B.E. Instrumentation Engineering Sem-III (Old)

IN303 - Network Theory

P. Pages : 4 **GUG/S/19/1510**

Time : Three Hours Max. Marks : 80

Notes :
1. Same Answer book must be used for each section.
2. All questions carry marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.

1. a) Find the voltage between A and B of the circuit shown in figure 1 by mesh analysis. **8**

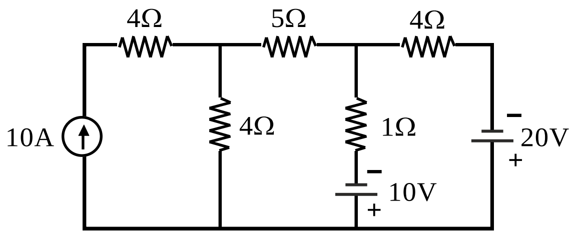

Figure 1

b) For the circuit shown in figure 2, find the current passing through the 5Ω resistor by using the nodal method. **8**

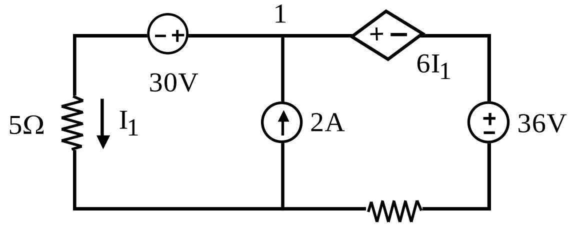

Figure 2

OR

2. a) Use nodal analysis to find V_2 in the circuit shown in figure 3. **8**

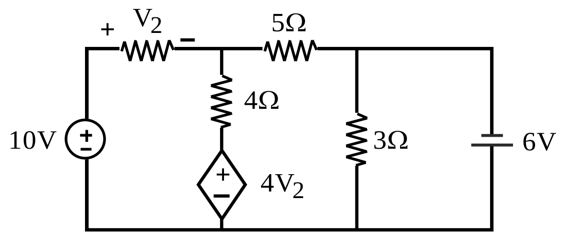

Figure 3

b) Determine the current in the 5Ω resistor in the network shown in figure 4. **8**

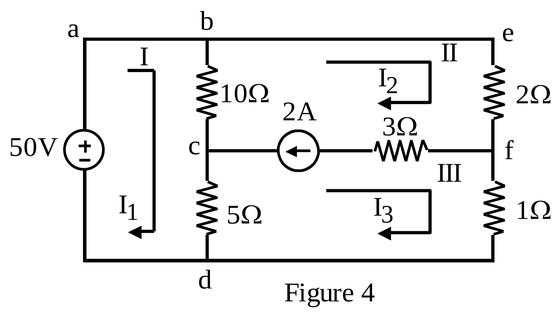

Figure 4

3. a) Verify the reciprocity theorem for the network shown in figure 5. **8**

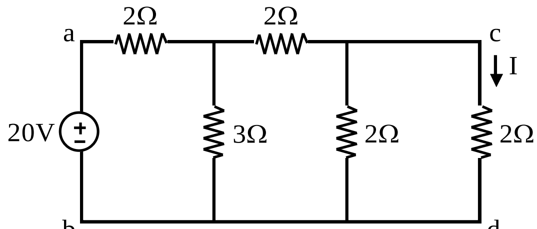

Figure 5

b) Determine the current flowing through the 5Ω resistor in the circuit shown in figure 6 by using Norton's theorem. **8**

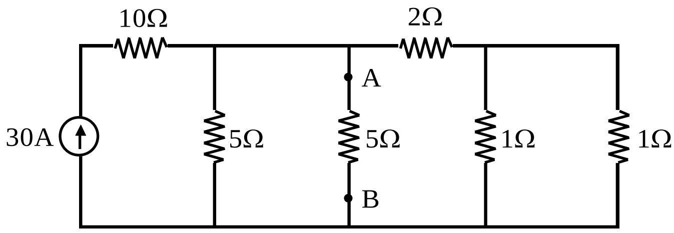

Figure 6

OR

4. a) Using the compensation theorem, determine the ammeter reading where it is connected to the 6Ω resistor as shown in figure 7. The internal resistance of the ammeter is 2Ω. **8**

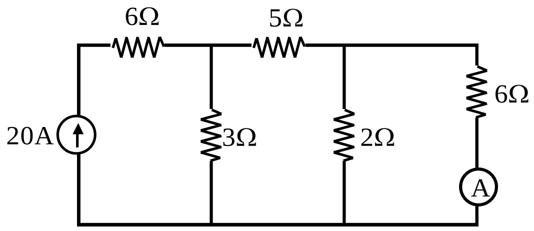

Figure 7

b) State and discuss superposition theorem. **8**

5. a) Obtain the complex impedance for the ckt shown in figure 8. Also draw impedance diagram. **8**

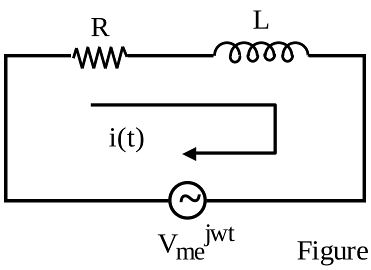

Figure 8

b) Determine the maximum power delivered to the load in the ckt shown in figure 9. **8**

