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Subject Code: AAS0301A

Roll No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P. J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course: B.Tech Branch: CSE/IT/CS

Semester: III **Sessional Examination: II** **Year: (2020-2021)**

Subject Name: Eng. Maths III

Time: 1.15Hours **[SET-B]** **Max. Marks:30**

General Instructions:

- This Question paper consists of 2 pages & 5 questions. It comprises of three Sections, A, B, and C.
- Section A -Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each. You are expected to answer them as directed.
- Section B - Question No-3 is short answer type questions carrying 5 marks each. You need to attempt any two out of three questions given.
- Section C -Question No. 4 & 5 Long answer type (within unit choice) questions carrying 6 marks each. You need to attempt any one-part *a* or *b*.

		SECTION – A	[8 Marks]	
1.	**Attempt all parts**		(4×1=4)	
	a.	The value of $\int_C \log z \, dz$ where C is unit circle $(i)\ 2\pi i \quad (ii)\ -2\pi i \quad (iii)\ 0 \quad (iv)$ None of these	(1)	CO2
	b.	Residue of $ze^{1/z}$ at $z = 0$ is $(i)\ 0 \quad (ii)\ 1 \quad (iii)\ -1/2 \quad (iv)\ 1/2$	(1)	CO2
	c.	The region of validity for Taylor's series about $z = 0$ of the function $1/1 + z$ is $(i)\ \|z\| = 0 \quad (ii)\ \|z\| < 1 \quad (iii)\ \|z\| > 1 \quad (iv)\ \|z\| < \infty$	(1)	CO2
	d.	If $f(z) = \frac{z - sinz}{z^5}$, then $z = 0$ is (i) Removable singularity (ii) Pole of order 5 (iii) Pole of order 2 (iv) None of these	(1)	CO2
2.	**Attempt all parts**		(2×2=4)	
	a.	State Cauchy Integral formula for derivatives.	(2)	CO2
	b.	Evaluate the integral $\int_0^{3+i} (\bar{z})^2 \, dz$ along the real axis from $z = 0$ to $z = 3$ and then along a line parallel to imaginary axis from $z = 3$ to $z = 3 + i$.	(2)	CO2

		SECTION – B	**[10 Marks]**	
			(2×5=10)	
3.	**Answer any <u>two</u> of the following-**			
	a.	Verify Cauchy integral theorem for $f(z) = e^{iz}$ along the boundary of the triangle with the vertices $1+i, -1+i$ and $-1-i$.	**(5)**	**CO2**
	b.	Integrate $(z^3-1)^{-2}$ the counter clockwise sense around the circle $\|z-1\| = 1$	**(5)**	**CO2**
	c.	Evaluate $\int_C \frac{1}{z^2(z^2-4)e^z} dz$ where C is $\|z\| = 1$.	**(5)**	**CO2**
		SECTION – C	**[12 Marks]**	
			(1×6=6)	
4	**Answer any <u>one</u> of the following-**			
	a.	Expand $f(z) = \frac{z}{(z-1)(z-2)}$ (i) $\|z-1\| > 1$ (ii) $0 < \|z-2\| < 1$	**(6)**	**CO2**
	b.	State & Prove Cauchy Integral formula.	**(6)**	**CO2**
5.	**Answer any <u>one</u> of the following-**		**(1×6=6)**	
	a.	Evaluate $\int_0^{2\pi} \frac{1}{5+4\sin\theta} d\theta$ using contour integration.	**(6)**	**CO2**
	b.	Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)} dx$ using contour integration.	**(6)**	**CO2**