Roll No. 2382300071

Total No. of Questions : 5] [Total No. of Printed Pages : 3

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B.Tech. III[rd] Semester (New Scheme) CSE

Examination, 2023-24

Engineering Mathematics-II

Paper - CS-301

Time : 3 Hours] **[Maximum Marks : 60**

Note :- Attempt all questions. All questions carry equal Marks.

Attempt any two from each question.

1. (a) Solve $(1 + y^2)\,dx = (\tan^{-1} y - x)\,dy$

(b) Using method of variation of parameters

P.T.O.

Solve $(D^2+4)\,y = 4\tan 2x$.

(c) Solve : $\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 9y = 40\sin 5x$

2. (a) Solve : $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} - y = 0$ given that $\left(x + \frac{1}{x}\right)$ is one integral.

(b) Solve : $\frac{d^2y}{dx^2} - 2\tan x\frac{dy}{dx} + 5y = e^x.\sec x$

(c) Solve : $(D^2+1)\,y = x^2.\,\text{Sin}\,2x$; $D \equiv \frac{d}{dx}$

3. (a) Solve : $x^2p^2 + y^2q^2 = z^2$

(b) Solve using lagrange's method $(mz - ny)p + (nx - lz)q = ly - mx$

(c) Solve : $(D^2 + D'^2)\,Z = x^2y^2$ where $D \equiv \frac{\partial}{\partial x}, D' \equiv \frac{\partial}{\partial y}$

4. (a) Find the analytic function $u + iv$ of which the real part is $u = e^x(x\cos y - y\sin y)$

(b) Evaluate $\int_0^{2+i} (\bar{z})^2 \, dz$, along the real axis to 2 and than vertically to $2+i$

(c) Find the order of each pole and residue at it of $\frac{1-2z}{z(z-1)(z-2)}$

6. (a) If $\vec{V} = x^2 z i - 2y^3 z^2 j + xy^2 z k$ find curl $\vec{V}$ at $(1, 2, 3)$

(b) Show that $\nabla^2 f(r) = f''(r) + \frac{2}{r} . f'(r)$

(c) Evaluate $\iint_S F.\hat{n} \, ds$ where $F = 18 zi - 12j + 3yk$ and S is part (i.e. surface) of the plane $2x + 3y + 6z = 12$ which is in the first octant.

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