

313332

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) Use of Non-programmable Electronic Pocket Calculator is permissible.
(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 –

- i) Resonance frequency
- ii) Q- Factor

b) Identify the type of circuit from given diagram. Refer Figure No. 1

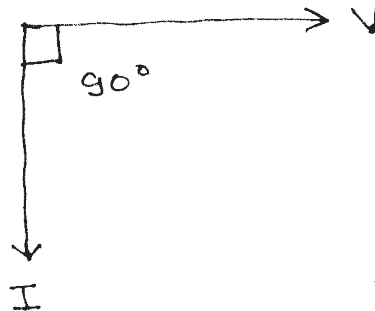


Fig. No. 1

P.T.O.

- c) Convert the given Delta network into star. Refer Figure No. 2

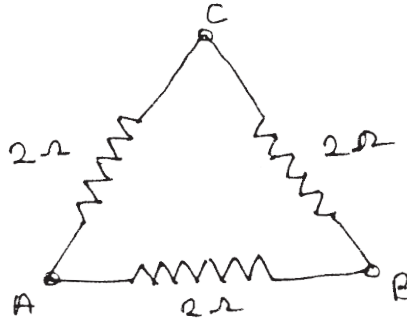


Fig. No. 2

- d) Define –
- i) Node
 - ii) Branch
- e) State Nortons theorem
- f) State the condition for maximum power transfer theorem.
- g) State superposition theorem.

2. Attempt any THREE of the following :

12

- a) An a.c. series circuit has a resistance of 10Ω , as inductance of 0.2 H and a capacitance of $60\text{ }\mu\text{f}$. Calculate :-
- i) Resonant frequency
 - ii) Current
 - iii) Power at resonance. Applied voltage is 200V .
- b) For the parallel RLC circuit, if $R = 10\Omega$, and $L = 0.1\text{ H}$ are in series and the combination is connected across $c = 50\text{ }\mu\text{F}$ then find
- i) Total impedance
 - ii) Total current
 - iii) Circuit power factor
 - iv) Power consume

- c) Prove that, for balanced star load,

$$V_L = \sqrt{3} V_{ph}$$

- d) Use nortons theorem to find the current flowing through $3\ \Omega$ resistor for the circuit shown in Figure No. 3

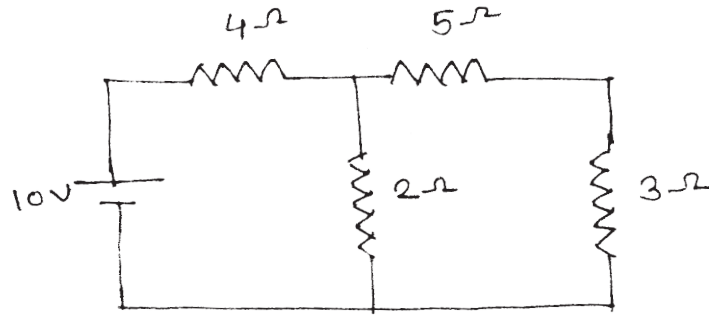


Fig. No. 3

3. Attempt any THREE of the following :

12

- a) Compare series and parallel resonance circuit on the basis of –
 - i) Impedance
 - ii) Current
 - iii) Magnification
 - iv) Type of circuit
- b) Compare Star and Delta connection. (Any four points)
- c) Explain with suitable diagram, steps to solve the given network using mesh analysis.
- d) State maximum power transfer theorem. Find the value of variable resistor 'R' so that maximum amount of power is delivered to the load for the circuit shown in Figure No. 4.

