B.E. Instrumentation Engineering (CBCS Pattern) Third Semester

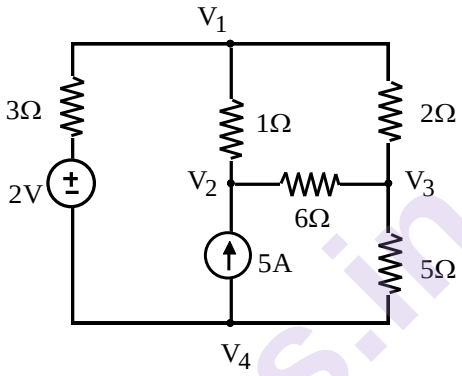
3BEIE03 - Network Theory

P. Pages : 4 **GUG/W/18/11513**

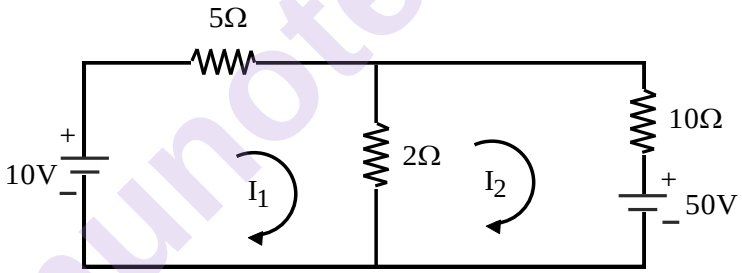
Time : Three Hours * 3 5 9 3 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Use node analysis to find power dissipated in 6Ω resistor of circuit shown in fig. **8**

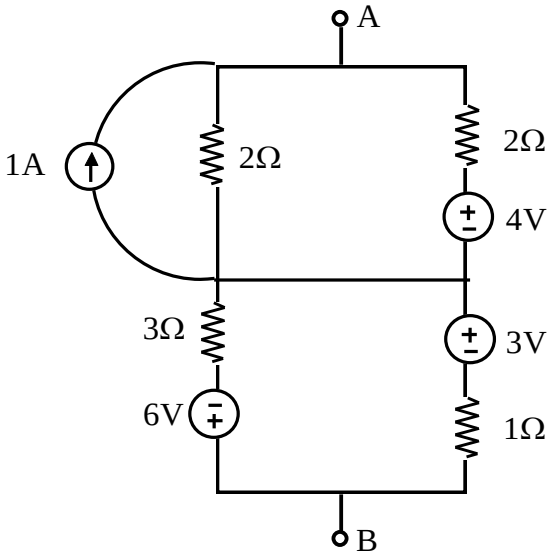


b) Determine $I_1 \& I_2$ in the given circuit using mesh analysis. **8**

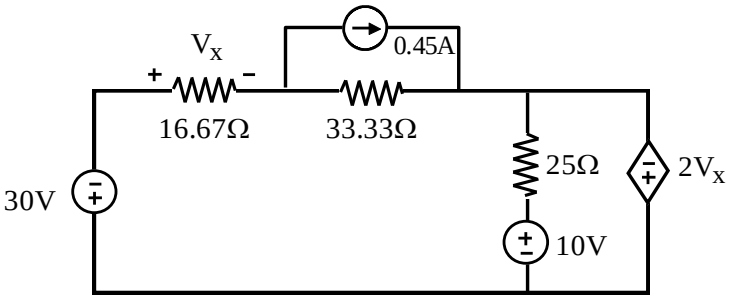


OR

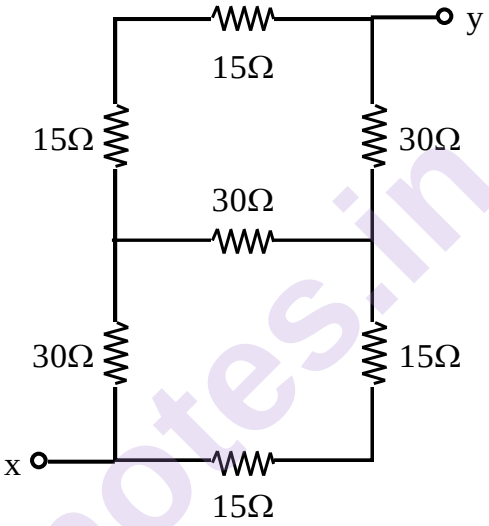
2. a) Reduce the network to a form with only one current source across terminals AB. **8**



