B.E. Electrical (Electronics & Power) Engineering (Model Curriculum) Semester - III

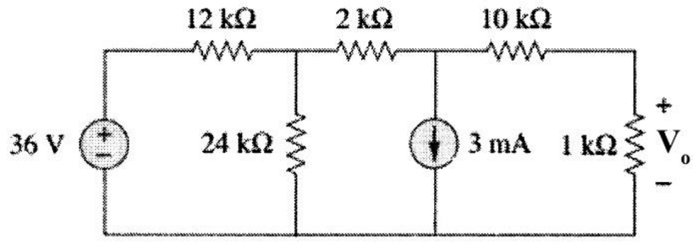
002 - Electrical Circuit Analysis

P. Pages : 5 **GUG/S/23/13853**

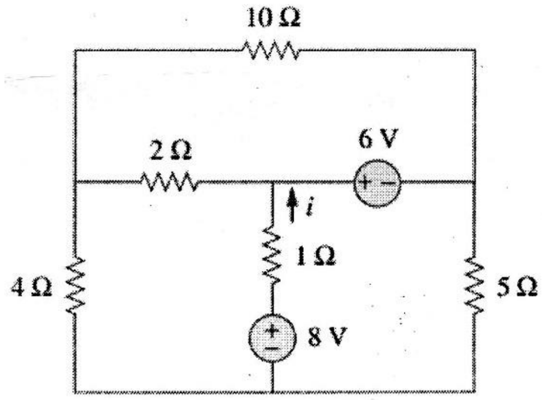
Time : Three Hours Max. Marks : 80

Notes :
1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.
5. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted.
6. Answer **any five** questions as per internal given choice.
7. Use of non programmable calculator is permitted.

1. a) Use Norton's theorem to find V_0 in the circuit of Fig. **8**

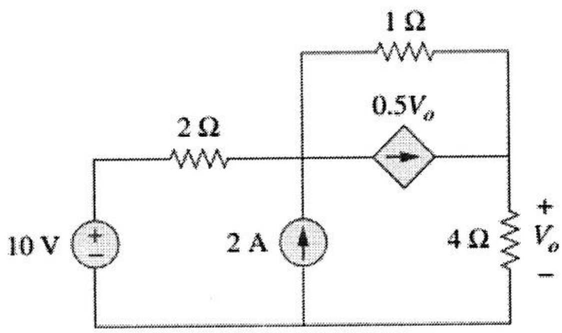


b) Apply mesh analysis to find *i* in Fig. **8**

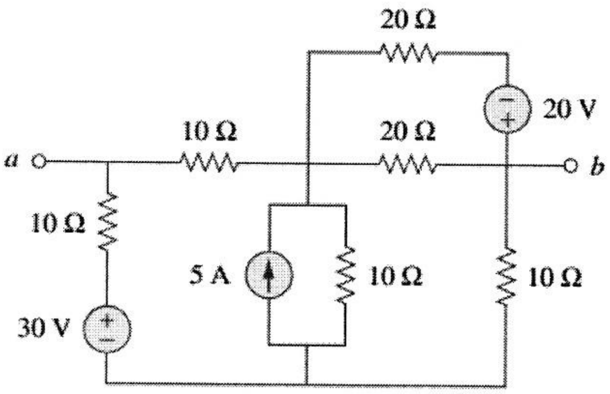


OR

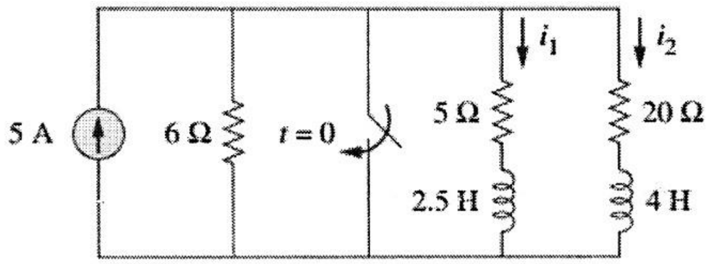
2. a) Use superposition to find V_0 in the circuit of Fig. **8**



b) For the circuit in Fig. find the Thevenin equivalent between terminals a and b. **8**

