



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 IV - ANALYTIC FUNCTIONS

Part – A

1.	The critical point of the transformation $w = z^2$ is (A) $z = 0$ (B) $z = -i$ (C) $z = 1$ (D) $z = -1$	ANS A	(CLO-4, Apply)
2.	If $w = f(z) = u + iv$ is analytic, then the family of curves $u = C_1$ and $v = C_2$ (A) cut orthogonally (B) intersect each other (C) are parallel (D) coincide	ANS A	(CLO-4, Remember)
3.	If a function $u(x, y)$ satisfies the equation $u_{xx} + u_{yy} = 0$, then u is called (A) analytic function (B) harmonic function (C) differential function (D) continuous function	ANS B	(CLO-4, Remember)
4.	Cauchy-Riemann equations in Polar co-ordinates are (A) $u_r = \frac{1}{r} v_\theta, v_r = -\frac{1}{r} u_\theta$ (B) $u_r = -\frac{1}{r} v_\theta, v_r = \frac{1}{r} u_\theta$ (C) $u_r = -\frac{1}{r} v_\theta, v_r = -\frac{1}{r} u_\theta$ (D) $u_r = \frac{1}{r} v_\theta, v_r = \frac{1}{r} u_\theta$	ANS A	(CLO-4, Remember)
5.	The critical point of the transformation $w = z^4$ is (A) $z = 2$ (B) $z = -2$ (C) $z = 0$ (D) $z = 1$	ANS C	(CLO-4, Apply)
6.	If $w = f(z) = u + i v$ is an analytic function of z , then (A) u and v are not harmonic (B) u is not harmonic (C) both u and v are harmonic (D) u and v are constants	ANS C	(CLO-4, Remember)

7.	An analytic function with constant modulus is (A) zero (B) analytic (C) harmonic (D) constant	ANS D	(CLO-4, Remember)
8.	Cauchy – Riemann equation in Cartesian co-ordinates are (A) $u_x = v_y, u_y = -v_x$ (B) $u_x = -v_y, u_y = v_x$ (C) $u_x = v_y, u_y = v_x$ (D) $u_x = -v_y, u_y = -v_x$	ANS A	(CLO-4, Remember)
9.	The invariant point of the transformation $w = \frac{1}{z-2i}$ is (A) $z = 0$ (B) $z = 1$ (C) $z = -1$ (D) $z = i$	ANS D	(CLO-4, Apply)
10.	The transformation $w = az$, where a is a real constant represents (A) magnification (B) rotation (C) reflection (D) inversion	ANS A	(CLO-4, Apply)
11.	The fixed points of the transformation $w = \frac{z-1}{z+1}$ are (A) $\pm i$ (B) ± 1 (C) ± 2 (D) ± 3	ANS A	(CLO-4, Apply)
12.	An analytic function with constant real part is (A) zero (B) analytic (C) harmonic (D) constant	ANS D	(CLO-4, Remember)
13.	An analytic function with constant imaginary part is (A) zero (B) analytic (C) harmonic (D) constant	ANS D	(CLO-4, Remember)
14.	The transformation $w = az$, where a is a complex constant represents (A) magnification (B) reflection (C) magnification and rotation (D) inversion	ANS C	(CLO-4, Remember)
15.	If $f(z) = e^z$, then $f(z)$ is (A) zero function (B) analytic function (C) discontinuous function (D) constant function	ANS B	(CLO-4, Remember)

