Sample Question Paper – I

9031

Course Name :- Electrical Engineering Group
Course code :- EE/EP
Semester :- Third
Subject :- Electrical Circuits and Network
Duration :- 3 hours Marks: 80

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.

Marks

Q.1 Attempt any Eight of the following **16**

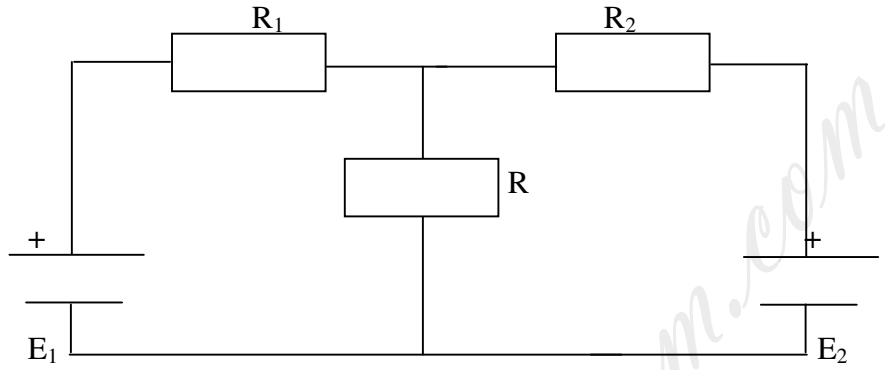
a) Define: (i) Phase difference (ii) amplitude
b) An alternating quantity is given by e=141.4 sin (377t-JI/2). Find (i) rms. value (ii) frequency.
c) Draw the waveforms for current and voltage for pure inductive circuit.
d) With aid of power triangle define apparent power, reactive power.
e) Define quality factor of series circuit.
f) Write the principle of generation of three-phase AC voltage.
g) Three resistance of 4 ohm each are connected in star. Convert this connection into equivalent delta connections.
h) State two rules of Nodal Analysis.
i) State superposition theorem.
j) Define ideal constant current source.

Q.2 Attempt any three of the following 12

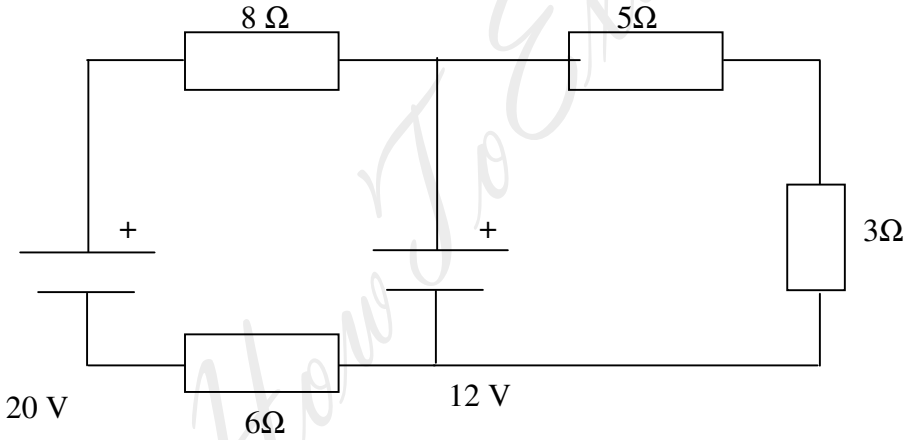
a) In a R-L series circuit R=3.5 Ω, L=0.1H. Find (I) current through the circuit (ii) Power factor when a.c. voltage V=220. v.50Hr. is applied across the circuit.

b) Represent the following quantities in their polar form (i) 24+j8 A1) (ii) 6-j8 V.

c) By using superposition theorem find the current in resistance R. Given R1 = 0.5 Ω, R2 = 0.4 Ω, R=1 Ω,E1=2.05 V, E2=2.15 V. Neglect internal resistance of the source.



d) Calculate current in 3 ohm resistance using mesh current analysis.



Q.3 Attempt any three of the following 12

a) Two impedance given by Z_1 = 3+j4 and Z_2 = 8-j6 Ω are joined in parallel and connected across 100 volt, 50 Hz supply. Calculate the supply current and power factor.

b) Justify that the resonance parallel circuit at resonance is normally called rejecter circuit.

c) Find the equivalent delta connection for three resistances of values 30 Ω , 40 Ω , 60 Ω connected in star.

d) Compare polyphase circuit with single-phase circuit on basis of following points (i) no. of phases (ii) waveforms (iii) cost (iv) power handling capacity.

Q.4 Attempt any Four of the following 16

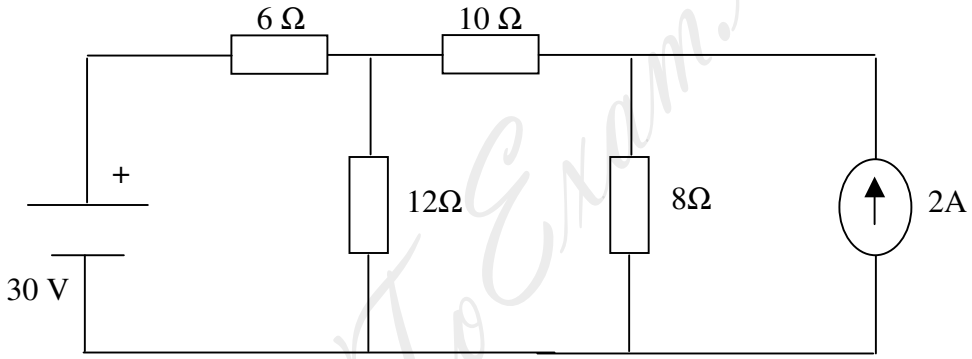
a) Estimate admittance, conductance and susceptance if Z=3+j4.

b) Derive the relationship between line and phase current for balanced star connected load.

c) State sign conventions suggested in applying Kirchoff's law.

d) State Norton's theorem and give steps to develop Norton's equivalent circuit from Thevenin's theorem.

e) By using superposition theorem find current in 10 ohm resistance.



