Time: 3 hours   Total Marks: 80
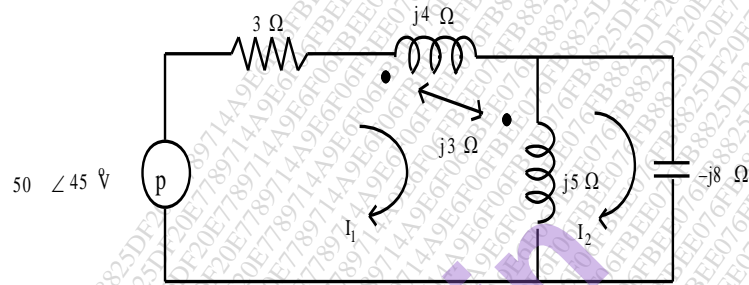
N.B.
1) Question No. 1 is Compulsory
2) Out of remaining questions, attempt any three
3) Assume suitable data if required
4) Figures to the right indicate full marks

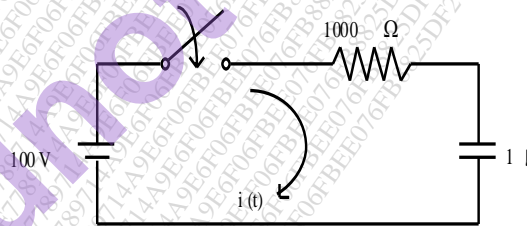1 (A)   Draw equivalent circuit for given magnetically coupled circuit.   **05**

(B)   In the network of Fig. switch is closed at t = 0. With capacitor uncharged, find value   **05**
for i and $\dfrac{di}{dt}$ at t = 0$^+$.

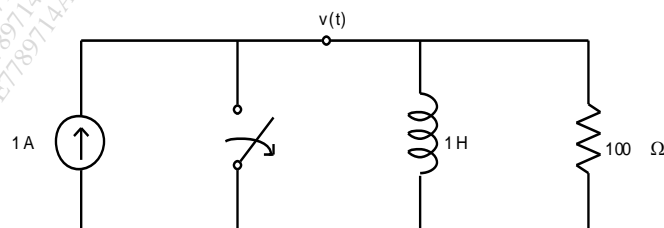(C)   Prove that AD − BC = 1 for Transmission parameters.   **05**

(D)   Design an m-derived T section high pass filter with a cut-off frequency of 2 kHz.   **05**
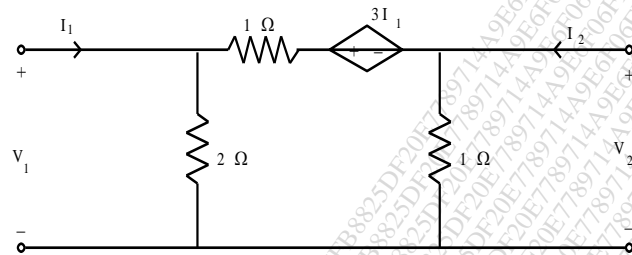Design impedance of 700Ω and m = 0.6.

2 (A)   In the network shown in Fig., at t = 0, switch is opened. Calculate v, $\dfrac{dv}{dt}$, $\dfrac{d2v}{dt2}$ at t =   **10**
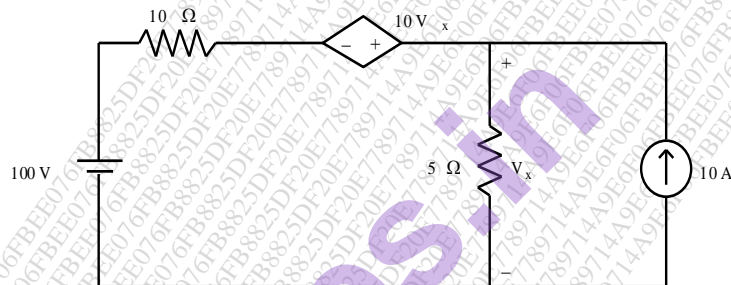0+.

E076FB8825DF20E7789714A9E6F06FBE

(B) For the network shown in Fig., find Y and Z-parameters. **10**

3 (A) Determine the current through 10 Ω resistor in the network of Fig. **10**

(B) The parameters of a transmission lines are R = 65Ω/km, L=1.6mH/km, G = 2.25 mmho/km, C=0.1μF/km. Find **10**

    i) Characteristic Impedance
    ii) Propagation Constant
    iii) Attenuation Constant
    iv) Phase Constant   at 1 kHz

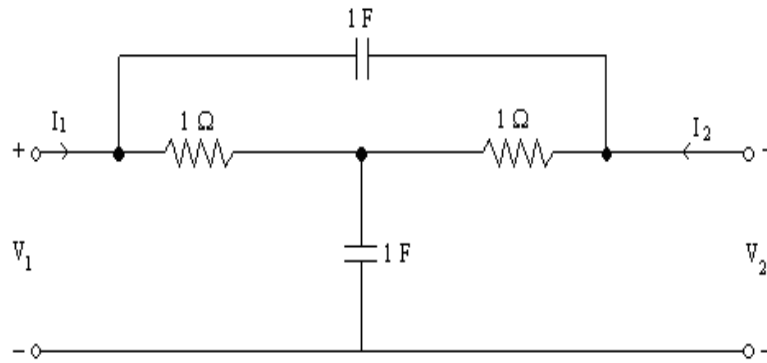4 (A) Determine whether following functions are positive real **10**

    i) $\dfrac{s^2 + 2s + 4}{(s + 1)(s + 3)}$

    ii) $\dfrac{s^2 + 25s + 25}{s + 4}$

(B) Find Norton's equivalent network. **10**
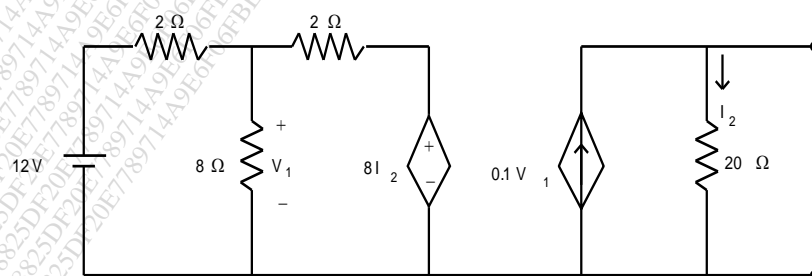
5 (A) Find Y-parameters for the network shown in Fig. **10**

(B) Realize the following functions in Foster II and Cauer I form **10**

$$Z(s) = \frac{2(s^2 + 1)(s^2 + 9)}{s(s^2 + 4)}$$

6 (A) A transmission line has a characteristics impedance of 50 ohm and terminate in a load $Z_L = 25 + j50$ ohm. Use smith chart and Find VSWR and Reflection coefficient at the load. **10**

(B) Determine current i2 (t) in the network of Fig., when switch is closed at t = 0. The inductor is initially deenergized. **10**

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