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

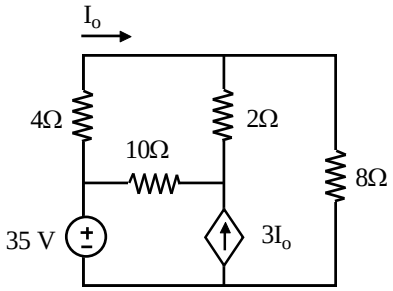
SE102 / 002 - Electrical Circuit Analysis

P. Pages : 4 **GUG/S/25/13853**

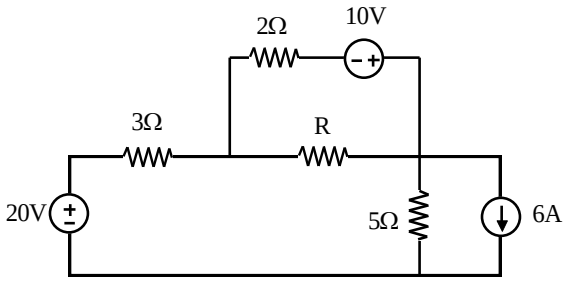
Time : Three Hours * 2 2 8 8 * Max. Marks : 80

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. Diagrams and Chemical equation should be given wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.
6. Use of slide rule, Logarithmic tables, Drawing instruments are permitted.
7. Use of non programmable calculator is permitted.

1. a) Use mesh analysis to find the current I_o in the circuit. **8**

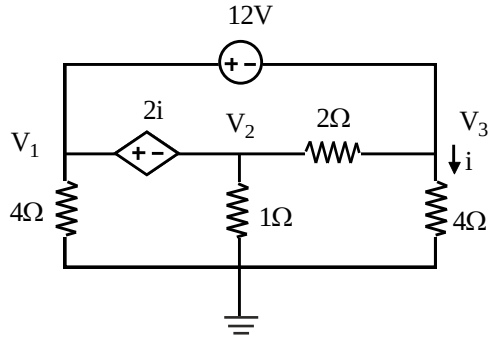


b) What resistor connected across terminals a-b will absorb maximum power from the circuit? What is that power? **8**

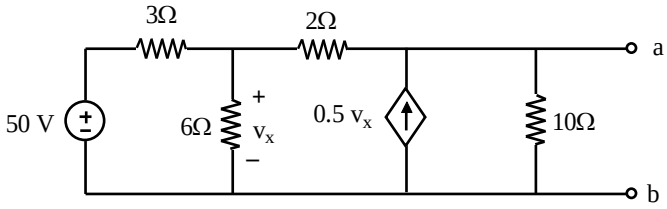


OR

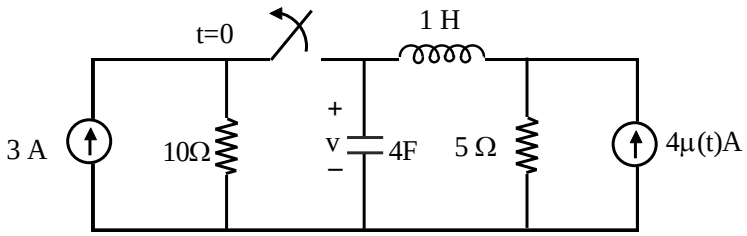
2. a) For the circuit in Fig., find V1, V2, V3 using Nodal Analysis. **8**



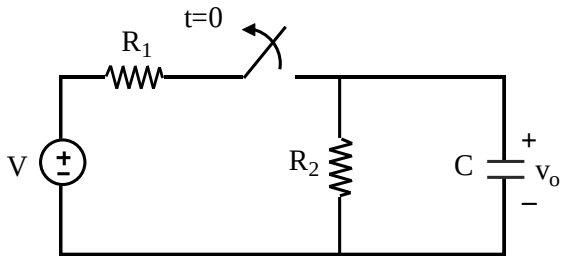
b) Obtain the Thevenin's equivalent circuits at terminals a-b for the circuit in fig. **8**



3. a) Find v(t) for t > 0 in the circuit of Fig. **8**

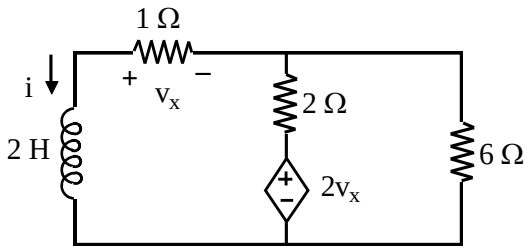


b) (i) If the switch in Fig. has been open for a long time and is closed at t=0 find $V_0(t)$ **8**
(ii) Suppose that the switch has been closed for a long time and is opened at t=0. Find $V_0(t)$ Consider, v=12 V, R_1 = 2 ohm, R_2 = 4 ohm and C=3F.

