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

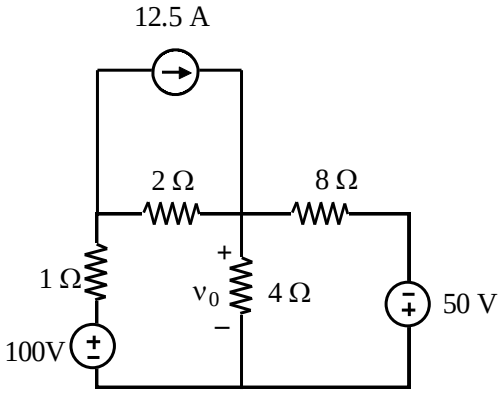
SE102 / 002 - Electrical Circuit Analysis

P. Pages : 4 **GUG/W/24/13853**

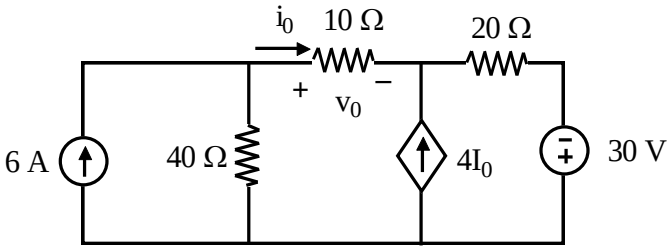
Time : Three Hours * 5 4 9 0 * Max. Marks : 80

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 is permitted.
7. Use of non programmable calculator is permitted.

1. a) Using nodal analysis, find v_o in the circuit of fig. **8**

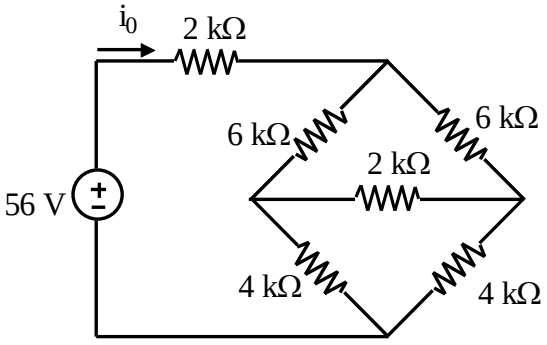


b) Use the superposition principle to find V_0 and I_0 in the circuit of Fig. **8**

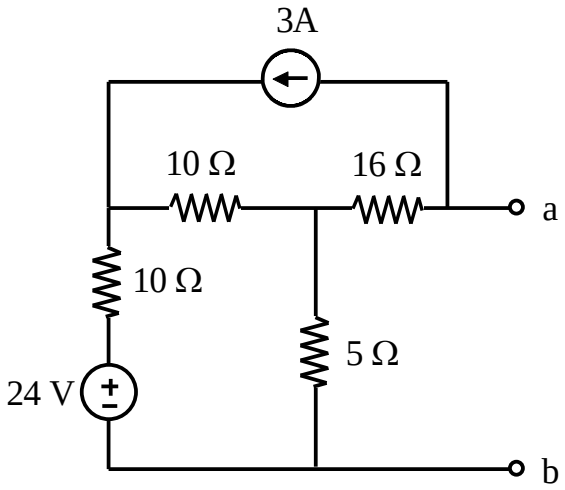


OR

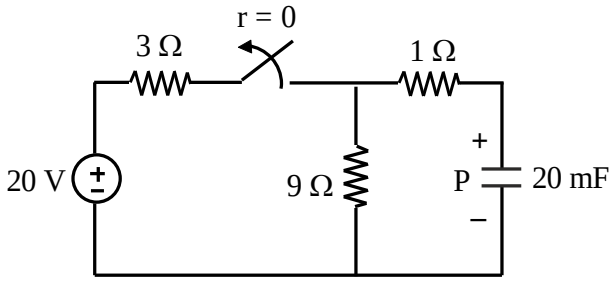
2. a) For the bridge network in fig. Find I_0 using mesh analysis. **8**



