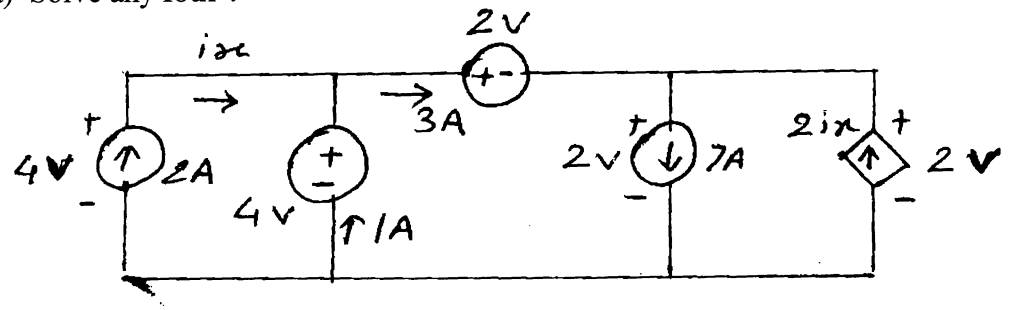
Con. 6506-13. **LJ-10415**

(3 Hours) **[Total Marks : 100**

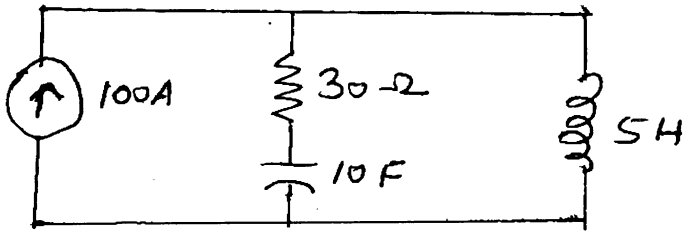
N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** out of remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **suitable** data if **necessary**.

1. (a) Solve any **four** :– **20**

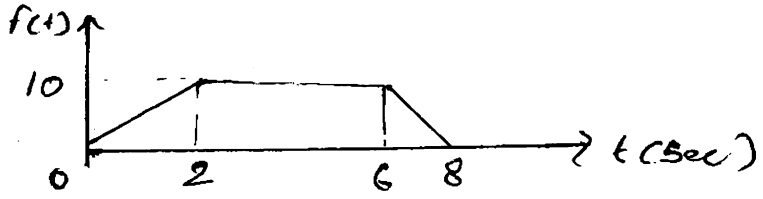


Show that the algebric sum of the five absorbed power values in **figure** is zero.

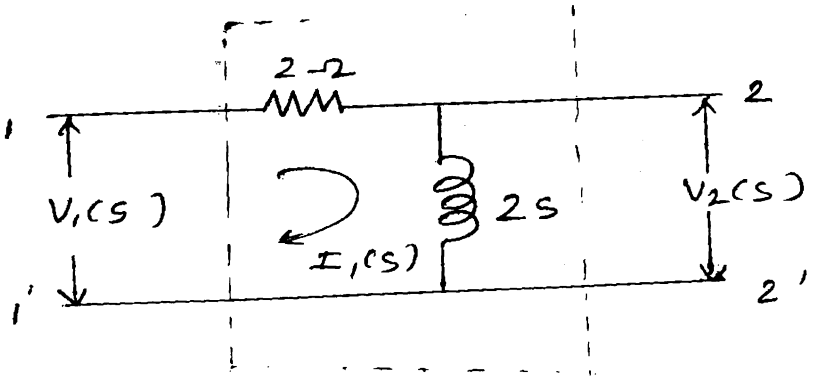
(b) Draw the dual circuit of **figure** shown below :-



(c) Use step function to write the expression for the following function :-



(d) For the network shown in **figure** obtain the transfer function G_{21} and Z_{21} and the driving point impedance $Z_{11}(s)$.