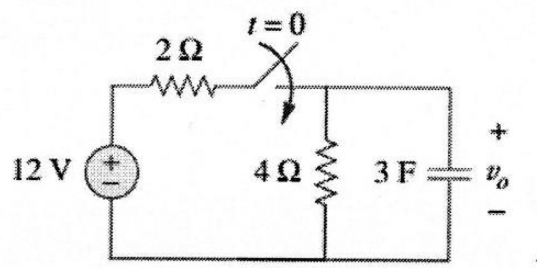


3. a) Find $i_1(t)$ and $i_2(t)$ for t > 0 in the circuit of Fig. **8**



b) i) If the switch in Fig. has been open for a long time and is closed at t = 0, find $v_o(t)$. **8**

ii) Suppose that the switch has been closed for a long time and is opened at t = 0. Find $v_o(t)$



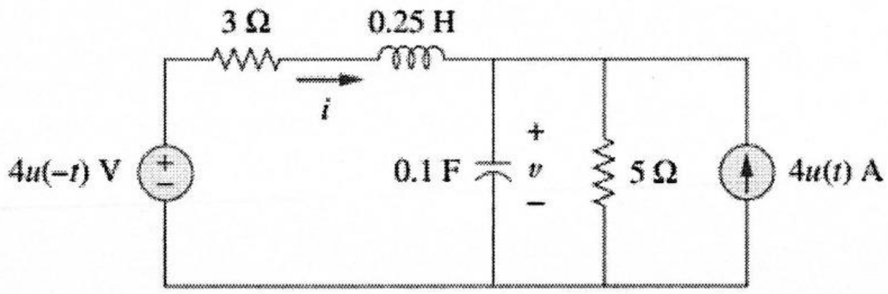
OR

4. a) In the circuit of Fig, find **8**

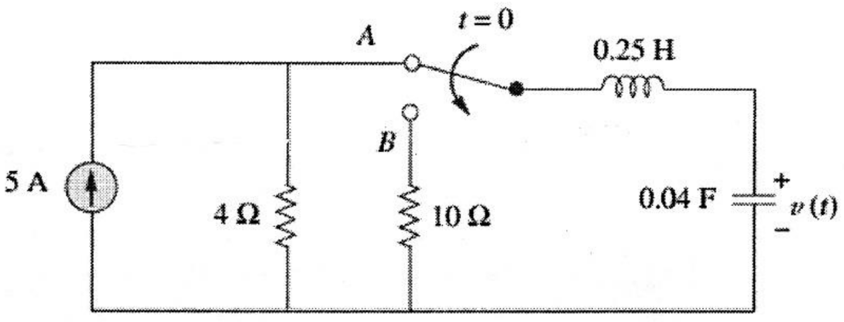
i) $v(0^+)$ and $i(0^+)$,

ii) $dv(0^+)/dt$ and $di(0^+)/dt$

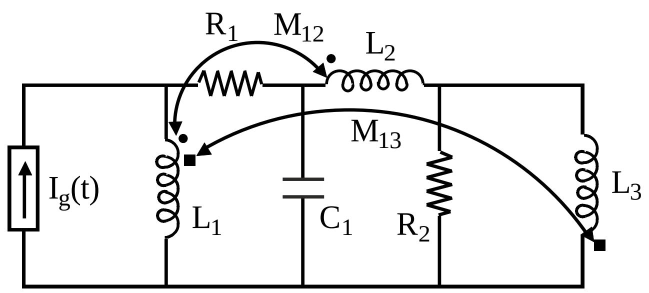
iii) $v(\infty)$ and $i(\infty)$



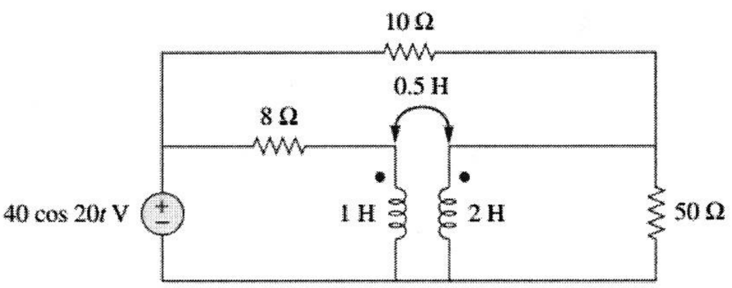