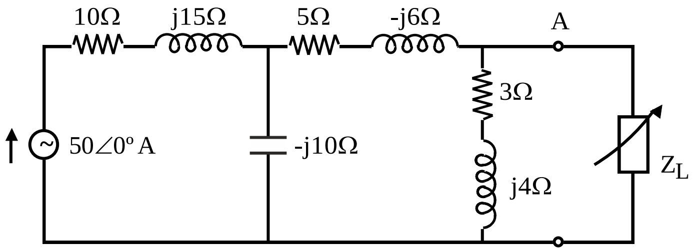

Figure 9

OR

6. a) Determine the power factor and the power dissipated in the circuit shown in figure 10. **8**

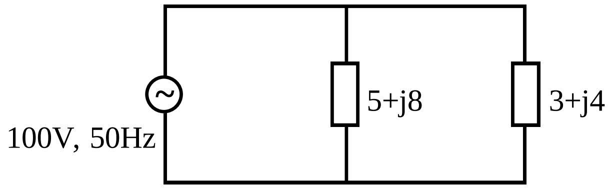

Figure 10

b) State and discuss Thevenin's theorem for a. c. circuits. **8**

7. a) Obtain the sinusoidal response of series R-L circuit shown in figure 11. **8**

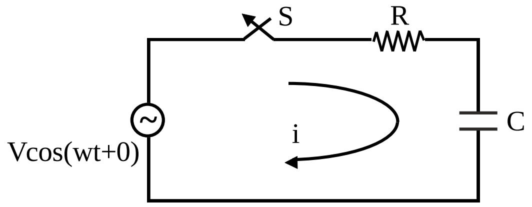

Figure 11

b) The circuit shown in figure 12 consists of resistance, inductance and capacitance in series with a 100V constant source when the switch is closed at t = 0. Find the current transient. **8**

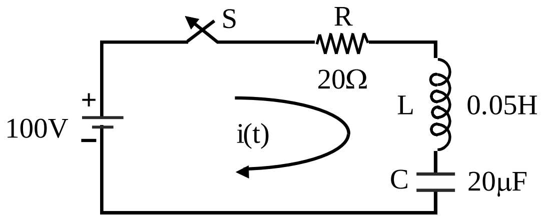

Figure 12

OR

8. a) A series RL circuit with R = 30Ω and L = 15H has a constant voltage V = 60V applied at t = 0 as shown in figure 13, Determine the current i, the voltage across resistor and the voltage across the inductor. **8**

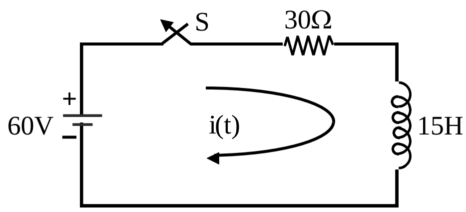

Figure 13

b) Obtain the dc response of an series R-L-C circuit shown in figure 14. **8**

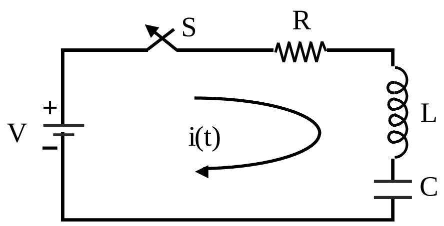

Figure 14

9. a) State the properties of Fourier transform prove any two properties of Fourier transform. **8**

b) For the circuit shown in figure 15, find the output voltage $V_o(t)$ by using the Fourier transform method. **8**

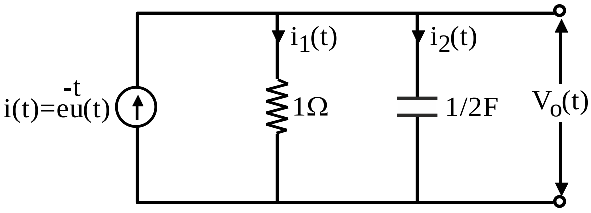

Figure 15

OR

10. a) Find the trigonometric Fourier series for the triangular even waveform shown in figure 16. **8**

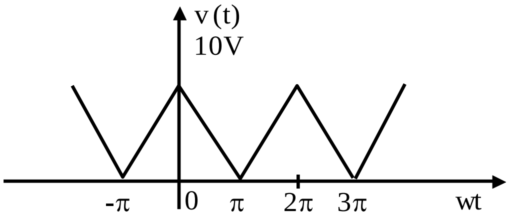

Figure 16

b) Find the Fourier transform of a periodic pulse train shown in figure 17. **8**

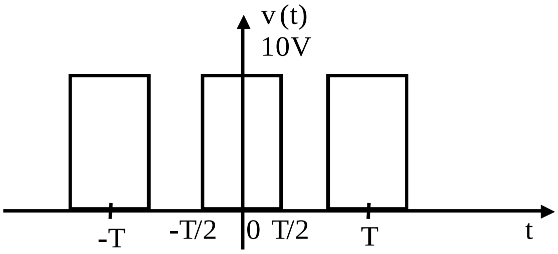

Figure 17

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