SRM Institute of Science and Technology
Ramapuram Campus

Department of Mathematics

Year / Sem: I / II

Branch: Common to ALL Branches of B.Tech. except B.Tech. (Business Systems)

UNIT V - COMPLEX INTEGRATION

Part – A

1.	The point z_0 at which a function $f(z)$ is not analytic is known as (A) zeros (B) isolated singular point (C) singular point (D) removable singular point	ANS **C**	(CLO-5, Remember)
2.	The singular points of $f(z) = \frac{z+3}{(z-3)(z-2)}$ are (A) $z = 1, 3$ (B) $z = 1, 0$ (C) $z = 1, 2$ (D) $z = 2, 3$	ANS **D**	(CLO-5, Apply)
3.	The value of $\int_C \frac{dz}{z-1}$ where C is the circle $\mid z \mid = 2$ is (A) 0 (B) $2\pi i$ (C) $-2\pi i$ (D) 1	ANS **B**	(CLO-5, Apply)
4.	The residue of $f(z) = \frac{z}{z-1}$ at its pole is (A) 0 (B) 1 (C) -1 (D) $2\pi i$	ANS **B**	(CLO-5, Apply)
5.	The residue of $f(z) = \frac{z}{z+1}$ at its pole is (A) 0 (B) 2 (C) -1 (D) $2\pi i$	ANS **C**	(CLO-5, Apply)
6.	The singular points of $f(z) = \frac{z+3}{(z+1)(z+2)}$ are (A) $z = 1, 3$ (B) $z = 1, 0$ (C) $z = -1, -2$ (D) $z = 2, 3$	ANS **C**	(CLO-5, Apply)

7.	The value of $\int_C \frac{z}{z-2}\,dz$ where C is the circle $\lvert z\rvert = 3$ is (A) 0 (B) $4\,\pi\,i$ (C) $-2\pi i$ (D) 1	ANS **B**	(CLO-5, Apply)
8.	The residue of $f(z) = \frac{z}{(z-1)^2}$ at its pole is (A) 0 (B) 1 (C) -1 (D) $2\pi i$	ANS **B**	(CLO-5, Apply)
9.	The value of $\int_C \frac{e^{-z}}{z+1}\,dz$ is (A) 0 (B) $2\,\pi\,i\,e$ (C) $-2\pi i$ (D) 1	ANS **B**	(CLO-5, Apply)
10.	The singularity of $f(z) = \frac{z}{(z-2)^3}$ is (A) pole of order 2 (B) pole of order 3 (C) simple pole (D) pole of order *n*	ANS **B**	(CLO-5, Apply)
11.	If $f(z) = \frac{\sin z}{z}$, then $z = 0$ is (A) pole (B) removable singularity (C) essential singularity (D) isolated singularity	ANS **B**	(CLO-5, Apply)
12.	If $f(z) = \int_C e^z\,dz$, where C is $\lvert z\rvert = 1$, then $f(z) =$ (A) 0 (B) $\pi\,i$ (C) -1 (D) $2\pi i$	ANS **A**	(CLO-5, Apply)
13.	The value of $\int_C \frac{3\,z^2+5\,z+1}{z+1}\,dz$, where $C : \lvert z\rvert = \frac{1}{2}$ is (A) 0 (B) $2\,\pi\,i$ (C) $-2\pi i$ (D) 1	ANS **A**	(CLO-5, Apply)
14.	The value of $\int_C \frac{dz}{z-1}$ where C is the circle $\lvert\, z-1\,\rvert = 1$ is (A) 0 (B) $2\pi i$ (C) $-2\pi i$ (D) πi	ANS **B**	(CLO-5, Apply)
15.	The value of $\int_C \frac{z^2}{(z-1)^2(z+1)}\,dz$, where $C : \lvert z\rvert = \frac{1}{2}$ is (A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{1}{3}$	ANS **A**	(CLO-5, Apply)

