

22330

22223

3 Hours / 70 Marks

Seat No.

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- 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 wave 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 theorem.
 - g) State the Z parameters of a two port network?

P.T.O.

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.

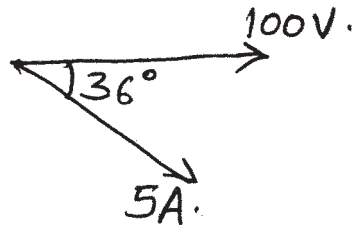


Fig. No. 1

- 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)

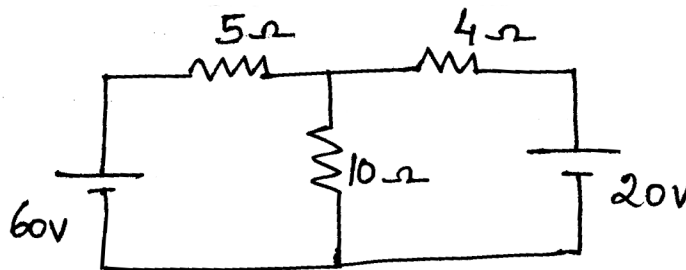


Fig. No. 2

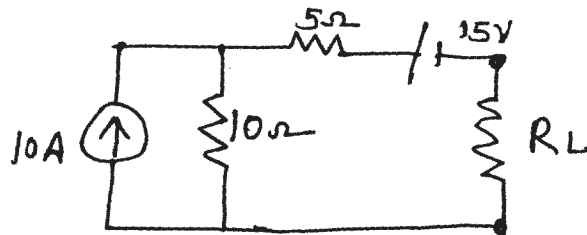
3. Attempt any THREE of the following:

12

- a) Draw resonance curve for series resonant circuit and explain the effect of
- Small R
 - Large R
 - $R=0$
- 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

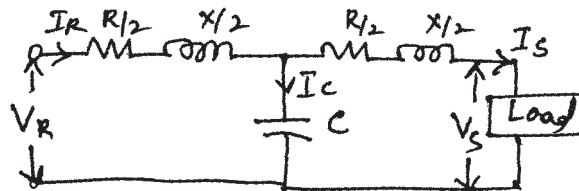
Fig. No. 4

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

4. Attempt any THREE of the following:

12

- State minimum power transfer theorem write steps to find current in load by maximum power transfer theorem.
- Give any four conditions for a two port network to be symmetrical.
- Sketch the phasor diagram for the given T. Circuit (Fig.No.5)

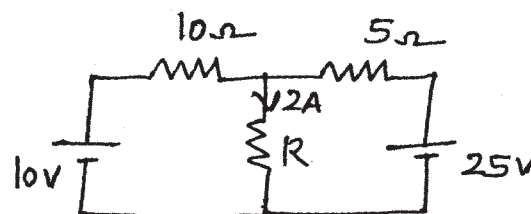
Fig. No. 5

- State and explain Norton's theorem.
- A series R-L-C circuit consists of $R=1000\Omega$, $L=100\text{mH}$ and $C=10\mu\text{F}$. The applied voltage across the circuit is 100v. Find
 - Resonant frequency of the circuit
 - Quality factor of the circuit at resonant frequency.

5. Attempt any TWO of the following:

12

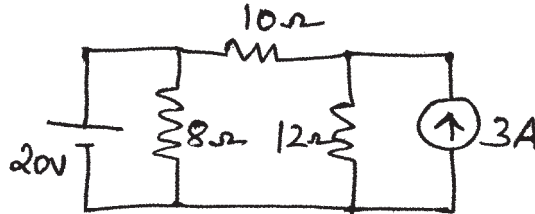
- For series RL circuit, draw circuit, sketch phasor diagram, waveform of current and voltage and draw voltage triangle and impedance triangle.
- An inductive circuit of resistance 2 ohm and inductance 0.01H is connected to a 250 V, 50Hz supply. A capacitance of $714\mu\text{f}$ placed in parallel with above circuit produces resonance. Find the total current and the currents in each branch.
- For the following circuit, find the value of R using nodal analysis Refer Fig.No.6.

Fig. No. 6

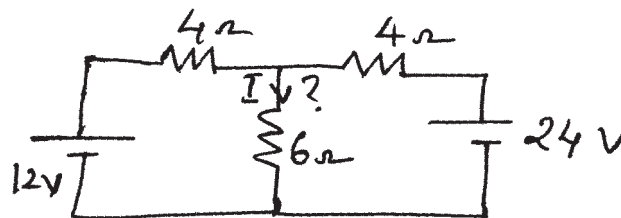
6. Attempt any TWO of the following:

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

Fig. No. 8