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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) $L^{-1}\left(\frac{S+7}{S^2+2S+2}\right)$ [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

<div align="center">OR</div>

      (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]

<div align="center">OR</div>

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

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

<div align="center">* *BEST OF LUCK * *</div>