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25226

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 the following terms :
 - i) Branch
 - ii) Loop
 - b) State Norton's theorem.
 - c) Write the equations for open circuit (z) parameters.
 - d) Define the following terms :
 - i) Active network
 - ii) Passive network
 - e) State the units of –
 - i) Impedance
 - ii) Reactance

P.T.O.

- f) Draw power triangle of R-C series circuit.
 g) What is condition for resonance in Parallel Circuit.

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

12

- a) Find the equivalent resistance between terminal A and B for circuit shown.

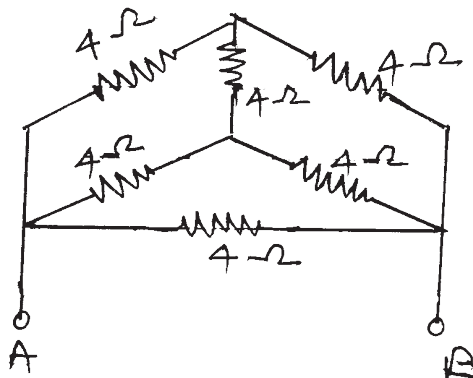


Fig. No. 1

- b) Using source conversion technique convert the given circuit into an equivalent circuit containing single resistance and voltage source. Refer Figure No. 2

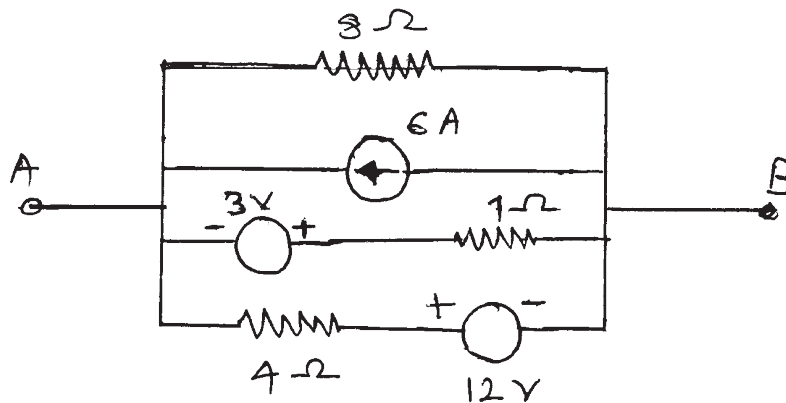


Fig. No. 2

- c) Explain the procedure for solving Thevenin's theorem with example.
 d) Draw equivalent circuit in terms of Y parameters. State condition of symmetry and reciprocity for Y parameters.

3. Attempt any THREE of the following :

12

- State different steps to solve example on Nodal analysis with one example.
- Find value of R_L so that maximum power will transfer from source to it. Refer Figure No. 3.

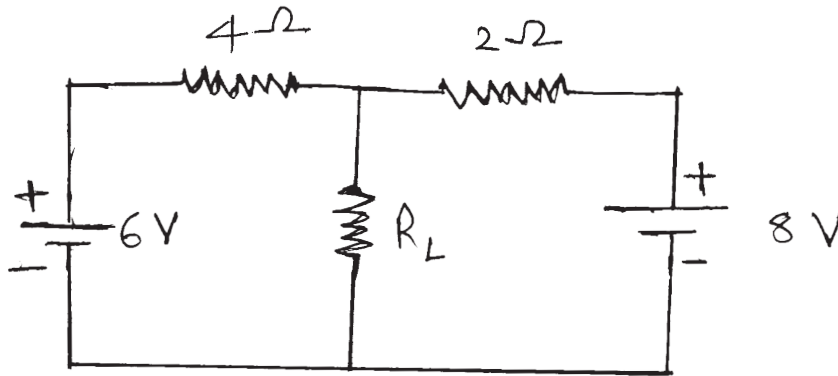


Fig. No. 3

- State the explain super position theorem.
- State features and applications of π attenuator.

