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I/IV B. Tech. DEGREE EXAMINATIONS, AUGUST - 2024

Second Semester

CE / AM / CS / CYS / DS / EC / EEE / ME

MATHEMATICS - II

Time : **Three Hours** Maximum : **70** Marks

Answer ONE Question from each Unit.

All Questions carry equal marks. **5x14=70 M**

UNIT - I

1. a) Define particular solution. Solve $(D^2-2D+4)y = 0$.

   b) Solve $(D^3 - 7D^2 + 14D - 8)\ y = e^x\ cos2x + x\sin x$.

(OR)

2. a) Using Method of Variation Parameters solve $(D^2 - 2D + 2)y = e^x \operatorname{Tan} x$.

   b) Write different types of particular integrals with example.

UNIT - II

3. a) Solve $(x+1)^2 \frac{d^2y}{dx^2} - 3(x+1)\frac{dy}{dx} + 4y = x^2 + x + 1$.

   b) Define Simultaneous - Linear Equations with example.

(OR)

4. Solve the Differential Equation $x^2 \frac{d^2y}{dx^2} - 3x\frac{dy}{dx} + 5y = x^2 \sin(\log x)$.

UNIT - III

5. a) Solve $(mz - ny)\ p + (nx - lz)\ q = 1y - mx$.

   b) Explain the procedure of Homogenous Partial Differential Equations.

(OR)

6. a) Solve $p^2 + q^2 = pq$.

   b) Solve $(D^2+DD^1-6D^{1^2})\ z = \operatorname{Cos}(2x+y)$.

P.T.O.

UNIT - IV

7. a) Find the directional derivative of $2xy + z^2$ at (1, -1, 3) in the direction of $\bar{i} + 2\bar{j} + 3\bar{k}$.

   b) Define Divergence, Gradiant and Curl with examples.

(OR)

8. Show that $grad\ div\ \bar{F} = CurlCurl\,\bar{F} + \nabla^2 \bar{F}$.

UNIT - V

9. Using Green's theorem for $\int_C [(y - \sin x)\,dx + \cos x\,dy]$ where c is the plane triangle enclosed by the lines $y = 0$, $x = \frac{\pi}{2}$ and $y = \frac{2x}{\pi}$.

(OR)

10. Verify Stoke's Theorem for the vector field F = (2x-y)I - yz^2J - y^2zK over the upper half surface of $x^2 + y^2 + z^2 = 1$, bounded by its projection on the xy - plane.