

CBCS SCHEME

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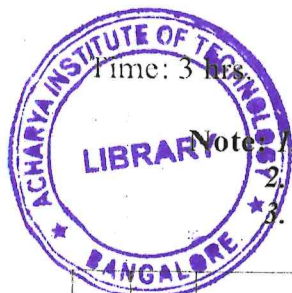
BESCK104B

First Semester B.E/B.Tech. Degree Examination, June/July 2026

Introduction to Electrical Engineering

Time: 3 hrs.

Max. Marks:100



- Notes:**
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
1	a.	Explain the general structure of electrical power system using single line diagram.	8	L2	CO1
	b.	Differentiate between Conventional and Non-conventional energy sources.	4	L1	CO1
	c.	A resistance of 8 ohm is connected in series with a parallel combination of 12 Ω and 24 Ω . The whole circuit is connected across a 100V supply. Find : i) The current drawn from the supply ii) The voltage across 8 Ω resistance iii) The currents flowing in 12 Ω and 24 Ω resistances.	8	L3	CO1
OR					
2	a.	With a neat diagram, explain nuclear power generation.	7	L2	CO1
	b.	Describe I , I_1 , I_2 , V_{ab} and V_{bc} in the network of Fig.Q2(b). Fig.Q2(b)	8	L3	CO1
	c.	State Ohm's law. Mention its limitations.	5	L1	CO1

Module – 2

3	a.	Deduce the relationship between instantaneous voltage and current of a series R–L circuit with a neat diagram. Also, derive the expression for instantaneous power. Draw relevant vector diagram and waveform.	8	L3	CO2
	b.	A circuit is composed of a resistance of $8\ \Omega$ and a capacitive reactance of $6\ \Omega$ in series. A voltage $v = 141.4 \sin(314t)$ is applied to the circuit. i) Find the impedance ii) rms value of current iii) Power delivered iv) Voltage across the capacitor v) Value of capacitance.	8	L3	CO2
	c.	Define the following : i) Amplitude ii) Time period iii) Instantaneous value iv) Peak factor.	4	L1	CO2

OR

4	a.	Explain the generation of three – phase voltages with a neat waveform.	7	L2	CO2
	b.	A balanced star – connected load of $(8 + j6)\ \Omega$ per phase is connected across a three – phase, 230 V supply. Find the line current, power factor, active power, reactive power and total volt ampere.	8	L2	CO2
	c.	List out the advantages of three – phase system over single-phase.	5	L1	CO2

Module – 3

5	a.	Explain the characteristics of DC series motor.	7	L2	CO3
	b.	With a neat sketch explain the working principle of DC motor.	8	L2	CO3
	c.	An 8-pole, DC generator running at 1200 rpm, and with a flux of 25 mwb per pole generates 440V. Calculate the number of conductors, if the armature is i) Lap wound ii) Wave wound.	5	L3	CO3

OR

6	a.	With a neat diagram, explain the construction of a DC generator.	8	L1	CO3
	b.	A 4-pole, 500V, DC shunt motor has 720 wave connected conductors on its armature. The full load armature current is 60A and flux per pole is 0.03 wb. The armature resistance is 0.2Ω and the contact drop per brush is 1V. Calculate full load speed of the motor.	6	L2	CO3
	c.	Derive an expression for induced emf of a DC generator.	6	L2	CO3

Module – 4

7	a.	Explain the operation of a single – phase transformer. Also derive the expression for induced emf.	8	L1	CO4
	b.	A three – phase, 440V, 50 Hz, 4-pole induction motor is running at 1440 rpm. Calculate : i) slip ii) the frequency of the rotor induced emf.	6	L2	CO4
	c.	Explain the construction of squirrel cage and wound rotor.	6	L1	CO4

OR

8	a.	Explain the different types of losses that occur in a transformer. Mention their equation and the ways to reduce the losses.	8	L2	CO4
	b.	A 40 KVA, single –phase transformer has core loss of 450 W and full load copper loss of 850 W. If the power factor of the load is 0.8, Calculate : i) Full-load efficiency ii) Maximum efficiency at upf.	6	L3	CO4
	c.	A 6-pole induction motor is fed from 50 Hz supply. If the frequency of rotor emf at full-load is 2 Hz. Find full-load slip and speed.	6	L2	CO4

Module – 5

9	a.	With a switching table and neat circuit, explain 3-way control of lamp.	8	L2	CO5
	b.	What s Electric shock? What are the factors affecting the severity of shock?	6	L1	CO5
	c.	Explain the working principle of miniature circuit breaker.	6	L1	CO5

OR

10	a.	What is Earthing? With a neat diagram, explain plate earthing.	6	L2	CO5
	b.	Explain the working of Fuse. Mention its advantages and disadvantages.	8	L1	CO5
	c.	List out the safety precautions that must be taken while working with electrical installations to avoid electronic shock.	6	L1	CO5
