Scheme – I

Sample Question Paper

Program Name : **Electronics Engineering, Digital Electronics and Instrumentation Engineering Program Group**

Program Code : **DE/EJ/ET/EN/EX/IE/IS/IC**

Semester : **Third**

22330

Course Title : **Electric Circuits and Networks**

Marks : **70** **Time: 3 Hrs.**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following. **10 Marks**

a) Define: i) Active Power ii) Reactive Power.
b) Write the equation of resultant Impedance of Series R-L-C circuit.
c) Define Quality factor of Series resonance circuit. Give equation of it.
d) Explain the term source transformation.
e) Write the formula for star to delta and delta to star conversion.
f) State Superposition Theorem.
g) Write the equations of Open circuit Z parameters.

Q.2) Attempt any THREE of the following. **12 Marks**

a) Draw circuit of series R- L circuit and sketch phasor diagram, waveform of voltage and current in the circuit.
b) Explain Q-factor of Series R-L-C circuit.
c) State the need for source transformation. Write three steps to convert voltage source into current source.
d) State Superposition theorem and write the steps to find the current through an element by Superposition theorem

Q.3) Attempt any THREE of the following. **12 Marks**

a) Draw phasor diagram, voltage and current waveform of parallel R-C circuit.
b) Derive an expression for resonant frequency of a series RLC circuit.
c) Explain the procedure to convert a practical Voltage source into an equivalent Current source with suitable example.

d) State Maximum Power transfer theorem. Write the steps to find the current in the load by Maximum Power Transfer theorem.

Q.4) Attempt any THREE of the following. 12 Marks

a) An alternating voltage of 250 V, 50 Hz is applied to a coil which takes 5 A of current. The power absorbed by the circuit is 1 KW. Calculate the resistance and inductance of the coil.

b) Draw the vector diagram for the circuit shown in Figure1 indicating the voltage drop V_1 and V_2 across the resistance and inductance and the current I flowing in the circuit.

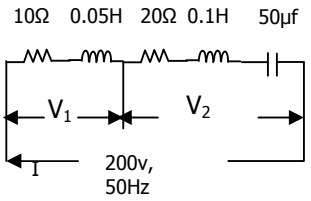


Figure 1

c) An a.c series circuit has a resistance of 10 W, an inductance of 0.2 H and a capacitance of 60 μF , voltage applied to the circuit is 200 V. Calculate : (a) resonant frequency (b) current (c) power at resonance..

d) Use Mesh analysis to calculate current in the 6 Ω resistor. (As shown in the Figure-2)

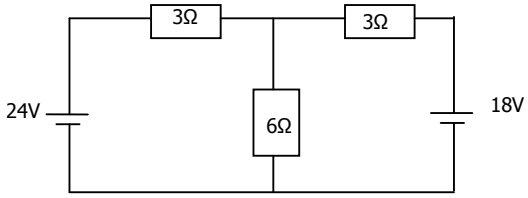


Figure 2

e) Apply Norton's theorem to calculate current flowing through 10Ω resistor of Figure3

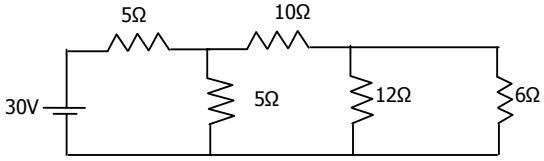


Figure 3

Q.5) Attempt any TWO of the following. 12 Marks

a) A coil of resistance 20 ohm and inductance of 200 mH is connected in parallel with a variable capacitor. This combination is connected in series with a resistance of 8000 ohm. Supply voltage is 200 V, 50Hz. Calculate the following

i) The value of C at resonance

ii) The Q of the coil

iii) Dynamic resistance of the circuit.

b)Find Current through Impedance 3+j5 as shown in the Figure 4 using superposition theorem.

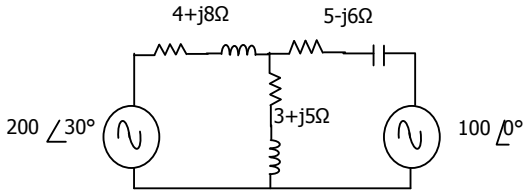


Figure 4

c) Draw the two port network and determine the indicated parameters for the following configurations.

i) Cascade configurations (ABCD parameter)
ii) Series configurations
iii) Parallel configurations.

Q.6) Attempt any TWO of the following. 12 Marks

a) Find the voltages at Node A and B in the network shown in Figure 5

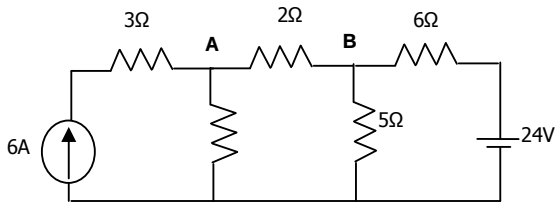


Figure 5

b) Use super-position theorem to find the voltage V in the network shown in Figure 6

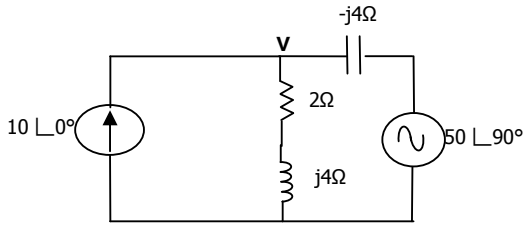


Figure 6

c) Find the z parameters for the network shown in Figure 7

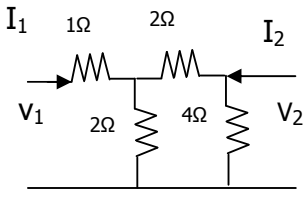


Figure 7

Scheme – I

Sample Test Paper - I

Program Name : **Electronics Engineering, Digital Electronics and Instrumentation Engineering Program Group**

Program Code : **DE/EJ/ET/EN/EX/IE/IS/IC**

Semester : **Third**

22330

Course Title : **Electric Circuits and Networks**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a) Define i) Apparent Power ii) Power factor.
b) Write the formula of active and reactive power.
c) State the behavior of following elements at the time of switching.

