

Level: Bachelor

Semester: Fall

Year : 2019

Programme: BE

Full Marks: 100

Course: Basic Electrical Engineering

Pass Marks: 45

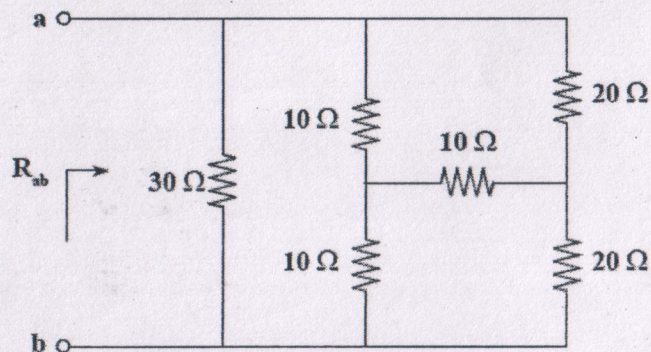
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

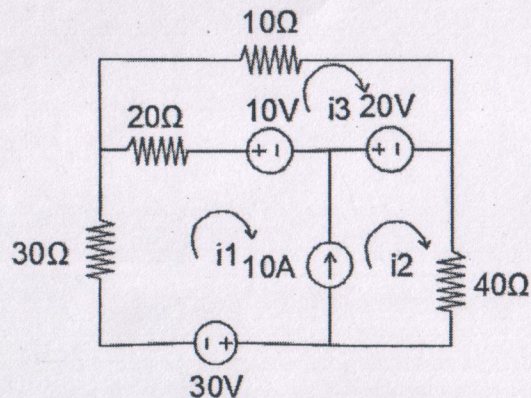
The figures in the margin indicate full marks.

Attempt all the questions.

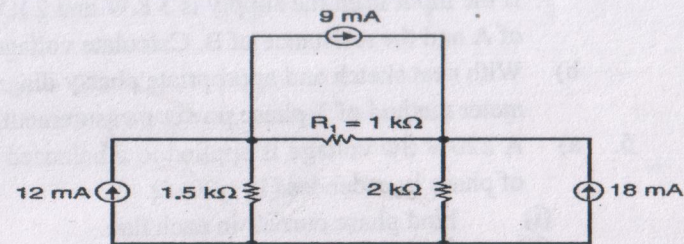
1. a) State Ohm's law and write its limitations. Obtain the equivalent resistance of the given circuit. 8



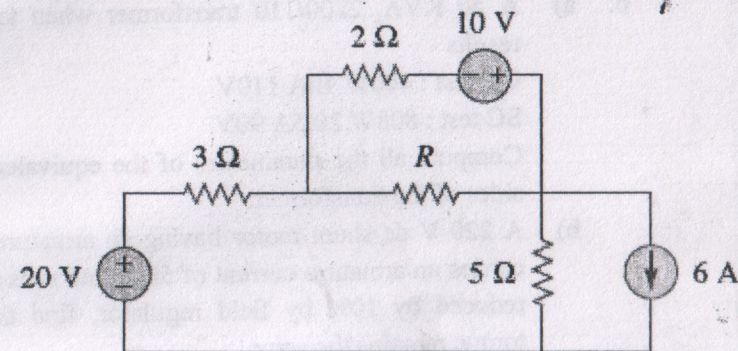
- b) Find  $i_1, i_2, i_3$  current using mesh analysis method. 7



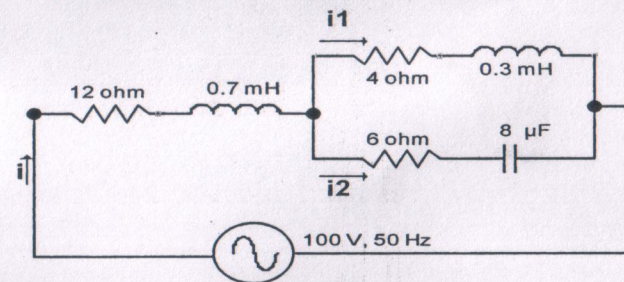
2. a) Find the current through  $R_1$  using superposition theorem. 7



- b) Find the maximum power that can be delivered to the resistor  $R$  in the below circuit. 8



3. a) Show that the peak factor of sine wave is equal to 1.41. 8  
b) Determine the total impedance and current in each branch of circuit below. 7



4. a) Two coils A and B are connected in series across a 240 V, 50 Hz supply. The resistance of A is  $5\Omega$  and the inductance of B is 0.015 H. 8



If the input from the supply is 3 KW and 2 KVAR, find the inductance of A and the resistance of B. Calculate voltage across each coil.

- b) With neat sketch and appropriate phasor diagram explain two watt-meter method of 3-phase power measurement. 7
5. a) A 220 V 3 $\Phi$  voltage is applied to a balanced delta connected 3 $\Phi$  load of phase impedences (15+j20)  $\Omega$ . 8
- (i) Find phase current in each line.  
(ii) Find power consumed in each phase  
(iii) Find the phasor sum of three line currents.  
(iv) Draw the phasor diagram.
- b) Explain the construction and working principle of three phase induction motor. 7
6. a) A 50 KVA, 2200/110 transformer when tested gave the following results 8
- OC test : 400W 10A 110V  
SC test : 808W 20.5A 90V
- Compute all the parameters of the equivalent circuit referred to LV sides of the transformer.
- b) A 220 V dc shunt motor having an armature resistance of 0.25 ohm carries an armature current of 50 A and runs at 600 rpm. If the flux is reduced by 10% by field regulator, find the speed assuming load torque remains the same. 7
7. Write short notes on: (Any two) 2 $\times$ 5
- a) Generation, transmission and distribution of electricity  
b) Color Coding of resistance  
c) Analogy between magnetic and electric circuits