22330

24225

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) Admittance

ii) Conductance

b) Draw the phasor diagram of R-L series circuit.

c) Define Q factor for series RLC circuit.

d) Write the formula for delta to star conversion.

e) Draw –

i) Ideal voltage source

ii) Practical current source.

f) State maximum power transfer theorem.

g) Write equation of open circuit Z parameters.

P.T.O.

Marks

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

a) Draw circuit of series R-C circuit, its phasor diagram, waveform of voltage and current in the circuit.

b) Compare series and parallel resonance on the basis of –

i) Resonant frequency

ii) Impedance

iii) Current

iv) Magnification.

c) Write steps to convert practical voltage source into practical current source.

d) State superposition theorem. Write steps to find current in an element using superposition theorem.

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

a) Explain concept of initial and final condition in switching circuits for elements R and L.

b) Drive expression for resonant frequency of R-L-C series circuit.

c) Find the current in 6Ω resistor in the circuit shown in Figure No. 1 using mesh analysis.

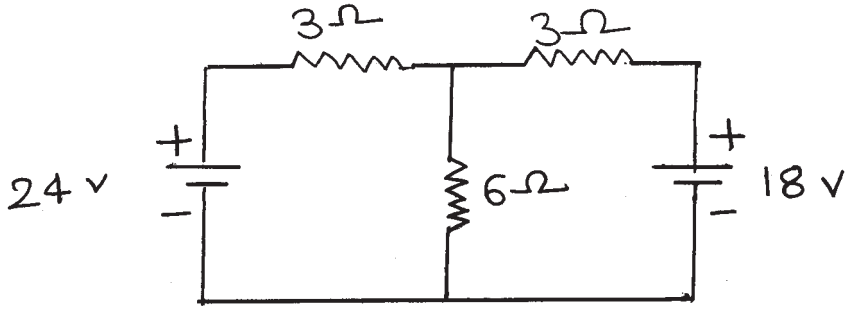


Fig. No. 1

d) State the condition for maximum power transfer theorem. Write steps to find current in the load by maximum power transfer theorem.

Marks

4. Attempt any <u>THREE</u> of the following: **12**

a) A series resistance of 20Ω, inductance of 0.2H and capacitance of 100 μF are connected in series across a 220 V, 60 Hz supply. Determine –

i) Impedance

ii) Current

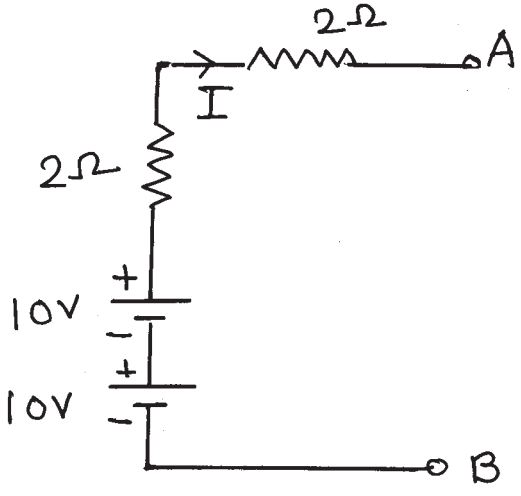
iii) Active power

iv) Apparent power.

b) An R-C series circuit consists of R = 10Ω and C = 200 μF. It is connected across 250 V, 50 Hz 1ϕ AC supply. Calculate the value of power consumed by the circuit.

c) Two impedances Z_1 = 10 + j5 and Z_2 = 8 + j9 are connected in parallel across a voltage source of V = 200 + j0. Calculate the circuit current and branch currents. Draw the vector diagram.

d) Using source transformation technique find resultant current I through the circuit given in Figure No. 2.



<u>Fig. No. 2</u>

e) Find the current in 100Ω resistance of Figure No. 3 using superposition theorem.

Marks

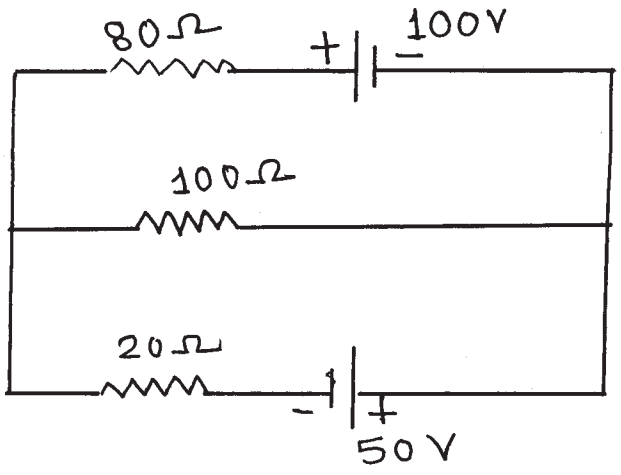


Fig. No. 3

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

a) A circuit having a resistance of 5Ω, inductance of 0.4 H and capacitance in series connected across 100 V, 50 Hz supply. Calculate –

i) Value of capacitance to give resonance

ii) Impedance

iii) Current at resonance

iv) Voltage across resistor

v) Voltage across inductor

vi) Q factor of resonance.

b) Find current through 6Ω resistor in circuit given in Figure No 4 using Thevenin's theorem.

