

Level: Bachelor  
Programme: BE

Course: Basic Electrical Engineering

Semester: Spring

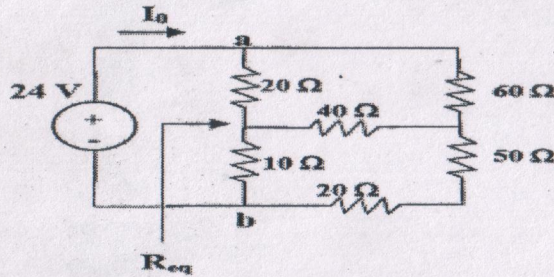
Year : 2019  
Full Marks: 100  
Pass Marks: 45  
Time : 3hrs.

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

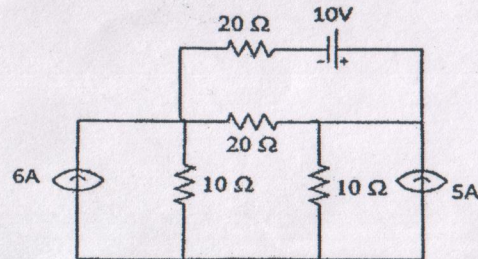
The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain with the help of a single line diagram about the generation, transmission and distribution of electric power. 7
- b) State and explain Ohm's law. Also write its limitation. Obtain the equivalent resistance and use it to find source current for the circuit shown below. 8

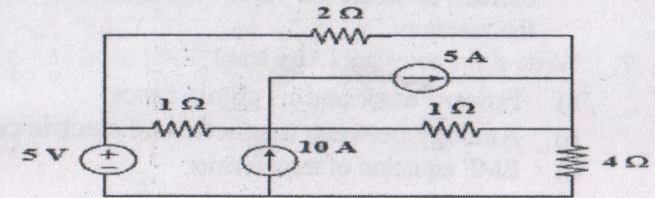


2. a) Using Node voltage method, find the current through each 10Ω resistor of the circuit as shown below. 8



- b) State and explain Norton's Theorem with appropriate example. 7

3. a) State maximum power transfer theorem. What resistance value load should be used instead of 4 ohm to deliver maximum power to the load? Also find the maximum power transferred. 8



- b) Calculate the average value, RMS (effective) value and form factor of the output of half wave rectifier when the input to the rectifier is a purely sinusoidal alternating current. 7
4. a) Differentiate between series resonance and parallel resonance. Show that for the series RLC circuit in resonance, the ratio of resonant frequency and the quality factor is the bandwidth. 8
- b) Two impedances  $(60+j15) \Omega$  and  $(30-j10) \Omega$  are connected in series across a 220V, 50 HZ supply. Find the current, active power, reactive power, apparent power and power factor of the circuit. 7
5. a) Explain the measurement of three phase power by two wattmeter method with necessary derivation and phasor diagram. 7
- b) A balanced delta connected load takes a phase current of 10 A at a power factor of 0.8(lagging) when connected to a 440 V, 50 Hz, three phase supply. Calculate the power drawn from the supply, phase impedance of each phase. 8
- If the same phase impedance is connected in star connection what will be the power consumed by the load. Also compare the power consumed for both connection of load.
6. a) The test data were obtained for 20KVA, 50Hz, 2000/200 V distribution single phase transformer. Calculate the approximate equivalent circuit refer to both H.V. and L.V. side. 8

Test	Voltage(V)	Current(A)	Power (Watt)
OCC with H.V. open Circuited	200	40	120
SC with L.V. Short Circuited.	60	10	300

Also determine the efficiency for half load of 0.8 pf lagging.



- b) A 240 V shunt motor runs at 1000 rpm of full load with an armature current of 10 A. The total resistance of the armature and brushes is  $0.6\Omega$ . If the speed is to be reduced to 800 rpm with the same armature current, calculate the value of resistance to be connected in series with the armature.

7. Write short notes on: (Any two)

- a) Power Factor and its significance
- b) Analogy between magnetic and electric circuit
- c) EMF equation of transformer

7

2×5