22330

12223

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 answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) 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 time period and auplitude related to sinusoidal a.c. waveform.

b) Draw the waveform and phasor diagram for a purely capacitive load.

c) Define the power factor and quality factor of series resonant circuit.

d) State the need for source transformation.

e) Draw star and delta network.

f) State Norton's theorem.

g) Write the equation of open circuit Y parameters.

Marks

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

a) Draw the circuit of series R-L-C- Circuit and sketch the phasor diagram , waveform of voltage and curent in the circuit.

b) Explain the resonance in a parallel circuit and also derive the equation for resonant frequency for the same.

c) Explain suitable example, procedure to convert a practical voltage source into an equivalent curent source.

d) Explain with neat sketch Reciprocity theorem.

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

a) Draw the phasor diagram of R-L-C series resonant circuit and write voltage and current equation.

b) Draw the phasor diagram, impedance triangle and power triangle for series R-L-C- circuit for the condition XL < XC.

c) Derive the formulae for star to delta transformation.

d) State maximum power transfer theorem.
Write steps to find load impedance by maximum power transfer theorem.

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

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

i) Impedance

ii) Current

iii) Active power

iv) Apparent power

b) A coil of resistance of 50Ω, and inductance of 0.1 H is connected in series with 100 μf capacitor supplied with 230V, $50H_z$ a.c. supply. Calculate voltage across each and draw the complete phasor diagram.

c) Two impedances (8+j6)Ω and (3-j4)Ω are connected in parallel. If the current taken by this combination is 25 Amp. Find the current and power taken by each impedance.

Marks

d) Using mesh analysis for the circuit of Fig. No. 1 find the values of R_1 and R_2

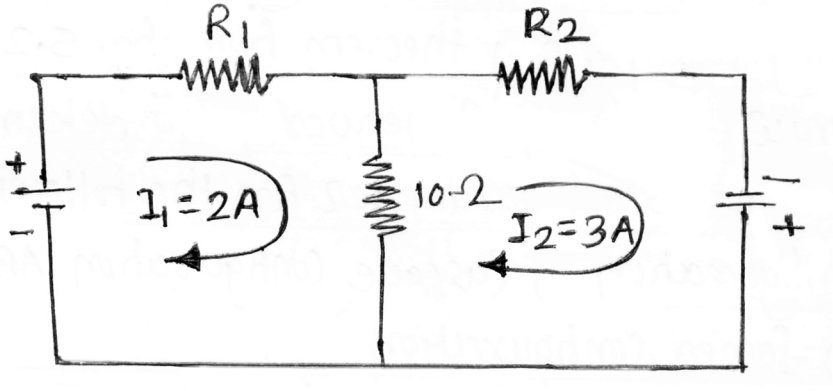

Fig. No. 1

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

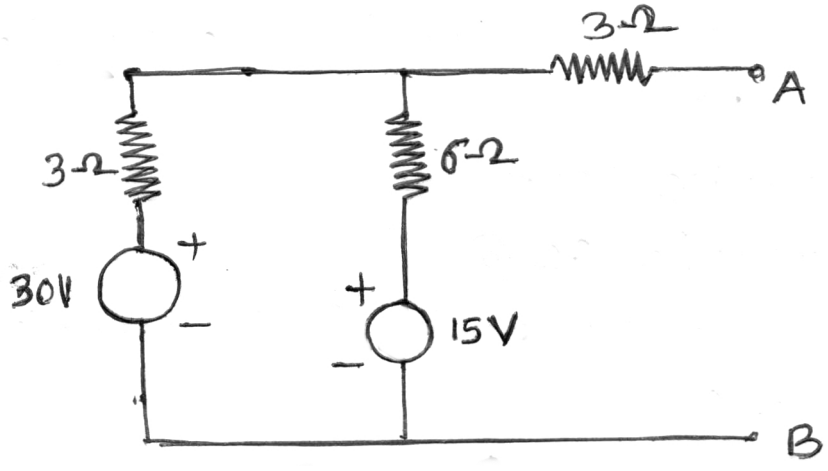

Fig. No. 2

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

a) A circuit having a resistance of 5Ω, L = 0.4 H and a capacitance in series is connected across a 100V, $50H_z$

Calculate

i) Value of capacitance to give resonance
ii) Impedance of the circuit
iii) Circuit current at resonance
iv) Voltage across the resistor
v) Voltage across inductance
vi) Q factor of resonance

Marks

b) Find out the current through 6Ω resistor using superposition theorem from Fig. No. 3 shown.

