CBCS SCHEME

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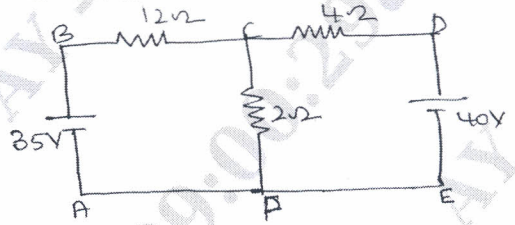
BESCK104B

First Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
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. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With neat single line diagram, explain the various steps of electrical power transmission and distribution system.	8	L2	CO1
	b.	State and explain Kirchoff's current and voltage law.	6	L2	CO1
	c.	A resistance R is connected in series with a parallel circuit comprising of two resistance 12Ω and 8Ω. The total power in the circuit is 70W, when the applied voltage is 20V. Calculate R.	6	L3	CO1
		OR			
Q.2	a.	With block diagram, explain Hydel Power generation.	6	L2	CO1
	b.	State and explain Ohm's law with its limitation.	6	L3	CO1
	c.	For the circuit shown in Fig. Q2(c), find the current in 2Ω resistor. Fig. Q2(c) 	8	L3	CO1
		Module – 2			
Q.3	a.	Define the following terms applied to alternating current wave : i) RMS value ii) Average value iii) Form factor iv) Peak factor v) Phase vi) Phase difference.	6	L3	CO2
	b.	Show that the current through purely capacitive circuit leads the applied voltage by 90° and average power consumed is zero. Draw the wave shapes of current voltage and power.	8	L3	CO2
	c.	An Inductive coil takes a current of 10A from a supply of 100V, 50Hz and lags the voltage of 30°. Calculate i) Parameters of the circuit ii) Power factor iii) Active reactive and apparent power.	6	L2	CO2
		OR			
Q.4	a.	Explain the generation of three phase A.C. and list the advantage.	6	L2	CO2

	b.	A circuit consists of a resistance of 20Ω and inductance of 0.05H, connected in series. A single phase supply of 230V, 50kg is applied across the circuit. Find i) Impedance ii) Current iii) Power factor iv) Power consumed by the circuit v) Voltage drop across R & L.	**8**	**L3**	**CO2**
	c.	Three coils having resistance of 10Ω and inductance of 0.02H are connected in star across 440V, 50Hz , 3 – ϕ supply. Calculate the line current , p.f and total power consumed.	**6**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	Derive E.M.F equation of the DC generator.	**6**	**L3**	**CO3**
	b.	Explain the characteristics of a D.C. shunt motor.	**7**	**L2**	**CO3**
	c.	A 4 pole, 1500 rpm , D.C generator has a lap wound armature having 32 slab and 8 conductor per slot. If the flux per pole is 0.04 wb. Calculate the emf induced in the armature. What would be the emf induced if the winding is wave connected.	**7**	**L3**	**CO3**
		OR			
Q.6	**a.**	Derive Torque equation of the D.C motor.	**6**	**L3**	**CO3**
	b.	Explain the various methods used to control the speed of DC series motor.	**8**	**L2**	**CO3**
	c.	A 4 – pole D.C shunt motor takes 25A from a 250V supply. The armature and field resistances are 0.5Ω and 12Ω respectively. The wave wound armature has 30 slots and each slot containing 10 conductors , if the flux per pole is 0.02 wb. Calculate i) speed ii) torque developed iii) power developed.	**6**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Derive the emf equation of a transformer and hence obtain the voltage and current transformation ratios.	**8**	**L2**	**CO4**
	b.	With neat diagram, explain the types of 3 – ϕ induction motor.	**7**	**L2**	**CO4**
	c.	A transformer is rated at 100KVa. At full load its copper loss is 1200w and its iron loss is 960W. Calculate the following : i) the efficiency at full load, VPF ii) the efficiency at half load, 0.8 pf. iii) the load KVA at which maximum efficiency will occur. iv) maximum efficiency at 0.85 p.f.	**5**	**L3**	**CO4**
		OR			
Q.8	**a.**	Explain the various losses in transformer, how to minimize them?	**8**	**L2**	**CO4**
	b.	With diagrams, explain the concept of rotating magnetic field.	**8**	**L2**	**CO4**
	c.	A three phase induction motor with 4 pole is supplied from the alternator having 6 poles running at 1000 rpm. Calculate Synchronous speed , rotor speed of the induction motor when slip is 0.04 and frequency of the rotor emf when the speed is 600 rpm.	**4**	**L3**	**CO4**

Module – 5					
Q.9	**a.**	With neat circuit diagram and switching table explain two way and three way control of load.	**8**	**L2**	**CO5**
	b.	Explain working principle of fuse and miniature circuit breaker.	**7**	**L2**	**CO5**
	c.	What is earthing? With neat diagram, explain any one type of earthing.	**5**	**L2**	**CO5**
OR					
Q.10	**a.**	What is Electric shock? Give the list of preventive measures against shock.	**6**	**L2**	**CO5**
	b.	What are the desirable characteristics of a tariff and explain two part tariff.	**6**	**L2**	**CO5**
	c.	List out the power rating of home hold appliances including air conditioners , PCs, laptops , printers etc. Find the total power consumed.	**8**	**L3**	**CO5**

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