22330

23124

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

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) 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) Apparent power

ii) Active power

b) Write the equation of resultant of series R-C circuit.

c) Define quality factor of parallel resonance circuit. Give equation of it.

d) Define the term source transformation.

e) State Nortan's theorem.

f) Write the equations of closed circuit Y parameters.

g) Define resonant frequency of a series resonant circuit and state its expression.

Marks

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

a) Draw circuit of series R-L-C circuit and sketch phasor diagram, waveform of V and I in the circuit.

b) Explain the meaning of resonance in series RLC circuit. Derive expression of resonant frequency in RLC series circuit.

c) State Thevenin's theorem and write stepwise procedure for Thevenin's theorem.

d) Explain the formulaes of ABCD parameters.

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

a) State and explain superposition theorem.

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

i) Resonating frequency

ii) Impedance

iii) Current

iv) Magnification.

c) Draw phasor diagram, voltage and current waveform of parallel R-C circuit.

d) Draw the star and delta conversion, state conversion formula for any one.

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

a) A coil having 10Ω resistance and 0.1 H inductance is connected across 230V, 50Hz ac supply. Calculate –

i) Impedance

ii) Current

iii) Power factor

iv) Power absorbed by the coil.

Marks

b) Use Mesh analysis to find current through 4Ω resistance. Figure No. 1.

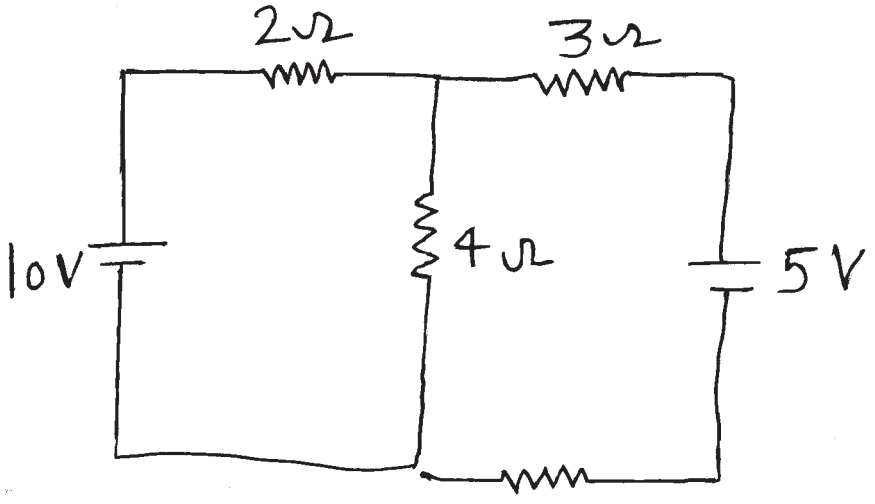

Fig. No. 1

c) A coil has an inductance of 0.02 H and resistance of 5 Ohm. It is supplied with 100 V, 50 Hz a.c. supply. Determine the current taken by the coil. Also find the power factor of the coil and power consumed by it.

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

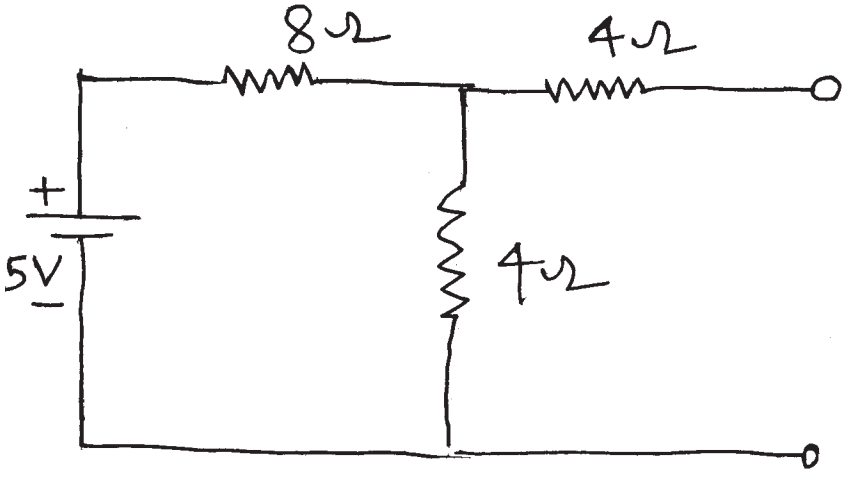

Fig. No. 2

e) Explain Z parameters of two port network in detail.

Marks

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

a) Draw the two port network and determine the indicated parameters for the following configurations –

i) Series configurations

ii) Parallel configurations

iii) Cascade configuration.

b) Using superposition theorem find current in 3Ω resistor in Figure No. 3 and also state any two drawbacks of superposition theorem.

