CBCS SCHEME

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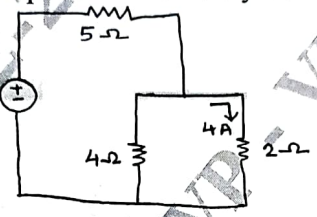
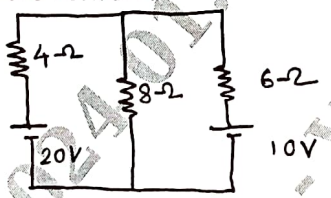
BESCKB104/BESCK104B

First Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Introduction to Electrical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. VTU Formula Hand Book is permitted.
3. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain nuclear power generation with the help of neat block diagram.	7	L1	CO1
	b.	In the circuit shown find the power delivered by the source.  Fig.Q.1(b)	7	L3	CO1
	c.	State and explain Ohm's law with its limitations.	6	L1	CO2
		OR			
Q.2	a.	State and explain Kirchoff's current and voltage laws.	7	L1	CO1
	b.	Explain the general structure of electrical power system, using single line diagram.	7	L1	CO1
	c.	Calculate the currents in the network.  Fig.Q.2(c)	6	L3	CO2
		Module – 2			
Q.3	a.	Obtain the behavior of voltage, current and power in a pure resistor connected to 1-ϕ A.C. supply. Draw the voltage, current and power waveforms.	7	L2	CO2
	b.	A current of average value 18.019A is flowing in a circuit to which a voltage of peak value 141.42V is applied. Determine: i) Impedance in polar form. ii) rms values of voltage and current. iii) Power consumed by the circuit. Assume voltage lags current by 30°.	7	L3	CO2

	c.	Define following terms related to sinusoidal waveform of AC parameter: i) Instantaneous value ii) Amplitude iii) Frequency iv) Time period v) Form factor vi) Peak factor.	6	L1	CO1
		OR			
Q.4	a.	Derive the equation of the power consumed by R-L series circuit. Also draw the waveforms of voltage current and power.	7	L3	CO2
	b.	A circuit consist of a resistance of 20Ω, an inductance of 0.05H connected in series. A supply voltage of 230V, 50Hz is applied across the circuit. Find the current, P.F. and power consumed by the circuit. Draw the vector diagram.	7	L3	CO2
	c.	What are the advantages of a 3-ϕ system over a single phase system?	6	L1	CO1
		Module – 3			
Q.5	a.	With a neat diagram, explain the construction of D.C. generator.	7	L1	CO3
	b.	A 4 pole lap connected DC generator has 600 armature conductors and run at 1200rpm. The generator has total flux of 0.24wb, calculate the emf induced. Find the speed at which it should be driven to produce the same emf when wave connected.	7	L3	CO2
	c.	Derive the torque equation of a D.C. motor.	6	L2	CO2
		OR			
Q.6	a.	A 4 pole, 250V series motor has wave connected armature with 1254 conductors. The flux per pole is 22mwb, when the motor is taking 50A. The armature and series field coil resistances are 0.3Ω and 0.2Ω respectively. Calculate the speed and torque of the motor and also power developed in watts.	7	L3	CO2
	b.	With usual notations derive an emf equation of D.C. generator.	7	L2	CO2
	c.	Explain the following characteristics of a D.C. shunt motor: i) Torque vs armature current ii) Speed vs armature current.	6	L2	CO2
		Module – 4			
Q.7	a.	Derive the emf equation of a transformer and hence obtain the voltage and current transformation ratios.	6	L2	CO2
	b.	With neat figure explain the construction of two types of rotor of a 3-ϕ induction motor.	7	L2	CO1
	c.	A 125KVA transformer has a primary voltage of 2000V at 60Hz with 182 and 40 turns on primary and secondary respectively. Calculate: i) no load secondary emf ii) Full load primary and secondary currents iii) Max value of flux in the core.	7	L3	CO2

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		OR			
Q.8	**a.**	Explain how a rotating magnetic flux is created in the stator of 3-ϕ induction motor.	7	L2	CO2
	b.	A 3-ϕ, 6 pole, 50Hz induction motor has a slip of 3% at full load. Find the synchronous speed, rotor speed and the frequency of rotor current at full load.	7	L3	CO2
	c.	Explain the various losses in a transformer and how to minimize them.	6	L1	CO2
		Module – 5			
Q.9	**a.**	Explain two way and three way control of lamps with circuit diagram and truth table.	7	L1	CO2
	b.	Define "unit" used for consumption of electrical energy and explain the two part tariff with its advantages and disadvantages.	6	L1	CO2
	c.	What is earthing? Explain plate earthing with neat figure.	7	L2	CO4
		OR			
Q.10	**a.**	What is electric shock? Write a note on precautions against electric shock.	6	L2	CO5
	b.	List out the power rating of household appliances including air conditioners, PCs, laptops, printers etc.	7	L2	CO5
	c.	Explain casing-capping wiring with neat diagram.	7	L2	CO4

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