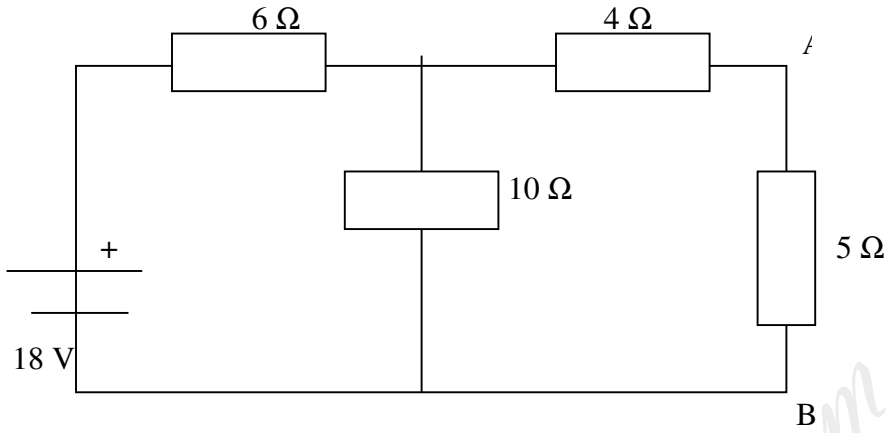
f) Three impedance ach of magniitude 15-j20 Ω are connected in mesh across three-phase, 50Hr 400 volt AC supply. Determine the phase current, line current, active power and reactive power drawn from the supply.

Q.5 Attempt any three of the following 12

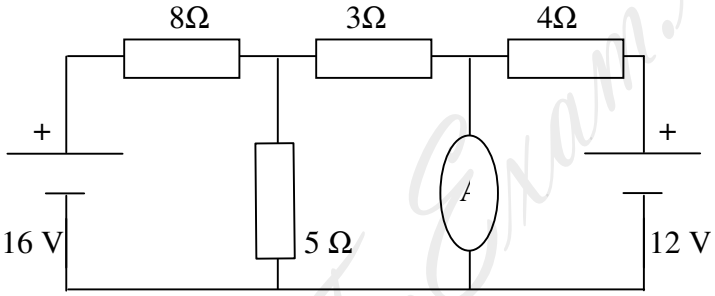
a) Draw the vector diagram for R-L-C series circuit.

b) Give meanings of unbalanced load and balanced load as referred to polyphase circuit.

c) Obtain the Thevenin's equivalent circuit to find current in branch AB.



d) Find the ammeter current by using nodal analysis.



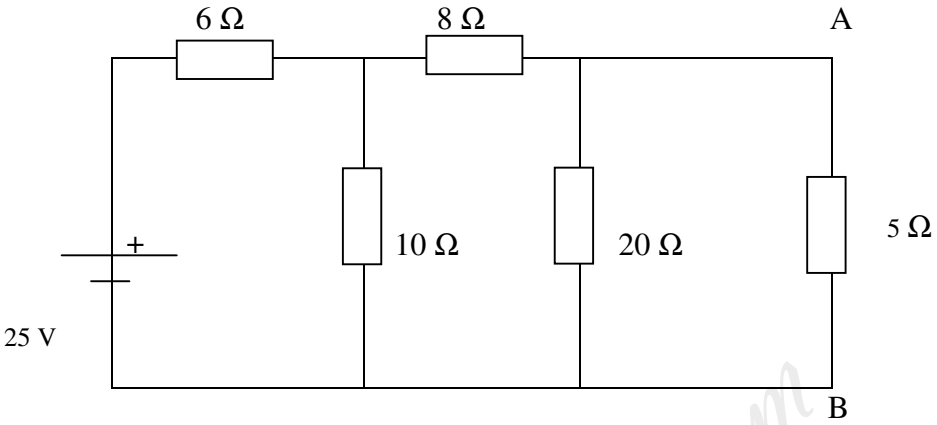
Q.6 Attempt any three of the following 12

a) An emf represented by e=100 sin 100 Л t is applied across a circuit consisting of 40 ohm resistance in series with 40 microfarad capacitance and 9.25 H inductance. Determine RMS value of current.

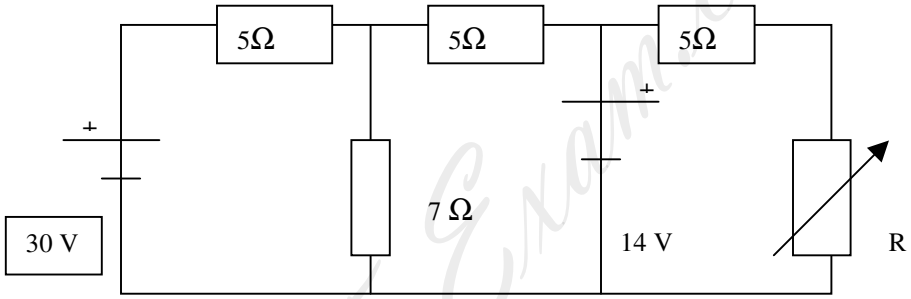
b) Draw vector diagram of AC supply through pure R and pure C.

c) Find current flowing through 5 Ω resistance by applying Norton's theoram

d) superposition theorem find current in 10 ohm resistance.



e) Calculate the value of resistance R so that the power transferred to the load will be maximum.



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