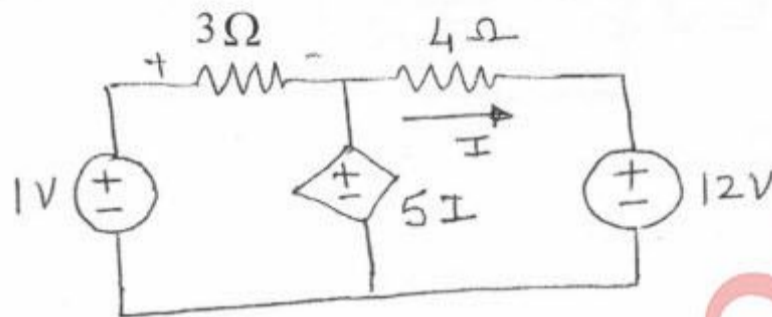**QP Code : 551001**

(3 Hours) [Total Marks : 80]

N.B. : (1) Question **No. 1** is Compulsory.

(2) Attempt **any three** questions from remaining **five** questions.
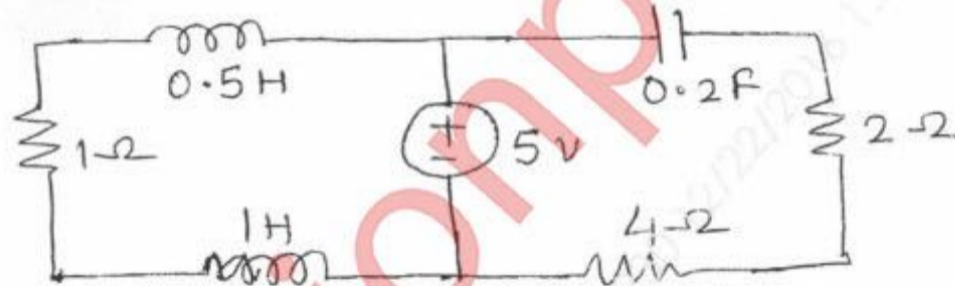
1. Attempt any **four** : 20

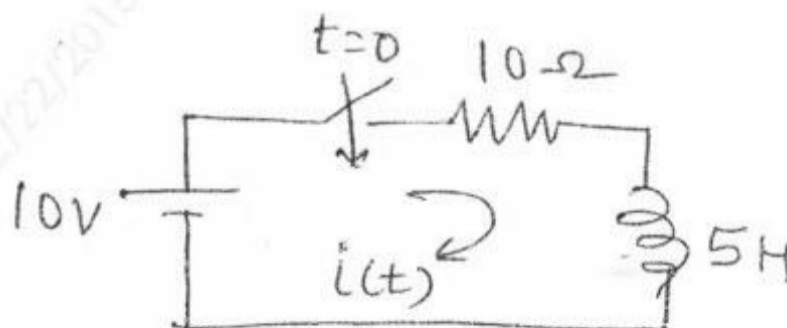(a) Find V_x in the circuit shown using superposition theorem.

(b) Obtain dual of given network

(c) Test whether Hurwitz or not
$P(s) = s^5 + 12s^4 + 45s^3 + 60s^2 + 44s + 48$

(d) In the given network, switch is closed at $t = 0$, with initial conditions $= 0$;
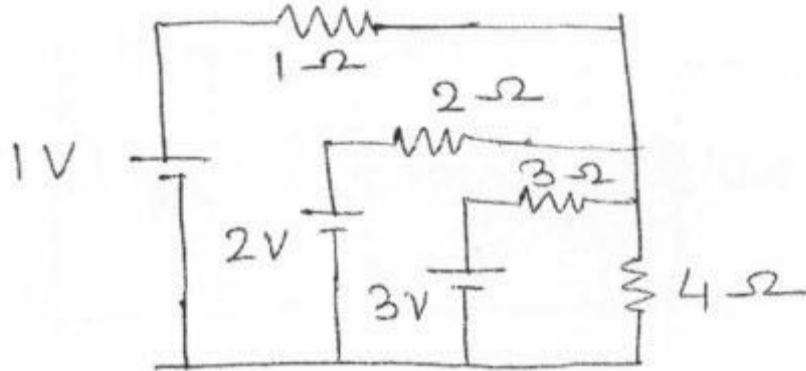find
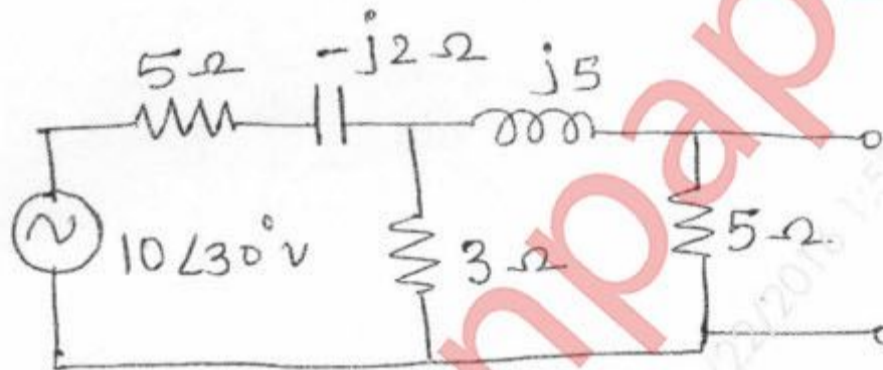$i, \dfrac{di}{dt}, \dfrac{d^2i}{dt^2}$ at $t = 0^+$

