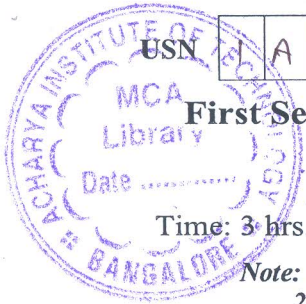


CBCS SCHEME

BESCKB104/BESCK104B



USN: AY 23 CS 012

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. <div style="text-align: center;"> <p style="text-align: center;">Fig.Q.1(b)</p> </div>	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. <div style="text-align: center;"> <p style="text-align: center;">Fig.Q.2(c)</p> </div>	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
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	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
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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

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