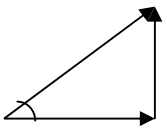
i) Pure L ii) Pure C

d) State the meaning of t = o – and t = o +.
e) Define Quality Factor of Parallel resonance circuit. Give equation of it
f) Write Current magnification formula in Parallel Circuit.

Q.2 Attempt any THREE. **12 Marks**

a) For the given Impedance triangle

i) Identify the circuit
ii) Mark Parameters of all sides of triangle
iii) State the Nature of power factor
iv) Draw sinusoidal waveform for voltage and current



b) Draw circuit diagram, phasor diagram and waveform of voltage and current of series R- C circuit

c) A two element series circuit is connected across an a.c source e = 200 2 sin (wt20°) V. The current in the circuit then is found to be i = 10 2 cos (314 t – 25°) A. Determine the elements and its value of the circuit.

d) Define the power factor of resonant circuit .State the value of power factor at resonance.

e) Compare series and parallel resonance on the basis of following:

(i) Resonant frequency

(ii) Impedance

(iii) Current

(iv) Bandwidth

f) A circuit consisting of a coil of resistance 12 Ω and inductance 0.15 H is connected in series with a capacitor of 12 μF , variable frequency supply of 240 V is applied across the circuit . Calculate: (a) resonant frequency (b) current in the circuit at resonance

Scheme – I

Sample Test Paper - II

Program Name : **Electronics Engineering, Digital Electronics and Instrumentation Engineering Program Group**

Program Code : **DE/EJ/ET/EN/EX/IE/IS/IC**

Semester : **Third**

22330

Course Title : **Electric Circuits and Networks**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a) Draw symbol for current controlled voltage source.
b) Define dependent Current source and draw its symbol.
c) State Thevenin's Theorem.
d) State Reciprocity Theorem.
e) Write the condition to transfer Maximum Power to the load in a.c circuits.
f) Write the condition for network to be reciprocal in terms of Y and Z parameters.

Q.2 Attempt any THREE. **12 Marks**

a) Write the steps to convert given current source into equivalent voltage source.
b) Use Mesh Analysis for Figure1 find the values of R_1 and R2.

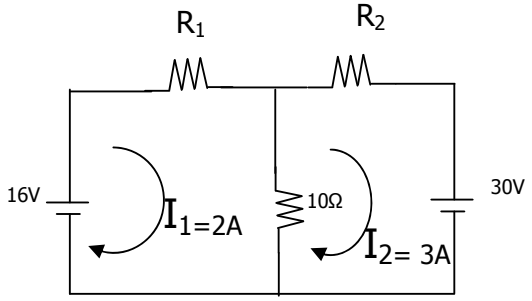


Figure 1

c) State the Norton's theorem. Write stepwise procedure for applying Norton's theorem to simplify the circuit.

d) Calculate the value of load R to transfer the maximum power, for the circuit shown in the

Figure 2

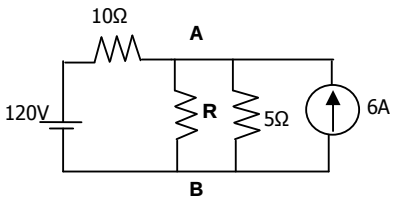


Figure 2

e) For the given two-port network equations, draw an equivalent network.

$I_1 = 5V_1 - V_2$; $I_2 = -V_2 + V_1$

f) A symmetrical T-network has the following open-circuit and short-circuit impedances:

$Z_{oc} = 800\Omega$ (open circuit impedance)

$Z_{sc} = 600\Omega$(short circuit impedance)

Calculate impedance values of the network.

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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

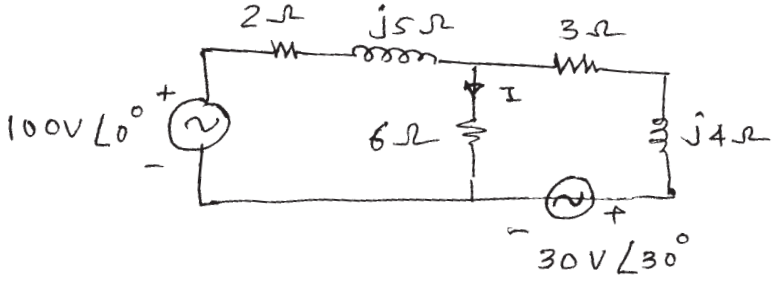
ii) current at this condition

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.

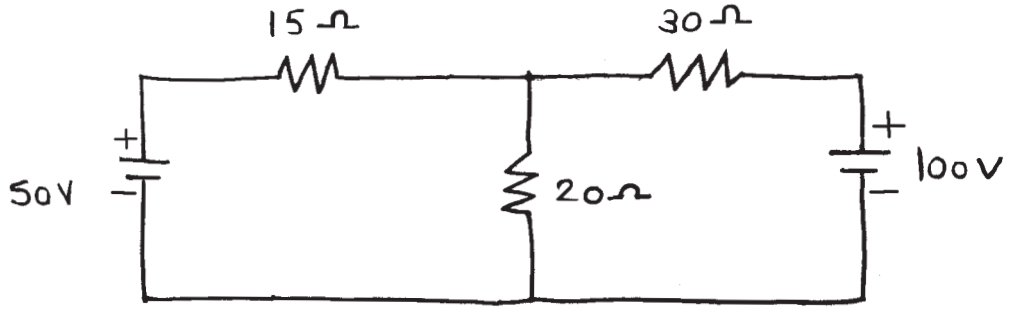
4. Attempt any <u>THREE</u> of the following: **12**

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+

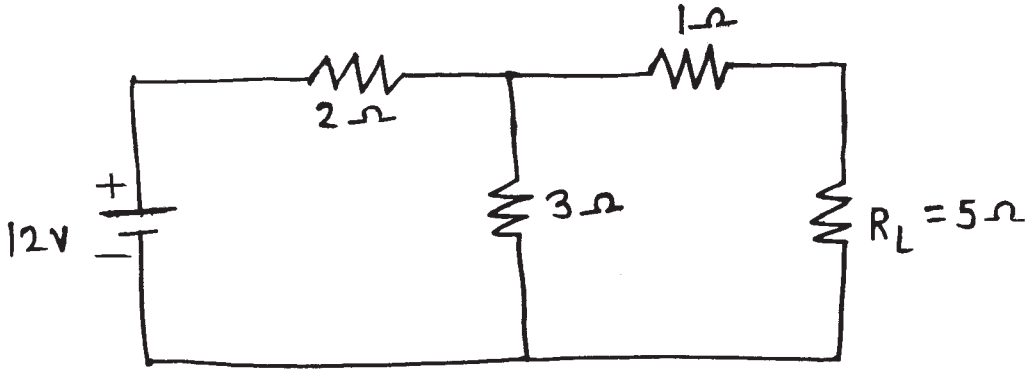
c) Derive the expression for resonance frequency of series RLC circuit.

