

(Section 4.6, 7.1, 7.2)

Q1. Solve (using Variation of Parameters) $y'' + y = \sin x$

Ans : $y = c_1 \cos x + c_2 \sin x - \frac{1}{2} x \cos x$

Q2 .Find $L[f(t)]$, $f(t) = e^{-t} \sin t$ Ans : $\frac{1}{s^2 + 2s + 2}$

Q3. Find $L^{-1} \left[\frac{-2s+6}{s^2+4} \right]$ Ans : $-2\cos 2t + 3 \sin 2t$

Q4. Solve the given differential equation by using Laplace transform:

$y'' - 6y' + 13y = 0$ $y(0) = 0$, $y'(0) = -3$ Ans : $(-3 e^{3t} \sin 2t) / 2$

Q5. Evaluate $L^{-1} \left\{ \frac{s^2+6s+9}{(s-1)(s-2)(s+4)} \right\}$ Ans: $-\frac{16}{5} e^t + \frac{25}{6} e^{2t} + \frac{1}{30} e^{-4t}$

Q6. Solve $y'' + 4y' + 6y = 1 + e^{-t}$, $y(0) = 0$, $y'(0) = 0$ Ans: $\frac{1}{6} + \frac{1}{3} e^{-t} - \frac{1}{2} e^{-2t} \cos \sqrt{2} t - \frac{\sqrt{2}}{3} e^{-2t} \sin \sqrt{2} t$