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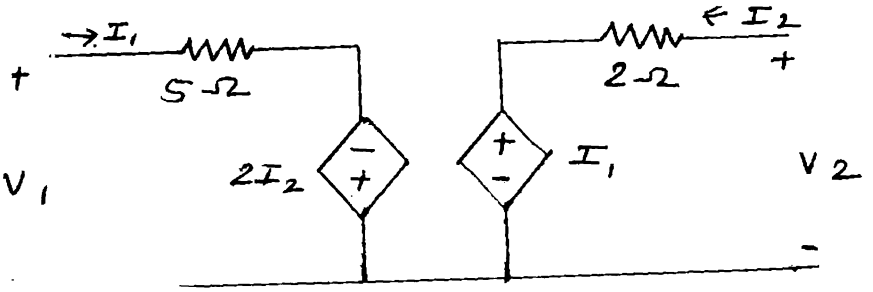
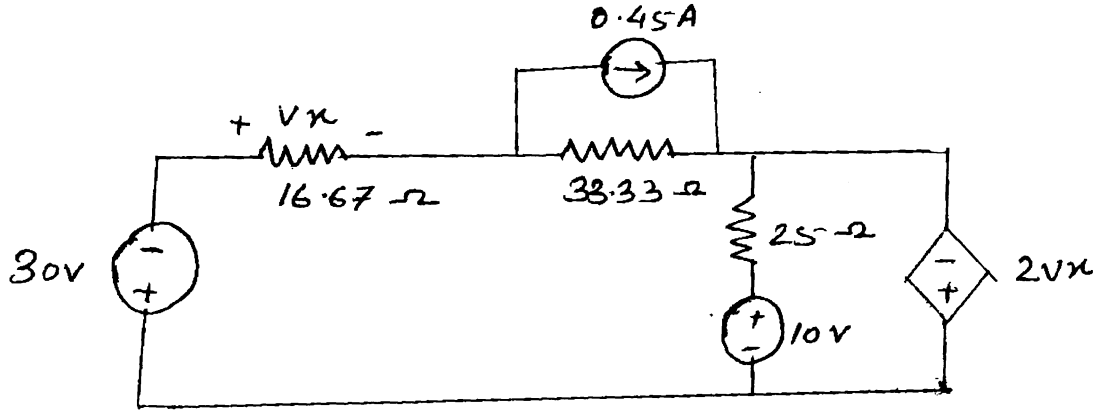
(e) Find the z parameters of the two part Network in **figure**.

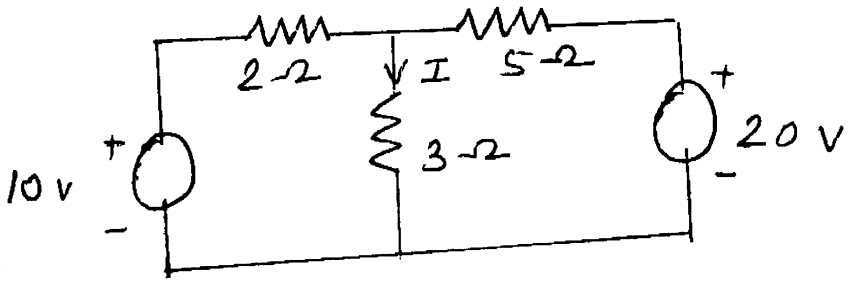


(f) Define properties of positives real function.

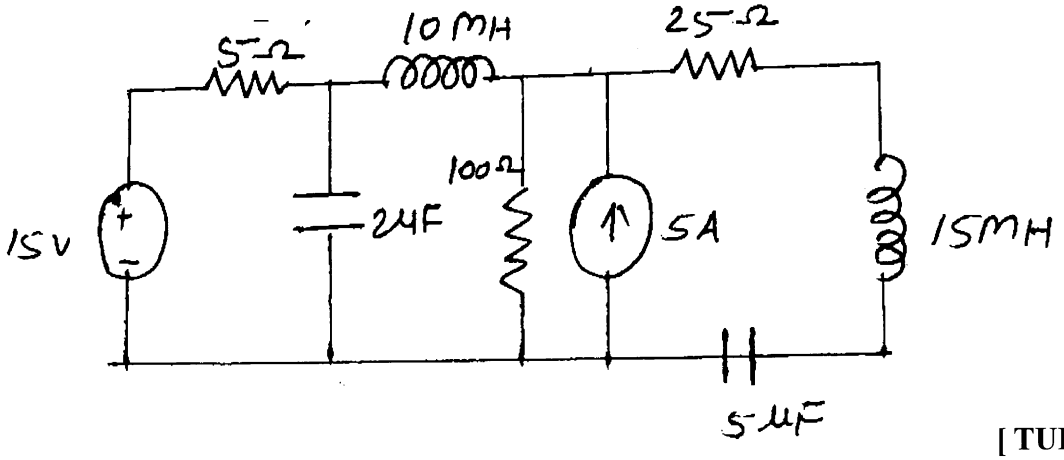
2. (a) Use mesh analysis to find Vx in the circuit shown in **figure**. **10**



(b) Define statement of Millmans theorem also calculate current I shown in **figure** using Millman's **10**



3. (a) For the electrical network shown in **figure** draw the topological graph and write its incidance Matrix, He-set Matrix, Link current transformation equation and branch currents. **10**