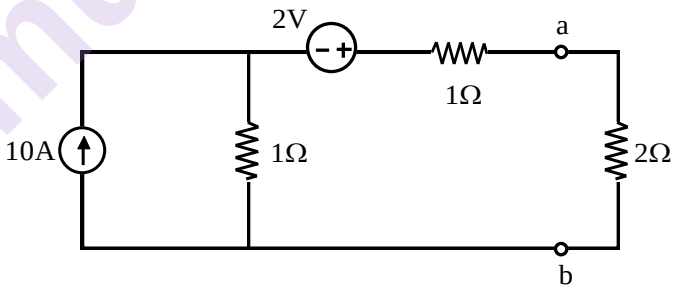
b) Use mesh analysis to find V_x in the circuit shown in fig. **8**



3. a) Determine the equivalent resistance between the terminal x and y of the circuit shown using star-delta transformation. **8**

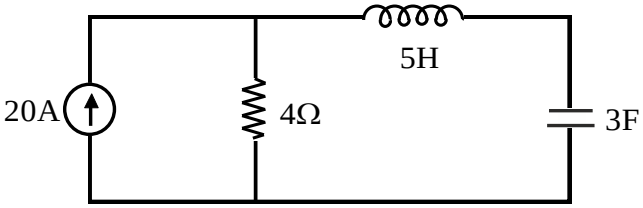


b) Determine the voltage across the 2Ω resistor using Norton's theorem. **8**

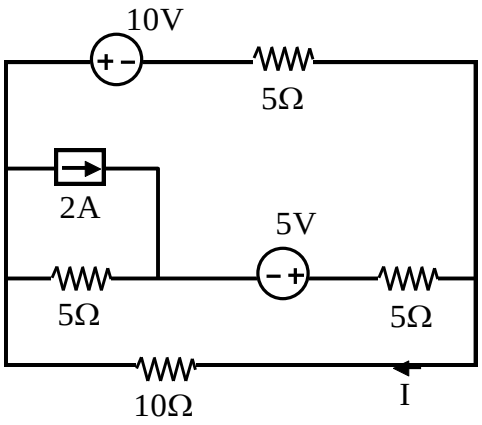


OR

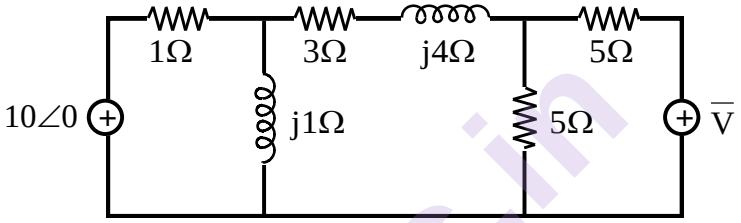
4. a) Explain the concept of dual networks. Draw the dual circuit for the given circuit shown in fig. **8**



b) Using superposition theorem find current I through 10Ω resistor. **8**



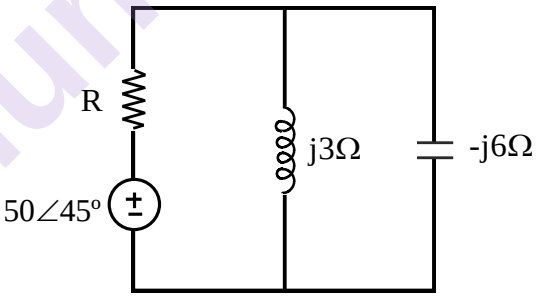
5. a) Determine $\overline{V}$ such that current through the impedance $(3+j4)\Omega$ is zero. By using Thevenin's theorem. **8**



b) Draw & explain the phase relationship between V and I for **8**
i) Series RL circuit. ii) Series RC circuit.

