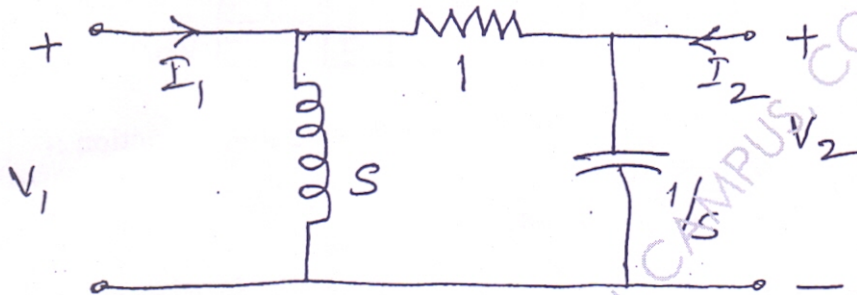**QP Code : 4898**

(3 Hours) [Total Marks : 80

N.B. : (1) Question no. **1** is **compulsory**.
(2) Attempt **any three** questions from **remaining** questions.
(3) Figures to the right indicate full marks.
(4) Assume **suitable data** if **required**.

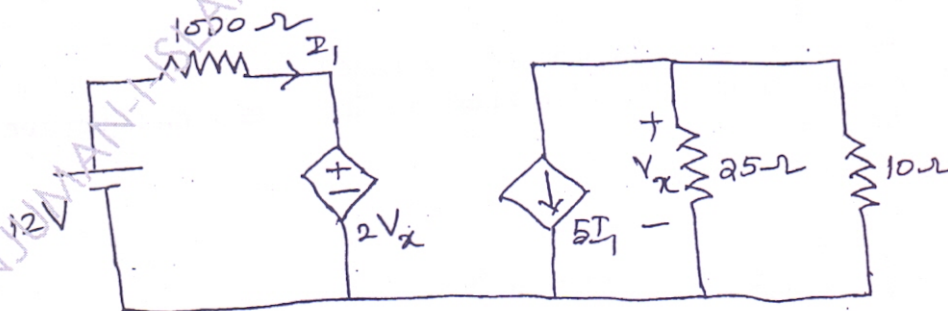1. (a) Determine y-parameters for the network. 5

(b) The constants of a transmission line are R = 6 Ω/km, L = 2.2 mH/Km, 5
G = 0.25×10⁻⁶ ℧/km, C = 0.005×10⁻⁶ F/km
Determine the characteristic impedeance, propagation constant and 5
attenuation constant at 1 KHZ.

(c) Test if $F(S) = 2S^6 + 4S^5 + 6S^4 + 8S^3 + 6S^2 + 4S + 2$ is a Hurwitz polynomial. 5

(d) The current I(S) in a network is given by $I(S) = \dfrac{2(S)}{(S+1)(S+2)}$. Plot the pole- 5
zero pattern in the S-plane and hence obtain i(t).

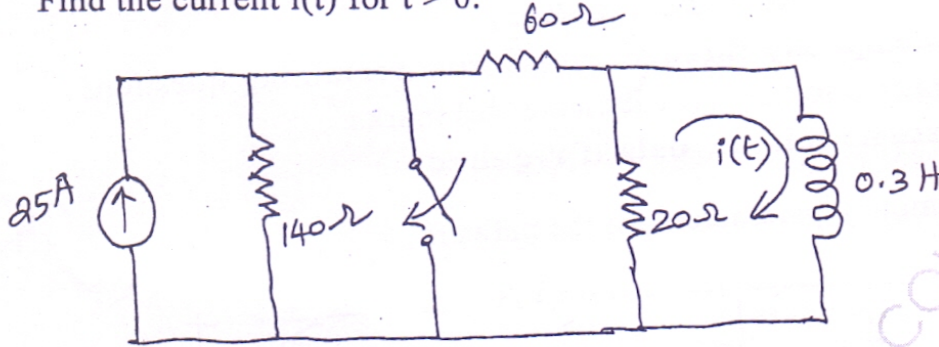2. (a) Find the current through 10Ω resistor using Norton's theorem. 10

[**TURN OVER**
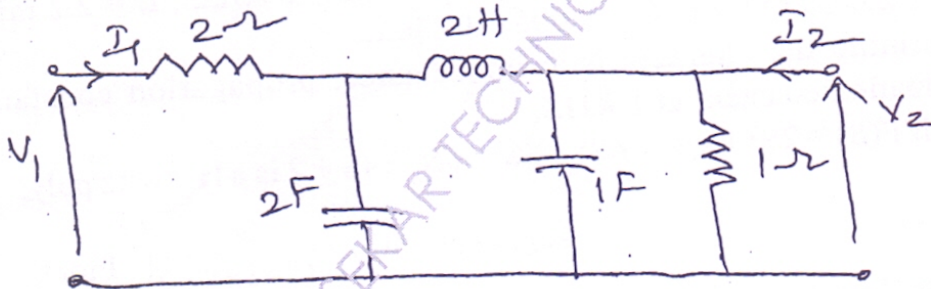
(b) Find the current i(t) for t > 0.　　　10

