Learning: Answer all questions of Part – A.
Answer five questions from Part – B.

PART – A

1. Explain about various types of energy sources for networks. 3
2. Draw the transform networks for inductance and capacitance. 2
3. What is the L.T. of f(t – T) u(t – T) and tf(t) ? 2
4. Determine the L.T. of the waveform shown. 3

5. Explain the time shifting property of L.T. 3
6. State the differentiation theorem of Fourier transform. 3
7. Find the Fourier transform of \( \sin \omega_o t \) and \( \cos \omega_o t \). 2
8. Find \( L^{-1} \left( \frac{2s}{(s + 1)(s^2 + 2s + 2)} \right) \). 3
9. What is a positive real function? Write down the properties of PR functions. 2
10. Check whether the function \( F(s) = \frac{s^2 - 1}{-s + 8} \) is a PR function or not. 2

(This paper contains 3 pages)
11. Find $i(t)$ for $t > 0$ in the figure shown below. The initial conditions of inductor and capacitor are as shown.


13. Find the transfer function $H(s) = I_2(s)/V(s)$ for the following circuit. Also find the impulse response $h(t)$.

14. Determine the Fourier series of the function given.
15. Determine the Fourier transform of the triangular waveform shown.

16. a) Explain briefly test procedure for positive real function.
    b) Is the following polynomial Hurwitz?
       \[ p(s) = s^6 + 4s^5 + 8s^4 + 20s^3 + 19s^2 + 16s + 12 \]

17. Synthesis the driving point impedance function using foster first form of realization.

\[ z(s) = \frac{(s + 1)(s + 3)(s + 5)}{s(s + 2)(s + 4)(s + 6)} \]