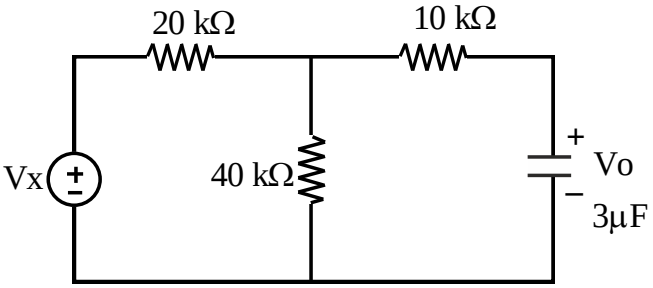
b) Obtain the Thevenin equivalent at terminals a-b of the circuit shown in fig. **8**



3. a) The switch in the circuit in Fig. 7.8 has been closed for a long time, and it is opened at t = 0 Find V(t) for $t \geq 0$. **8**

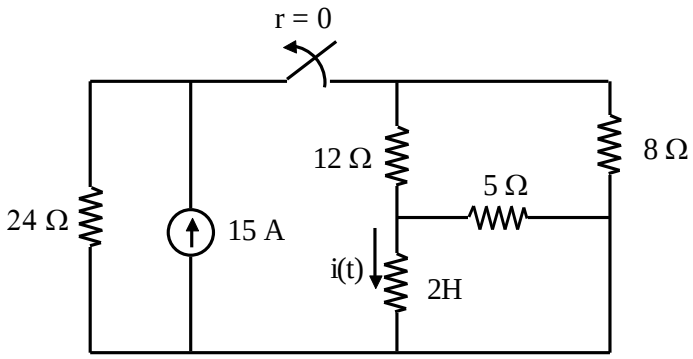


b) Find in the circuit of fig. when V(0) = 5V. Assume Vx = 30u(t) V. **8**

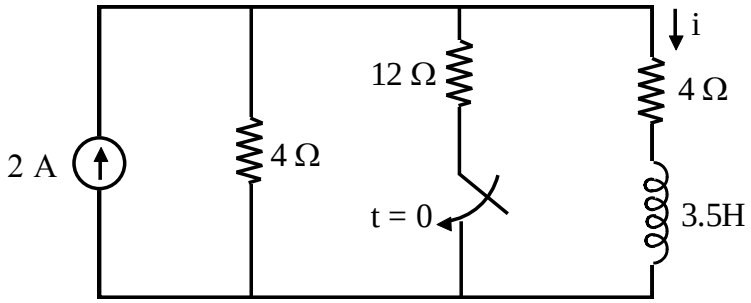


OR

4. a) For the circuit in Fig. find i(t) for $t \geq 0$. **8**

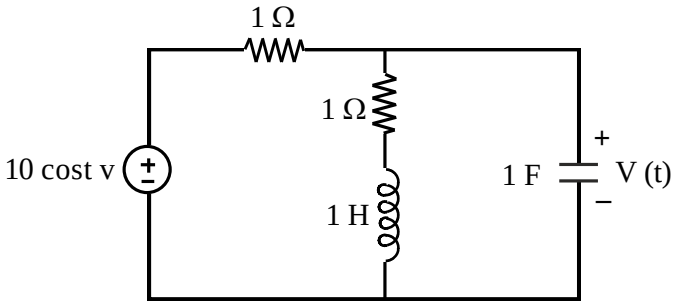


b) Obtain the inductor current for both and in the circuits for $t < 0$ and $t > 0$. **8**