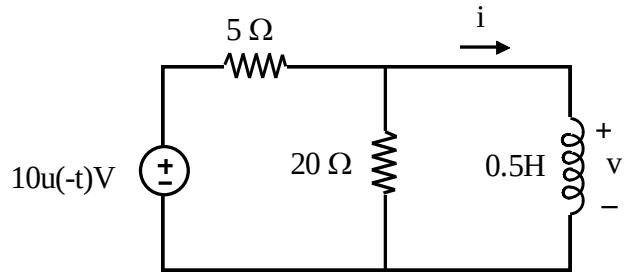


OR

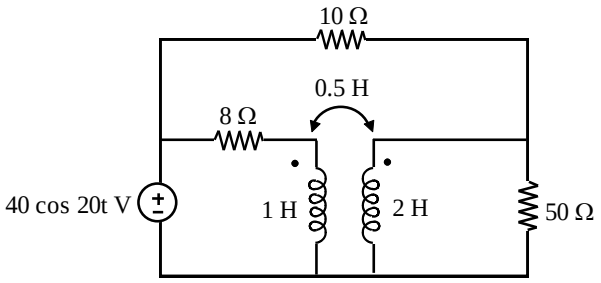
4. a) Find I and v_x in the circuit of fig. Let i(0) = 12 A **8**



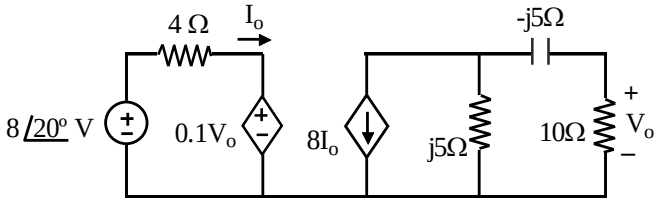
b) Obtain v(t) and i(t) in the circuit of fig. **8**



5. a) Find the average power delivered to the 50 ohm resistor in the circuit of Fig. **8**



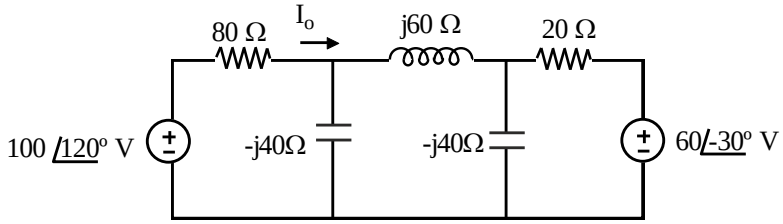
b) Find the average power absorbed by the 10 ohm resistor. **8**



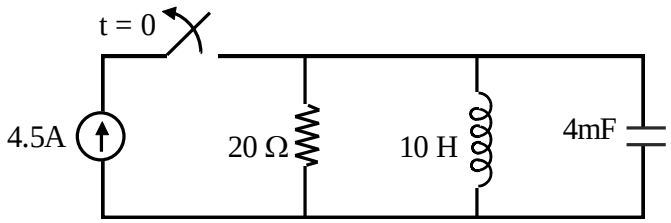
OR

6. a) In a balanced $\Delta - Y$ circuit, $V_{ab} = 240\angle 15^{o}$ and $Z_Y = (12 + j15)\Omega$. Calculate the line currents. **8**

b) Determine current I_0 in the circuit. **8**



7. a) In the circuit of Fig. find v(t) for t > 0. **8**



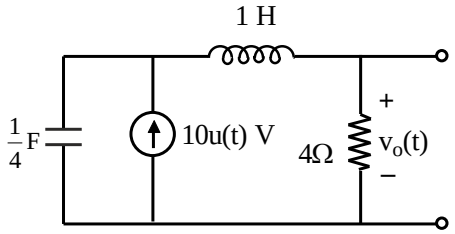
b) Obtain the Laplace transform of each of the following functions: **8**

a) $e^{-2t}\cos 3tu(t)$ b) $e^{-2t}\sin 4tu(t)$

c) $e^{-3t}\cosh 2tu(t)$ d) $e^{-4t}\sinh tu(t)$

OR

8. a) Determine $V_0(t)$ in the circuit of Fig. assuming zero initial conditions. **8**



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

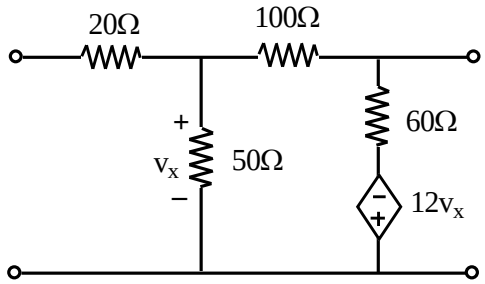
$$V(s) - \frac{2s+26}{s(s^2+4s+13)} \text{ and } F_3(s) - \frac{10}{(s+1)(s^2+4s+8)}$$

9. a) Express: **8**

a) Y – Parameters in terms of T-Parameters

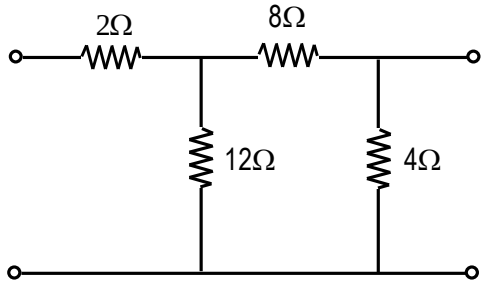
b) H - Parameters in terms of Y – Parameters.

b) Calculate the impedance – parameter equivalent of the circuit in Fig. **8**



OR

10. a) Calculate the impedance – parameter equivalent of the circuit in Fig. **8**



b) Given the transmission parameters **8**

$$[T] = \begin{bmatrix} 3 & 20 \\ 1 & 7 \end{bmatrix}$$

Obtain the other five two-port parameters.

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