1. (a) Find the Laplace transform \( X(s) \) and the corresponding ROC for the function \( x(t) \) below: (5 points)
\[ x(t) = \delta(t) \]
(b) Find the Laplace transform \( X(s) \) for the function \( x(t) \) given below. (5 points)
\[ x(t) = u(t) \]
(c) Find the Laplace transform \( X(s) \) for the function \( x(t) \) given below. (5 points)
\[ x(t) = e^{-3t}u(t) \]

2. Consider the circuit below:

(a) Find the differential equation relating the output voltage \( y(t) \) across R and the input voltage \( x(t) \). (10 points)
(b) Find the solution of the differential equation. (Derive the solution). (20 points)
(c) Find the step response of the circuit. (5 points)
(d) Find the impulse response of the circuit. (5 points)