This question paper contains 6 printed pages.

3334 *Your Roll No.* .....

B.Tech. (EC) / I J

Paper EEC–104 – NETWORKS

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer any five questions.
All questions carry equal marks.

Assume missing data (if any).

1. (*a*) Differentiate between independent and dependent energy sources. Discuss the types of dependent energy sources.

   (*b*) Find i_1 and i_2 in fig. 1. 7+7

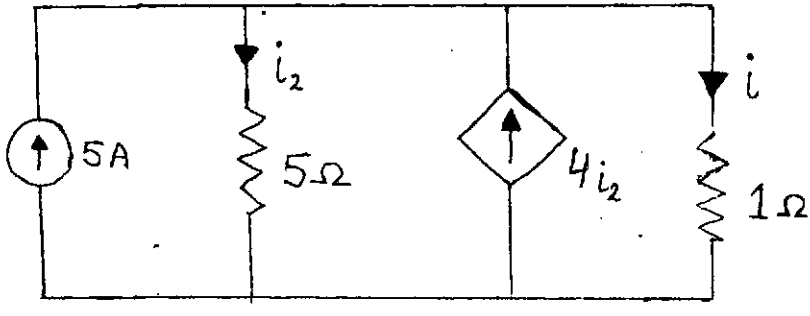

Fig.1

P. T. O.

2. (*a*) Find the current in the 5 Ω resistor for the circuit shown in Fig. 2 using Norton's theorem.

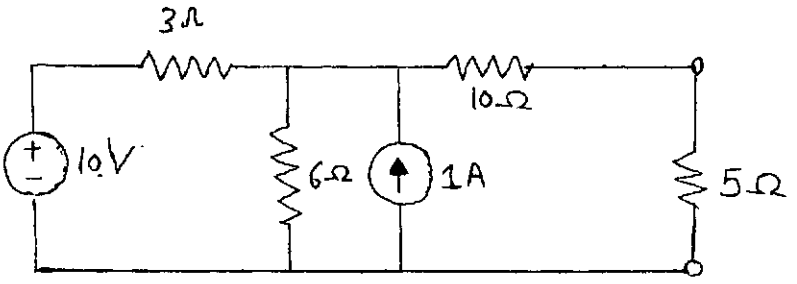

Fig. 2

(*b*) Find i_0 and i from the circuit of Fig. 3 using Superposition theorem. 7+7

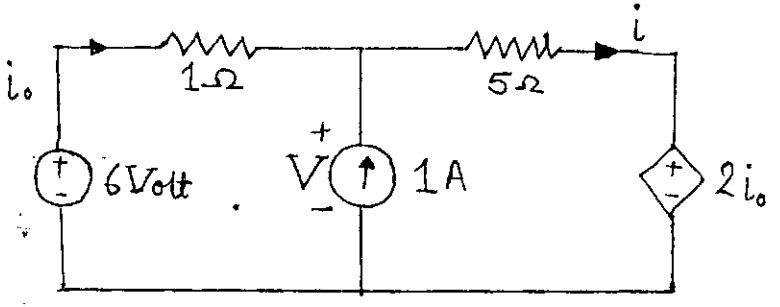

Fig. 3

3. (*a*) Determine the current through the 6 Ω resistor in the circuit of Fig. 4 using Thevenin's theorem.

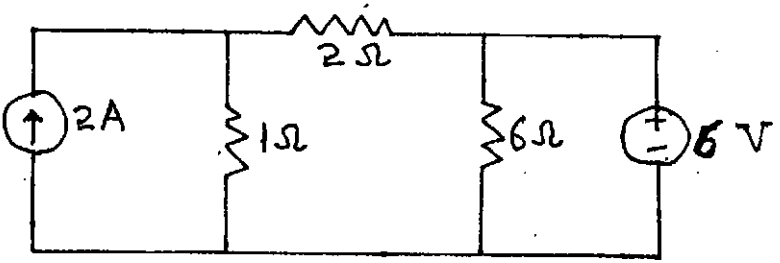

Fig. 4

(*b*) Prove that the power transfer from a dc source network to a resistive network is maximum when the internal resistance of the dc source network is equal to the load resistance. 7+7

4. (*a*) Find the load impedance in Fig. 5 for maximum power to the load. Find the amount of maximum power.

