(b) For the network given, draw the graph and a tree. Show the link currents. Write the tie-set schedule for the tree, the equations for branch currents in terms of link currents. Also write independent equations. (13)

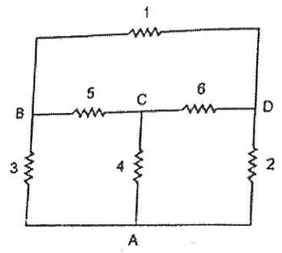

Fig. Q. 15 (b)

PART C — (1 × 15 = 15 marks)

16. (a) A series circuit containing pure resistance and pure inductance the current and voltages are $i(t)=5\sin\left(314+\frac{2\pi}{3}\right)$ and $v(t)=20\sin\left(314+\frac{5\pi}{6}\right)$

(i) What is the impedance of the circuit?

(ii) What are the values of resistance, inductance and power factor?

(iii) What is the power drawn by the circuit?

Or

(b) When a voltage of 100 V at 50Hz is applied to chocking coil 1, the current taken is 8 A and the power is 120 W. When the same supply is applied to chocking coil 2, the current is 10 A and the power is 500 W. Find the current and power when the supply is applied to two coils connected in series.

10/01/23 - FN.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 70082

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Second Semester

Electronics and Communication Engineering

EC 3251 – CIRCUIT ANALYSIS

(Common to: Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Summarize the basic mesh analysis procedure.

2. State Ohm's law and its limitations.

3. Three resistors $10\Omega, 5\Omega$ and 20Ω are connected in star. What are the equivalent delta resistors?

4. Define dual networks. List out four pairs of dual quantities.

5. What is admittance? What are its components?

6. Give the relation between apparent power, average power and relative power.

7. An RLC series circuit has $R=10\Omega, XC=62.833\Omega$. Find the value of L for resonance at 50HZ.

8. Write the characteristics of series resonance.

9. Define mutual inductance and write an expression for it.

10. State the dot rule for coupled circuit.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Define the terms Nodes, Branches, Loops and Meshes. (5)

(ii) Find the number nodes, branches, loops and meshes present in the given circuit. (8)

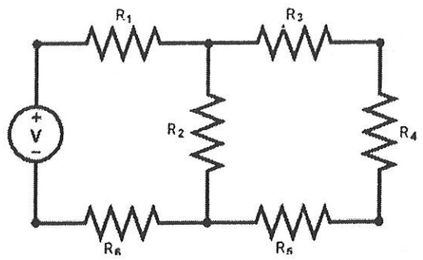

Fig. Q. 11 (a)

Or

(b) (i) State and Explain Kirchhoff's laws. (10)

(ii) List the difference between series and parallel circuits. (3)

12. (a) Determine the current I in the network by using Thevenin's theorem. (13)

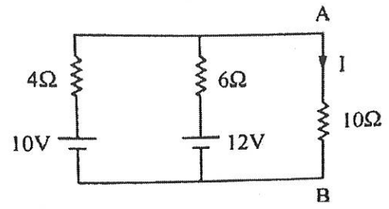

Fig. Q. 12 (a)

Or

(b) Find the current through 23Ω resistor of the given circuit using superposition theorem. (13)

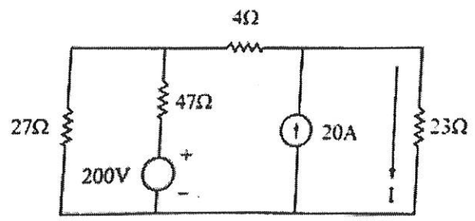

Fig. Q. 12 (b)

13. (a) In a RLC series circuit, the applied voltage is 5V. Drops across the resistance and inductance are 3V and 1V respectively. Calculate the voltage across the capacitor. Draw the phasor diagram. (13)

Or

(b) Use nodal voltage method to find the power dissipated in the 10Ω resistor on the circuit shown in the figure. Q. 13 (b) (13)

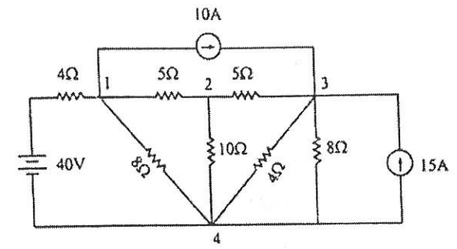

Fig. Q. 13 (b)

14. (a) A series RLC circuit has R =50Ω, L = 0.2H and C =50 μF. Constant voltage of 100V is impressed upon the circuit at t = 0. Find the expression for the transient current assuming initially relaxed conditions. (13)

Or

(b) For the circuit shown, determine the currents i_1 and i_2 when the switch is closed at t =0. Assume that the initial current through the inductor is 0. (13)

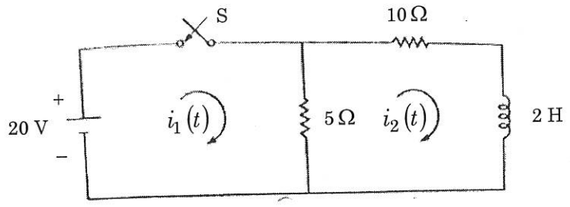

Fig. Q. 14 (b)

15. (a) For the given coupled circuit, find the voltage across the 5 Ω resistor. (13)

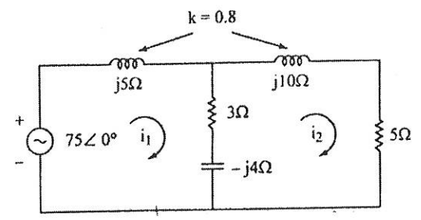

Fig. Q. 15 (a)

Or