USN | | | | | | | | | | | 17EE32

Third Semester B E Degree Examination, December 2018

Electric Circuit Analysis

Time: 3 Hours **Max. Marks: 100**

Note: Answer FIVE full Questions choosing one full question from each module.

1.

a. Reduce the network into equivalent circuit between A & B terminals by star-delta transformation for the network shown in fig (1.a). 10M

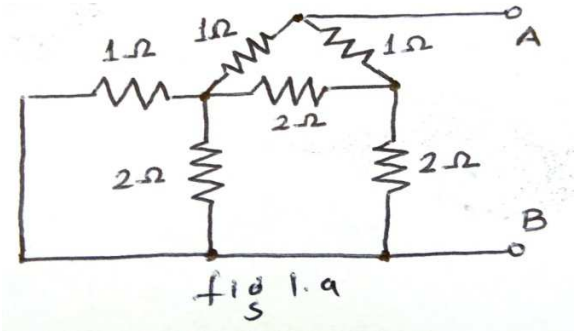


fig 1.a

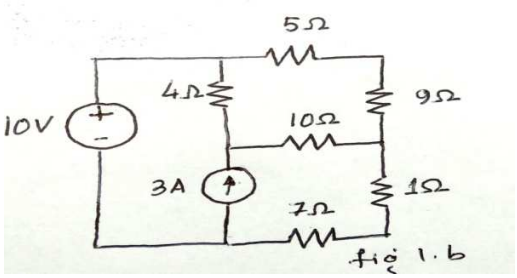


fig 1.b

b. Using mesh current analysis finds loop currents for the circuit shown in fig (1.b). 10M

OR

2.

a. Using source transformation find the power delivered by 50 V source in given network of fig 2 (a) 10M

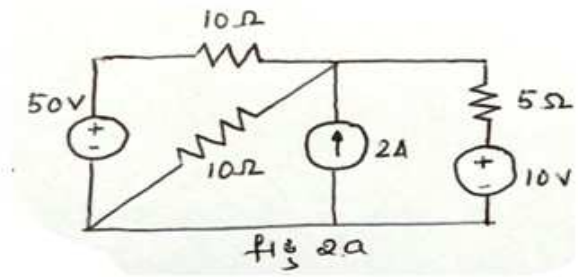


fig 2a

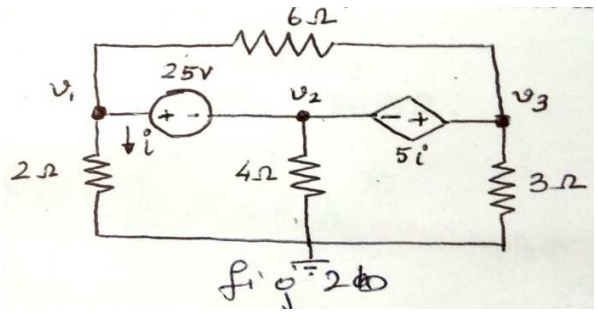


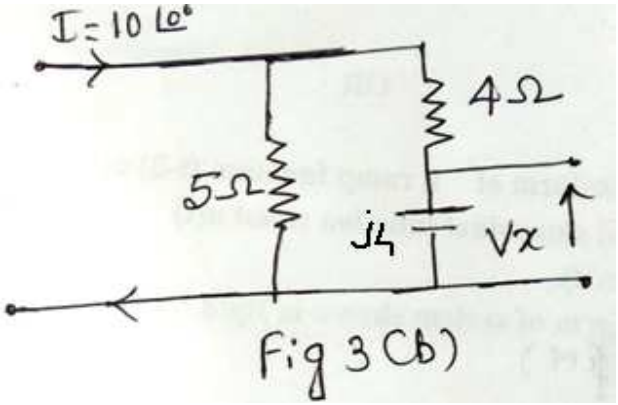
fig Q.2b

b. Find all node voltages for the circuit shown in fig (2.b) using node analysis.

