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Course Code: AHSD08



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech II SEMESTER CIE - I EXAMINATIONS MAY - 2024

Regulation: BT23

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

Time: 2 Hours

(COMMON TO ALL BRANCHES)

Max Marks: 20

Answer any FOUR questions

All parts of the question must be answered in one place only

1. (a) Check whether the given differential equation is exact or not and find the solution
$$x^3 \sec^2 y \frac{dy}{dx} + 3x^2 \tan y = \cos x$$

[BL: Apply| CO: 1|Marks: 2]

(b) Solve the differential equation $(1 + e^{\frac{x}{y}})dx + e^{\frac{x}{y}}(1 - \frac{x}{y})dy = 0$ to obtain the general solution.

[BL: Apply| CO: 1|Marks: 3]
2. (a) Solve the following differential equation $e^x \frac{dy}{dx} = 2xy^2 + ye^x$

[BL: Apply| CO: 1|Marks: 2]

(b) Solve the given first order differential equation $(x^4 e^x - 2mxy^2)dx + 2mx^2 y dy = 0$

[BL: Apply| CO: 1|Marks: 3]
3. (a) Apply the method of variation of parameters to solve $(D^2 - 2D)y = e^x \sin x$

[BL: Apply| CO: 2|Marks: 2]

(b) Find the general solution of $y^{1111} + 8y^{11} + 16y = 0$.

[BL: Apply| CO: 2|Marks: 3]
4. (a) Using the method of variation of parameters, solve $(D^2 - 6D + 9)y = \frac{e^{3x}}{x^2}$

[BL: Apply| CO: 2|Marks: 2]

(b) Solve the differential equation $(D^2 + 4)y = 96x^2 + \sin 2x - k$.

[BL: Apply| CO: 2|Marks: 3]
5. (a) Form the partial differential equation by eliminating the arbitrary function from
 $z = f(x + ct) + g(x - ct)$

[BL: Apply| CO: 3|Marks: 2]

(b) Form a partial differential equation by eliminating a, b, c from $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

[BL: Apply| CO: 3|Marks: 3]

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