16.	The value of $\int_C \frac{z}{z-2}\, dz$ where C is the circle $\|z\| = 1$ is (A) 0 (B) $4\,\pi\, i$ (C) $-2\pi i$ (D) 1	ANS **A**	(CLO-5, Apply)
17.	The residue of $f(z) = \frac{z}{(z-1)^2}$ at its pole is (A) 0 (B) 1 (C) -1 (D) 2	ANS **D**	(CLO-5, Apply)
18.	A zero of an analytic function $f(z)$ is a value of z for which (A) $f(z) = 1$ (B) $f(z) \neq 1$ (C) $f(z) \neq 0$ (D) $f(z) = 0$	ANS **D**	(CLO-5, Apply)
19.	The annular region for the function $f(z) = \frac{1}{z\,(z-1)}$ is (A) $0 < \|\, z\,\| < 1$ (B) $1 < \|\, z\,\| < 2$ (C) $2 < \|\, z\,\| < 3$ (D) $\|\, z\,\| > 1$	ANS **A**	(CLO-5, Apply)
20.	If $f(z)$ is analytic and $f'(z)$ is continuous at all points in the region bounded by the simple closed curves C_1 and C_2, then (A) $\int_{C_1} f(z)\, dz = \int_{C_2} f(z)\, dz$ (B) $\int_{C_1} f(z)\, dz \neq \int_{C_2} f(z)\, dz$ (C) $\int_{C_1} f'(z)\, dz = \int_{C_2} f'(z)\, dz$ (D) $\int_{C_1} f'(z)\, dz \neq \int_{C_2} f'(z)\, dz$	ANS **A**	(CLO-5, Remember)
21.	If $f(z)$ is analytic and $f'(z)$ is continuous at all points inside and on a simple closed curve C, then $\int_C f(z)\, dz =$ (A) 0 (B) $2\pi i$ (C) $-2\pi i$ (D) 1	ANS **A**	(CLO-5, Remember)
22.	If $f(z)$ is analytic inside and on C, then the value of $\oint_C \frac{f(z)}{z-a}\, dz$, where C is a simple closed curve and 'a' is any point within C is, (A) 0 (B) $2\pi i\, f(a)$ (C) $-2\pi i\, f(a)$ (D) 1	ANS **B**	(CLO-5, Remember)
23.	The annular region for the function $f(z) = \frac{1}{z^2 - z - 6}$ is (A) $0 < \|\, z\,\| < 1$ (B) $1 < \|\, z\,\| < 2$ (C) $2 < \|\, z\,\| < 3$ (D) $\|\, z\,\| < 3$	ANS **C**	(CLO-5, Apply)

24.	The annular region for the function $f(z) = \frac{1}{z^2 - 3z + 2}$ is (A) $0 < \vert z \vert < 1$ (B) $1 < \vert z \vert < 2$ (C) $1 < \vert z \vert < 0$ (D) $\vert z \vert < 1$	ANS **B**	(CLO-5, Apply)
25.	The value of $\int_C \frac{e^z}{(z-1)^3}\, dz$, where $C : \vert z \vert = \frac{1}{2}$ is (A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{1}{3}$	ANS **A**	(CLO-5, Apply)
26.	The value of $\int_C \frac{1}{(z-1)^2(z-2)(z-3)}\, dz$, where $C : \vert z \vert = \frac{1}{2}$ is (A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{1}{3}$	ANS **A**	(CLO-5, Apply)
27.	If C is a simple closed curve containing a and b, then $\int_C \frac{1}{(z-a)(z-b)}\, dz$ is (A) 0 (B) $2\pi i\, a$ (C) $2\pi i\, b$ (D) 1	ANS **A**	(CLO-5, Apply)
28.	$f(z) = \frac{z-2}{(z-1)(z+3)(z+2)}$ has a zero at (A) $z = 1$ (B) $z = 2$ (C) $z = -2$ (D) $z = -3$	ANS **B**	(CLO-5, Apply)
29.	$f(z) = \frac{z+2}{(z-1)^2(z-2)}$ has (A) poles at $z = 1, 2$ (B) a simple pole at $z = 1$ (C) essential singularity (D) no poles	ANS **A**	(CLO-5, Apply)
30.	The value of $\int_C \frac{z^2+1}{z^2-1}\, dz$ where C is the circle $\vert z - 1 \vert = 1$ is (A) 0 (B) $4\pi i$ (C) $2\pi i$ (D) 1	ANS **C**	(CLO-5, Apply)
31.	The residue of $f(z) = \frac{z-2}{z(z-1)}$ at $z = 0$ is (A) 0 (B) -2 (C) 2 (D) 1	ANS **C**	(CLO-5, Apply)

32.	If $f(z) = \frac{1}{(z^2+1)^2}$, then (A) $z = \pm i$ each simple pole (B) $z = \pm i$ each pole of order 2 (C) $z = \pm 1$ each simple pole (D) $z = i$ is not a pole	ANS **B**	(CLO-5, Apply)
33.	The value of $\int_C \frac{dz}{z-a} dz$, where $C: \mid z - a \mid = r$ is (A) 0 (B) $4\pi i$ (C) $2\pi i$ (D) 1	ANS **C**	(CLO-5, Apply)
34.	If $z = a$ is inside a simple closed curve C, then $\int_C \frac{dz}{(z-a)^2} =$ (A) 0 (B) $2\pi i$ (C) $-2\pi i$ (D) 1	ANS **A**	(CLO-5, Apply)
35.	Let $C_1: \lvert z-a \rvert = R_1$ and $C_2: \lvert z-a \rvert = R_2$ be two concentric circles with $R_2 < R_1$, the annular region is defined as (A) within C_1 (B) within C_2 (C) within C_2 and outside C_1 (D) within C_1 and outside C_2	ANS **D**	(CLO-5, Remember)
36.	The value of of $\int_C \frac{dz}{3z+1} dz$ where C is the circle $\mid z \mid = 1$ is (A) 0 (B) πi (C) $\frac{2\pi i}{3}$ (D) 1	ANS **C**	(CLO-5, Apply)

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