[TURN OVER]

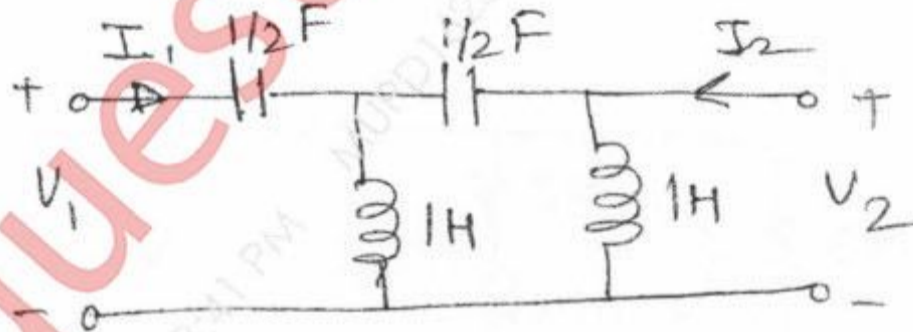(e) Find $I_{4\Omega}$ using Nodal Analysis.

2. (a) Find thevenin's equivalent network for the shown network. 10

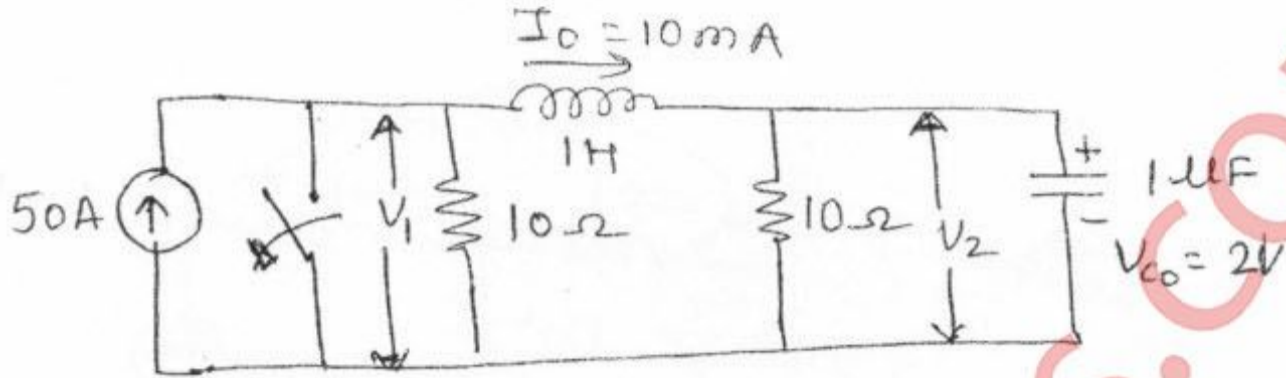(b) Find Y - parameters for the given network.

10

3. (a) For the network given below, switch is opened at $t = 0$ with initial conditions as shown. find the values of

10

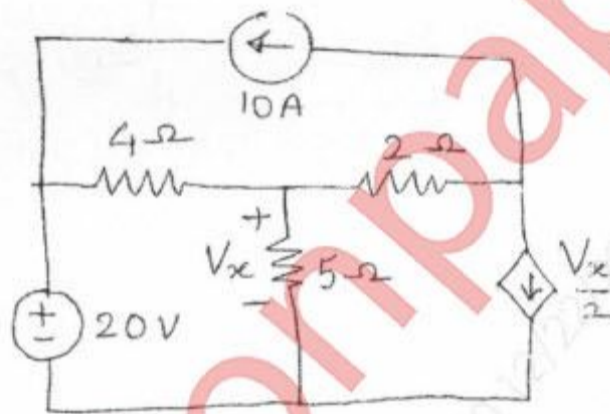$$V_1, V_2, \frac{dv_1}{dt}, \frac{dv_2}{dt} \text{ at time } t = 0^+$$
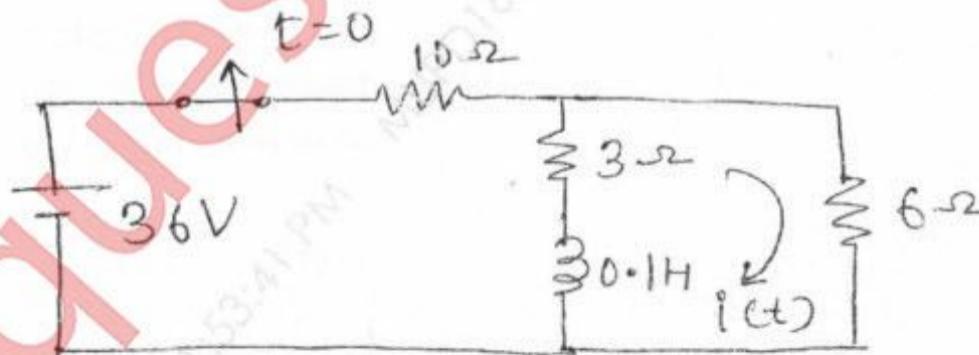
(b) Find Vx   10

