Assignment Sheet - 10

1. Use Laplace transform to solve the initial value problem $\frac{df}{dt} + 2f = \cos t$, $f(0) = 1$.

2. Solve the system $\frac{dx}{dt} = 2x - 3y, \frac{dy}{dt} = y - 2x, x(0) = 2, y(0) = 1$ by the Laplace transform.

3. Use Laplace transform to solve $\frac{d^3f}{dt^3} + \frac{d^2f}{dt^2} = 3e^{-4t}, f(0) = 0, f'(0) = -1, f''(0) = 1$.

4. Use Laplace transform to solve the partial differential equation $\frac{\partial f}{\partial x} - 2\frac{\partial f}{\partial t} = y,\ f(x, 0) = 5e^{-x}$.

5. Use Laplace transform to find the solution of $\frac{\partial u}{\partial t} - 2\frac{\partial^2 u}{\partial x^2}, u(0, t) = 0 = u(5, t), u(x, 0) = 10 \sin 4\pi x$.