Roll No.						

Total No. of Pages: 02

Total No. of Questions: 09

B.Tech All (Sem. – 2) MATHEMATICS-II Subject Code: BTAM- 203-18 M Code: 76256 Date of Examination : 23-01-23

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION B & C have FOUR questions each, carrying EIGHT marks each.
- 3. Attempt any FIVE questions from SECTION B & C, selecting atleast TWO questions from each of these SECTIONS B & C.

SECTION-A

- 1. Answer the following:
 - a) Solve $y + px = x^4 p^2$
 - b) Solve (y px)(p 1) = p
 - c) Find the particular integral of $\frac{d^3y}{dx^3} + 4\frac{dy}{dx} = \sin 2x$
 - d) Solve $\frac{d^2x}{dt^2} + 5\frac{dx}{dt^2} + 6x = 0$ given $x(0) = 0, \frac{dx}{dt}(0) = 15$.
 - e) Solve $\frac{dy}{dx} + 2xy = x$.
 - f) Define harmonic function.
 - g) Find the residue at z = 0 of $z \cos \frac{1}{z}$.
 - h) State Liouville's theorem.
 - i) Find all the values of z such that $e^z = -2$.
 - j) Show that e^z is nowhere analytic.

SECTION-B

2. a) Solve
$$xy(1 + xy^2)\frac{dy}{dx} = 1$$

b) Solve $e^{4x}(p-1) + e^{2y}p^2 = 0$ M-76256

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3. Solve $x(1-x^2)\frac{dy}{dx} + (2x^2-1)y = x^3$

4. a) Using method of variation of parameters, solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^x \log x$.

- b) Solve y'' + 6y' + 13y = 0, y(0) = 3, y'(0) = -1.
- 5. Solve $x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$

SECTION-C

- 6. a) Evaluate $\oint_C \frac{e^z}{(z^2 + \pi^2)^2} dz$ where C is |z| = 4.
- b) Find Laurent's expansion of $f(z) = \frac{7z-2}{(z+1)z(z-2)}$ in region 1 < z+1 < 3. 7. If $\frac{(1+i)^{x+iy}}{(1-i)^{x-iy}} = \alpha + i\beta$, prove that one of the values oftan $-\frac{1}{\alpha} = \frac{1}{2}\pi x + y\log 2$.
- 8. Find the residue of $f(z) = \frac{z^3}{(z-1)^4(z-2)(z-3)}$ as its poles and evaluate $\oint_c f(z) dz$, where C is the circle |z| = 2.5circle |z| = 2.5.
- townhoated from the second sec 9. Find the analytic function whose real part is $e^{2x}(x\cos 2y - y\sin 2y)$.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.

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