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

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

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

(3) Illustrate your answers 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 the terms:

i) Mesh

ii) Node

b) State the reciprocity theorem.

c) Write the formula for following Z-parameters:

i) Z_{11}

ii) Z_{21}

d) What is pass band and stop band of filter?

e) Draw the phasor diagram for purely inductive circuit.

f) Define resonance in series RLC circuit. State the resonant frequency of series resonant circuit.

g) Draw well labeled diagram showing variation of impedance in parallel resonant circuit.

P.T.O.

Marks

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

a) Explain with suitable example, procedure to convert voltage source into its equivalent current source.

b) State Superposition Theorem. List the drawbacks of superpositions theorem. (Any two)

c) Give the comparison in between T and π attenuators. (Any four points)

d) A coil consists of 0.08 H inductance with resistance of 40 Ω connected to 230 V, 50 Hz supply. Find:

i) Impedance

ii) Reactance

iii) Current

iv) Power factor

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

a) Find the current in 6 Ω resistor in the circuit shown in the Fig. No. 1.

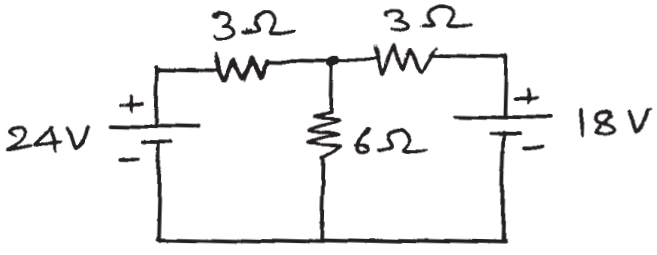

Fig. No. 1

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

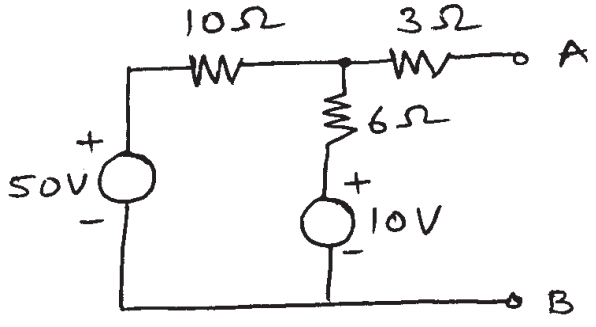

Fig. No. 2

Marks

c) For a 1Φ series RC circuit:

i) Draw the circuit diagram.

ii) Write voltage and current equation.

iii) Draw impedance triangle

iv) Draw phasor diagram.

d) Explain the variation of current and power factor in R-L-C series resonant circuit.

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

a) Determine the equivalent resistance between terminals A and B for a circuit shown in Fig. No. 3.

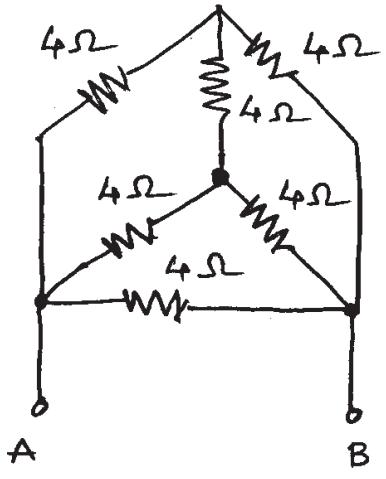

Fig. No. 3

b) Calculate the current flowing through 5Ω resistor using Norton's theorem for the circuit shown in the Fig. No. 4.

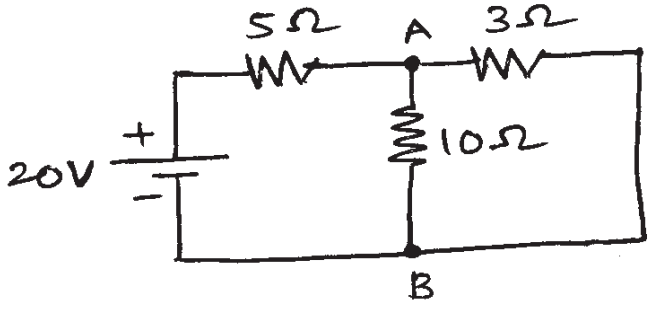

Fig. No. 4

Marks

c) Find short circuit admittance (Y) parameters for the network shown in the Fig. No. 5.