b) In the circuit of Fig. the switch instantaneously moves from position A to B at t = 0. Find v(t) for all $t \geq 0$. **8**



5. a) Write the equilibrium equation in matrix form for the network of Fig. on the mesh basis. **8**

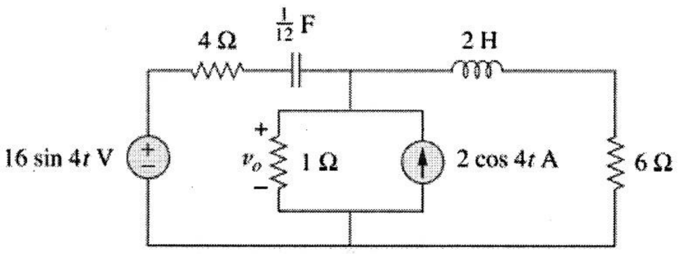


b) Find the average power delivered to the $50-\Omega$ resistor in the circuit of Fig. **8**

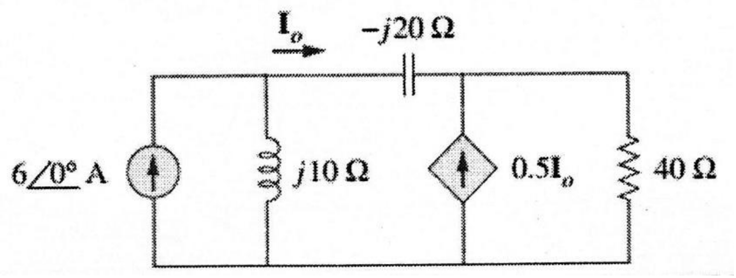


OR

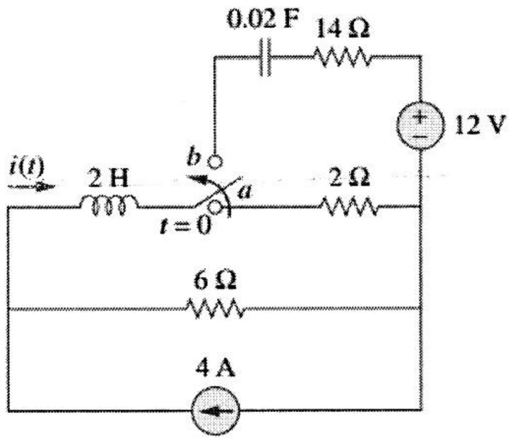
6. a) Determine v_o in the circuit of Fig. **8**



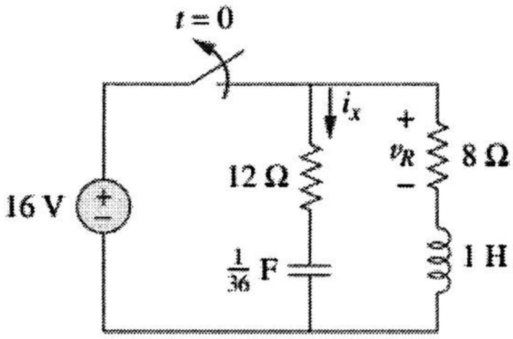
b) In the circuit of Fig. determine the average power absorbed by the $40-\Omega$ resistor. **8**