3. (a) Find Foster I and Foster II forms of the driving point function :-　　10

$$F(S) = \frac{S^3 + 9S^2 + 23S + 15}{S(S^3 + 12S^2 + 44S + 48)}$$

(b) Determine ABCD parameters of the network shown :-　　10

4. (a) A transmission line has a characteristic impedance of 50 Ω and terminated　　10
in a load $Z_L = 75 - j100\Omega$. Using switch chart, find
   (i) VSWR
   (ii) Reflection coefficient
   (iii) input impedance at a distance 0.1λ from the load
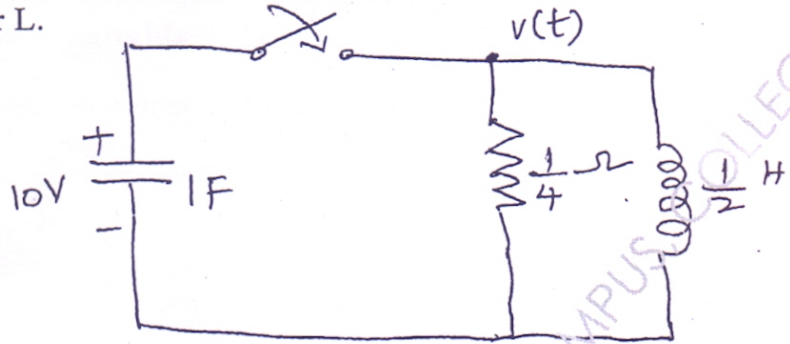   (iv) location of first voltage maximum and first voltage minimum from
      the load.

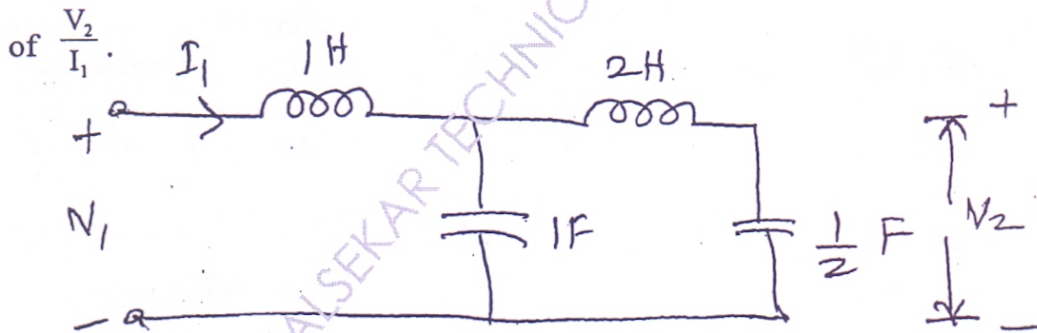(b) Find I_2 using mesh analysis.　　10
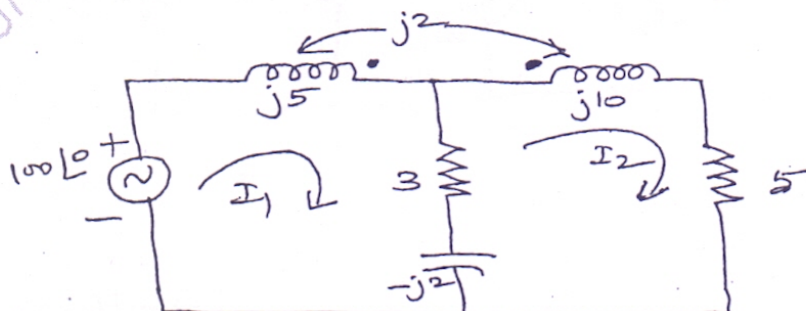
5. (a) For the network shown, capacitor C has an initial voltage $V_c(-0)$ of 10V and at the same instant, current in the inductor L is zero. The switch is closed at time t = 0. Obtain the expression for voltage V(t) across the inductor L.   **10**

(b) For the network shown, determine $\dfrac{V_1}{I_1}$ and $\dfrac{V_2}{I_1}$. Plot the poles and zeros   **10**

of $\dfrac{V_2}{I_1}$.

6. (a) For the network shown, find the equivalent T - network.   **10**
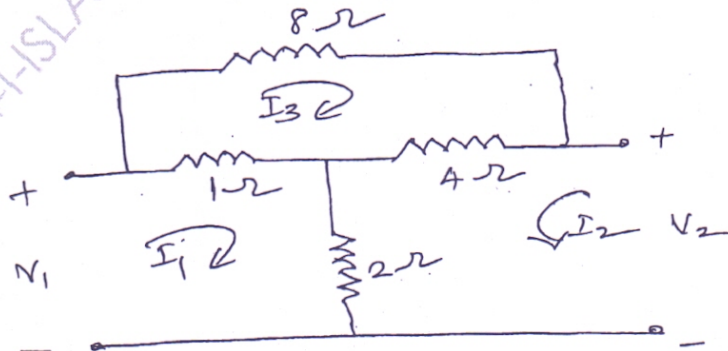
(b) Derive condition for recipro city in terms of Z parameters and symmetry in terms of h parameters.   **10**

JP-Con. : 12226-15.