PART – A****(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

- | | CO # | Blooms
Level |
|---|------|-----------------|
| a. Evaluate $\oint_c \frac{dz}{z-3i}$, $c: z = 1$ | CO1 | K2 |
| b. Find the value of “a” for which the function $U = e^{ax} \sin y$ is harmonic | CO1 | K3 |
| c. Find the Residue at the singular point $f(z) = \frac{z}{z^2+9}$ | CO2 | K2 |
| d. Given that $f(0)=1, f(1)=3, f(3)=55$. Find the Lagrange’s interpolating polynomial. | CO3 | K1 |
| e. Define Newton’s Forward difference interpolation formula. | CO3 | K1 |

PART – B**(15 x 4 = 60 Marks)**Answer ALL questionsMarks CO # Blooms
Level

- | | | | |
|--|---|-----|----|
| 2. a. Find the value of “a” such that the function $e^{ax} \cos 5y$ is harmonic. Also find the corresponding harmonic conjugate. | 8 | CO1 | K3 |
| b. Find an Analytic function whose real part is $x^3 - 3x^2y + x^2 - y^2$ | 7 | CO1 | K3 |
| (OR) | | | |
| c. Find the line integral over the curve $\oint_c z dz$; c is the shortest path from $1+i$ to $2+3i$. | 8 | CO1 | K3 |
| d. Evaluate $\int \sin^2 z dz$ along $ z = \pi$ in the right half plane | 7 | CO1 | K3 |
| 3.a. Find the Laurent series expansion of | 7 | CO2 | K3 |
| $\frac{z^2}{(z-3)(z-5)}$, valid in the region $3 \leq z \leq 5$ | | | |
| b. Evaluate $\int_0^{2\pi} \frac{d\theta}{2+\cos \theta}$ | 8 | CO2 | K3 |
| (OR) | | | |
| c. Find the Laurent series of $\frac{1}{(z-1)(z-3)}$, valid in the region $1 \leq z \leq 3$. | 8 | CO2 | K3 |
| d. Evaluate $\int_0^{2\pi} \frac{d\theta}{4+\sin \theta}$ | 7 | CO2 | K3 |
| 4.a. Calculate $y(0.2), y(0.4)$ using Fourth Order R-K method given that | 7 | CO3 | K3 |

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, y(0) = 1$$

- b. Find the Lagrange's Polynomial for the following data 8 CO3 K3

x	10	20	25	30
f(x)	30	60	80	120

(OR)

- c. Calculate $y(0.8)$ using R-K method given that 7 CO3 K3

$$\frac{dy}{dx} = y - x^2, y(0.6) = 1.7379 \text{ taking } h = 0.1$$

- d. From the following data find the value of $f(8)$. 8 CO3 K3

x	1	3	5	7
f(x)	12	35	73	128

- 5.a. The probability density function $f(x) = \begin{cases} k(1 - x^2) & ; 0 < x \leq 1 \\ 0 & ; \text{otherwise} \end{cases}$ 7 CO4 K3

Find k, Mean and variance.

- b. Find the coefficient of correlation for the following data 8 CO4 K3

x	14	16	17	18	19
y	84	78	70	75	66

(OR)

- c. Find the regression line of X on Y for the following data 8 CO4 K3

x	10	12	13	16	17	20	25
y	10	22	24	27	29	33	37

- d. 20% of the items from a factory are defective. Out of a sample of 5 items, what is the probability that (i) none is defective (ii) one is defective (iii) at least one is defective. 7 CO4 K3

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