Roll No. ....

Y – 3175 (A)

M.A./M.Sc. (Mathematics) (Second Semester) (SPECIAL)

EXAMINATION, August 2021

(SECOND CHANCE)

Paper – 201

COMPLEX ANALYSIS

Time : Three Hours

Maximum Marks : 85 *Minimum Pass Marks : 29*

Note—Attempt *all* questions.

1. Define Analytic function. If $f(z) = u + iv$ is an analytic function and $z = re^{i\theta}$ Where u, v, r, θ are all real, show that the Cauchy Riemann equations are

$$\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}$$

and
$$\frac{\partial v}{\partial r} = \frac{-1}{r}\frac{\partial u}{\partial \theta}$$
17

2. Let $f(z)$ be analytic within and on a closed contour C, and let z_o any point within C, then 17

$$f(z_0) = \frac{1}{2\pi i}\int_c \frac{f(z)}{z - z_0}\,dz$$

3. Find the bilinear transformation which maps the points $Z_1 = 2, Z_2 = i, Z_3 = -2$ into the points $W_1 = 1$, $W_2 = i$ and $W_3 = -1$. 17

4. Find the singularity of the function $\dfrac{e^{c/(z-a)}}{e^{z/a} - 1}$, indicating the character of each singularity. 17

5. Show that 17

$$\int_0^{2\pi} \cos^{2n}\theta \, d\theta = \frac{2\pi \,\underline{|2n}}{2^{2n}\,(\underline{|n})^2}$$