## Assignment questions on Inverse Laplace transform

1. Inverse Laplace transform of $\frac{e^{-11s}}{s^3}$ =________
2. $L^{-1}\left[\frac{1}{(s+2)^5}\right] =$ _____.
3. $L^{-1}\left[\frac{e^{-2s}}{s}\right] =$ _____
4. $L^{-1}\left[\frac{1}{(s+2)^5}\right] =$ _____.
5. $L^{-1}\left[\frac{s}{(s^2+a^2)^2}\right] =$ ____
6. $L^{-1}[cot^{-1}(s+1)] =$ _____
7. Obtain the inverse Laplace transform of the following functions
   (i) $\frac{1}{(s-1)(s^2+4)}$ (ii) $\frac{4s+5}{(s+1)^2(s+2)}$ (iii) $\frac{s-3}{s^2-6s+2}$ by partial fractions.
8. $L^{-1}\left[\frac{3s+5\sqrt{2}}{s^2+8}\right]$
9. $L^{-1}\left[\frac{se^{-\frac{s}{2}}+\pi e^{-s}}{s^2+\pi^2}\right]$
10. $L^{-1}\left[\frac{3s+7}{(s-3)(s+1)}\right]$
11. $L^{-1}\left[\frac{2s-1}{s^2+2s+17}\right]$
12. Find (i) $L^{-1}\left[cot^{-1}\left(\frac{2}{s+1}\right)\right]$ (ii) $L^{-1}\left[e^{-4s}\left(\frac{s+3}{s^2+4s+13}\right)\right]$
13. Obtain Inverse Laplace transform of (i) $\frac{2s+1}{s^2+3s+1}$ (ii) $\frac{s^3}{s^4-1}$
14. Using convolution theorem obtain the inverse Laplace transform of $\frac{s}{(s^2+4)^2}$ and $\left[\frac{1}{(s^2+a^2)^2}\right]$
15. Obtain the inverse Laplace transform of $\frac{1}{s^2(s^2-9)}$ by applying convolution theorem.
16. Using the convolution theorem, obtain the inverse Laplace transform of $\frac{1}{(s+1)(s^2+4)}$
17. Using convolution obtain the inverse Laplace transform of $\frac{s^2}{(s^2+a^2)\,(s^2+b^2)}$
18. Using convolution obtain the inverse Laplace transform of $\frac{1}{s(s^2+a^2)}$
19. Solve initial value problem $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 4y = e^{-t}, y(0) = 0,\ y'(0) = 0,$
20. Solve using Laplace transform : $\frac{d^2y}{dt^2} - 3\frac{dy}{dt} + 2y = 1 - e^{2t}, y(0) = 1,\ y'(0) = 1,$
21. Solve $\frac{d^2y}{dt^2} + \frac{dy}{dt} = t^2 + 2t, y(0) = 4,\ y'(0) = -2$, using Laplace transform.
22. Solve using Laplace transform $\frac{d^2y}{dt^2} + y = t$, given $y(0) = 1,\ y'(0) = -2$.
23. Apply the Laplace transform to compute the solution $q(t)$of the differential equation $\frac{d^2q}{dt^2} + 5\frac{dq}{dt} + \frac{25}{2}q = 50$ with $q(0) = q'(0) = 0$.