



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.	8	L3	CO1	
Fig. Q2(c)						
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 $230V$, $50Hz$ 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 $440V$, $50Hz$, $3 - \phi$ 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 $3 - \phi$ 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

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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