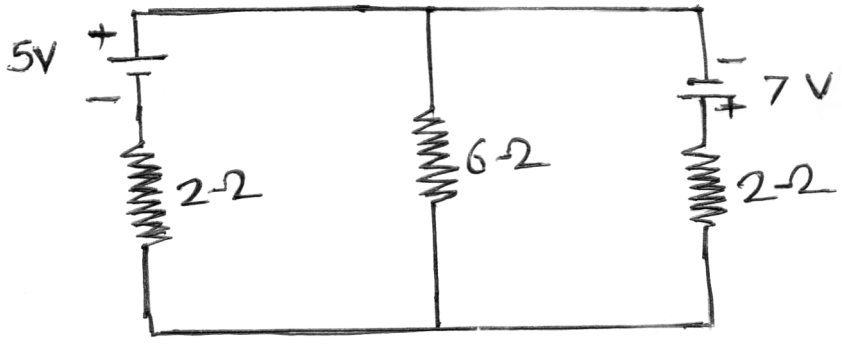

Fig. No. 3

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

i) Cascade configuration ABCD Parameter

ii) Series configuration

iii) Parallel configuration

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

a) Using Star/Delta conversion, find the equivalent resistance between AB for the circuit shown in Fig. No. 4

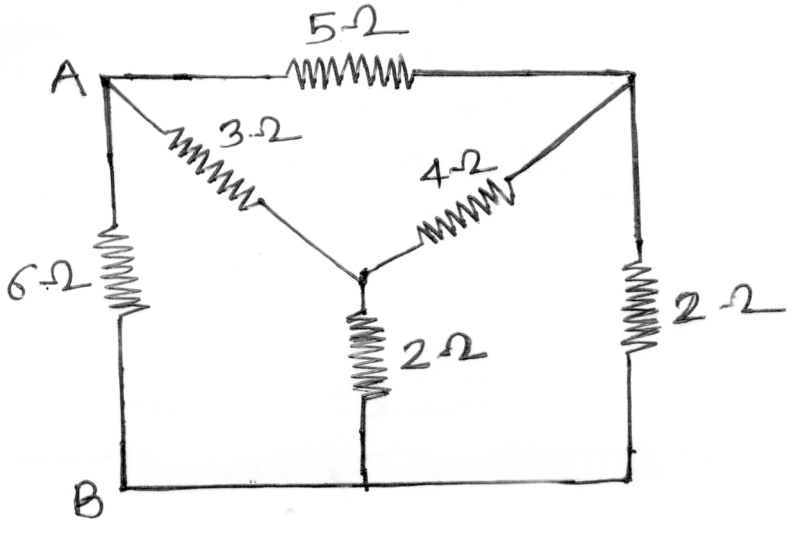

Fig. No. 4

Marks

b) Verify the Reciprocity theorem for the network shown in Fig. No.5

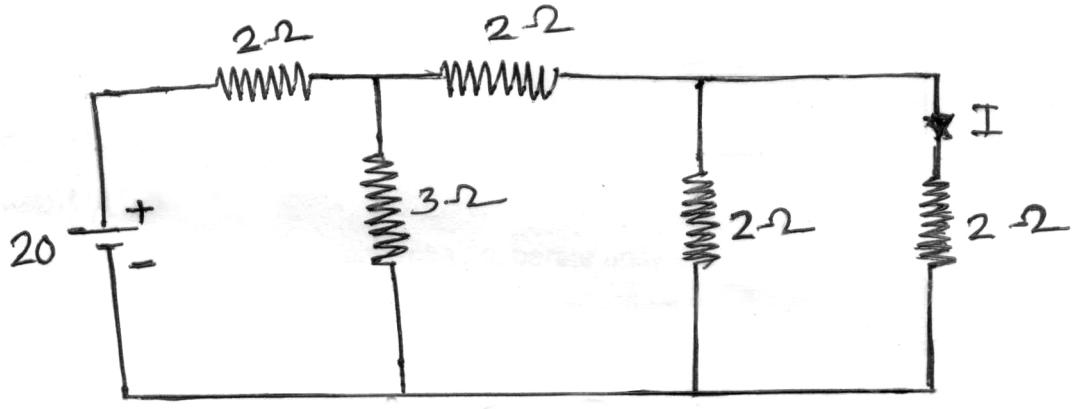

Fig. No. 5

c) Find the Y parameter for the network shown in Fig. No. 6

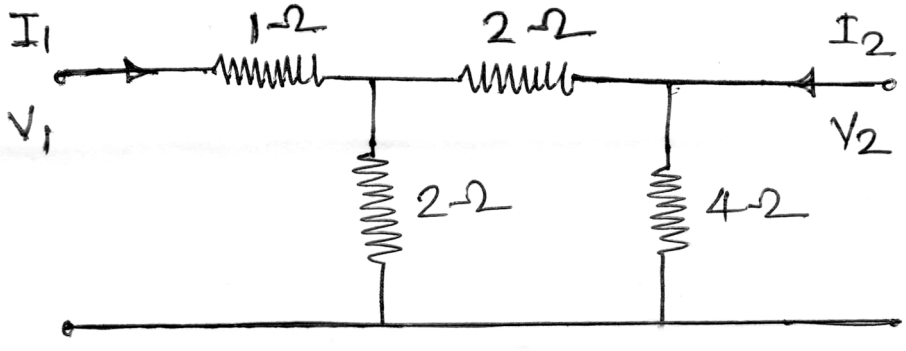

Fig. No. 6