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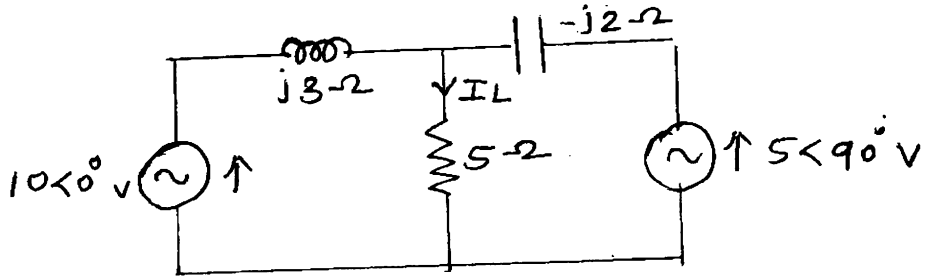
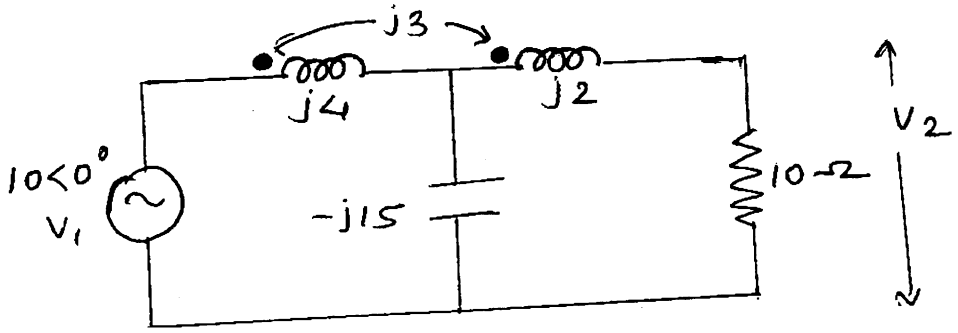
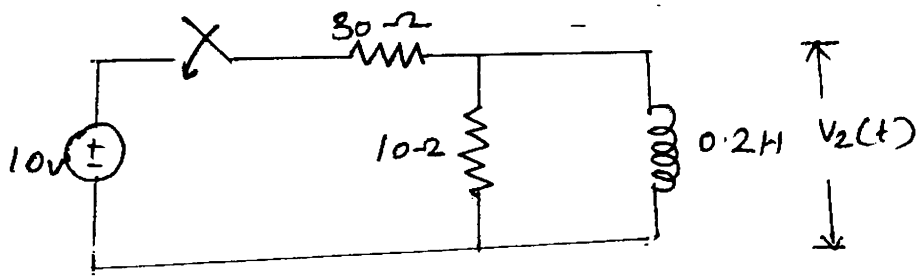
(b) For the circuit shown in **figure** determine the load current IL by using Norton's theorem. **10**



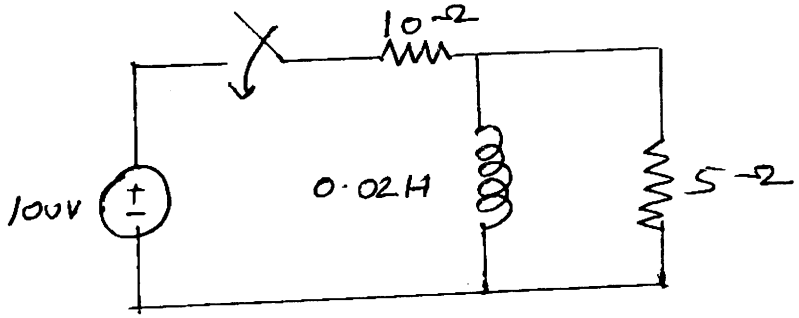
4. (a) Find the voltage across the 10Ω resistor for the network shown in **figure.** **10**



(b) The switch in the circuit shown in **figure** is closed at t = 0. Find $V_2(t)$ for all $t \geq 0$ by time domain method. Assume zero initial current in the inductance. **10**



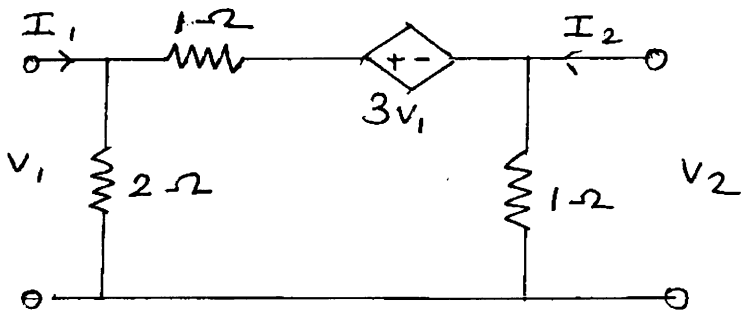
5. (a) In the two-mesh network of **figure** the current which result when the switch is closed. **10**



(b) For the given network function draw the pole zero diagram and hence obtain the time domain response i(f) **10**

$$I(s) = \frac{5s}{(s+1)\left(s^2 + 4s + 8\right)}$$

6. (a) Determine Z and Y parameters for the circuit shown in **figure**. **10**



(b) Test ff the following polynomial for Hurwitz property– **10**

(i) $F(s) = s^5 + s^4\ 6s^3 + 4s^2 + 8s + 3$

(ii) $F(s) = s^4 + s^3 + 2s^2 + 4s + 1$

7. (a) The driving point impedance of an LC network is given by $z(s) = z(s) = \frac{s^4 + 4s^2 + 3}{(s^3 + 2s)}$. **10**

Determine the second Cauer form of the network.

(b) Find the first Foster form of the network. **10**

$$z(s) = \frac{2s^3 + 8s}{s^2 + 1}.$$