7. a) The switch in the circuit of Fig. is moved from position a to b (a make before break switch) at t = 0. Determine i(t) for t > 0. **8**



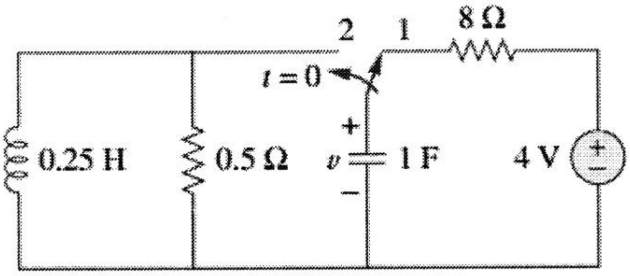
b) If the switch in Fig has been closed for a long time before t = 0 but is opened at t = 0, determine i_x and v_R for t > 0. **8**



OR

8. a) In the circuit of fig the switch has been in position 1 for a long time but moved to position 2 at t = 0. Find : **8**

i) $v(0^+), dv(0^+)/dt$ ii) $v(t)$ for $t \ge 0$.



b) Find the inverse Laplace transform of : **8**

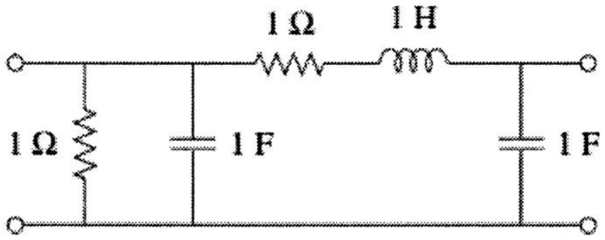
i) $H(s) = \dfrac{s+4}{s(s+2)}$

ii) $G(s) = \dfrac{s^2 + 4s + 5}{(s+3)(s^2+2s+2)}$

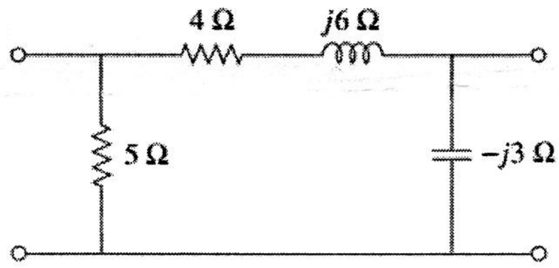
iii) $F(s) = \dfrac{e^{-4s}}{s+2}$

iv) $D(s) = \dfrac{10s}{(s^2+1)(s^2+4)}$

9. a) Obtain the z parameters for the network in Fig. as functions of s. **8**

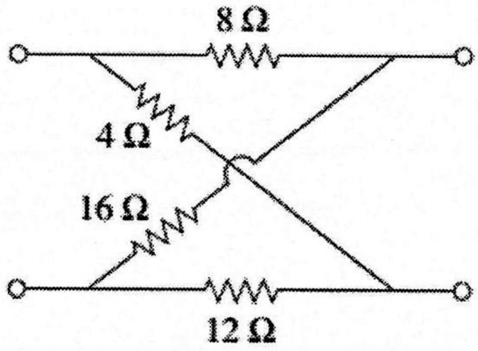


b) Obtain the h parameters for the two-port of Fig. **8**

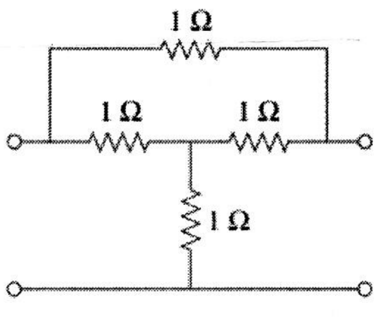


OR

10. a) Determine the z and y parameters for the circuit in Fig. **8**



b) For the bridge circuit in Fig. obtain the transmission parameters. **8**



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