22330

22223

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) 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 power factor. Write the value of power factor of a purely capacitive ac circuit.

b) Define admittance. What is the admittance of a circuit having impedance of 0.5 ohm.

c) Define half weave bandwidth of a series R-L-C circuit at resonance?

d) Write steps to convert voltage source into current source.

e) Define branch and node related to elective circuit.

f) State Reciprocity thereom.

g) State the Z parameters of a two port network?

Marks

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

a) For the phasor diagram shown below (Fig. No. 1) find impedance, power factor, total power, values of circuit components.

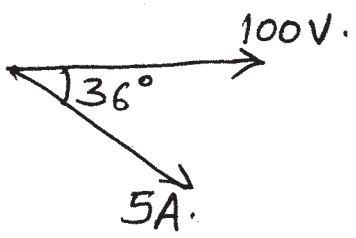

Fig. No. 1

b) Explain conditions of initial and final condition of switching circuit for elements R and L

c) Give a comparison between series and parallel resonant circuits with reference to impedance at resonance, current, resonant frequency, magnification.

d) Convert the following delta connected network into equivalent star (Fig. No. 2)

Fig. No. 2

Marks

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

a) Draw resonance curve for series resonant circuit and explain the effect of

i) Small R

ii) Large R

iii) R=0

b) Using rush analysis, calculate the voltage drop across 10Ω resistor (Refer Fig. No. 3)

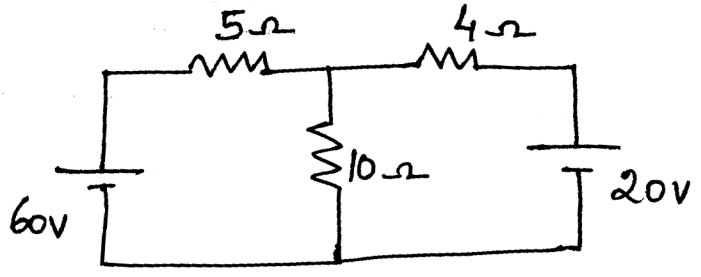

Fig. No. 3

c) Find the value of load resistance 'R_L' for the maximum power to be transferred to it for the following circuit Refer Fig. No. 4

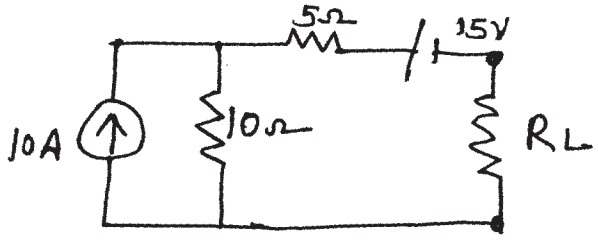

Fig. No. 4

d) State Thevenin's theorem. Explain stepwise procedure to find current through a particular branch using Thevenin's theorem for a sample network.

Marks

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

a) State minimum power transfer theorem write steps to find current in load by maximum power transfer therorem.

b) Give any four conditions for a two port network to be symmetrical.

c) Sketch the phasor diagram for the given T. Circuit (Fig. No. 5)

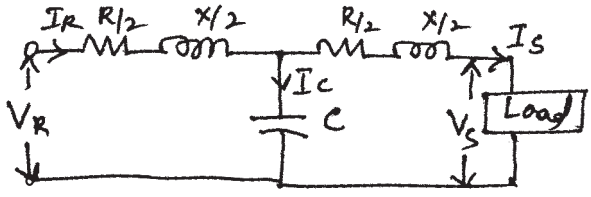

Fig. No. 5

d) State and explain Norton's theorem.

e) A series R-L-C circuit consists of R=1000Ω L=100mH and C=10μF. The applied voltage across the circuit is 100v. Find

i) Resonant frequency of the circuit

ii) Quality factor of the circuit at resonant frequency.

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

a) For series RL circuit, draw circuit, sketch phasor diagram, waveform of current and voltage and draw voltage triangle and impedance triangle.

b) An inductive circuit of resistance 2 ohm and inductance 0.01H is connected to a 250 V, 50Hz supply. A capacitance of 714μf placed in parallel with above circuit producers resonance. Find the total current and the currents in each branch.

c) For the following circuit, find the value of R using nodal analysis Refer Fig. No. 6.

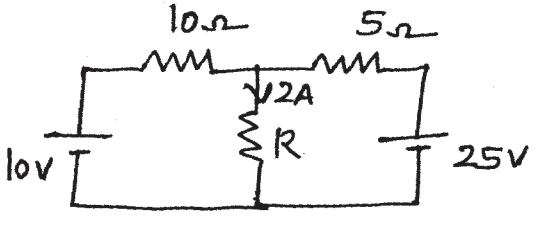

Fig. No. 6

Marks

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

a) Calculate the current through each branch using super position theorem for the following circuit. Refer Fig. No. 7

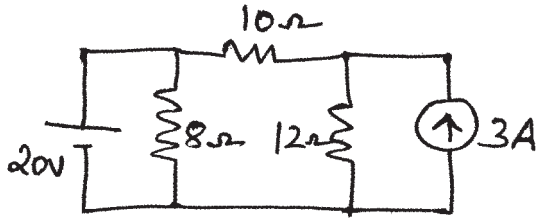

Fig. No. 7

b) Draw two part network and determine indicated parameters for following configuration.

i) Cascade configuration

ii) Series configuration

iii) Parallel configuration

c) Find the current through 6Ω resistor in the following circuit Refer Fig. No. 8 using Thevenin's theorem.

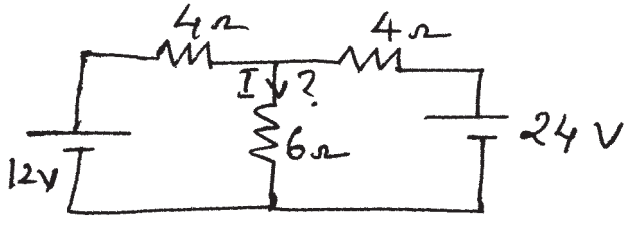

Fig. No. 8