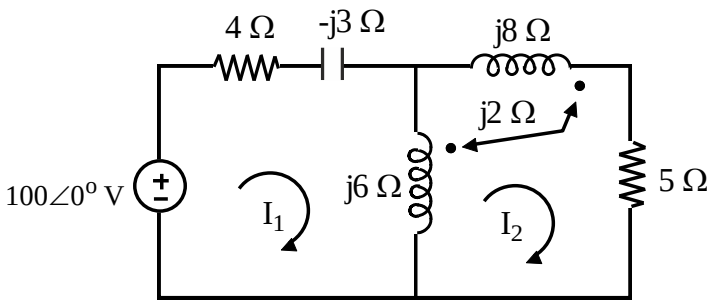
5. a) A balanced Y-connected load with a phase impedance of $40 + j25\Omega$ is supplied by a balanced, positive sequence $\Delta -$ connected source with a line voltage of 210V. Calculate the phase currents. Use V_{ab} as a reference. **8**

b) Find $v(t)$ in the RLC circuit of Fig. **8**

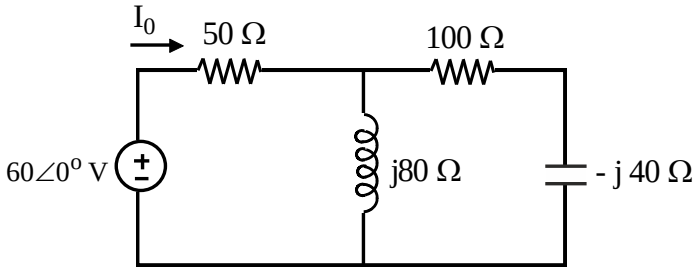


OR

6. a) Calculate the mesh currents in the circuit of Fig. **8**



b) Find current I_0 in the circuit shown in fig. **8**

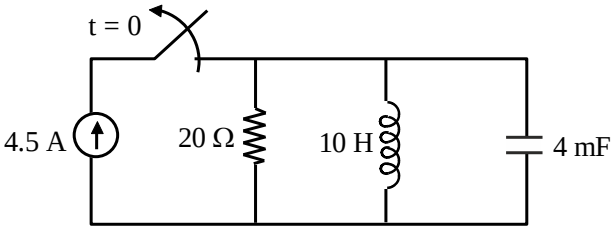


7. a) Obtain the Laplace transform of each of the following functions: **8**

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

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

b) In the circuit of fig. Find $v(t)$ for $t > 0$. **8**

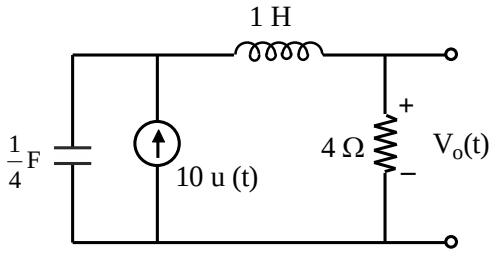


OR

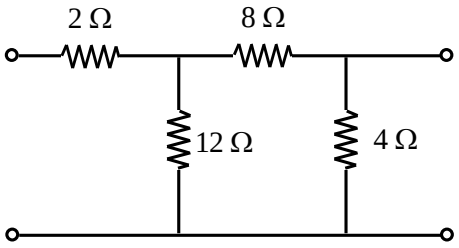
8. a) Find the inverse Laplace transform of **8**

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

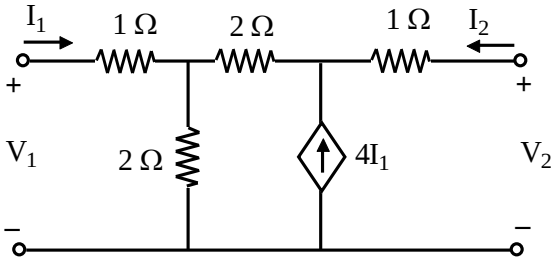
b) Determine $V_0(t)$ in the circuit of Fig. assuming zero initial conditions. **8**



9. a) Obtain the z parameters for the network in fig. **8**



b) Determine the hybrid parameters for the network in fig. **8**



OR

10. a) Given the transmission parameters **8**

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

Obtain the Z and Y two-port parameters.

b) Express **8**

a) Z- Parameters in terms of Y-Parameters.

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

****