4. Attempt any THREE of the following :

12

- Using mesh current analysis find current through 2Ω resistance shown in Figure No. 4

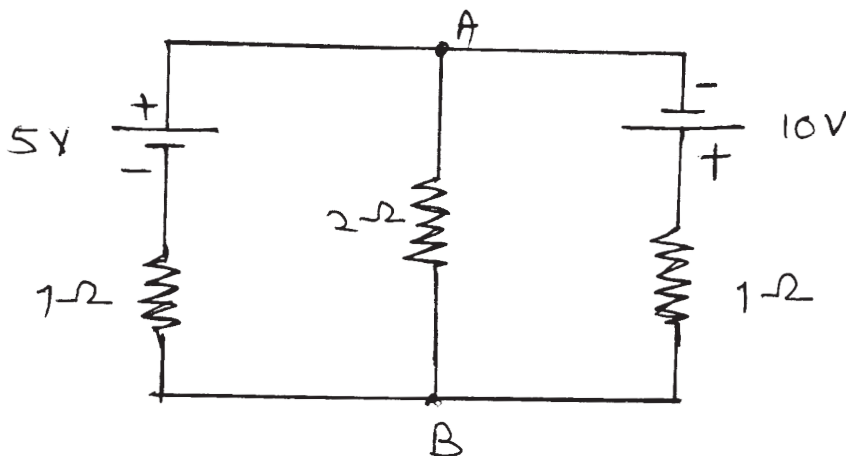


Fig. No. 4

- b) Differentiate between Low pass filter and High pass filter.
- c) An RC series circuit consist of $R = 10\Omega$ and $C = 200\ \mu\text{F}$. It is connected across 250V, 50Hz. 1 ϕ AC supply. Calculate the value of power consumed by the circuit.
- d) Derive an expression for resonant frequency of series RLC circuit.

5. Attempt any TWO of the following :

12

- a) State Thevenin's Theorem. Find current through branch AB using Thevenins theorem Refer Fig. No. 5.

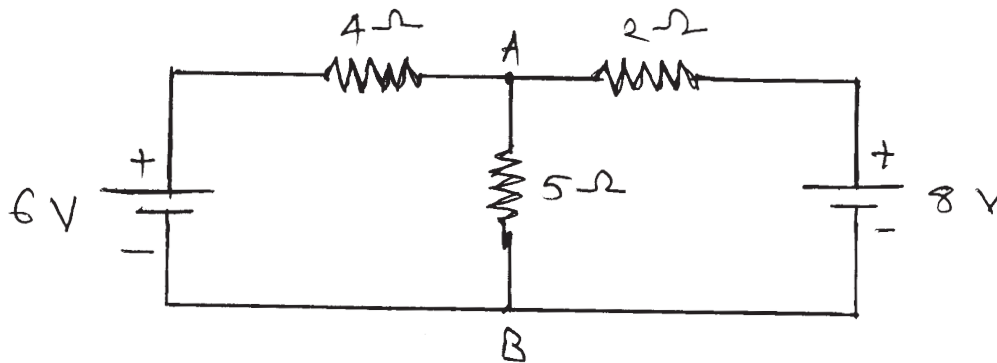


Fig. No. 5

- b) Define Apparent Power. If a coil of resistance 15Ω and inductance of 0.05H connected in series with $100\ \mu\text{F}$ capacitor across 230V, 50Hz ac supply; find :
 - i) Current
 - ii) Power Factor of circuit
 - iii) Voltage across coil
 - iv) Voltage across capacitor
- c) Draw and explain resonance curve for series resonance.

6. Attempt any TWO of the following :

12

- a) Find the current through 3Ω by using superposition theorem. Refer Figure No. 6

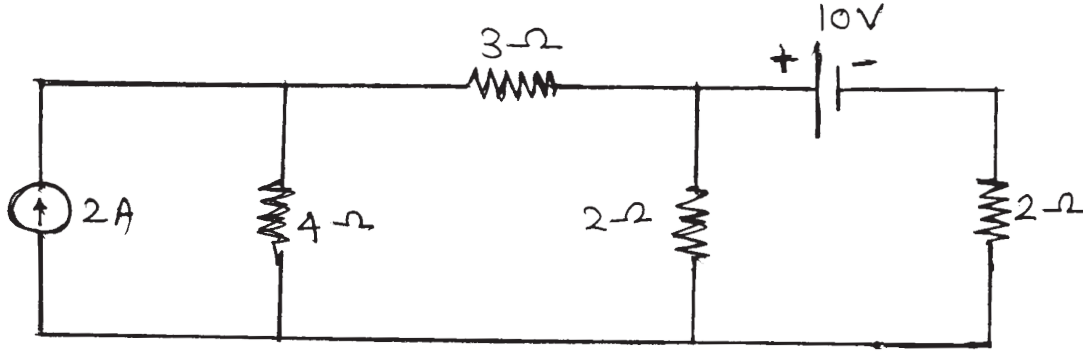


Fig. No. 6

- b) For series RL circuit, draw circuit draw phasor diagram, waveform of V and I, draw voltage triangle.
- c) Define quality factor and bandwidth of a series resonant circuit and give expression of the same.
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