22330

21222

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

15 minutes extra for each hour

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 <u>FIVE</u> of the following: **10**

a) Define -

i) Apparent power

ii) Reactive power

b) Draw the phasor diagram for series RL and series RC circuit.

c) Write the formula of resonance frequency and Q factor of parallel RLC circuit.

d) Stale the formulae for star to delta conversion.

e) Define the following term.

i) Mesh

ii) Node

f) State the reciprocity theorem

g) Write the ABCD parameter of two port network.

P.T.O.

Marks

2. Attempt any <u>THREE</u> of the following: **12**

a) A series RL circuit takes a current of 2.7A. when connected to 240V, 50Hz a.c supply and comsumes 350 watt. Calculate resistance inductance, impedance and power factor.

b) An RLC series circuit with resistance of 20Ω, inductance 0.25H and capacitance of 100μF is supplied with 240V A.C. supply Calculate

i) resonance frequency

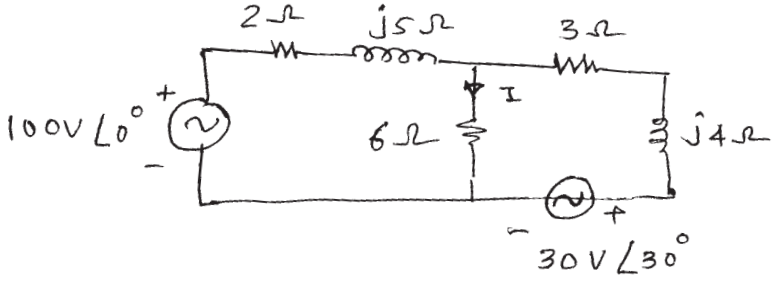
ii) current at this condition

iii) power factor

iv) quality factor

c) Three resistance each of 12Ω are connected in star convert it into equivalent delta connection.

d) Find value of 'I' of Fig. No. 1 using superposition theorem.



<u>Fig. No. 1</u>

3. Attempt any <u>THREE</u> of the following: **12**

a) A resistance of 10Ω, inductance of 0.1H and capacitance of 100μf are connected in series across 100V, 50Hz a.c. supply Calculate

i) current

ii) power factor

iii) power and draw vector diagram

b) Compare series and parallel resonance circuit (any four points).

Marks

c) Give the stepwise procedure for finding current using mesh analysis.

d) Derive the condition so that power transferred from source to load is maximum.

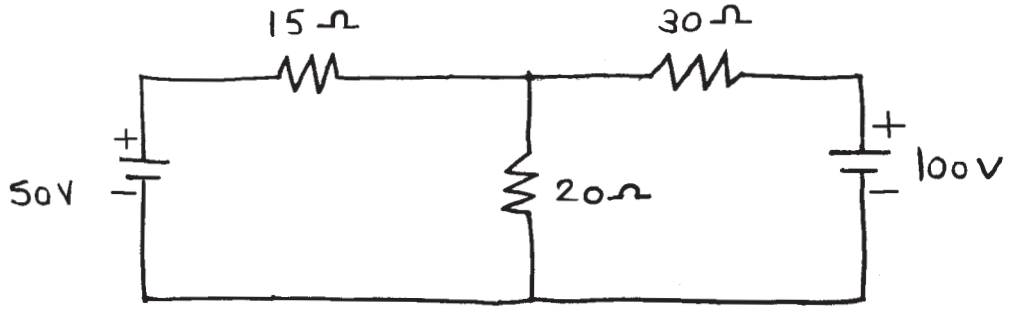
4. Attempt any <u>THREE</u> of the following: **12**

a) Two impedances $Z_1 = 6 + j8\Omega$ and $Z_2 = 3 - j4\Omega$ are connected in parallel across 220V, 50 Hz, 1ϕ AC. Calculate admittance of each branch, total admittance and supply current.

b) Explain the concept of initial and final condition. State the meaning of t = o– and t = o+

