

B.E. Instrumentation Engineering (MODEL CURRICULUM) Sem-III
IN305 : Network Theory

P. Pages : 3

Time : Three Hours



GUG/W/22/14013

Max. Marks : 80

- Notes :
1. Same answer book must be used for each section
 2. All questions carry equal marks.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Diagrams and Chemical equation should be given wherever necessary.

1. a) Write the node voltage equations and determine the currents in each branch for the network shown in fig. 1. 8

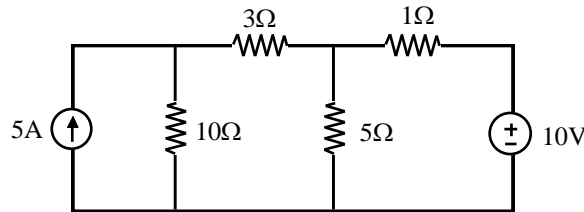


Fig. 1

- b) Write the mesh equations for the ckt shown in fig.2 and determine the currents I_1 , I_2 and I_3 . 8

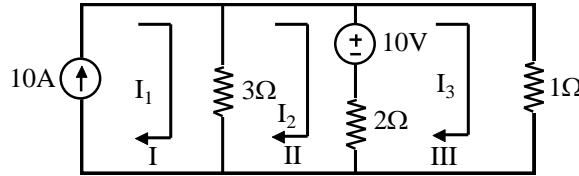


Fig. 2

OR

2. a) Determine the current in the 5Ω resistor in the network given in fig. 3. 8

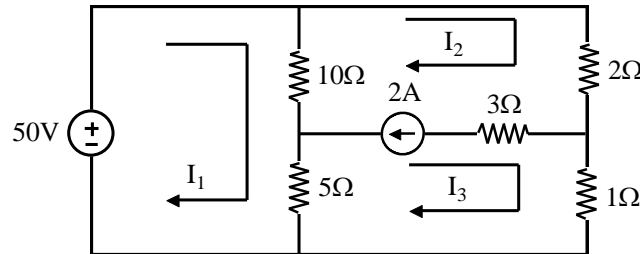


Fig. 3

- b) Determine the voltage ratio V_{out}/V_{in} for the circuit shown in fig. 4. 8

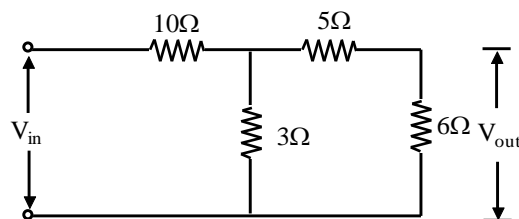


Fig. 4

3. a) State maximum power transfer theorem. Derive the condition for maximum power transfer in d.c. circuits. 8

- b) Find Thevenin's equivalent circuit for the circuit shown in fig. 5. 8

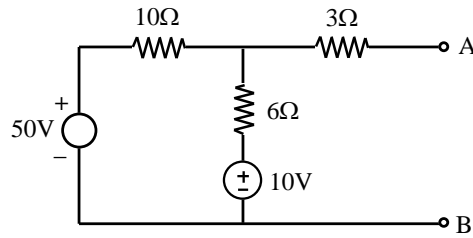


Fig. 5

OR

4. a) Determine Norton's equivalent circuit for the circuit shown in fig.6. 8

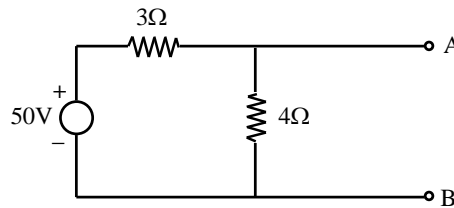


Fig. 6

- b) State and explain superposition theorem for d.c. circuits. 8

5. a) Calculate the total current in the circuit in fig. 7 and determine the voltage across resistor V_R , and across capacitor V_C . 8