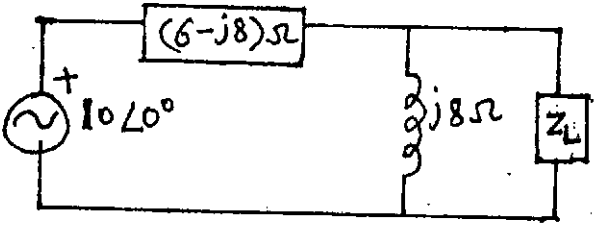

Fig. 5

P. T. O.

(*b*) In the network shown in fig. 6, $V_1=10$ V, $V_2=4$ V, $V_4=6$ V. Also $I_1=2$ A, $I_2=2$ A and $I_3=4$ A. Check the validity of Tellegen's theorem. 7+7

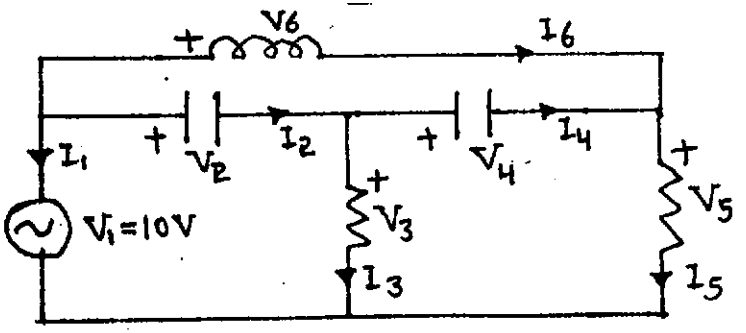

Fig. 6

5. (*a*) Using Nodal method, find the current through r_2 in Fig. 7.

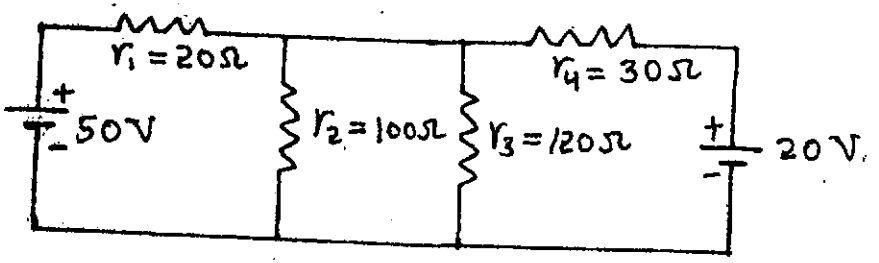

Fig. 7

(*b*) Find V_1 and V_2 in Fig. 8. 7+7

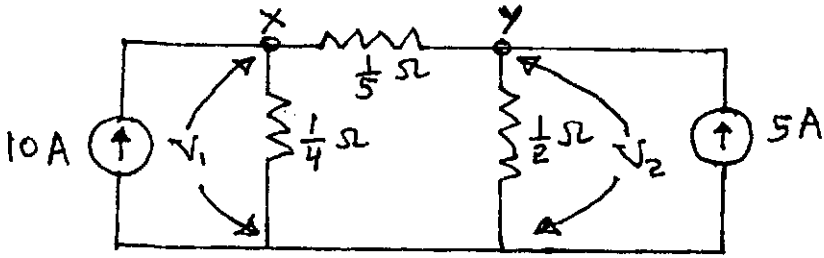

Fig. 8

6. (*a*) Find Z parameters of the following circuit shown in Fig. 9.

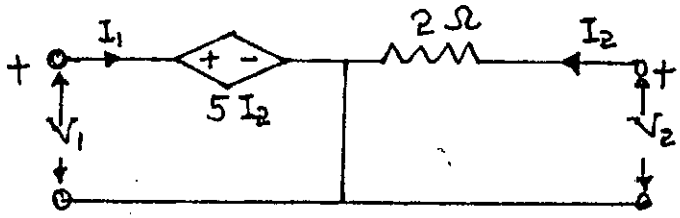

Fig. 9

(*b*) The Z parameters of a circuit are given by:

$$\begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}$$

Obtain the transmission parameters. 7+7

P. T. O.

7. (*a*) From given Z parameters, find ABCD parameters.

   (*b*) Find ABCD parameters in terms of *h*-parameters.

7+7

8. (*a*) State initial and final value theorem in Laplace transformation.

   The current through a circuit element is $\frac{4s^2}{(s+7)}$.

   Find the current in *t* domain as $s \to 0$ and $s \to \infty$.

   (*b*) In Fig. 10, the battery voltage is applied for a steady state period. Obtain the complete expression for the current after closing the switch K. Assume $R_1 = 1\ \Omega$, $R_2 = 2\ \Omega$, $L = 1$ H, $E = 10$ V.

7+7

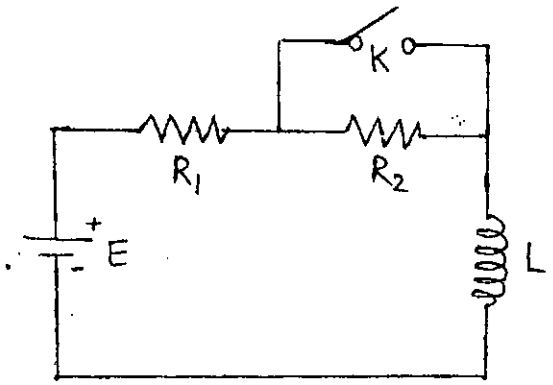

Fig.10

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