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R-11

Code: 1GC41

Last Chance Special Supplementary Examinations

II B.Tech. II Semester Supplementary Examinations July 2021

Mathematics – III

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal Marks (**14 Marks** each)

1. a) Find the value of $\int_0^1 x^3 \sqrt{1-x} dx$ using Γ and β functions 7M
b) Prove that $\beta(m, 1/2) = 2^{2m-1} \beta(m, m)$. 7M
2. State and Prove Cauchy-Riemann equations in Cartesian form. 14M
3. a) State the Real and Imaginary parts of $\cos z$ 7M
b) If $\tan(x + iy) = A + iB$, then show that $A^2 + B^2 + 2AC \cot 2x = 1$. 7M
4. a) State and prove Cauchy's integral formula. 7M
b) Evaluate $\int_c (x + y) dx + x^2 y dy$ from (0,0) to (3,9) along the straight line $x^2 = y$ 7M
5. Find the Laurent Series Expansion of $f(z) = \frac{1}{(z+1)(z+3)}$ for $1 < |z| < 3$ 14M
6. Determine the poles of the function $f(z) = \frac{1}{(z-1)(z-3)}$ and find the residue at each pole. 14M
7. State and prove Rouché's theorem. 14M
8. Under the transformation $w = \frac{1}{z}$ find the image of the circle $|z - 2i| = 2$. 14M
