VIVEKANANDA COLLEGE OF ENGINEERING AND TECHNOLOGY
[A unit of Vivekananda Vidyavardhaka Sangha, Puttur®]
Affiliated to Visvesvaraya Technological University
Approved by AICTE New Delhi & Govt of Karnataka

QUESTION BANK

Transform Calculus, Fourier series and Numerical Techniques (18MAT31)

Module-1 Inverse Laplace Transform

1. Find i) $L^{-1}\left\{\frac{s^2+4}{s(s+4)(s-4)}\right\}$ ii) $L^{-1}\left\{\frac{2s^2-6s+5}{s^3-6s^2+11s-6}\right\}$ iii) $L^{-1}\left\{\frac{3s+2}{s^2-s-2}\right\}$
2. Evaluate i) $L^{-1}\left\{\frac{5s+3}{(s-1)(s^2+2s+5)}\right\}$ ii) $L^{-1}\left\{\frac{7s+4}{4S^2+4S+9}\right\}$ iii) $L^{-1}\left\{\log\left(\frac{s(s+5)}{(s^2+25)(s-7)}\right)\right\}$ iv) $L^{-1}\left\{\tan^{-1}\left(\frac{2}{s^2}\right)\right\}$
   v) $L^{-1}\left\{\frac{1}{s(s^2+a^2)}\right\}$ vi) $L^{-1}\left\{\frac{s+1}{S^2+6S+9}\right\}$ vii) $L^{-1}\left\{\cot^{-1}\left(\frac{s}{a}\right)\right\}$
3. Find $L^{-1}\left\{\frac{s}{(s-1)(s^2+4)}\right\}$ using convolution theorem
4. Apply convolution theorem to find $L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$
5. Apply convolution theorem to find the inverse Laplace transform of $\frac{4}{(s^2+2s+5)^2}$
6. Using convolution theorem find $L^{-1}\left\{\frac{s}{(s^2+a^2)^2}\right\}$
7. Solve $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} - 4y = 2e^{-x}$ given $y(0) = y'(0) = 1$, using Laplace transform
8. Solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 2y = 5\sin t$ given $y(0) = y'(0) = 0$, using Laplace transform
9. Solve using Laplace transform $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^{2x}$ given $y(0) = 2$, $y'(0) = -1$
10. Using Laplace transform solve $y'' + 5y' + 6y = 5e^{2t}$ given $y(0) = 2$, $y'(0) = 1$

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