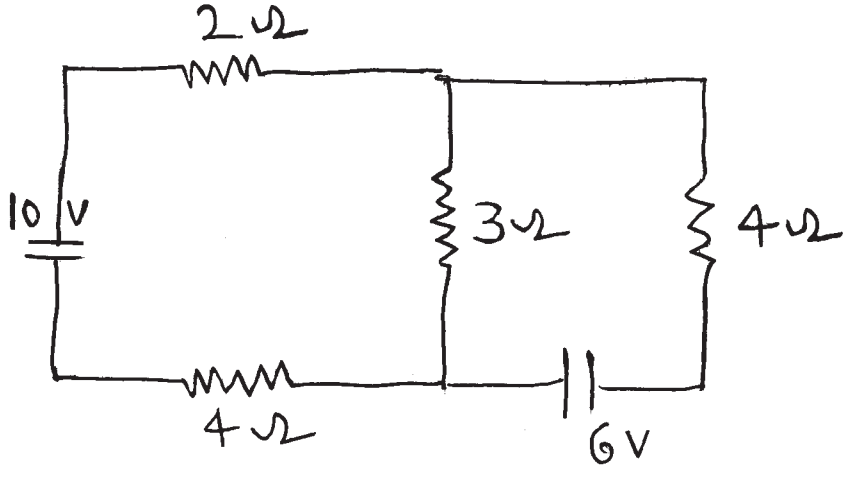

Fig. No. 3

c) State Kirchhoff's current law and using nodal analysis, find current through 4Ω resistance of the given circuit shown in (below) Figure No. 4

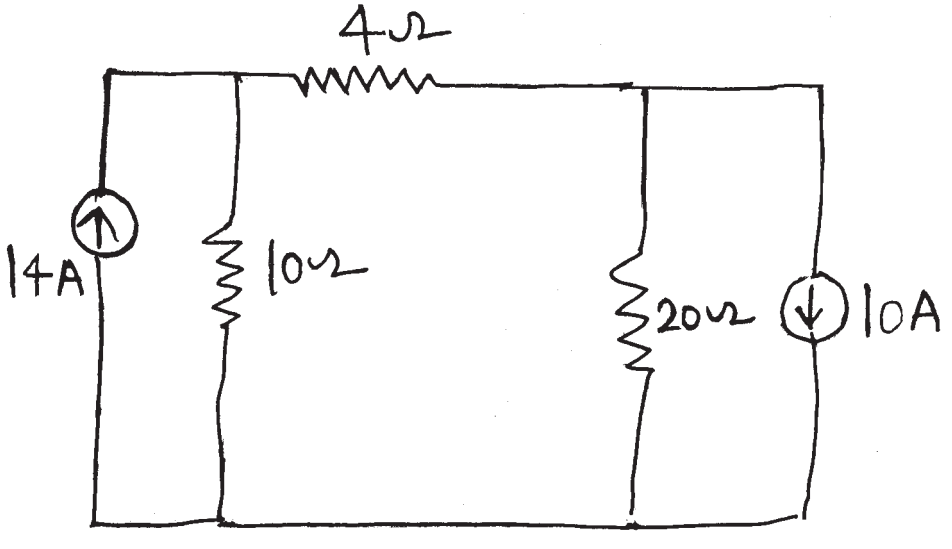

Fig. No. 4

Marks

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

a) Two circuits the impedances of which are given by $Z_1 = 6 + j8$ and $Z_2 = 8 - 6j$ Ohm are connected in parallel. If the applied voltage the combination is 100 V find –

i) Current and power factor of each branch.

ii) Overall current and power factor of the combination.

iii) Power consumed by each impedance and draw a neat phasor diagram.

b) A coil of resistance 20 Ohm and inductance of 200 μH is in parallel with variable capacitor. This combination is series with a resistance of 800 Ohm. The voltage of the supply is 200 V and a frequency of 10^6 Hz. Calculate –

i) Value of C to give resonance.

ii) The Q of the coil.

iii) Dynamic resistance of the circuit.

c) Verify reciprocity theorem for voltage and current shown in Figure No. 5

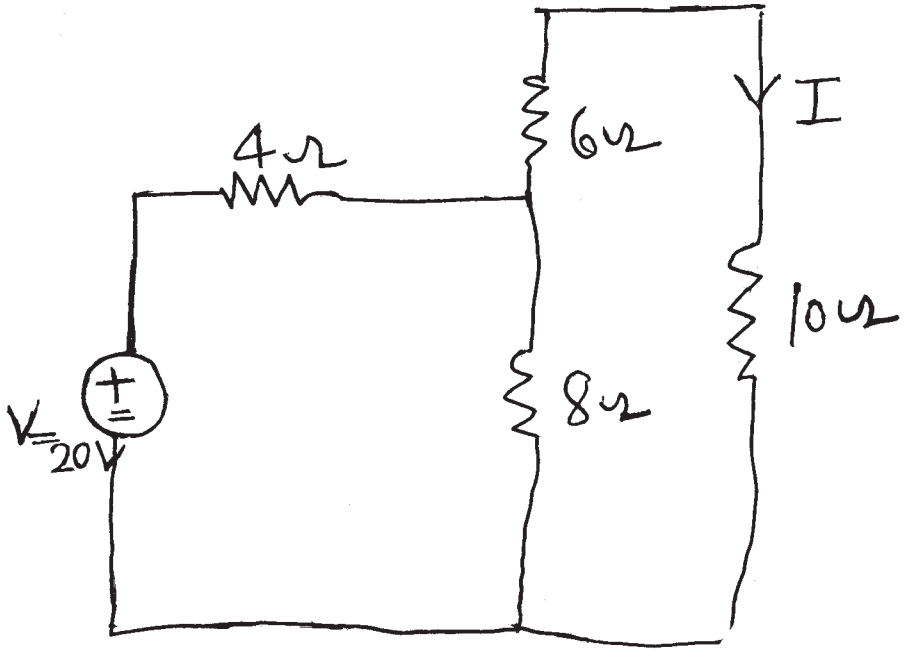

Fig. No. 5