Tutorial 10

NOTE: Kindly refer to table I and II on page no. 559 and 561 respectively.

Q.1.

For the following functions, specify the range of σ_0 for which the one-sided Laplace transform exists: $(a)\ t+4$; $(b)\ (t+1)(t-2)$; $(c)\ e^{-t/2}u(t)$; $(d)\ \sin 10t\ u(t+1)$.

Q.2.

Obtain an expression for $\mathbf{G(s)}$ if $g(t)$ is given by $(a)\ [5u(t)]^2 - u(t)$; $(b)\ 2u(t) - 2u(t-2)$; $(c)\ tu(2t)$; $(d)\ 2e^{-t}u(t) + 3u(t)$.

Q.3.

Determine the inverse transform of $\mathbf{V(s)}$ equal to $(a)\ \dfrac{\mathbf{s}^2+2}{\mathbf{s}} + 1$;

$(b)\ \dfrac{\mathbf{s}+8}{\mathbf{s}} + \dfrac{2}{\mathbf{s}^2}$; $(c)\ \dfrac{\mathbf{s}+1}{\mathbf{s}(\mathbf{s}+2)} + \dfrac{2\mathbf{s}^2-1}{\mathbf{s}^2}$; $(d)\ \dfrac{\mathbf{s}^2+4\mathbf{s}+4}{\mathbf{s}}$.

Q.4.

Obtain the time-domain expression which corresponds to each of the following s-domain functions: $(a)\ 2\dfrac{3\mathbf{s}+\frac{1}{2}}{\mathbf{s}^2+3\mathbf{s}}$; $(b)\ 7 - \dfrac{\mathbf{s}+\frac{1}{\mathbf{s}}}{\mathbf{s}^2+3\mathbf{s}+1}$;

$(c)\ \dfrac{2}{\mathbf{s}^2} + \dfrac{1}{\mathbf{s}} + \dfrac{\mathbf{s}+2}{\left(\frac{\mathbf{s}}{2}\right)^2+4\mathbf{s}+6}$; $(d)\ \dfrac{2}{(\mathbf{s}+1)(\mathbf{s}+1)}$; $(e)\ \dfrac{14}{(\mathbf{s}+1)^2(\mathbf{s}+4)(\mathbf{s}+5)}$.