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}.

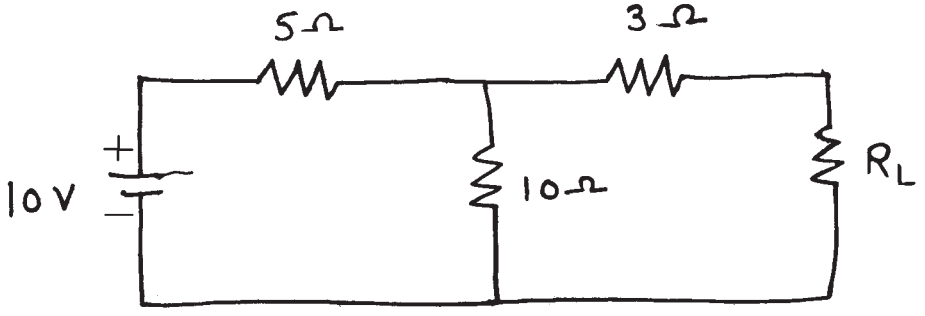


Fig. No. 4

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.

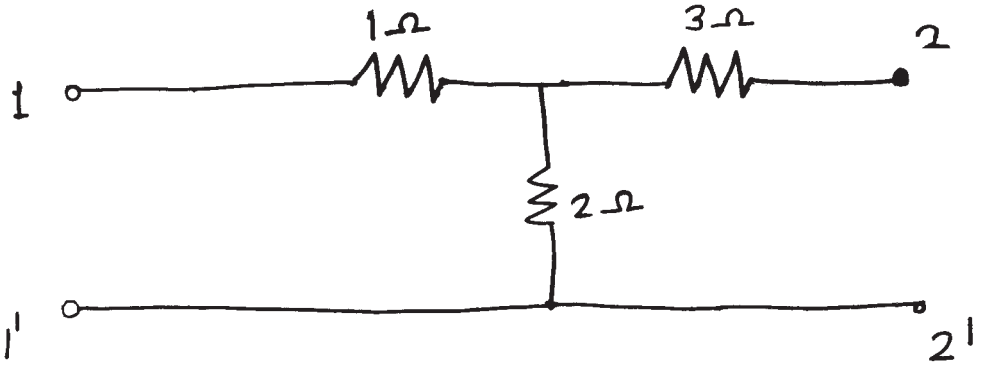


Fig. No. 5

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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

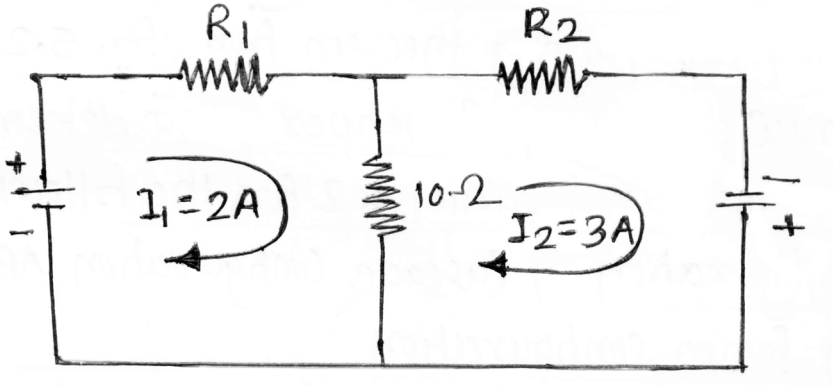

Fig. No. 1

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

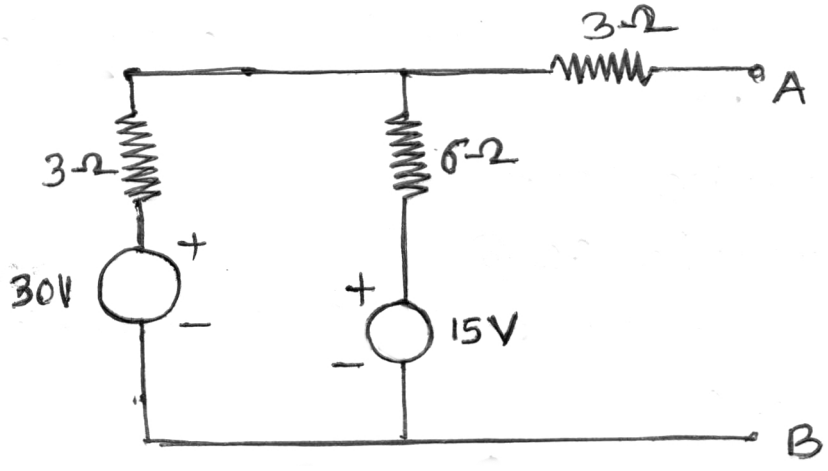

Fig. No. 2

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.

