

Printed Pages : 4



EE201

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 199213

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B. Tech.

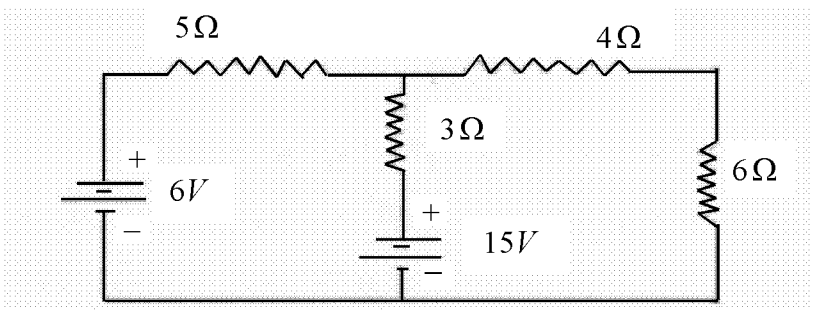
(SEM. II) THEORY EXAMINATION, 2014-15
ELECTRICAL ENGINEERING

Time : 3 Hours]

[Total Marks : 100

Note : Attempt **All** Questions. **All** Questions carry **equal** marks.

- 1 Answer any four parts of the following : **5x4=20**
- Three resistances r , $2r$ and $3r$ are connected in delta. Determine the resistances for anequivalent star connection. Prove formula used.
 - State and explain Super position theorem. Determine the current through 6Ω resistor.

**Fig.1**

- c) Define the following terms:
- (i) Active and passive elements
 - (ii) Voltage and current source
 - (iii) Unilateral and bilateral elements
- d) State and prove the Maximum Power Transfer Theorem.
- e) Find the Norton equivalent for the network shown in the fig 2.

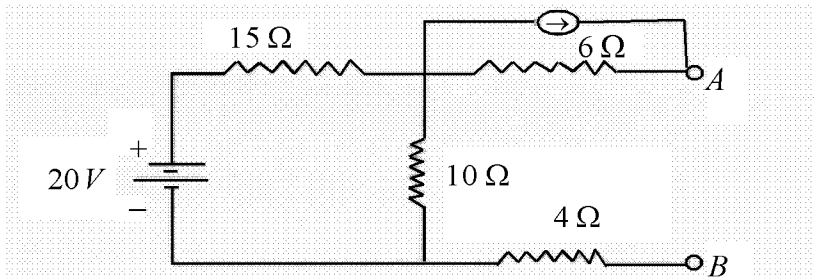


Fig.2

- f) Determine the current through 2Ω resistor in the network by Thevenin's Theorem.

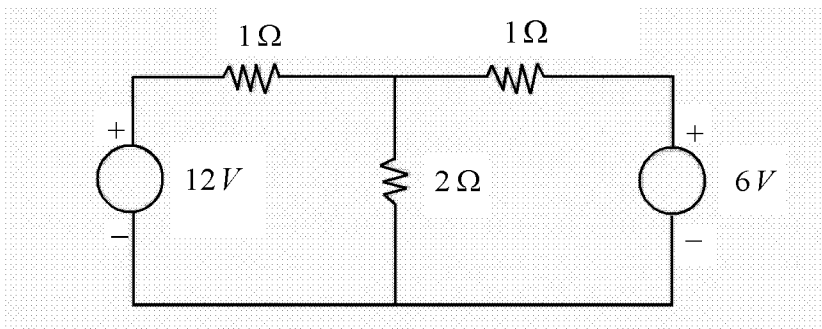


Fig.3

2 Answer any four parts of the following: **5x4=20**

- a) Deduce an expression for the resonant frequency of a series R-L-C ac circuit.
- b) Explain active, reactive and apparent power.
- c) A circuit takes a current $i=20 \sin(314t-\pi/6)$ amperes when the supply voltage is $v = 100 \sin 314 t$. calculate the impedance, phase angle, resistance and inductance of the circuit.
- d) A coil in parallel with a $200\mu\text{F}$ capacitor is connected across a 200V , 50 Hz supply. The coil takes a current of 8A and loss in the coil is 960W . Calculate the resistance, inductance of the coil and power factor of the entire circuit.
- e) Why series resonant circuit is called as an acceptor circuit? Explain bandwidth and quality factor of series resonant circuit.
- f) Three impedances $(6+j5)\Omega$, $(8-j6)\Omega$ and $(8+j10)$ are connected in parallel. Calculate the current in each branch when the total current is 20 A .

3 Answer any two parts of the following: **10x2=20**

- a) Compare 3 phase star and delta connected systems. Show the total power in these connections remains same. A balanced 3 phase star connected load takes a power of 5 kW at 0.8 pf lagging when connected to a 400 V , 3 phase supply. Calculate the line current and impedance per phase of the load.
- b) Explain moving iron instruments working principle as an ammeter.

- c) Explain the principle of operation of a single phase transformer.

A 230/460 V transformer has a primary resistance of $0.2\ \Omega$ and a resistance of $0.5\ \Omega$ and the corresponding values for the secondary are $0.75\ \Omega$ and $1.8\ \Omega$ respectively. Find the secondary terminal voltage when supplying

- (i) 10 A at 0.8 p.f. lagging
- (ii) 10 A at 0.8 p.f. leading.

4 Answer any two parts of the following: **10x2=20**

- a) Explain two wattmeter method to measure three phase power with suitable diagram.
- b) Power in a 3-phase circuit is measured by two wattmeters and the readings of the wattmeters are 5 kW and 0.5 kW, the latter reading being obtained after reversal of the current coil connection. Find the total power, and power factor of the circuit.
- c) Explain different types of d.c. machines and derive emf equation.

5 Answer any two parts of the following: **10x2=20**

- a) Rotor of 3 phase induction motor cannot run at synchronous speed. Explain a three phase slip ring, 4 pole induction motor has rotor frequency 2.0 Hz while connected to 400 V, 3 phase, 50 Hz supply determine slip and rotor speed.
- b) Draw torque-speed characteristics of 3 phase induction motor. Show the different operating regions. What will happen if rotor resistance of motor changes?
- c) Why single phase induction motor is not self-starting? Explain method to start it.