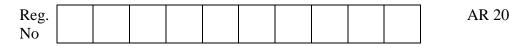


Time: 2 hrs



GIET UNIVERSITY, GUNUPUR – 765022

M. Sc. (Second Semester) Examinations, September - 2021

20MTPC204 - Complex Analysis

(Mathematics)

Maximum: 50 Marks

 $(2 \times 10 = 20 \text{ Marks})$

Marks

(6)

(6)

(The figures in the right hand margin indicate marks.) PART – A

Q.1. Answer ALL questions

- a. Define an analytic function. Give an example.
- b. Verify whether the function $F(z) = \frac{2}{z^2}$ is Analytic or not
- c. State Cauchy's integral formula
- d. Evaluate $\oint_c \frac{dz}{z-3i}$, c: |z| = 1
- e. Write the parametric representation of $(x + 3)^2 + (y 5)^2 = 8$.
- f. Is the function $f(Z) = e^z$ is analytic? Justify your answer
- g. Find centre and radius of convergence of $\sum \frac{1}{n(n+1)}$ (z-2)ⁿ
- h. State Cauchy s residue theorem.
- i. Find the Residue at the singular point of $f(z) = \frac{\cos z}{z^4}$
- j. Define conformal mapping.

PART - B (6 x 5 = 30 Marks)

Answer ANY FIVE

- 2. Prove that an analytic function of constant absolute value is constant (6)
- 3. Evaluate $\oint \frac{z^2 \sin z}{4z^3 1} dz$; c: |z| = 2 by residue theorem (6)
- 4. Prove that the function $u = x^3 3x^2y$ harmonic. Find its harmonic conjugate also find (6) the corresponding analytic function.
- 5. State and prove Morera's theorem
 - 6. Find the Laurent series of $\frac{z^2}{(z-1)(z-2)}$, valid in the region $1 \le |z| \le 2$ and $|z| \ge 2$ (6)
- 7. Evaluate $\int_0^{2\pi} \frac{dz}{2+\cos z}$. by residue theorem
- 8. Find the image of the infinite strip i) $\frac{1}{4} \le y \le \frac{1}{2}$ ii) $0 \le y \le \frac{1}{2}$ under the mapping (6) $w = \frac{1}{z}$.