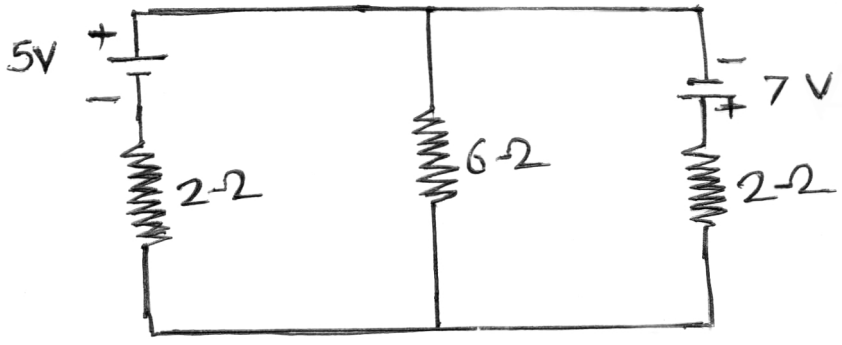

Fig. No. 3

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

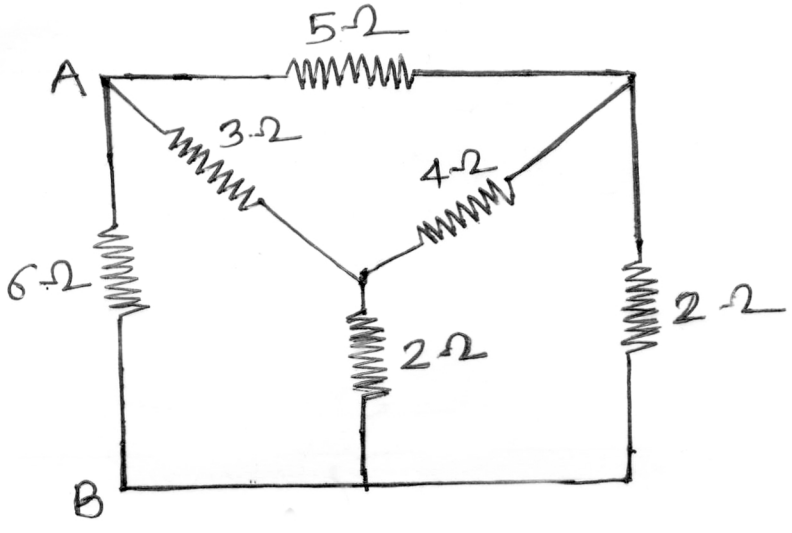

Fig. No. 4

Marks

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

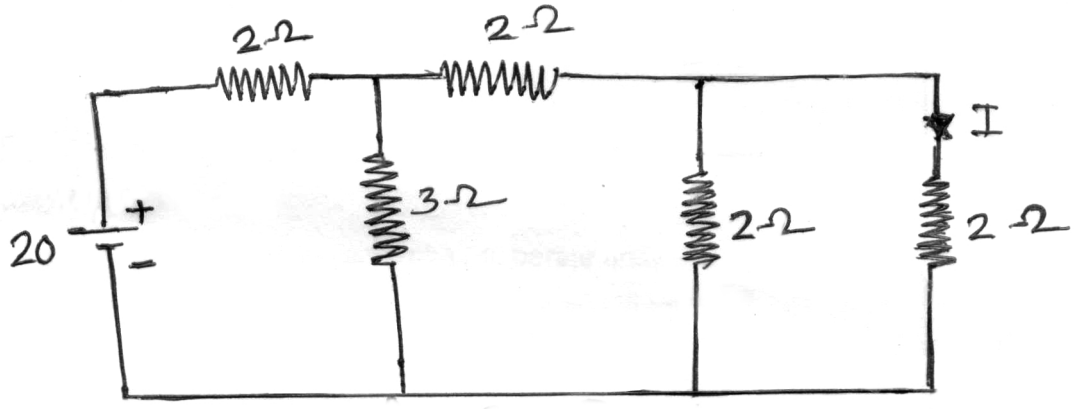

Fig. No. 5

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

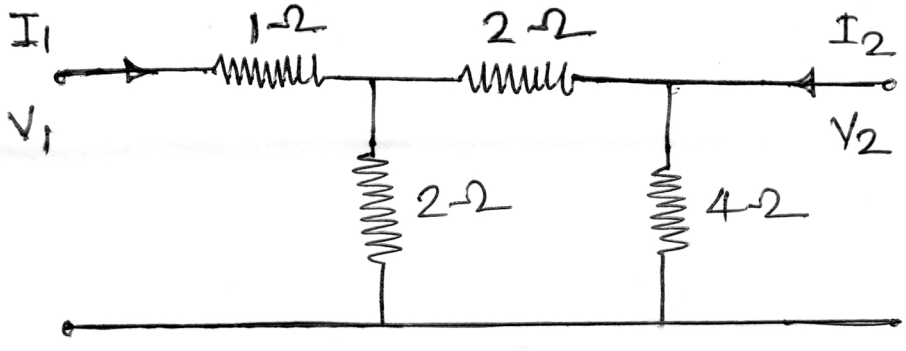

Fig. No. 6

22330

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

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

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) 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 :

(i) Apparent power

(ii) Real power

b) Write equation of resultant impedance in R-L circuit.

c) State condition for resonance in R-L-C series circuit.

d) Draw -

(i) Practical voltage source

(ii) Ideal current source

e) Write formula for star to delta and delta to star transformation.

f) State maximum power transfer theorem.

g) Write equation of short circuit Y parameters.

Marks

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

a) For R-C series circuit draw

(i) Circuit diagram

(ii) Vector diagram

(iii) Waveform of voltage and current

b) Compare series and parallel resonance on the basis of

(i) Resonating frequency

(ii) Impedance

(iii) Current

(iv) Magnification

c) Explain the suitable example to convert a practical current source into equivalent voltage source.

d) Write the steps for finding the current through an element by Thevenin's theorem.

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

a) Explain the concept of initial and final conditions in switching circuits for elements R and L.

b) Derive an expression for resonant frequency of series RLC circuit.

c) Derive the expression for delta to star transformation.

d) State super position theorem. Write steps to find current in an element using super position theorem.

Marks

4. Attempt any THREE of the following: 12

a) A series combination of resistance 100 ohm and capacitance 50 µf is connected in series to a 230 V, 50 Hz supply. Calculate

(i) Capacitive reactance

(ii) Current

(iii) Power factor

(iv) Power consumed

b) Two unpedauces given by $Z_1 = 10 + j5$ and $Z_2 = 8 + j9$ are joined in parallel and connected across a voltage of $V = 200 + j0$. Calculate the circuit current and branch currents. Draw the vector diagram.

c) An a.c series circuit has resistance of 10 ohm inductance of 0.1 H and capacitance of 10 µf., Voltage applied to circuit is 200V. Find

(i) Resonant frequency

(ii) Current at resonance

(iii) Power at resonance

d) Use mesh analysis to calculate ammeter current in Fig. No. 1.

