SEE MODEL QUESTION PAPER-2

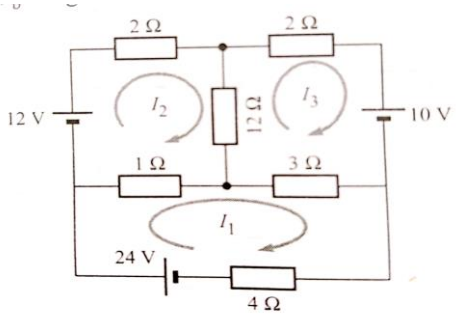
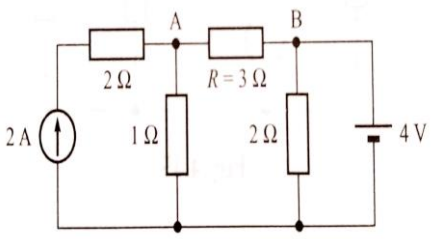
UG

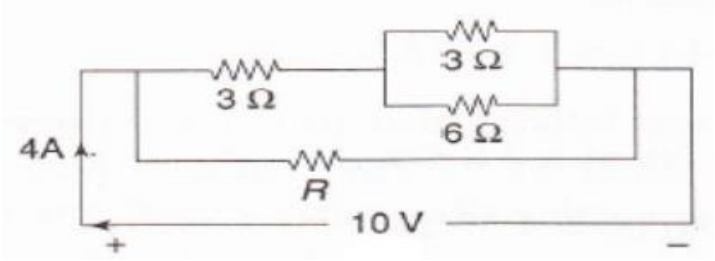
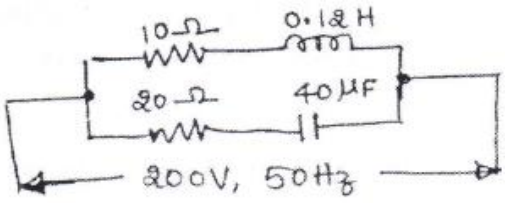
First Semester B.E. Degree Examination, April - 2021

Fundamentals of Electrical Engineering

Time: 3 hrs. **Course Code: 20ELE14** **Max. Marks: 100**

Note: Answer any Five full questions, choosing ONE full question from each module.

	Module 1	Marks
1	a Draw a schematic diagram and explain steam power station. b. Draw and explain a typical structure of electrical power system. c. List the applications of solar PV system system.	10 6 4
	OR	
2	a. With a schematic diagram, explain the working of hydroelectric power station. b. List the classifications of Energy Resources and explain briefly. c. List the applications of biogas system.	10 6 4
	Module 2	
3	3.a. State and explain Kirchhoff's laws as applied to DC circuits. 3.b. A 8 Ω resistor is in series with a parallel combination of two resistors 12 Ω and 6Ω. If the current in 6 Ω resistor is 5 A, determine the total power dissipated in the circuit. 3.c. Determine the mesh currents I_1, I_2 and I_3 in the circuit shown in fig. (3.c)  fig. (3.c)	5 7 8
	OR	
4	a. State and explain Ohm`s law. Mention its limitations. b Determine the current flowing through the 3 Ω resistor (from A to B) in the circuit shown in fig. (4.b) using superposition theorem.  fig. (4.b)	5 7

	c. Determine the value of R in the network shown in fig. (4.c)  fig. (4.c)	8
	Module 3	
5	a. Show that the power consumed by a pure capacitor is zero. Draw the voltage, current and power wave forms. b. A choke coil takes a current of 2 A lagging 60° behind the applied voltage of 220 V at 50 Hz. Calculate the inductance, resistance and impedance of the coil. Also determine power consumed, when it is connected to a 100 V, 25 Hz supply. c. For the network shown in fig. (5.c), find (i) current in each branch (ii) power factor of the circuit.  fig. (5.c)	5 7 8
	OR	
6	a. Define and derive an expression for average vale of an alternating quantity. b. A series circuit with resistance 0f 10Ω , inductance of 0.2 H and capacitance of 40 uF is supplied with a 100 V supply at 50 Hz. Find the current, power and power factor of the circuit.	10 10
	Module 4	
7	a. In a three phase delta connection, find the relation between the line and phase quantities of voltages and currents. b. Mention the advantages of 3-phase system over single phase system. c. A 3-phase, 50 Hz, 16 pole alternator with star connected winding has 144 slots with conductor/slot is 10.the flux per pole is 24.8 mWb sinusoidally distributed. The coils are full pitched. Find (i) speed and (ii) line emf.	7 8 8
	OR	
8	a. Explain with a neat sketch the construction of a synchronous generator.	10

	b. A balanced star connected load of (8+j6) Ω/phase is connected to a 3-phase, 220 V supply. find the line current, power factor, power reactive volt-ampere and total volt-ampere.	10
Module 5		
9	a. Derive the emf equation of an transformer. b. A three phase 6 pole 50Hz induction motor has a slip of 1% at no load and 3% at full load. Determine: i) Synchronous speed ii) No load speed iii) Full load speed iv) frequency of rotor current at stand still. v) Frequency of rotor current at full load.	10 10
OR		
10	a. Explain the concept of rotating magnetic field in 3-phase induction motor. b. Find the efficiency of 150 KVA, single phase transformer at 1) Full load at UPF .2) 70 % load 0.95 p.f. 2) 50 % load 0.85 p.f., If the copper loss at full load is 1600 watts and Iron loss is 1400 watts.	10 10