IN 303 - Network Theory

P. Pages : 4

Time : Three Hours

0924

GUG/S/18/3782

Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
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.

1. a) State & explain Kirchhoff's voltage law? Also determine the voltage drop across the 10Ω resistance in the ckt as shown in fig. 1 (a). **8**
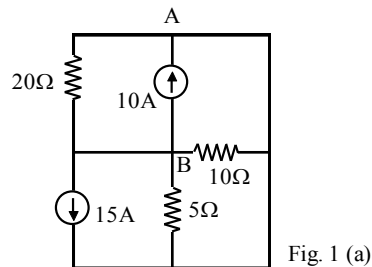

Fig. 1 (a)

b) Explain the term with example. **8**
i) Graph of network
ii) Tree & link
iii) Tie set
iv) Cut set

OR

2. a) Explain the term with suitable example **8**
i) Super mesh
ii) Super node

b) Find the power delivered by the 5A current source in the circuit shown in fig. 2 (a) by using nodal analysis. **8**
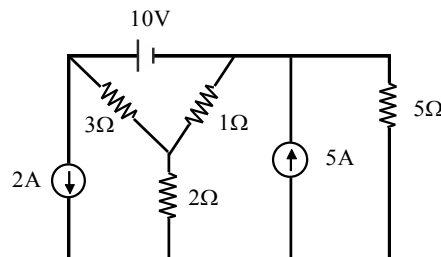

Fig. 2 (a)

3. a) State the following theorem with example. **8**
i) Reciprocity theorem.
ii) Compensation theorem.

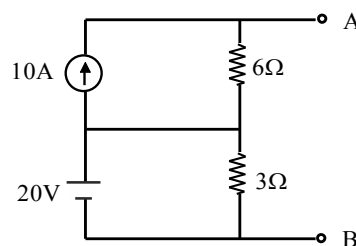b) Replace the given network in fig 3 (b) by single current source in parallel with resistance with values of each? **8**

Fig. 3 (b)

4. a) What do you mean by dual network? Draw the dual circuit for the given below network fig 4 (a). **8**
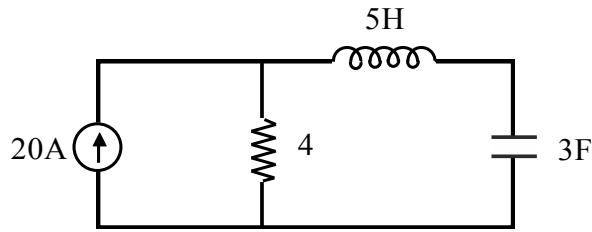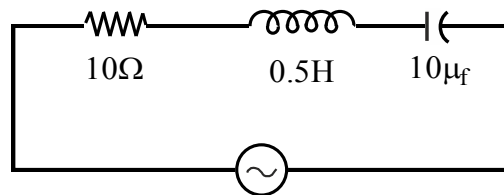

Fig. 4 (a)

b) Define maximum power transfer theorem in D.C. circuits & Also derive the necessary condition for maximum power transfer. **8**

5. a) Determine the total impedance, current I in the circuit & phase angle ϕ bet^n V & I. Also find the voltage across each element in the ckt. given below (fig 5 A). **8**
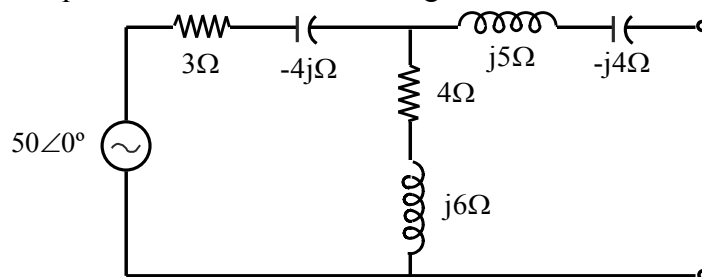

v_3 50v, $50\,H_z$ Fig. 5 (a)

b) A sine wave of V (t) = 200 sin 50t is applied to 10Ω resistor in series with coil. The reading of a voltmeter across the resistor is 120V & across the coil 75V. Calculate the power & reactive power. In the coil and power factor of the circuit. **8**