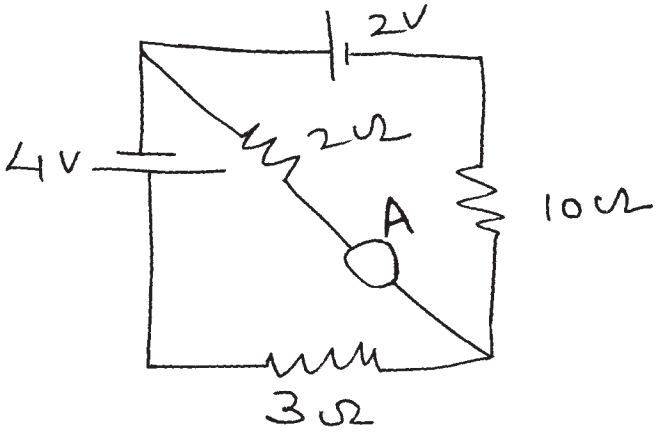

Fig. No. 1

Marks

e) Find the Norton equivalent resistance for the network shown in Fig.No. 2.

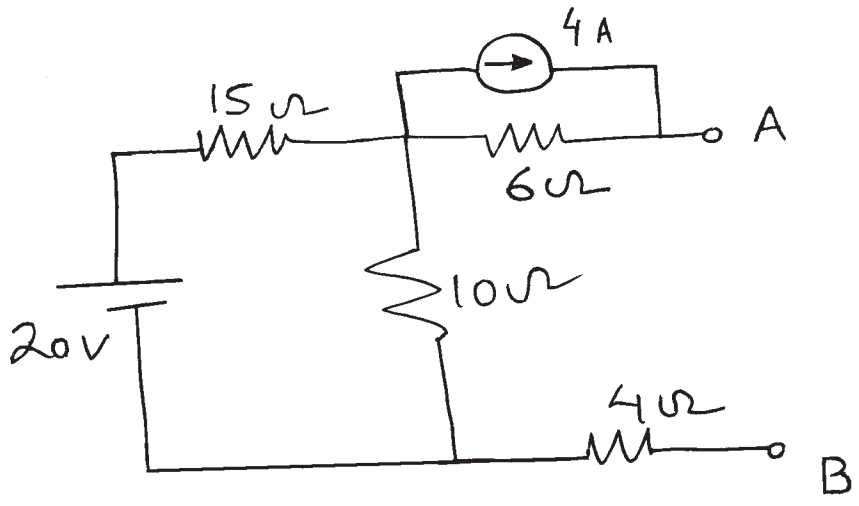

Fig. No. 2

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

a) A coil of resistance 20 ohm and inductance of 200 μH is in parallel with variable capacitor. This combination is in series with a resistance of 8000 ohm The voltage of the supply is 200 V and at a frequency of 10^6 Hz. Calculate

(i) Value of C to give resonance

(ii) The Q of the coil

(iii) Dynamic resistance of the circuit.

b) Apply superposition theorem to Fig.No. 3 for determining the current in 100 Ω resistance.

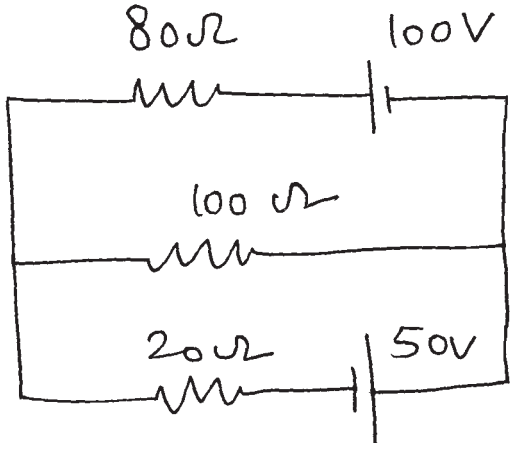

Fig. No. 3

Marks

c) Draw the two port network and determine the indicated parameters for the following configuration

(i) Cascade configuration (ABCD parameter)

(ii) Series configuration

(iii) Parallel configuration

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

a) Find current in 40Ω and 10Ω in Fig. No. 4 by node voltage analysis method.

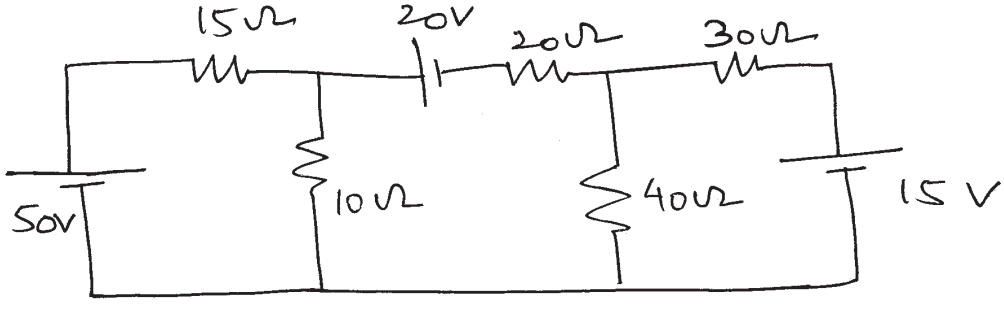

Fig. No. 4

b) Find the value of resistance to be connected across AB so as to consume maximum power in Fig. No. 5. Also find maximum power consumed by it.

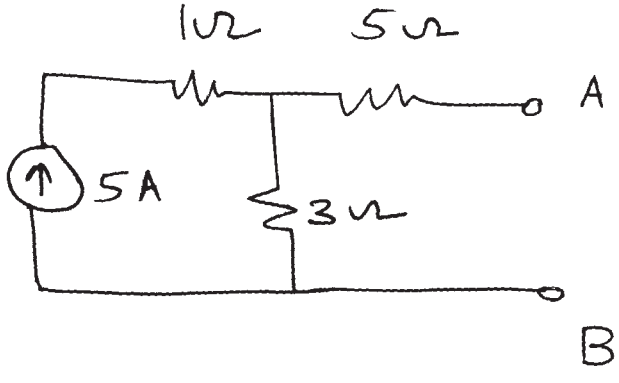

Fig. No. 5

Marks

c) Find the Z parameters for the network shown in Fig. No. 6.

