Code No.: **10M08/20M08** | **MR11/ MR12**

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)

Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad

II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, NOVEMBER-2018

Subject: **Mathematics -III**

Branch: **ECE**

Time: 3 hours **Max. Marks: 75**

Answer any **FIVE** Questions of the following **5x15M=75M**

1. a. Define Gamma function. Prove that $\Gamma(n+1) = n\Gamma(n)$ [7M]
   b. Express $\int_0^1 x^m (1-x^n)^p \, dx$ interms of Gamma function. And evaluate $\int_0^1 x^5 (1-x^3)^{10} \, dx$ [8M]

2. a. State and prove Rodrigue's Formula. [10M]
   b.Express $J_3(x)$, interms of $J_0(x)$ and $J_1(x)$ [5M]

3. a. Find the analytic function whose real part is $u=y+e^x \cos y$.
   b. State and prove polar forms of Canchy – Riemann equations.
   c. Determine all values of $(1-i)^{1+i}$

4. a. Evaluate $\oint_C \frac{\cosh \pi z}{z(z^2+1)} dz$, where C is $|z|=2$ [8M]
   b.State abd prove Candy's integral formula. [7M]

5. a. State and prove Taylor's theorem [7M]
   b. Expand $f(z) = \frac{e^{2z}}{(z-1)^3}$ about z=1 as a Laurent's series. [8M]

6. a. Find the residue of the function $f(z) = \frac{1-e^{2z}}{z^4}$ at the poles. [7M]
   b. Evaluate $\oint \frac{e^{2z}}{(z-1)(z-2)} dz$ where C is the circle $|z|=3$. By using residue theorem. [8M]

7. a. Evaluate $\int_{-\infty}^{\infty} \frac{x \, dx}{(x^2+1)(x^2+2x+2)}$ by contour integration method. [8M]
   b. Evaluate $\int_0^{2\pi} \frac{d\theta}{\sqrt{2} \cos\theta}$ by contour integration method. [7M]

8. a. Determine the linear fractional transformation that sends the points z=0, -i, 2i into the points $\omega = 5i, \infty, \frac{-i}{3}$ respectively. [8M]
   b. Find the number of different spanning trees for the simple graph K_4 [7M]