[Time: 3 Hours]   **[Marks:80]**

Please check whether you have got the right question paper.

N.B: 1.   Question No. 1 is compulsory.
        2.   Attempt any three questions out of remaining five.
        3.   Assume suitable data if required.
        4.   Figures to the right indicate full marks.

Q.1 a) Draw the oriented graph for the given matrix and calculate number of possible trees   **(05)**

$$A = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 \\ -1 & 0 & 0 & 1 & 0 \\ 0 & -1 & 1 & 0 & 0 \end{bmatrix}$$

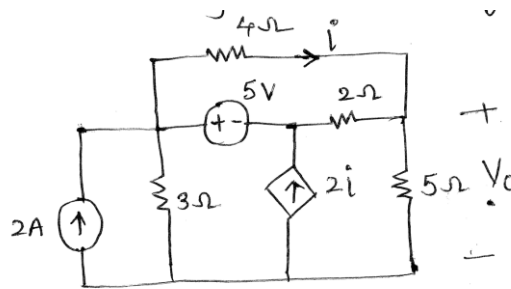**b)** Draw the pole-zero plot of $\dfrac{I_2}{I_1}$ for the network shown   **(05)**
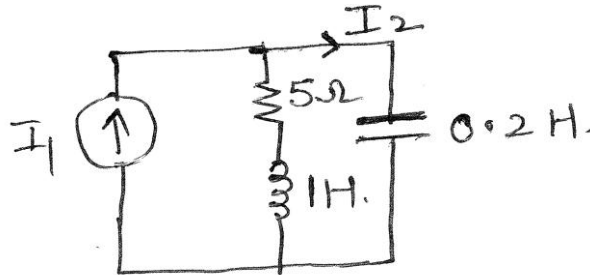
c) Check whether polynomial is Hurwitz.   **(05)**
   $P(S) = S^5 + 2S^4 + 4S^3 + 6S^2 + 4S + 3$

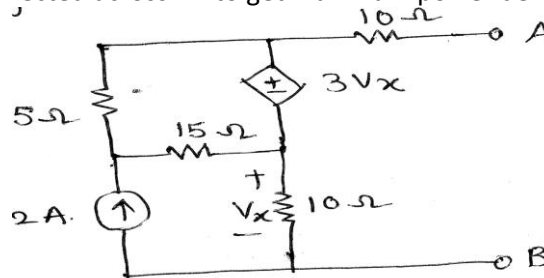**d)** Write a short note on initial conditions and its significance   **(05)**

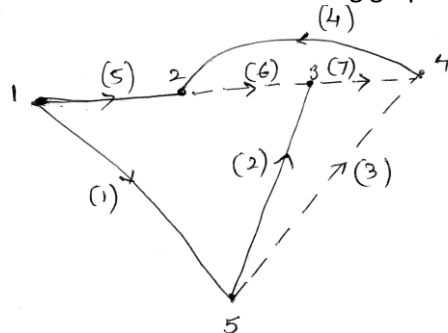**Q.2 a)** Find Vo using nodal analysis   **(10)**

b) Find the value of R_L to be connected across AB to get maximum power delivered to it   **(10)**
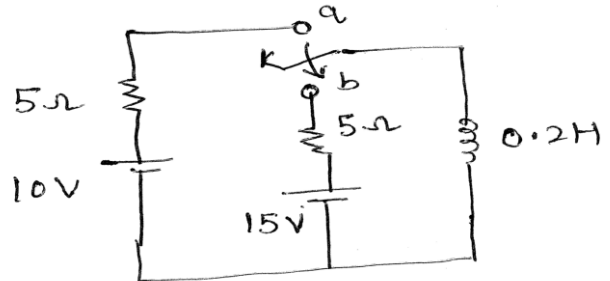
Q.3 a) Define and with suitable example differentiate between (06)
  i) Planar and non planar graph
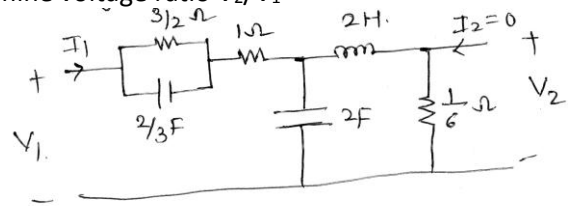 **ii)** Tree and co-tree

Q.3 b) Obtain incidence matrix, tie set and f-cutset matrix for following graph. (14)
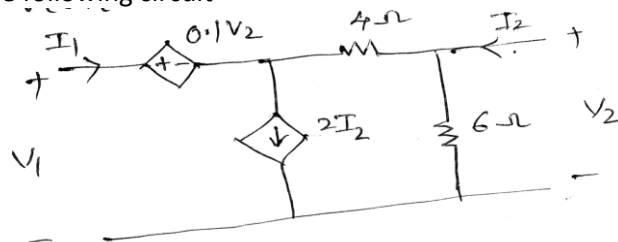

Q.4 a) In a given network, the switch k is moved from a to b at t=0 find i(t) (10)

b) For the given network determine voltage ratio V_2/V_1 (10)

Q.5 a) Obtain h-parameters for the following circuit (10)

b) If two networks are connected in cascade, find the transmission parameters of equivalent network. (10)

Q.6 a) Realize foster (I & II) forms of the following $z(s) = \dfrac{3(s+1)(s+4)}{s(s+3)}$ (10)

b) Realize cauer (I & II) forms of the following impedance function $z(s) = \dfrac{s(s^2+2)}{(s^2+1)\,(s^2+3)}$ (10)

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