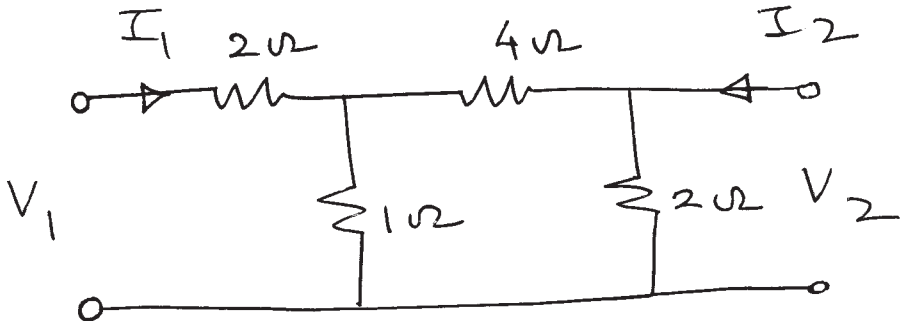

Fig. No. 6

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

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

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) 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 impedance and reactance related to single phase AC series circuit. Give unit of both.

b) Draw the impedance triangle for R-L series circuit.

c) State Q factor for parallel R.L.C circuit.

d) Give four steps to solve nodal analysis.

e) Write the formula for star to delta.

f) State Thevenin's theorem.

g) State the significance of two port network.

Marks

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

a) An RC series circuit consists of R = 10 Ω and C = 200 μf. It is connected across 250 V, 50 Hz, 1 ϕ AC. Calculate the value of power consumed by the circuit.

b) Describe the procedure to tune the given electrical circuit using the principles of resonance.

c) Find the current in 6 Ω resistor in the circuit shown in Fig. No. 1 using mesh analysis.

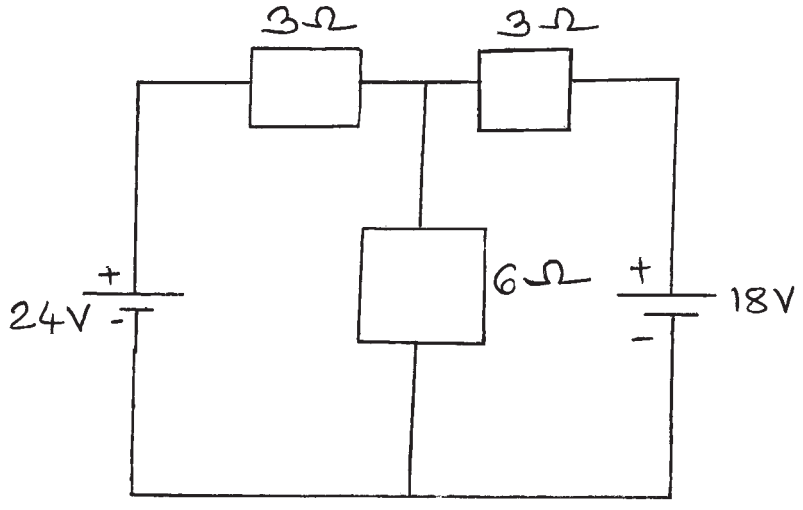

Fig. No. 1

d) Find value of R_L so that maximum power will transfer from source to it. Also write equation for P_{max} (Fig. No. 2)

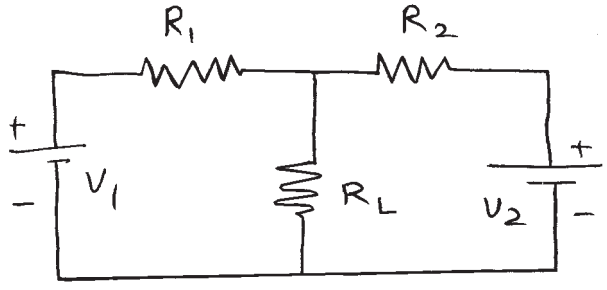

Fig. No. 2

Marks

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

a) List the power factor improves technique and explain any one with advantage and disadvantage.

b) Compare series resonance to parallel resonance on the basis of:

(i) Resonant frequency

(ii) Impedance

(iii) Current and

(iv) Magnification.

c) Write the procedure to convert voltage source into equivalent current source. Give its application. Draw neat diagrams of both the sources.

d) Find Norton's equivalent circuit of the Fig. shown (Fig. No. 3)

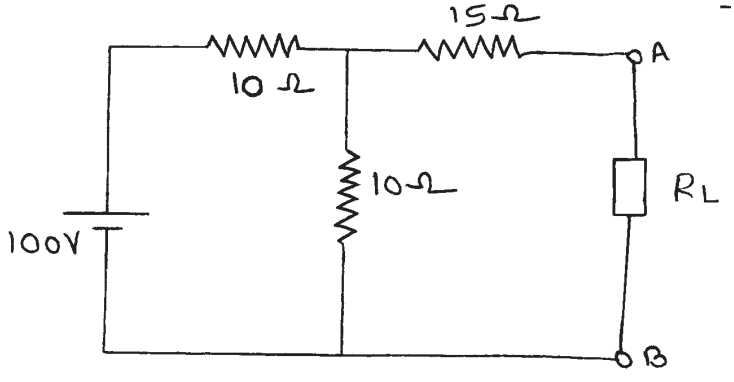

Fig. No. 3

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

a) In a series circuit containing pure resistance pure inductance, the current and voltage are expressed as:
$i(t) = 5\sin(314t + 2\pi/3)$ and $v(t) = 20\sin(314t + 5\pi/6)$

Find:

(i) Impedance of circuit

(ii) Resistance of circuit

(iii) Inductance in circuit

(iv) Average power drawn by circuit.

