QP Code: S253A022 | Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Third Semester – Regular & Supplementary) Examinations, November 2025

23BBSBS230E1 – Engineering Mathematics-III

(ECE)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	Verify whether the function u= $y^3 - 3x^2y$ is harmonic or not	CO1	K2
b.	Evaluate $\oint \frac{z^2+5z+2}{(z-2)^2} dz$ where C is | z | =1	CO2	K2
c.	What is correlation .	CO3	K1
d.	Find the Lagrange's interpolating polynomial for f (0) =1, f (1) =3, f (3) =55.	CO4	K2
e.	What is jointly – WSS process	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	Find the Analytic Function corresponding to $u = e^x[xcosy - ysiny]$	5	CO1	K3
b.	Find the image of $\|z - 1\| = 1$ under the Transformation $w = 1/z$	5	CO1	K3
	(OR)			
c.	Find the image of the Infinite strip $\frac{1}{4} \le y \le \frac{1}{2}$ under the mapping w= $\frac{1}{z}$	5	CO1	K3
d.	Find the conjugate harmonic of $V = -e^{-x} siny$ by using C-R Conditions	5	CO1	K3
3a.	State and prove Cauchy integral theorem	5	CO2	K3
b.	Find the Laurent's series expansion of the function $\frac{z-1}{(z+2)(z+3)}$, valid in the region $2 < \|z\| < 3$.	5	CO2	K3
	(OR)			
c.	Evaluate $\int_0^{2\pi} \frac{d\theta}{2+\cos\theta}$	5	CO2	K3
d.	Find the Residue at the singular points for $f(z) = cosz/z^4$	5	CO3	K3
4.a.	Using Newton Forward Interpolation formula, Estimate the Population in the year 1923.	5	CO3	K3

Year	1911	1921	1931	1941	1951	1961
Population	12	15	20	27	39	52

b.	Find the real root of $x^3 - x - 1 = 0$, by Fixed Point Iteration method.	5	CO3	K3
	(OR)			
c.	Find the real root of $5x^2 + 11x - 17 = 0$, by Newton Raphson method	5	CO3	K3
d.	Using Lagrange's interpolation formula find f (10) from the given data.	5	CO3	K3

x	5	6	9	11
y	12	13	14	16

5.a.	20% of the items from a factory are Defective. what is the probability that	5	CO4	K3

(a) none is defective (b) one is defective items, from a sample of 5 items

b. Find the coefficient of correlation for the following data — 5 CO4 K3

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

(OR)

c. Find the Regression Equation for the following data — 5 CO4 K3

x	2	5	9	11	14
y	12	24	33	46	56

d. The probability density function $f(x) = \begin{cases} k\lambda e^{-\lambda x} & ; x \geq 0 \\ 0 & ; \text{otherwise} \end{cases}$ — 5 CO4 K3

Find a)k b) Mean

6.a. Prove that the random process $\{x(t)\} = A\cos(wt + \theta)$ is a WSS process where A and w are constants and θ is uniformly distributed from (0,2π) — 5 CO5 K3

b. Prove that the sum of two independent Poisson processes is ta Poisson process. — 5 CO5 K3

(OR)

c. Suppose that customers arrive at a bank according to a Poisson process with a mean rate of 3 per minute, find the probability that during a time interval of 2 minute (i) more than 4 customers arrive (ii) exactly 4 customers arrive. — 5 CO5 K3

d. Prove that $\{x(t)\} = A\,coswt + B\,sinwt$ is a WSS where A and B are uncorrelated random variable with zero mean and same variance, w being a constant — 5 CO5 K3

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