6. a) Find the Thevenin's equivalent circuit for following network bet^n terminal A & B. **8**

b) Draw phase relation ship between voltage & current for (i) Series RL circuit and (ii) Series RC circuit. **8**

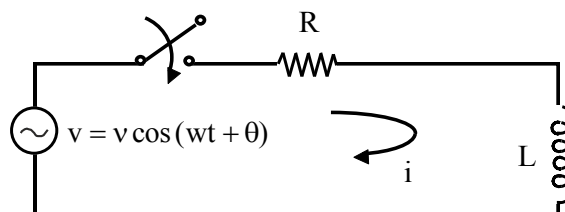**7.** a) Obtained the response for series R-L network in terms of current i after switch is closed in fig. **8**

Fig. 7 (a)

b) Determine the current expression i (t) after $t = 0_+$ when switch is connected to position 2 after long period of time at 1 show in. fig 7 (B). **8**
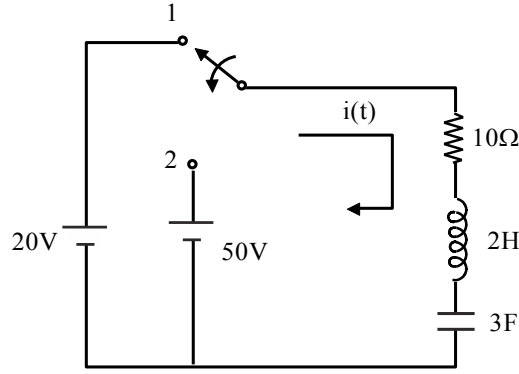

Fig. 7 (b)

OR

8. a) Find the transient response for R-C network excited by sinusoidal source in the following fig 8 A. **8**
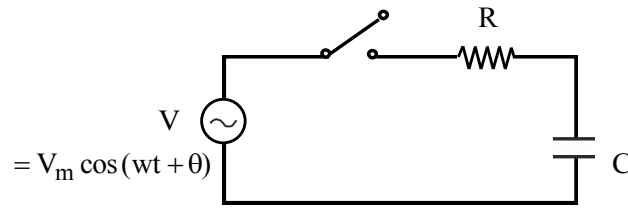

Fig. 8 (a)

b) Determine the current equation i_1 & i_2 when switch is closed at $t = 0$ in the circuit shown in fig 8 (b). **8**
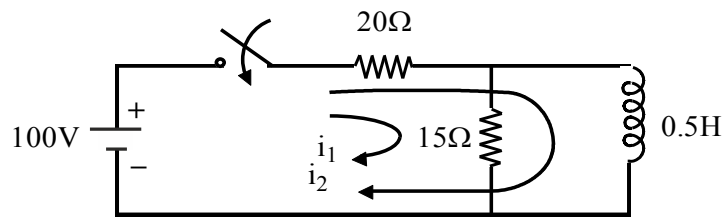

Fig. 8 (b)

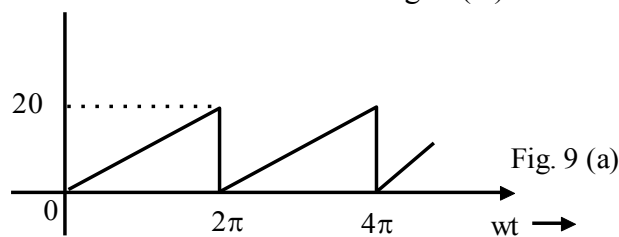**9.** a) Find the Fourier series for the waveform shown in fig. 9 (A). **8**

Fig. 9 (a)

b) Justify the meaning of Fourier transform and state any three properties of fourier transform. **8**

OR

10. **a)** Calculate the Fourier series term for halfwave rectified sine wave shown in fig 10A and also sketch the spectrum. **8**
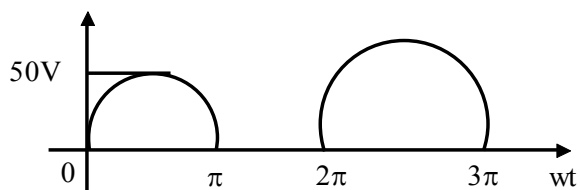

50V

0   π   2π   3π   wt

Fig.10(a)

b) Find the Fourier transform of the following pulse shown in fig 10 (B). **8**

50V

−T   −T/2   O   +T/2   T

Fig. 10 (b)

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