Marks

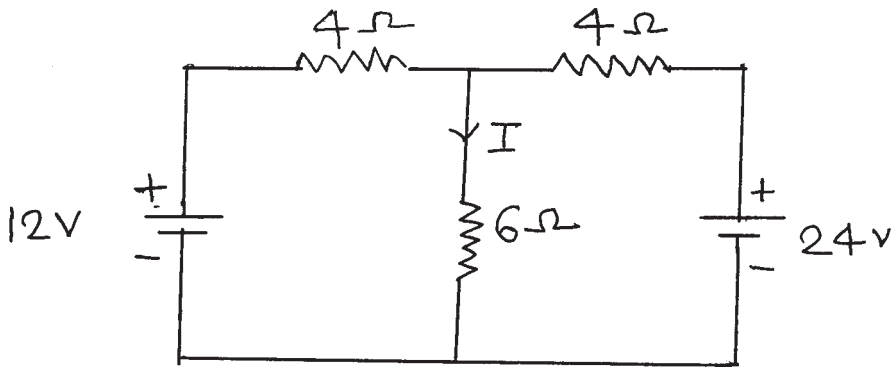


Fig. No. 4

c) Draw the two port network and determine the indicated parameter for the following configuration –

i) Cascade configuration

ii) Series configuration

iii) Parallel configuration.

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

a) Find current in 40Ω and 10Ω resistor in circuit given in Figure No. 5 using nodal analysis method.

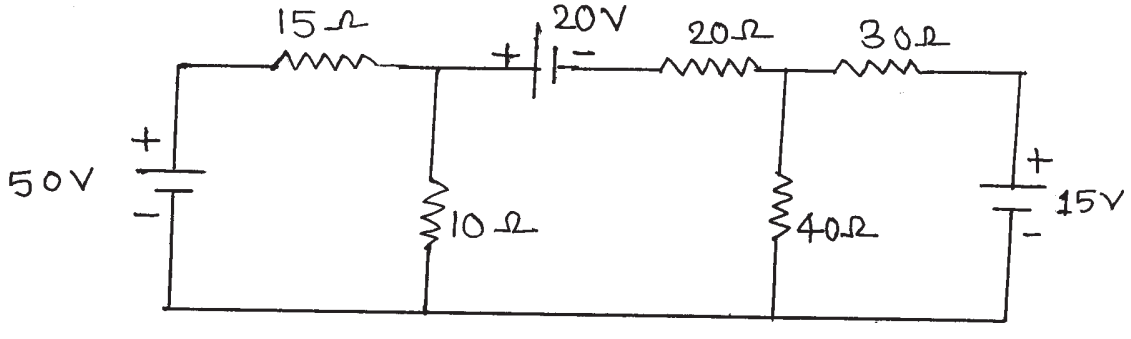


Fig. No. 5

b) Verify the reciprocity theorem for the network given in Figure No. 6.

Marks

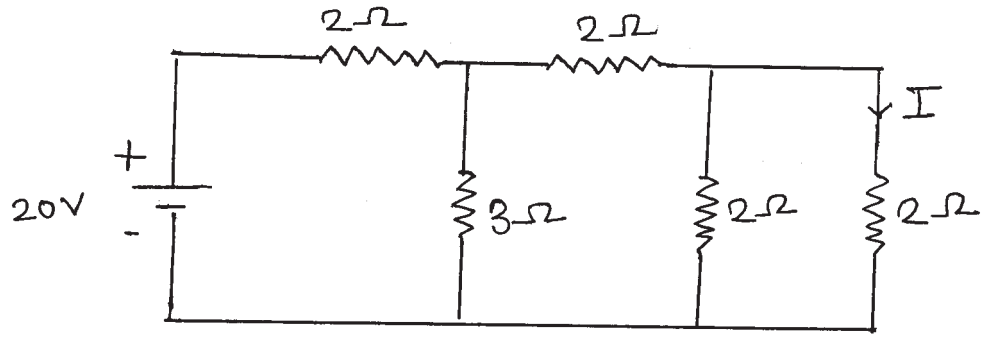


Fig. No. 6

c) Find Z parameters for the network given in Figure No. 7.

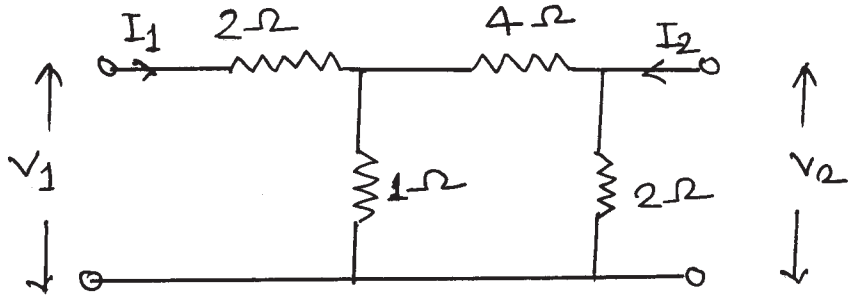


Fig. No. 7