16.	$f(z) = \frac{1}{z^2 + 1}$ is analytic everywhere except at (A) $z = \pm i$ (B) $z = \pm 1$ (C) $z = \pm 2$ (D) $z = \pm 3$	ANS A	(CLO-4, Apply)
17.	The invariant points of the transformation $w = \frac{2z+6}{z+7}$ are (A) 6, -1 (B) 3, 2 (C) -3, 2 (D) -6, 1	ANS D	(CLO-4, Apply)
18.	The fixed points of the transformation $w = \frac{z-1}{z+1}$ are (A) $\pm i$ (B) ± 1 (C) ± 2 (D) ± 3	ANS A	(CLO-4, Apply)
19.	The image of $ z - 2i = 2$ under the transformation $w = \frac{1}{z}$ is (A) $1 - 4v = 0$ (B) $1 - 2v = 0$ (C) $1 + 4v = 0$ (D) $1 + 2v = 0$	ANS C	(CLO-4, Apply)
20.	The image of $ z = 2$ under the transformation $w = 3z$ is (A) $u^2 + v^2 = 6$ (B) $u^2 + v^2 = 36$ (C) $u^2 - v^2 = 36$ (D) $u^2 - v^2 = 6$	ANS B	(CLO-4, Apply)
21.	The image of $ z + 1 = 1$ under the transformation $w = \frac{1}{z}$ is (A) $1 + 2u = 0$ (B) $1 - 2u = 0$ (C) $1 + 2v = 0$ (D) $1 - 2v = 0$	ANS A	(CLO-4, Apply)
22.	The transformation $w = \frac{1}{z}$ is known as (A) magnification (B) reflection (C) rotation (D) inversion	ANS D	(CLO-4, Remember)
23.	If the image of a point z under the transformation $w = f(z)$ is itself, then the point is called (A) fixed point (B) critical point (C) singular point (D) regular point	ANS A	(CLO-4, Remember)
24.	The function $f(z) = \bar{z}$ is (A) nowhere differentiable (B) analytic (C) constant (D) singular	ANS A	(CLO-4, Apply)

25.	The function $f(z) = \sin z$ is (A) nowhere differentiable (C) not analytic (B) analytic (D) constant	ANS B	(CLO-4, Apply)
26.	A mapping that preserves angles between oriented circles both in magnitude and in sense is called a _____ mapping. (A) isogonal (C) regular (B) conformal (D) formal	ANS B	(CLO-4, Remember)
27.	A transformation that preserves angles between every pair of curves through a point only in magnitude, but not in direction is said to be _____ at that point. (A) isogonal (C) regular (B) conformal (D) formal	ANS A	(CLO-4, Remember)
28.	The real part of $f(z) = e^{2z}$ is (A) $e^x \cos y$ (C) $e^{2x} \cos 2y$ (B) $e^x \sin y$ (D) $e^{2x} \sin 2y$	ANS C	(CLO-4, Apply)
29.	The points at which the function $f(z) = \frac{1}{z^2 - 1}$ fails to be analytic are (A) $z = \pm i$ (C) $z = \pm 2$ (B) $z = \pm 1$ (D) $z = \pm 3$	ANS B	(CLO-4, Apply)
30.	The transformation $w = z + a$, where a is a complex constant represents (A) magnification (C) translation (B) reflection (D) inversion	ANS C	(CLO-4, Remember)
31.	The fixed points of the transformation $w = \frac{5z + 4}{z + 5}$ are (A) $\pm i$ (C) ± 2 (B) ± 1 (D) ± 3	ANS C	(CLO-4, Apply)
32.	The harmonic conjugate of $u = e^x \cos y$ is (A) $e^x \sin y$ (C) $e^{2x} \cos 2y$ (B) $e^{2x} \sin y$ (D) $e^{2x} \sin 2y$	ANS A	(CLO-4, Apply)
33.	The invariant points of the transformation $w = \frac{1 - iz}{z - i}$ are (A) $\pm i$ (C) ± 2 (B) ± 1 (D) ± 3	ANS B	(CLO-4, Apply)

34.	<p>The real part of $f(z) = \log z$ is</p> <p>(A) $u = \log r$ (B) $u = \log x$ (C) $u = \log y$ (D) $u = \log \theta$</p>	ANS A	(CLO-4, Apply)
35.	<p>If $f(z) = x + y + i(cy - x)$ is analytic, then the value of c is</p> <p>(A) $\pm i$ (B) 1 (C) 2 (D) -1</p>	ANS B	(CLO-4, Apply)
36.	<p>The critical points of the transformation $w = z + \frac{1}{z}$ are</p> <p>(A) $\pm i$ (B) ± 1 (C) ± 2 (D) ± 3</p>	ANS B	(CLO-4, Apply)

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