

3 a. Solve
$$(2x-1)2 \frac{cr}{dx^2} + (2x-1)\frac{dy}{dx} - 2y = 8x' - 2x + 3$$
. (06 Marks)

b. Solve
$$xy(\frac{dy}{dx})$$
 (05 Marks)
 (05 Marks)

c. Solve $x^2 (y - px) - p^2 y$ by reducing into Clairaut's form and using the substation $X = x^2$ and Y = (05 Marks)

OR

- a. Solve $x^{-1}y'' xy' + 2y = x \sin(\log x)$. 4 (06 Marks)
 - Obtain the general solution of the differential equation $p^2 + 4x'p-12x^4y = 0$. (05 Marks)
 - Obtain the general and singular solution of y = 2px + p'y. c. (05 Marks)

Module-3

a. Form the partial differential equation by eliminating the arbitrary function from the relation 5 Z = y f(x) + x g(y).(06 Marks)

Solve $\frac{1}{axay} = x \sin y$ for which $\frac{z}{O^1} = -2\sin y$ when x 0 and z 0 when y is an odd b. multiple of n/2. (05 Marks)

Derive one dimensional wave equation (05 Marks) c.

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Second Semester B.E. Degree Examination, June/July 2019 Engineering Mathematics _ II

Time: 3 hrs.

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- a. Solve $(D^2 4D + 4)y = e^{2t} + \cos 2x + 4$ by inverse differential operator method. 1 (06 Marks)
 - b. Solve $\frac{d^2y}{dx} 2\frac{dy}{dx} + Sy e^2 x \sin x$ by inverse differential operator method. (05 Marks)
 - c. Using the method of undetermined coefficients, solve yff 3y' + 2y = +ex. (05 Marks)

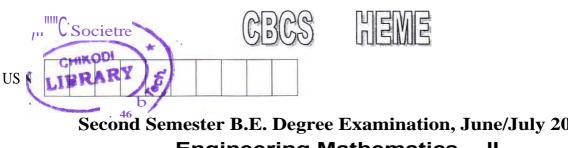
OR

2 a. Solve $\int_{dx}^{cry} 2\frac{dy}{dx} + y = xex \sin x$ by inverse differential operator method. (06 Marks) b. Solve $(\mathbf{D}^3 \mathbf{6D}^2 + \mathbf{I} \mathbf{1D} - \mathbf{6})\mathbf{y} = \mathbf{e}^{-2}\mathbf{x} + \mathbf{b}\mathbf{y}$ inverse differential operator method. (05 Marks) c. Solve- $y'' - 2y' + y = _$ by method of variation of parameters. (05 Marks)

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Max. Marks: 80

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OR Form a partial differential by eliminating the arbitrary function (I) from the relation ${}^{4)(x^{2} + y^{2} + z^{2}, z^{2} - 2xy) = 0$. (06 Marks) 6 b. Solve $\frac{a^2z}{ax^2} + 4z = 0$, given that when x = 0, $z = e^{111}$ and $\frac{az}{ax} = 2$ (05 Marks) c. Determine the solution of the heat equation $\frac{\mathbf{a}\mathbf{u}}{\mathbf{u}} = c^2 \frac{\mathbf{a}^{\underline{211}}}{\mathbf{b}^2}$ by the method of separation of variables for the constant K is positive. (05 Marks) **Module-4** 24 7 a. Evaluate if (xy + e) dy dx(06 Marks) 4a 2\ ax dydx by changing the order of integration. b. Evaluate (05 Marks) $0 x^2 / 4a$ Obtain the relation between the beta and gamma function in the form С $\mathbf{p}(\mathbf{m},\mathbf{n}) = \frac{\underline{km} - \mathbf{l}(\mathbf{0})}{\mathbf{l}(\mathbf{n}\mathbf{i} + \mathbf{n})}$ (05 Marks) OR a. Evaluate fJe 4,2 dxdy by changing into polar coordinates. 8 (06 Marks) Evaluate $\int_{J}^{x \times} fe^{-Y} dz dy dx$ (05 Marks) $\int_{0}^{1} \frac{x^{2}}{-x^{4}} dx x \frac{y}{-x^{4}} \int_{0}^{1} \frac{y}{-x^{4}} dx x^{4} = \frac{y}{-x^{4}}$ c. Using beta and gamma function, prove that (05 Marks) 4-\12 **Module-5** 9 a. Find L (06 Marks) , where gt + 2n = f(t), then prove that $L\{f(t) = \frac{1}{4}an h$ If f(t) Its 2 (05 Marks) c. Find $\mathbf{r}^{i} \left| \frac{S}{s^{2} \pm a^{2} / 2} \right|$ using convolution theorem. (05 Marks) OR a. Express $f(t) = \begin{vmatrix} 0 < t < 1 \\ t & 1 < t < 2 \end{vmatrix}$ in term of unit step function and hence find its Laplace 10 transform. (06 Marks) Find L- $\frac{s+5}{s^2-6s+13}$ b. (05 Marks) Employ the Laplace transform to solve the differential equation y''(t) + 4y'(t) + 4y'(t) = e'with the initial condition AO = 0 and y'(0) = 0. (05 Marks)

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