3.

a. State and prove Superposition Theorem. 10M

b. Prove Reciprocity Theorem for the circuits shown in fig (3.b). 10M



OR

4.

a. Find the Thevenin's equivalent ckt of the ckt shown in fig(4.a). 10M

b. Find Norton's equivalent circuit at the terminals shown in fig (4.b). 10M

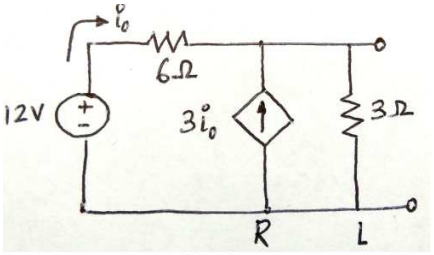
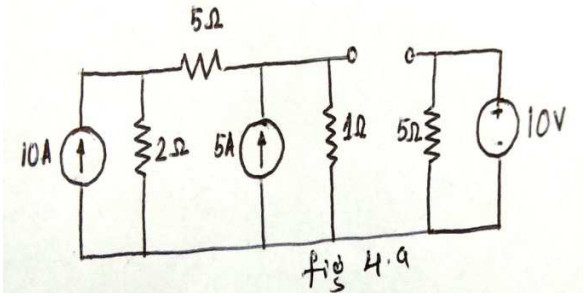


fig 4.b



5.

a. Show that in series resonant circuit the resonant frequency is equal to the geometric mean of half power frequencies. 10M

b. A two branch anti resonance ckt contains L=0.4H & C=40 microF. Resonance is to be achieved by variation of R_L & R_C. calculate the resonant frequency for the following cases 10M

i. R_L=120 ohm, R_C=80 ohm

ii R_L=100 ohm, R_C=100 ohm

OR

6.

a. Show that

i. **The voltage of a capacitor cannot Change instantly. 10M**

ii The current in an inductor cannot change instantly.

b. **For the ckt sown in fig (6.b) find Vc at t=0+ & t=∞** **10M**

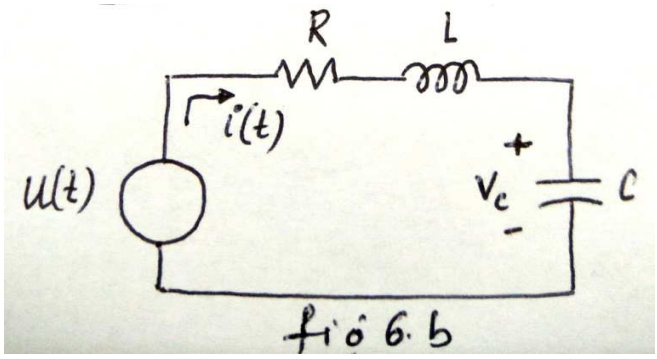


fig 6.b

7.

a. **State and Prove Initial and final value theorem.** **10M**

b. **Find Laplace of the saw tooth waveform shown in fig 7.b** **10M**

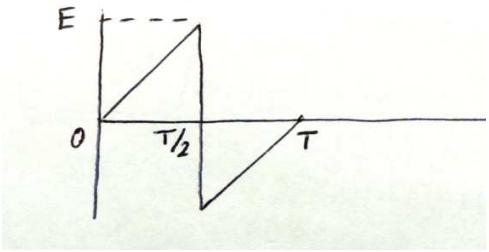


Fig 7.b

OR

8.

a. **Obtain the Laplace transform of i) ramp function (t-2) u(t) ii) exponential function e^{-at} u(t) iii) sinusoidal function sinωt u(t) iv) V(t)=4u(t-2)-3u(t) v)impulse function δ(t)u(t).** **10M**

b. **Obtain Laplace Transform of system shown in fig(8.b).** **10M**

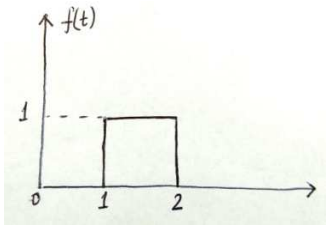


Fig 8.b

9.

a. **Define two port networks and Give expression for T parameters.** **10M**

b. **Following short circuit currents and voltages are obtained experimentally for a two port network: Determine Y parameters** **10M**

i) **With output short circuited I_1= 5mA ; I_2=-0.3mA and V_1=25 V**

ii) **With input short circuited I_1= -5mA; I_2=10mA and V_2=30 V**

OR

10.

c. Express Z parameters in terms of Y parameters. 10M

d. Following are the hybrid parameters for a network Determine the Y parameters for the network 10M

$$\begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ 3 & 6 \end{bmatrix}$$