Marks

b) Find I, I_1, I_2 power factor of the circuit in Fig. No. 4

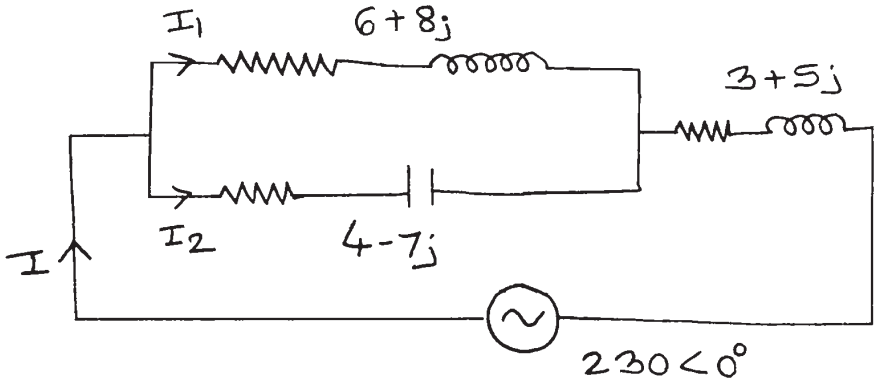

Fig. No. 4

c) Explain the term bandwidth of a series resonant circuit. Derive its equation.

d) A bridge network ABCD has arms AB, BC, CD and DA of resistances 1, 1, 2 and 1 ohm respectively. If the detector AC has a resistance of 1 ohm, determine by star/delta transformation, the network resistance as viewed from the battery terminals.

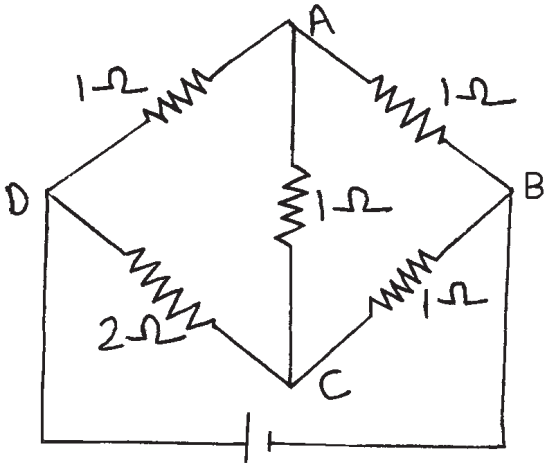

Fig. No. 5

Marks

e) Find current though 6 Ω resistor using superposition theorem. Fig. No. 6

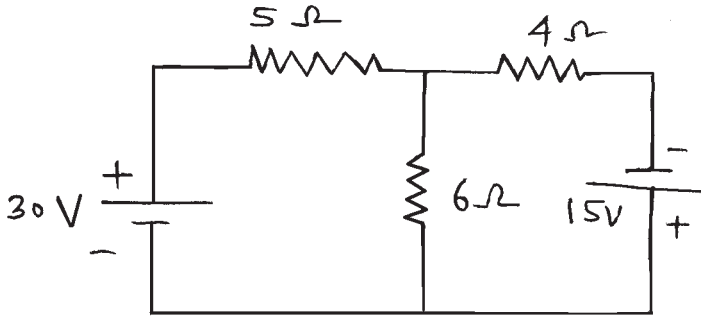

Fig. No. 6

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

a) A coil of resistance 20 Ω and inductance 200 μH is in parallel with a variable capacitor. The voltage of the supply is 20 V at a frequency of 10^6 Hz. Calculate:

(i) The value of C to give resonance.

(ii) The Q of the coil

(iii) The current in each branch of the circuit at resonance.

b) Find current through impedance 3 + j5 using superposition theorem in the circuit as shown in Fig. No. 7.

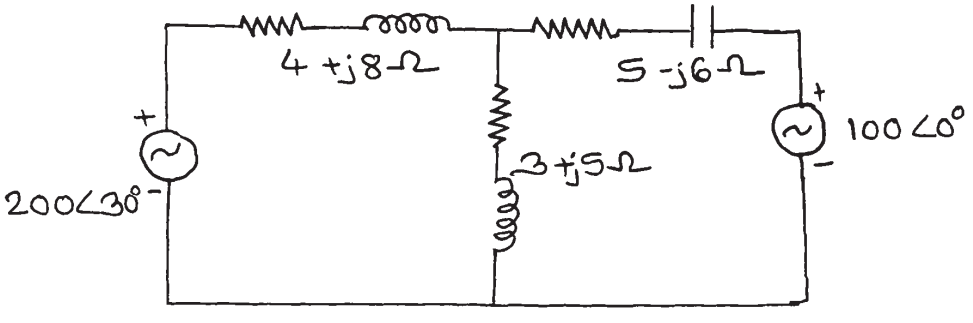

Fig. No. 7

c) Sketch the phasor diagram for the nominal drawn circuit with justification of each phasor drawn.

Marks

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

a) Use nodal analysis to calculate the current flowing in each branch of the network shown in Fig. No. 8

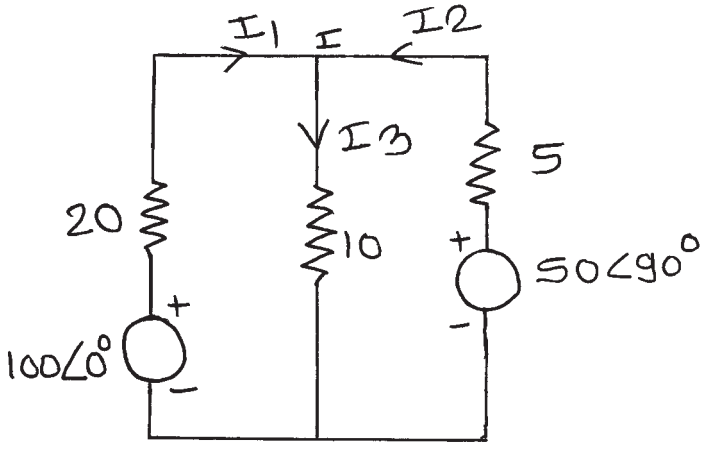

Fig. No. 8

b) Verify the reciprocity theorem in the circuit given in Fig. No. 9.

