(3 Hours)   **[Total Marks: 80]**
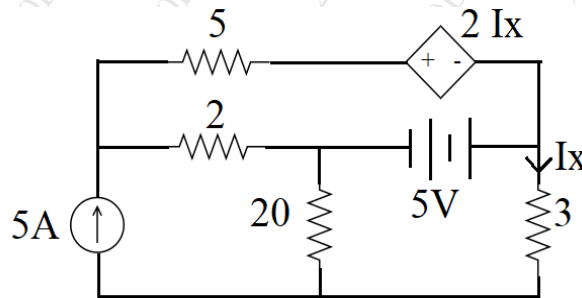
N.B.: (1) Question No. 1 is compulsory.
   (2) Solve any three questions from the remaining five
   (3) Figures to the right indicate full marks
   (4) Assume suitable data if necessary and mention the same in answer sheet.
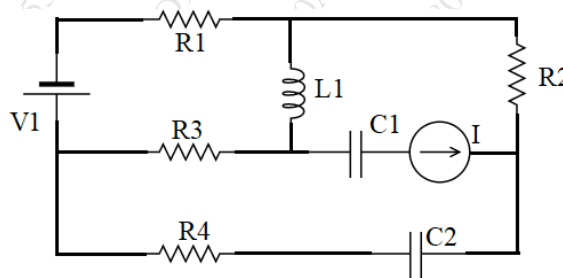   **(5)** All the values of resistors are in ohms.

Q.1 a) Find current through 5 Ω resistor using KVL.   5M

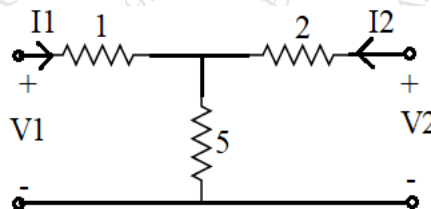b) Draw the graph of following network and obtain incidence matrix.   5M

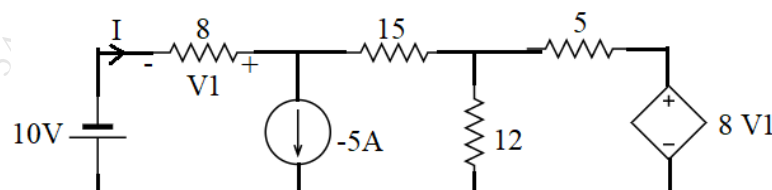
c) Find transmission parameters of the following network.   5M

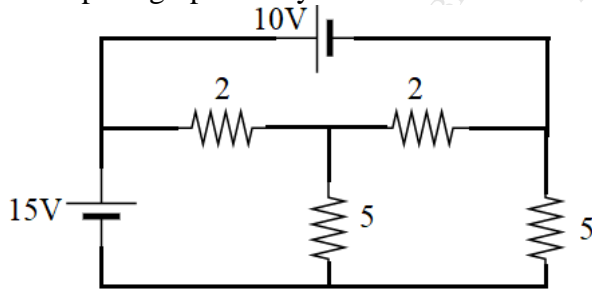d) What is positive real function? What are the properties of Positive real function?   5M

Q.2 a) Find current 'I' in 8 Ω resistor using superposition theorem.   10M

**28344**   **Page 1 of 3**

b) For the following network obtain the equilibrium equation in matrix form using concept of graph theory and find links current.   10M

Q.3 a) The switch is changed from position-1 to position-2 at $t = 0$. Steady state condition was reached before switching. Find value of i, $di(t)/dt$ and $d^2i(t)/dt^2$ at t $= 0^+$.   10M
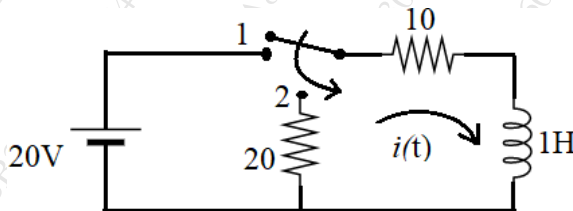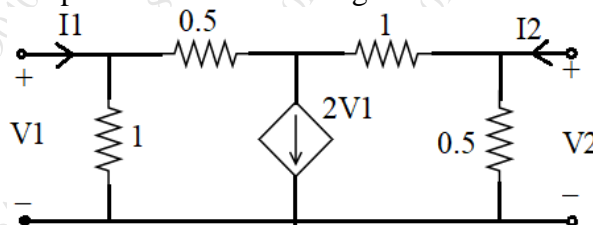

b) Find the network function V_1/I_1, V_2/V_1 and V_2/I_1 for network shown in figure.   10M
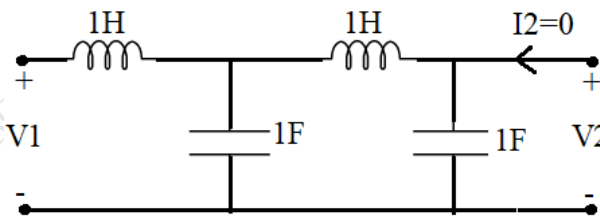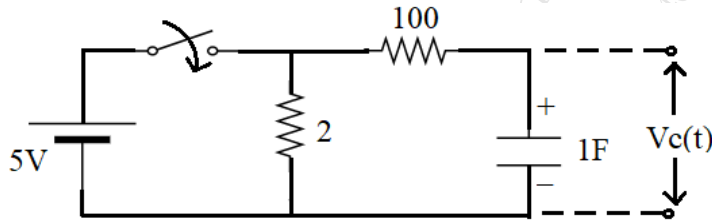

Q.4 a) Synthesize the following function in Foster-I and Foster-II form.   10M

$$Z(S) = \frac{4\,(S+2)(S+7)}{s(S+4)}$$

b) Determine Y and Z parameters of following network.   10M

Q.5 a) The switch is closed at $t = 0$. Find Vc(t) for $t > 0$.   10M

28344   **Page 2 of 3**

A5316D9040AA80330B960BCA2950BBB3

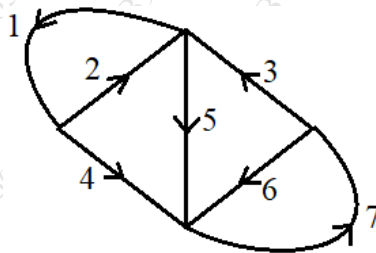b) Test whether following polynomials are Hurwitz   10M
    i) $P(S) = S^4 + 7S^3 + 6S^2 + 21S + 8$
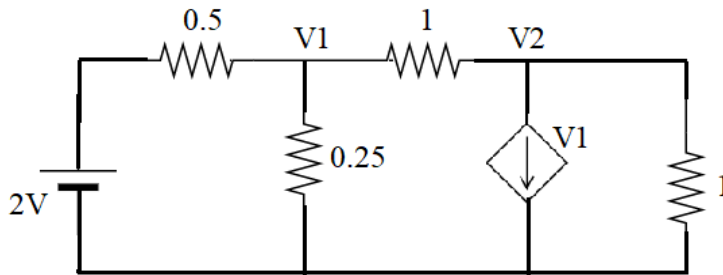   ii) $P(S) = S^4 + S^3 + 2S^2 + 3S + 2$

Q.6   a) The graph of a network is given below. Obtain tieset matrix.   5M

b) Determine node V1 and V2 using nodal analysis.   5M

c) Derive condition of reciprocity for ABCD parameter.   5M

d) Realize the following function in Cauer-I and Cauer-II   5M

$$Z(S) = \frac{S(S+3)}{(S+1)}$$

****

A5316D9040AA80330B960BCA2950BBB3