

Code No: 53007

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, February/March - 2016

MATHEMATICS-III

(Common to EEE, ECE, EIE, ETM, AGE)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

1.a) Evaluate $\int_0^1 \frac{x^4 dx}{\sqrt{1-x^2}}$, using β - Γ functions.

b) Prove that $\frac{d}{dx}(x^{-n} J_n(x)) = -x^{-n} J_{n+1}(x)$. [7+8]

2.a) Express $x^3 - 2x^2 + 4x - 4$ in terms of $P_n(x)$.

b) Evaluate $\int_{-1}^1 x^4 (1-x^2)^{-1/2} T_2(x) dx$. [8+7]

3.a) Show that the function defined by $f(z) = \frac{x^3(1+i) - y^3(1-i)}{(x^2 + y^2)}$ at $z \neq 0$, and $f(0) = 0$ is continuous and satisfies C.R equations at the origin, but $f'(0)$ does not exist.

b) Find the principal values of $(1+i)^{-i}$. [7+8]

4.a) Evaluate $\int_C |z|^2 dz$ around the square with vertices at (0, 0), (1, 0), (1, 1) and (0, 1).

b) Evaluate $\int_C \frac{ze^z dz}{(4z + \pi i)^2}$ where $C: |z| = 1$. [8+7]

5. Expand $\frac{1}{z^2 - 4z + 3}$ in the region:

a) $|z| < 1$

b) $1 < |z| < 3$

c) $|z| > 3$. [5+5+5]

6.a) Find the residue $\frac{z \sin z}{(z-\pi)^3}$ at $z = \pi$.

b) Evaluate using Residue theorem $\int_C \frac{e^{2z} dz}{(z-1)^2}$ where C is $|z|=2$.

c) Evaluate by residue theorem $\int_C \frac{(1+e^z) dz}{(z \cos z + \sin z)}$ where C is $|z|=1$. [5+5+5]

7.a) Find the image of the region bounded by the lines $x = 1$, $y = 1$, $x + y = 1$ under the transformation $w = z^2$.

b) Under the transformation $w = \frac{z-i}{1-iz}$ find the image of the circle $|z|=1$. [8+7]

8. Define the following and give one example for each.

a) Bipartite graph

b) Multiple edge

c) planar Graph

d) Adjacency matrix

e) Chromatic number.

[3+3+3+3+3]

