12526

3 Hours / 70 Marks   Seat No. ⬚⬚⬚⬚⬚⬚⬚⬚

Instructions –   (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answer with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   **Attempt any FIVE of the following:**   **10**

a) Define :–

   i)   Node

   ii)   Branch

b) State Kirchoff's Voltage Law (KVL).

c) Define Two port network.

d) State maximum power transfer theorem.

e) State characteristics of series resonant circuit. (Any four points)

f) Define :–

   i)   Apparent Power

   ii)   Active Power.

g) Parallel circuit is called as a Rejector circuit. Justify.

Marks

2. **Attempt any THREE of the following:** 12

a) Write the mathematical equations of short circuit Y parameters. State expressions of Y_{11}, Y_{12}, Y_{21} and Y_{22}.

b) Calculate the current flowing through 6Ω resistor, using Nodal analysis as shown in Figure No. 1.
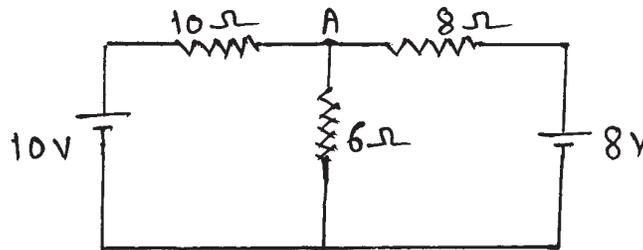
Fig. No. 1

c) Draw circuit diagram and phasor diagram of series RC circuit.

d) Obtain the Thevenin's equivalent circuit for the network shown in Figure No. 2.
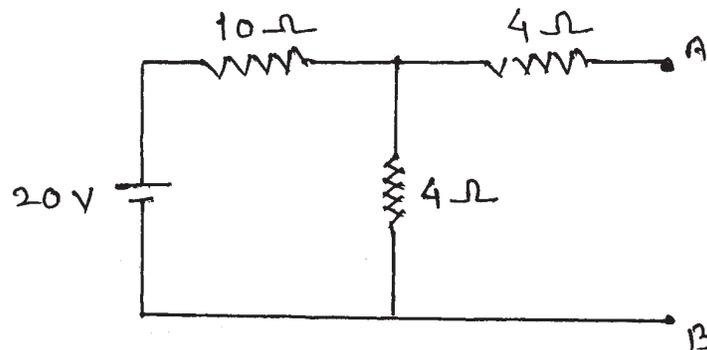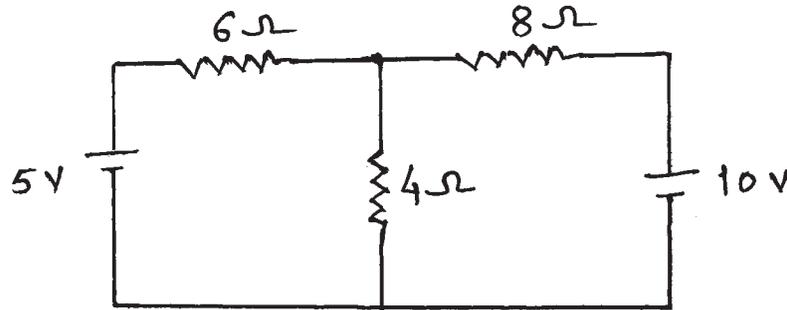
Fig. No. 2

3. **Attempt any THREE of the following:** 12

a) Find equivalent resistance across points AB in the given network as shown in Figure No. 3.
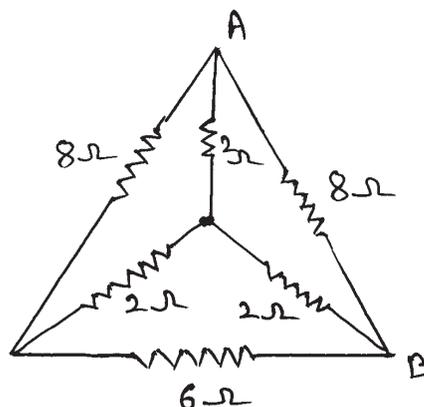
Fig. No. 3

b) Draw RL series – C and parallel to series combination of RL circuit and it's phasor diagram.

c) Using superposition theorem, find current through 4Ω resistor as shown In Figure No. 4.