4. (a) In the network ; the switch is opened at $t = 0$; find $i(t)$.   10
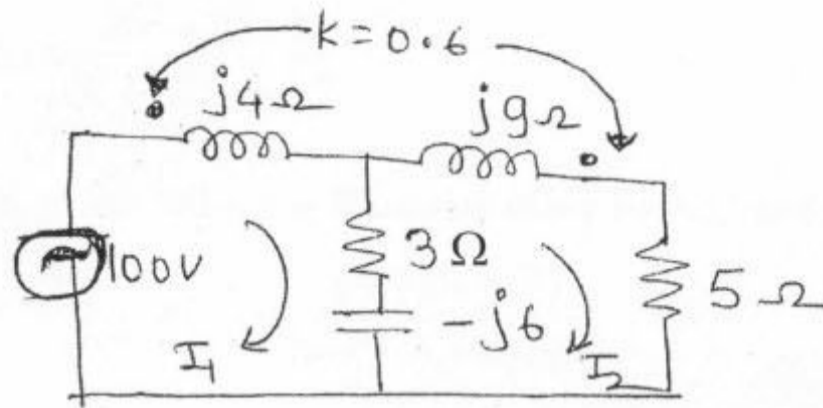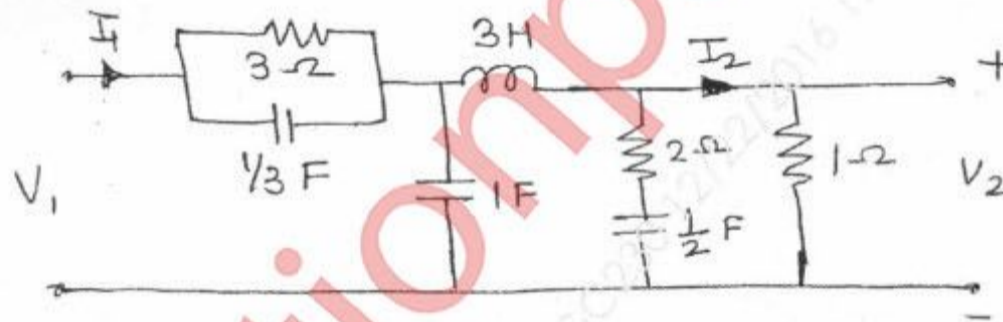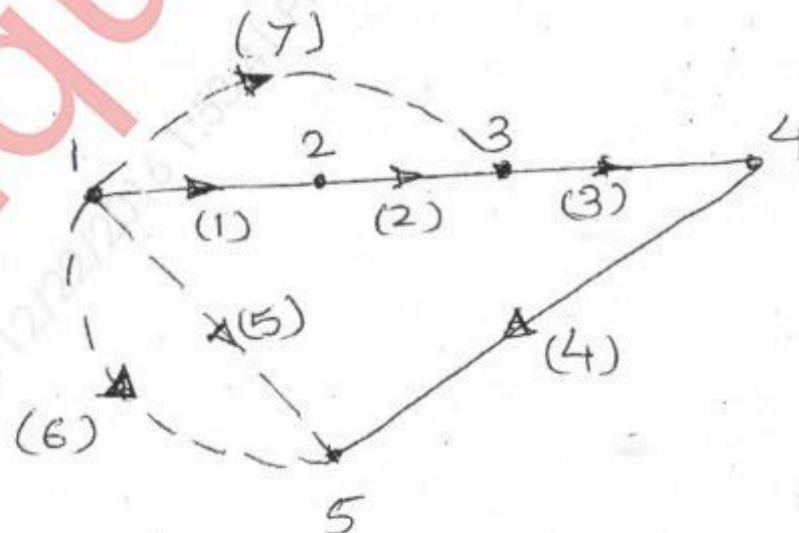
(b) For the network det. I_1 and I_2

10

5. (a) Determine, $\dfrac{V_2}{V_1}$, and $\dfrac{I_2}{I_1}$

10

(b) For the given tree find

10

   (i) Incidence matrix and
   (ii) Cutset Matrix

6. (a) Check for positive realness   **10**

$$F(S) = \frac{2S^2 + 2S + 1}{S^3 + 2S^2 + s + 2}$$

(b) Realize the following functions using Foster I and Foster -II forms   **10**

$$z(s) = \frac{(s+1)(s+3)}{S(s+2)(s+4)}$$