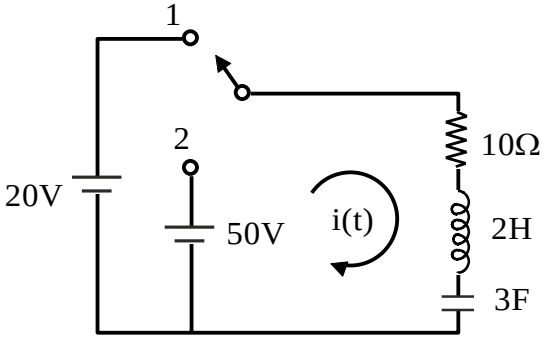
OR

6. a) Find the change in current across 5Ω is changed to 10Ω using compensation theorem. **8**



b) Derive condition for maximum power transfer for the circuit excited by a.c. supply using maximum power transfer theorem. **8**

7. a) Determine the current expression i(t) after t = 0 when the switch is connected to position 2 after long period of time at 1 as shown in fig. **8**



b) Explain steady state Responce using classical technique. **8**

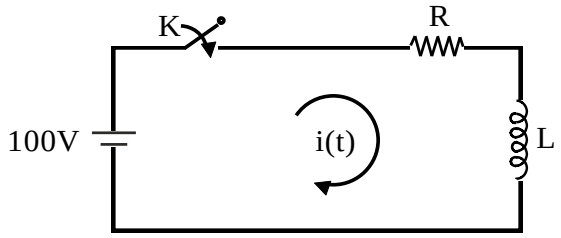
OR

8. a) Explain transient in R-C series ckt for discharging current. **8**

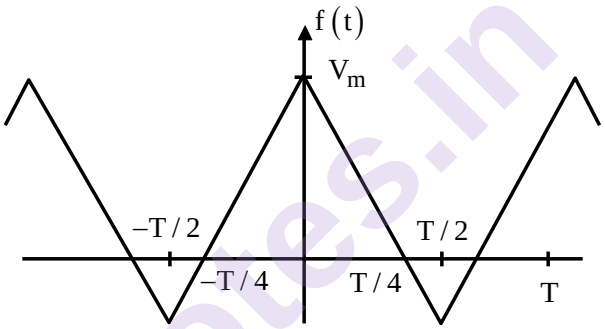
b) A series R-L circuit has $R = 2.5\Omega$ Time const. T = 1.6 sec. It is excited by 100V dc supply Determine. **8**

i) Value of L ii) Current at t = 8 sec

iii) Initial rate of rise of current iv) Energy stored in inductance at steady state.



9. a) Determine Fourier series of triangular waveform shown. **8**

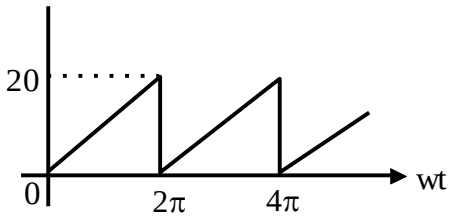


b) With respect to Fourier series expansion explain. **8**

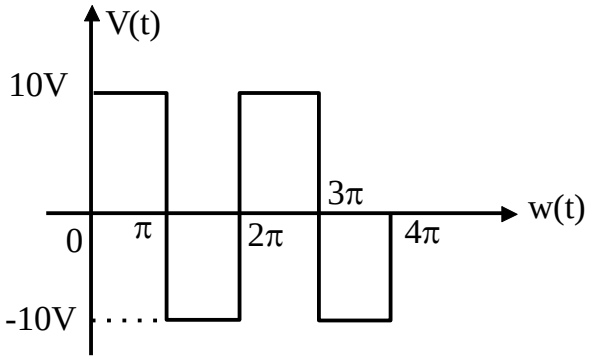
i) Even function. ii) Odd function. iii) Half wave symmetry.

OR

10. a) Find Fourier series for waveform shown in fig. **8**



b) Find complex Fourier series for square wave. **8**



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