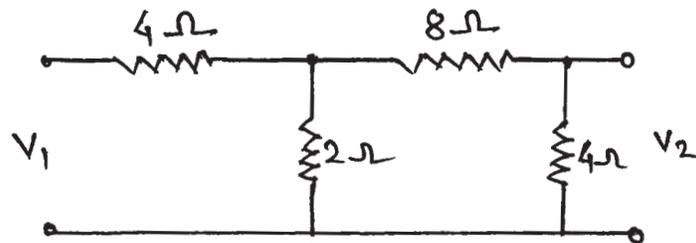**Fig. No. 4**

d) A series RLC circuit consists of R = 1KΩ, L = 50mH and C = 20μF. The applied voltage across the circuit is 100 V. Find :–

i)   Resonant frequency of the circuit.

ii)   Quality factor (Q) at the resonant frequency.
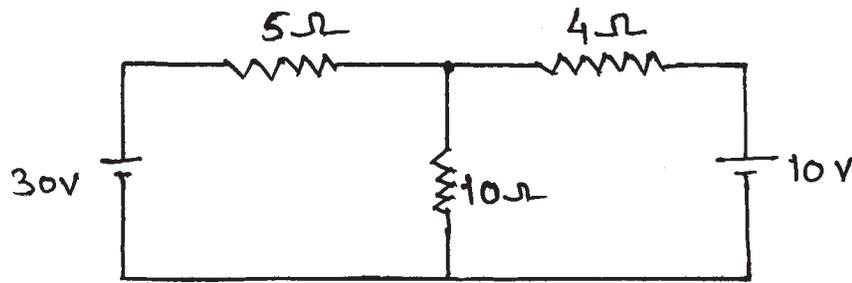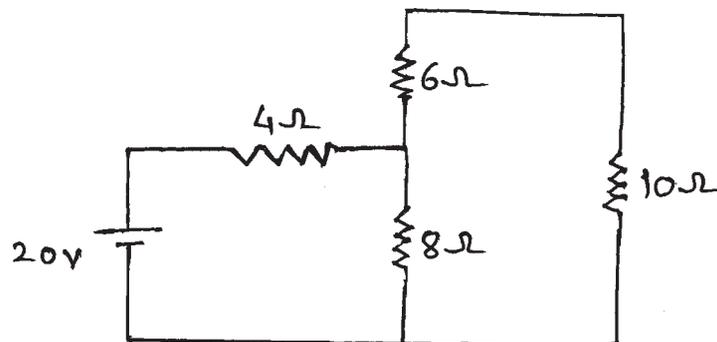
4.   **Attempt any THREE of the following:**   12

a) Find Z parameters of the given network shown in Figure No. 5.

Fig. No. 5

b) Using Mesh analysis, find current flowing through 10Ω resistor shown in Figure No. 6.

Fig. No. 6

c) An RC series circuit consists of R = 10Ω and C = 200μF. It is connected across 250V, 50Hz ac supply. Calculate :–

   i) Impedance Z

   ii) Current flowing through circuit

   iii) Power factor

   iv) Power consumed by circuit.

d) Verify reciprocity theorem for voltage and current shown in Figure No. 7.
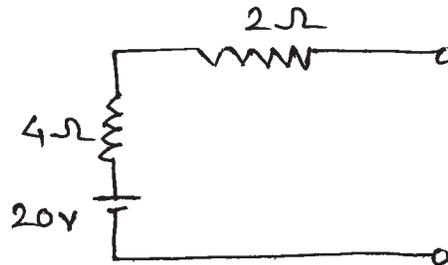

Fig. No. 7

e) Compare series and parallel resonant circuit. (Any four points)
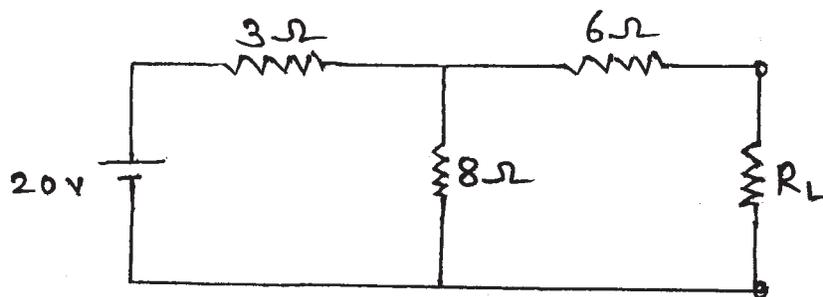
5. **Attempt any TWO of the following:**   **12**

a) A resistance of 20Ω, inductance of 0.2 H and capacitance of 100μF are connected in series across 200V, 50Hz AC supply. Find :–

   i) Impedance

   ii) Current flowing through circuit

   iii) Power factor

   iv) Power consumed by the circuit.

b) i) Explain ideal voltage source and practical voltage source with neat diagram.

ii) Convert the given voltage source into equivalent current source as shown in Figure No. 8.

Fig. No. 8

c) i) State Norton's Theorem.

ii) Find Norton's equivalent circuit for network shown in Figure No. 9.

Fig. No. 9

6. **Attempt any TWO of the following:** 12

a) Draw ideal frequency response of Passive Low Pass and High Pass filter. List any four applications of Passive Low Pass filter.

b) Derive the expression of resonant frequency in parallel resonant circuit and draw phasor diagram at resonant condition also write the expression of dynamic impedance.

c) State Thevenin's theorem. Write the stepwise procedure to find current through resistance using Thevenin's theorem.