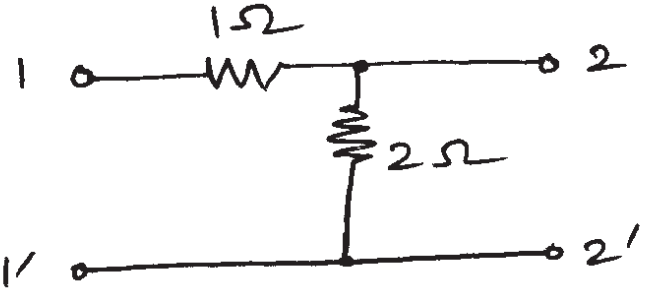

Fig. No. 5

d) A coil of resistance 10 Ω and inductance 0.1 H is connected in series with capacitor of 150 μF across 200 V, 50 Hz supply. Calculate:

Inductive reactance (X_L), Capacitive reactance (X_C), Impedance (Z) and Current (I).

e) A R - L - C series circuit with resistance of 20 Ω, inductance of 0.25 H and capacitance of 100 μF is supplied with 250 V, 50 Hz supply. Determine:

i) Resonant Frequency

ii) Current at resonance

iii) Power factor

iv) Quality factor

5. Attempt any <u>TWO</u> of the following: **12**

a) Use nodal analysis to calculate the power dissipation across 4 Ω resistor for the circuit shown in the Fig. No. 6.

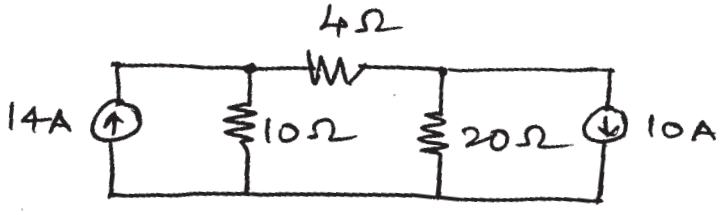

Fig. No. 6

Marks

b) Determine the value of load resistance R_L when load resistance draws maximum power for the circuit shown in Fig. No. 7. Also find the value of maximum power delivered to it.

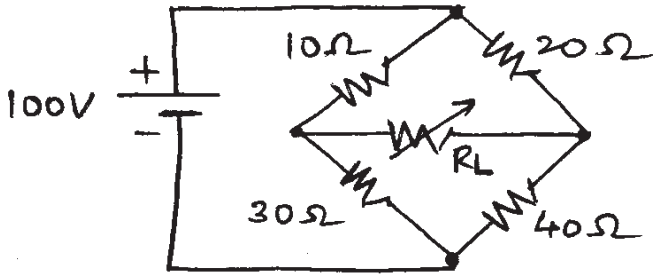

Fig. No. 7

c) A coil with an inductance of 0.01 H and a resistance of 2 Ω is connected in parallel with capacitor of 714 μF. Above circuit produces resonance when connected across 230 V, 50 Hz supply. Determine total current and current in each branch.

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

a) Use superposition theorem to find current through 4 Ω resistor for the circuit shown in Fig. No. 8.

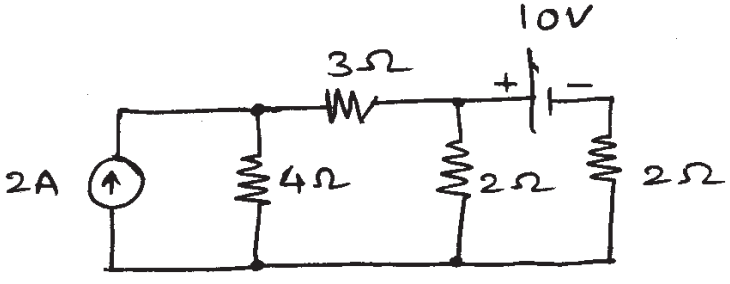

Fig. No. 8

b) Find ABCD parameters for the network shown in the Fig. No. 9. Comment on reciprocity and symmetry of the network.

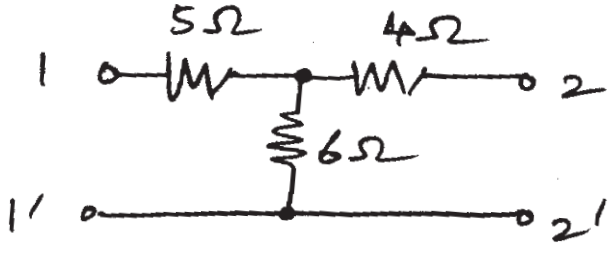

Fig. No. 9

P.T.O.

Marks

c) Compare series and parallel resonant circuit on the basis of:

i) Resonant Frequency

ii) Impedance at resonance

iii) Current at resonance

iv) Magnification

v) Power factor

vi) Application
