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B.E. Third Semester (Branch: ME, EE, CV, EC, AE)

MID SEMESTER EXAMINATION

Date/Day : 23/08/2014, Saturday   **Time : 10:30 am to12:00 pm**
Subject Name: Differential equation &   **Subject code:CC301A**
Integral transform   **Max. Marks: 30**

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate clearly, the options you attempt along with its respective
   question number.
5) Use the last page of main supplementary for rough work.

Q-1 (a) Solve $\frac{d^2y}{dt^2} - 5\frac{dy}{dt} + 6y = e^{4t}$ [05]

(b) Solve (i) $L(e^{-3t}\sin^2 t)$ (ii) $L^{-1}(\frac{S+7}{S^2+2S+2})$ [05]

Q-2 (a) Solve $(xy-2y^2)\, dx - (x^2 - 3xy)\, dy = 0$.   [05]

(b) Solve $y''' - y' = 2x^2 + e^{2x} + 4\sin x$ by Method of Undetermined   [05]
Coefficients

OR

(a) Solve the differential equation $\frac{dy}{dx} = \frac{y^3}{e^{2x}+y^2}$.   [05]

(b) Solve $(D^2 - 1)y = 2(1 - e^{-2x})^{-\frac{1}{2}}$ by variation of parameters.   [05]

Q-3 (a) Solve the initial value problem $\frac{d^3y}{dt^3} + 2\frac{d^2y}{dt^2} - \frac{dy}{dt} - 2y = 0$,   [05]
$y(0) = 1, y'(0) = 2, y''(0) = 2$ by Laplace transform.

(b) Find the Fourier series of f(x) = $\frac{(\pi-x)^2}{4}$ in the interval 0 to 2π.   [05]

OR

(a) Using convolution theorem obtain the value of $L^{-1}(\frac{s-2}{S\,(S^2-4\,s+13)})$.   [05]

(b) Find the Fourier series with period 3 to represent f(x) = $2x - x^2$ [05]
in the range (0, 3).

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