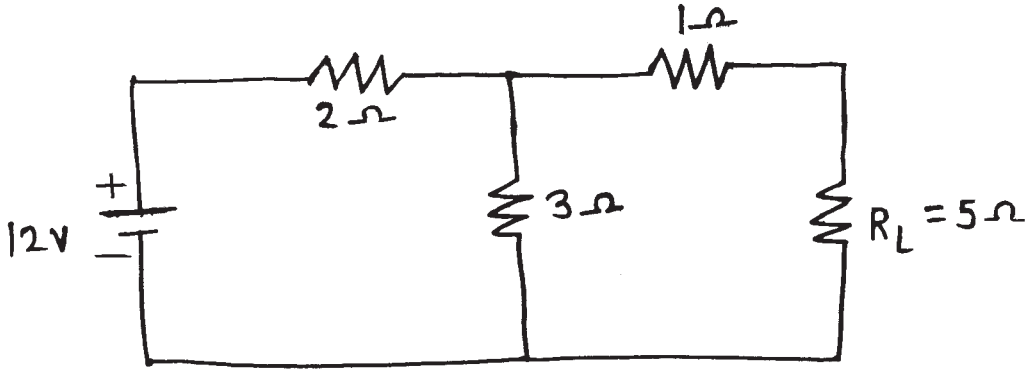
c) Derive the expression for resonance frequency of series RLC circuit.

d) Determine the current through 20Ω resistance in Fig. No. 2 using node analysis.



<u>Fig. No. 2</u>

e) Calculate the value of current in 5Ω resistance using Norton's theorem for network shown in Fig. No. 3.



<u>Fig. No. 3</u>

P.T.O.

Marks

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

a) A parallel circuit consist of a coil of R = 10Ω and L = 0.2H is connected in parallel with capacitor of 50μF. The circuit is supplied with 200V, 50Hz. Calculate the frequency at which the circuit behaves as a pure resistance and also find Q factor.

b) Find the value of load resistance R_L to get maximum power transfer to it a shown in Fig. No. 4. Also find P_{max}.

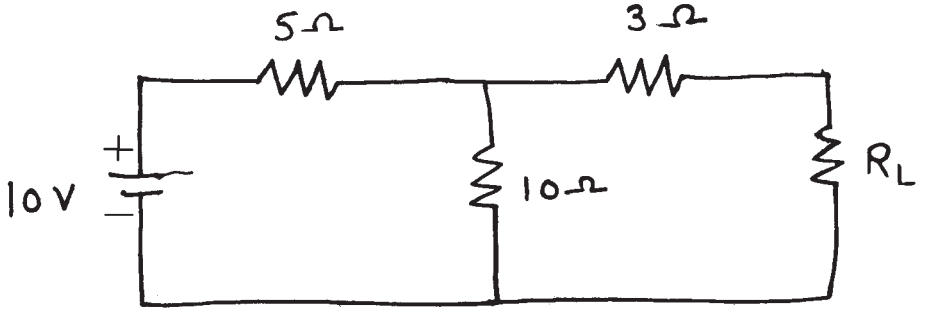


Fig. No. 4

c) Explain 'Z' parameter of two port network.

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

a) i) Explain with suitable example converting practical current source into equivalent voltage source.

ii) Practical voltage source into equivalent current source.

b) State and explain Thevenin's theorem with suitable example.

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

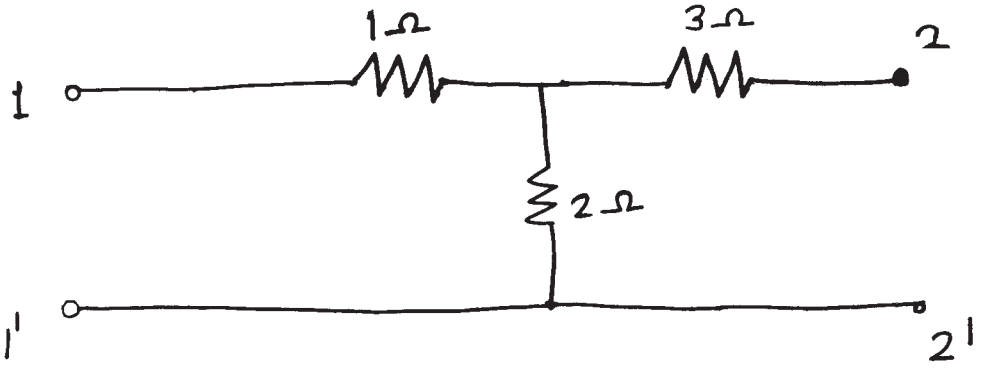


Fig. No. 5