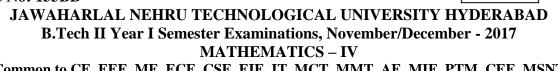
Code No: 133BD



(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, MMT, AE, MIE, PTM, CEE, MSNT) **Time: 3 Hours** Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(25 Marks)

[2]

[2]

1.a)	Show that $f(z) = z + \overline{z}$ is not analytic any where in the complex plane.	[2]
b)	Write Cauchy-Remainn equations in Polar form.	[3]
c)	Find the residues at the poles of the function $f(z) = \frac{1}{(z+1)(z+2)}$.	[2]

- Expand f(z) = Tanz in Taylor's series about the point z=0. d) [3]
- e) Define Bilinear transformation. Define for a complex function: i) Isolated Singularity ii) Removable Singularity. [3] f)
- If $f(x) = x^2$ in $[-\pi,\pi]$, find a_0 in Fourier series. **g**)
- State Fourier integral theorem. h) [3] Write the one dimensional Heat equation in steady state. i) [2]

j) Classify partial differential equation
$$\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0.$$
 [3]

PART-B

(50Marks)

- Determine p so that the function $f(z) = \frac{1}{2}\log(x^2 + y^2) + Tan^{-1}(\frac{px}{y})$ is analytic. 2.a)
- Find the analytic function f(z) = u + iv if $u v = e^{x} [\cos y \sin y]$. b) [5+5] OR
- Determine the analytical function whose real part is $x^3 3xy^2 + 3x^2 3y^2 = 1$. Also 3.a) find the harmonic conjugate of this real part.

b) Prove that
$$\left[\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right] |f(z)|^2 = 4 |f'(z)|^2$$
. [5+5]

- Using Cauchy integral formula, find $\int_{C} \frac{e^{2z}}{(z+1)^3} dz$, where C is the curve |z| = 2. 4.a)
- Evaluate $\int (x^2 iy^2) dz$ along a straight line from (0,0) to (0,1) and then from (0.1) to b) (2,1).[5+5] OR

5. Find Laurent's series of
$$\frac{z}{(z-1)(z-2)}$$
 about:
a) $|z| < 1$ b) $|z| > 1$ c) $1 < |z| < 2$ [10]
WWW.MANARESULTS.CO.IN

R16

6. Evaluate
$$\int_0^{2\pi} \frac{\cos 3\theta}{5 - 4\cos \theta} d\theta$$
. [10] **OR**

- 7. Find Mobius transformation that maps: a) $0,1,\infty$ into -5,-1,3, Find fixed points. b) $\infty, i, 0$ to $0, -i, \infty$.
- 8. Find the Fourier series of $f(x) = e^{-x}$ in the interval (0.2π) . Hence, deduce that $\frac{\pi}{2} \frac{1}{sinh\pi} = \sum_{n=2}^{\infty} \frac{(-1)^n}{n^2 + 1}$ **OR**

[5+5]

9.a) Find the Fourier series for $f(x) = x + x^2$ in $-\pi < x < \pi$.

b) Find the Fourier cosine transform of
$$e^{-x^2}$$
 [5+5]

10. Solve
$$\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y}$$
, $u(0, y) = 8e^{-3y}$ by the method of separation of variables. [10]

11. The ends of a uniform string of length 2l are fixed. The initial displacement is m y(x,0) = 3x(2l-x), 0 < x < 2l, while the initial velocity is zero, Find the displacement at any distance x from the end x=0 at any time 't'. [10]

---00000----

WWW.MANARESULTS.CO.IN