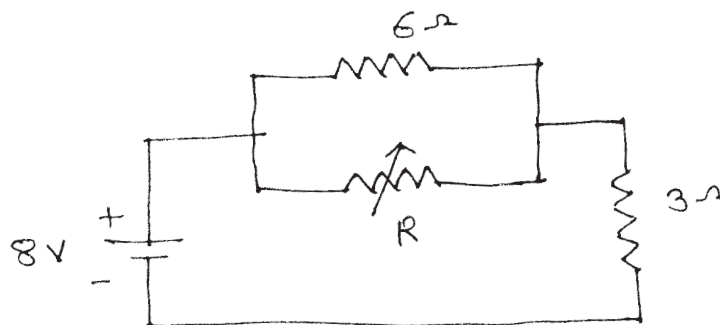


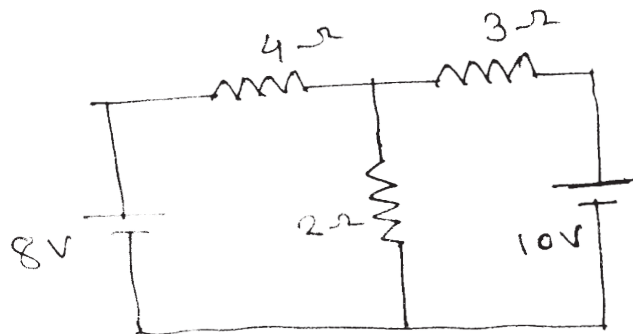
Fig. No. 4

P.T.O.

4. Attempt any THREE of the following :

12

- a) With reference to the response of purely inductive circuit.
 - i) Draw the circuit diagram.
 - ii) Draw the waveform of voltage and current.
 - iii) Draw the phasor diagram.
 - iv) Write the equation for voltage and current.
- b) An inductive coil having resistance of 10Ω and inductance of 0.5H is connected in parallel with a capacitor of $50\mu\text{F}$. Find.
 - i) Resonance frequency
 - ii) Q-Factor
 - iii) Current at resonance
 - iv) Power consume if the supply voltage is 230V .
- c) A star connected 3ϕ load, is supplied with 3ϕ , 415V , 50 Hz supply. If the line current is 20 Amp and total power taken is 100 KW . Find –
 - i) Per phase Resistance and Reactance
 - ii) Load power factor
 - iii) Three phase reactive power
- d) Find current flowing through 2Ω resistor for the circuit shown in Figure No. 5 using mesh analysis.

**Fig. No. 5**

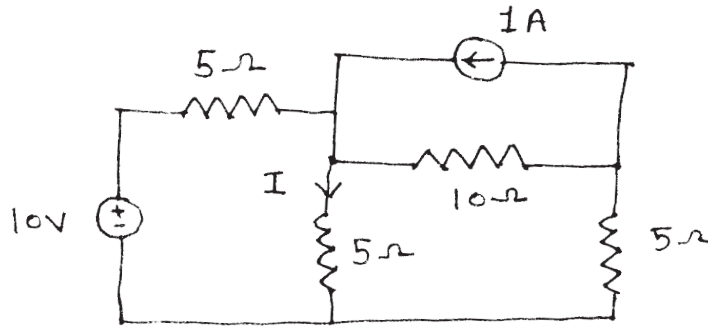
- e) State Thevenin's theorem. Write stepwise procedure to solve given network using Thevenins theorem.

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

- a) For series RLC circuit, draw the impedance triangle and voltage triangle for the following cases
- $X_L > X_C$
 - $X_C > X_L$
- b) i) State the features of parallel resonance circuit.
ii) Draw the resonance curve for parallel RLC circuit. Clearly state the meaning of each term on the curve.
- c) Compare single phase circuit with three phase circuit.
(Any 6 points)

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

- a) State different types of power with its unit and explain power factor. Draw power triangle for R-L series circuit.
- b) Using source transformation technique find, current flowing through 5Ω resistor for the circuit shown in Figure No. 6.

**Fig. No. 6**

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[6]

Marks

- c) Verify the reciprocity theorem for the circuit shown in Figure No. 7. Also comment on the result's obtained.

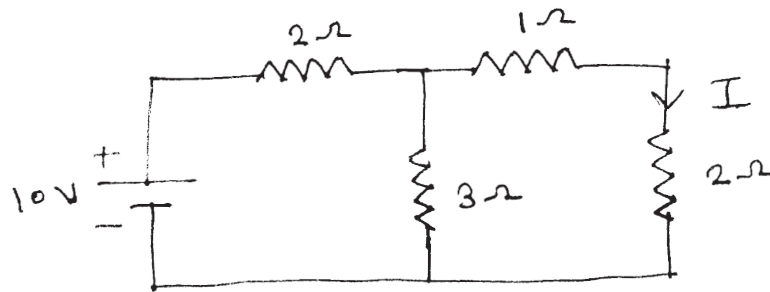


Fig. No. 7
