# GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester - Regular) Examinations, December – 2022

## 21BBSBS23001 – Engineering Mathematics - III

(Chemical Engg., Civil Engg., ECE, EE, EEE & Mechanical Engg.)

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 $\oint_c \frac{dz}{z-3i}$, $c: \lvert z \rvert = 1$ | C01 | $K_1$ |
| b. | Find the value of a for which the function $U = e^{ax} \sin y$ Is harmonic. | C01 | $K_2$ |
| c. | Find the singular points of the function $f(z) = \tan z$ . | CO2 | $K_2$ |
| d. | What is rounding off error? Explain with an example | CO3 | $K_1$ |
| e. | What is the probability of drawing a card which is either king or spade from pack of cards. | CO4 | $K_2$ |

**PART – B**                                                          **(15 x 4 = 60 Marks)**

<u>Answer **ALL** the questions</u>

|  |  | Marks | CO # | Blooms Level |
|---|---|---|---|---|
| 2. a. | Find an Analytic function whose real part is $x^3 - 3x^2y + x^2 - y^2$ | 8 | C01 | $K_3$ |
| b. | State and prove Cauchy's Integral theorem. | 7 | C01 | $K_2$ |
|  | (OR) |  |  |  |
| c. | Find the line integral over the curve $\oint_c z\,dz$; where c : $x^2 = y$ from 0 to 1+i | 8 | C01 | $K_3$ |
| d. | Evaluate $\oint_c \frac{z^2 dz}{(2z-1)^3}$, $c: \lvert z \rvert = 1$ | 7 | C01 | $K_3$ |
| 3.a. | Evaluate $\oint \frac{e^z+z}{z^3-z}dz$  c : $\lvert z \rvert = \frac{\pi}{2}$ by residue theorem | 8 | C02 | $K_3$ |
| b. | Find the Laurent series of $\frac{1}{(z-1)(z-2)}$, $valid\ in\ the\ region\ 1 \leq \lvert z \rvert \leq 2.$ | 7 | C02 | $K_3$ |
|  | (OR) |  |  |  |
| c. | Evaluate the following by using residue theorem. $$\int_0^{2\pi} \frac{dx}{5 + 3\sin x}$$ | 8 | C02 | $K_3$ |
| d. | Evaluate: $$\int_{-\infty}^{\infty} \frac{1}{(x^2 + 4)(x^2 + 9)}dx$$ | 7 | C02 | $K_3$ |
| 4.a. | Find the real roots of $x^3 + x - 5 = 0$, upto four significant digits by iteration method. | 8 | C03 | $K_3$ |
| b. | Find the real roots of 3x - cosx - 1= 0, by Newton's Method. | 7 | C03 | $K_3$ |
|  | (OR) |  |  |  |
| c. | Find  y(0.1) by Runge-Kutta  method given | 8 | C03 | $K_2$ |

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

| | | | | |
|---|---|---|---|---|
| d. | Evaluate $\int_0^1 \frac{dx}{1+x}$ using Simpson's one third rule with h=0.25 | 7 | C03 | K3 |

5.a.  The probability density function $f(x) = \begin{cases} k\,(1-x^2) & ; 0 < x \le 1 \\ 0 & ; \text{otherwise} \end{cases}$ , Find k , mean and variance.      8   C04   K3

b. State and prove Baye's theorem     7   C04   K2

<div align="center">(OR)</div>

c. Find the coefficient of correlation for the following data     8   C04   K3

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

d. Find the regression line of X on Y from the given points (2,12), (5,24), (9, 33), (14,50)     7   C04   K3

<div align="center">--- End of Paper ---</div>