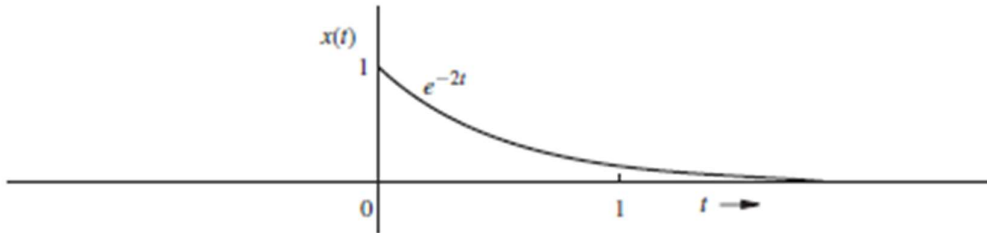


1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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Q.1(a) Sketch the following signals: [2]

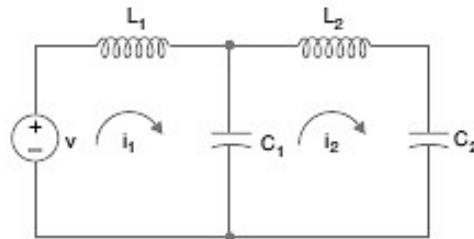
- (a) $u(t-5)-u(t-7)$
- (b) $t^2[u(t-1)-u(t-2)]$

Q.1(b) An exponential function $x(t) = e^{-2t}$ shown in Fig. is delayed by 1 second. Sketch and mathematically describe the delayed function. Repeat the problem with $x(t)$ advanced by 1 second. [3]

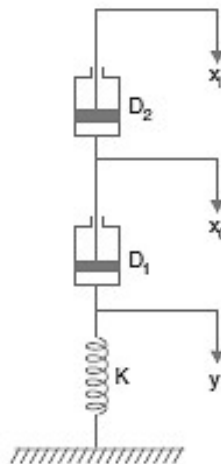


Q.2(a) Define an analogue system. [2]

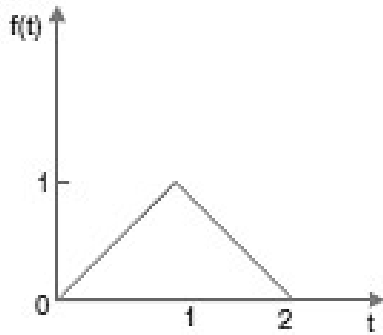
Q.2(b) Draw the mechanical analogue system of the electrical circuit shown in Fig. [3]



Q.3 Draw the electric analogue and derive the transfer function of a mechanical lead network as shown in Fig., where x_i = input displacement, x_o = output displacement, y = displacement of the spring; D_1, D_2 = viscous damping coefficients and K = compliance of the spring. [5]



Q.4(a) Determine the Laplace transform of the triangular waveform $f(t)$ shown in Fig [2]



Q.4(b) Determine the Fourier transform of $e^{at} \sin(\omega_0 t), t \geq 0$. [3]

Q.5(a) Find the Laplace inverse of $\left[\frac{s+4}{2s^2+5s+3} \right]$ [2]

Q.5(b) A triangular pulse shown in Fig. is applied as input to the RL series circuit of Fig. below. [3]
Determine the current response $i(t)$.

