

CBCS SCHEME

BESCK204B/BESCKB204



Second Semester B.E./B.Tech. Degree Supplementary Examination,
June/July 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. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	With a neat single line diagram, explain various components of electrical power transmission and distribution system.	6	L2	CO1
	b.	State and explain Ohm's law with its limitations.	6	L2	CO1
	c.	Find the currents in all the branches of the network given below starting from branch current 'I' in branch 'ea' Ref Fig Q1(c)	8	L3	CO1
<p style="text-align: center;">Fig Q1(c)</p>					
OR					
Q.2	a.	With a neat block diagram, explain a Nuclear power plant.	6	L2	CO1
	b.	State and explain Kirchhoff's laws with relevant examples for each.	6	L2	CO1
	c.	A resistor of 12Ω is connected in series with a combination of 15Ω and 20Ω resistors in parallel. The supply voltage is 120V. Find the current flowing through the parallel branches and the circuit. Also find voltage across each of them.	8	L3	CO1
Module – 2					
Q.3	a.	With the help of a circuit diagram and the phasor diagram, conclude about phase angle, impedance and power consumed by a series R-C circuit.	6	L2	CO2
	b.	If the details given are for a 3φ, 50Hz, 400V supply where $Z_{ph} = 25 + j22\Omega$ are connected in delta. Calculate the line current, phase current, power factor, active power, reactive power and apparent power.	8	L3	CO2
	c.	A series circuit consisting of R, L, C with respective voltage of 170V, 150V and 100V across them. The current flowing through them is 4A. Find the values of R, L, C, power factor and also the supply voltage. Assume $f = 50\text{Hz}$.	6	L3	CO2

OR			
Q.4	a.	For single phase sinusoid generated emf, define : i) rms value ii) average value iii) form factor iv) peak factor v) phase vi) phase difference.	6 L1 CO2
	b.	Show that the current through a purely inductive circuit lags the applied voltage by 90°. Also discuss about the average power consumed. Draw the wave shapes of current, voltage and power.	8 L2 CO2
	c.	A circuit consists of a resistance of 10Ω and an inductance of 16mH and a capacitor of 150μF in series across a supply of 240V, 50Hz. Find : i) current ii) power factor iii) power consumed. Draw the phasor diagram.	6 L3 CO2
Module – 3			
Q.5	a.	With a neat diagram, explain the construction of a DC machine.	8 L2 CO3
	b.	Derive an expression for armature torque developed in a DC motor.	6 L2 CO3
	c.	An 8 pole lap wound DC generator has 500 armature conductors and has a useful flux per pole of 0.065Wb. What is the generated emf, if it runs at 1000rpm? When the armature is wave wound for the same, what will be its speed to generate the same emf.	6 L3 CO3
OR			
Q.6	a.	Explain various methods of speed control of DC shunt motor.	6 L2 CO3
	b.	With usual notations, derive emf equation of a DC generator.	8 L2 CO3
	c.	A 6 pole, lap connected DC shunt motor has 492 armature conductors having resistance of 0.2Ω. The flux per pole available is 50mWb. The motor runs at 20rps across a supply of 500V at full load. What will be the speed of motor when the load is reduced by 50%. Neglect all drops connected to brush and armature reaction.	6 L3 CO3
Module – 4			
Q.7	a.	Explain various losses incurred in a single phase transformer. Also discuss about technique used to minimize them.	6 L2 CO3
	b.	With neat vectorial representation, explain mmf theory.	8 L2 CO3
	c.	The primary winding of a 25KVA, single phase transformer has 200 turns and is connected to a 230V, 50Hz supply. The secondary number of turns is 50. Calculate : i) No load secondary emf ii) Primary and secondary currents iii) Flux density in the core, if the area of cross section is 60cm ² .	6 L2 CO3
OR			
Q.8	a.	With neat schematic diagrams, compare core and shell type of transformer.	6 L2 CO4
	b.	With diagrams, explain the types of three phase induction motors.	8 L2 CO4

	c.	A 12 pole, 3 phase alternator runs at 500rpm is coupled to a 3 phase induction motor which runs at full load speed of 1440rpm. Comment on synchronous speed of the induction motor. Calculate percentage slip and number of poles of the induction motor.	6	L3	CO4
Module – 5					
Q.9	a.	With neat circuit diagrams and switching tables, explain two way and three way control of a load.	8	L2	CO5
	b.	Explain plate earthing with a neat diagram.	6	L2	CO5
	c.	Explain working of a fuse. Also explain rated current, fusing current and fusing factor.	6	L2	CO5
OR					
Q.10	a.	What is electric shock? List preventive measure against the shock.	8	L2	CO5
	b.	Explain “unit” used in electrical energy consumption. Also explain two part tariff with its advantages and disadvantages.	6	L2	CO5
	c.	Calculate the monthly billing of a domestic consumer whose load factor is 70% if a unit is charges at Rs. 3. The load detail are as below : 5 numbers of 10W LED lamps 2 numbers of 80W fans 1 number of 450W AC 1 number of 2kW Geyser 1 number of 800W Refrigerators.	6	L3	CO5