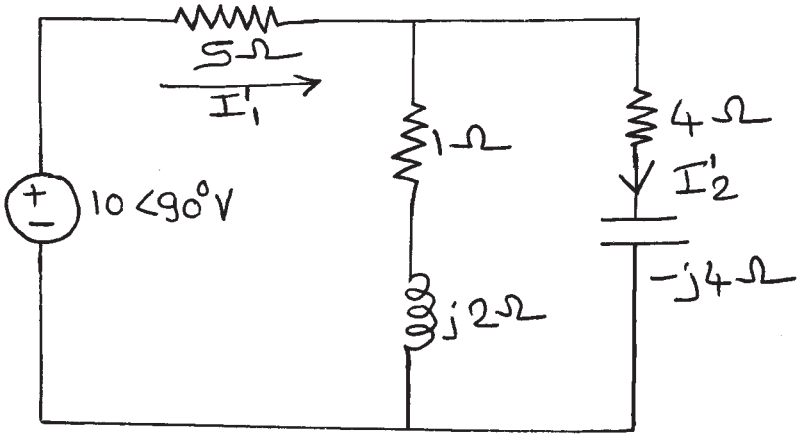

Fig. No. 9

c) Draw the two port network and determine the indicated parameters for the following configurations:

(i) Cascade configurations (ABCD parameter)

(ii) Series configurations

(iii) Parallel configurations

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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 :

(i) Admittance

(ii) Conductance

(b) Write the equation of open circuit Z parameter.

(c) Draw phasor diagram for R-L series circuit.

(d) Draw resonance curve for series resonance.

(e) Define :

(i) Node

(ii) Branch

(f) State Thevenins theorem.

(g) Write the formula for Delta to Star conversion giving examples.

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

(a) For RLC series circuit draw voltage triangle, power triangle and impedance triangle along with proper labellings and equations for condition $V_L > V_C$.

(b) Define and state equations for (i) Active Power (ii) Reactive Power (iii) Apparent Power

(c) Explain the steps for converting practical voltage source into practical current source.

(d) Three resistances 32 Ω, 40 Ω, 48 Ω are connected in star circuit. Determine its equivalent delta circuit.

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

(a) If $Z_1 = 3 + j7$ and $Z_2 = 12 - j16$ are connected in parallel. Find the equivalent impedance of combination.

(b) Determine Bandwidth and Quality factor (Q) for the series circuit.

(c) Using Mesh Analysis find current through 4 Ω resistance. (Refer fig. 1)

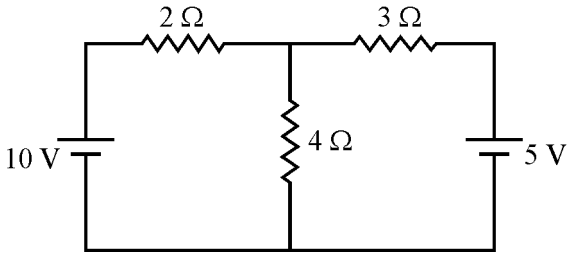

Fig. 1

(d) Explain the procedure for solving Thevenins theorem using suitable example.

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

(a) A coil has resistance of 4 Ω and an inductance of 9.55 mH. Calculate (i) Reactance (ii) The impedance (iii) The current taken from 240 V, 50 Hz supply.

(b) Draw the phasor diagrams for a series RL and series RC with AC supply.

(c) Compare series and parallel circuits.

(d) Using source transformation technique find the resultant current (I) through circuit. (Refer fig. 2)

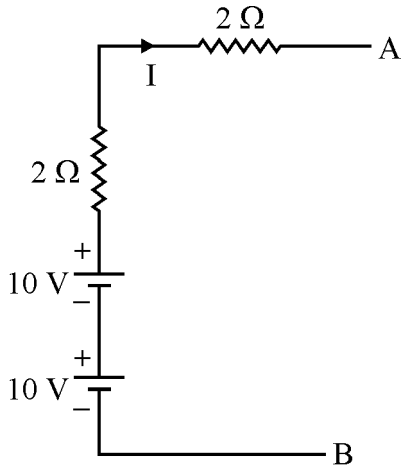

Fig. 2

(e) Using super-position theorem find current through 4 Ω resistance. (Refer fig. 3)

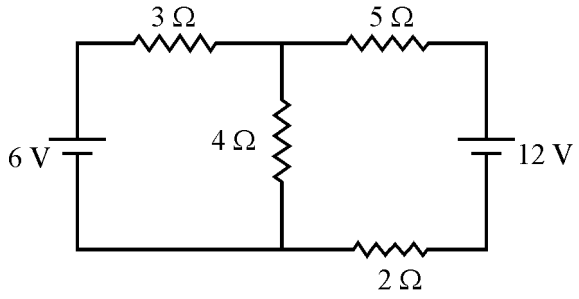

Fig. 3

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

(a) Derive the expression for resonance frequency for parallel circuit.

(b) Calculate current through 8 Ω resistance using Norton's theorem. (Refer fig. 4)

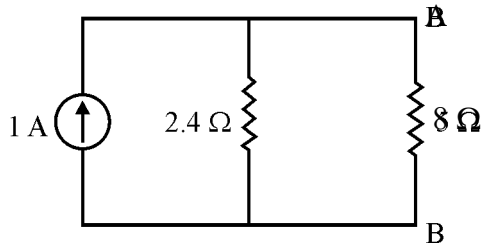

Fig. 4

(c) Explain 'Π' and 'T' circuit with proper phasor diagram.

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

(a) Calculate the nodal voltage V_B using nodal analysis. (Refer fig. 5)

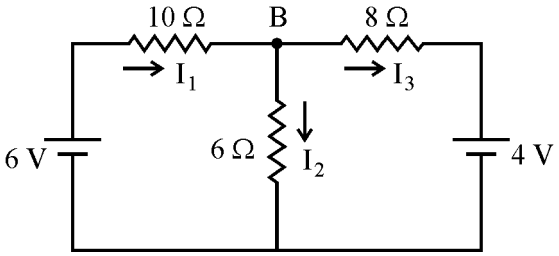

Fig. 5

(b) State and explain :

(i) Maximum power transfer

(ii) Reciprocity theorem

(c) Explain significance of two-port network. Also draw two port network for (i) Cascade configuration ABCD parameter (ii) Series configuration.