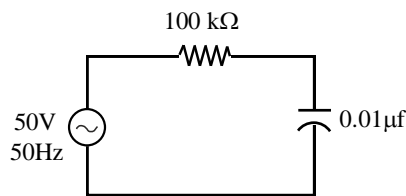


Fig. 7

- b) A sine wave of $v(t) = 200 \sin 50t$ is applied to a 10Ω resistor in series with a coil. The reading of a voltmeter across the resistor is 120V and across the coil, 75V. Calculate the power and reactive volt amperes in the coil and power factor of the ckt. 8

OR

6. a) Determine Norton's equivalent circuit between the output terminals, AB as shown in fig. 8 8

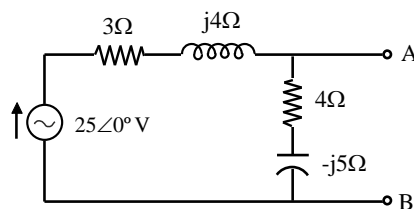


Fig. 8

- b) State and explain reciprocity theorem for a.c. circuits. 8

7. a) Obtain the dc response of an R-C circuit shown in fig. 9. 8

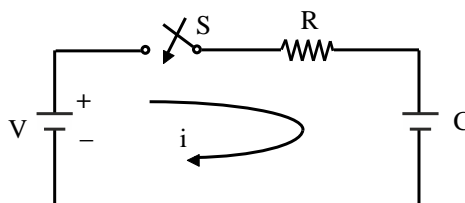


Fig. 9

- b) Determine the current i , the voltage across resistor and the voltage across inductor as shown in ckt fig 10. 8

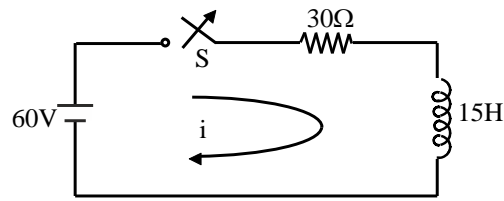


Fig. 10

OR

8. Obtain the sinusoidal response of R-L-C circuit shown fig.11. 16

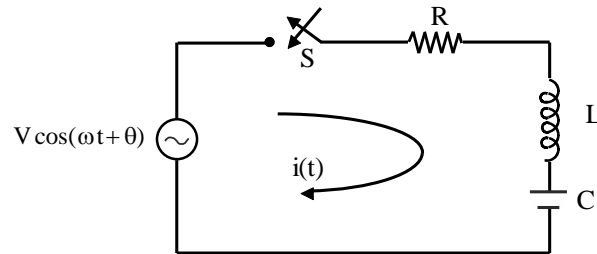


Fig. 11

9. a) Define and discuss the hybrid (h) parameters in the two port network. 8
- b) Find the y parameters for the network shown in fig. 12 8

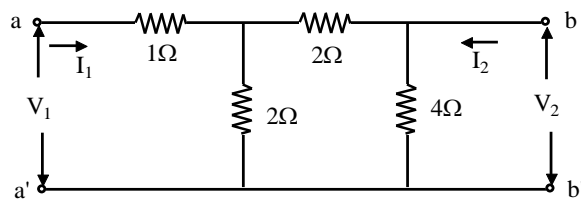


Fig. 12

OR

10. a) Define and discuss the open circuit impedance (z) parameters in the two port network. 8
- b) Find the ABCD circuit parameters for the circuit shown in fig. 13 8

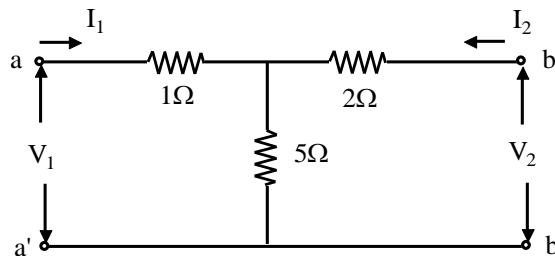


Fig. 13
