

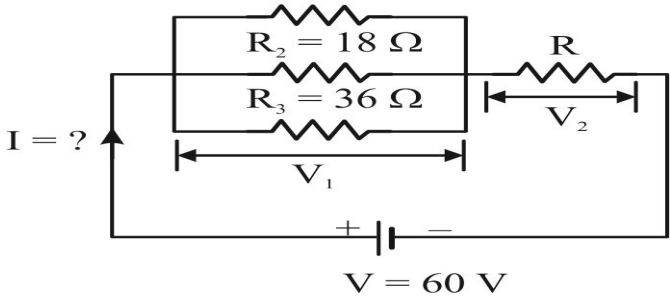
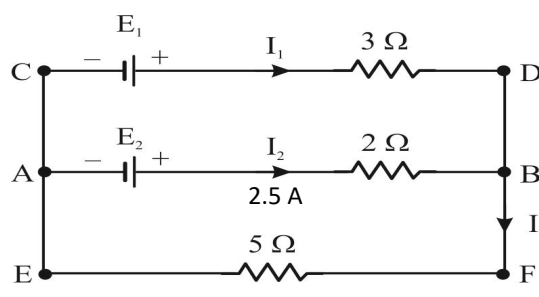
Model Question Paper with effect from 2022 (CBCS Scheme)

First Semester BE Degree Examination
Course Title – Elements of Electrical Engineering

TIME: 03 Hours

Max. Marks: 100

Note: Answer any FIVE full questions, choosing at least ONE question from each MODULE.

Q. No.	Module1	Marks
Q1	a	State Ohm's Law. Mention its limitations. 06
	b	Find the current and the unknown resistance R in the circuit shown below. The power consumed by the 12 Ω resistor is 36 watt. $R_1 = 12 \Omega$  $V = 60 \text{ V}$ 06
	c	i) State and explain Faraday's Laws of Electromagnetic Induction. ii) Derive the expression for energy stored in inductor. 08
OR		
Q2	a	State and explain Kirchoff's Laws. 06
	b	In the circuit shown, find the voltage sources E1 and E2 such that the power dissipated in 5Ω resistor is 125watts.  06
	c	A coil consists of 600 turns and a current of 10A in the coil gives rise to a magnetic flux of 1mWb. Calculate (1) self inductance (2) induced emf (3) energy stored when the current is reversed in 0.01 seconds. 08
Module 2		
Q3	a	Show that the power consumed in a pure capacitive circuit is zero with the help of voltage, current and power waveforms. 06
	b	A resistance of 10 Ω is connected in series with an inductor of 33 mH. The circuit is 06

		connected to 230V, 50Hz supply. Calculate (i) circuit current (ii) Phase angle and power factor	
c		<p>For the circuit shown, determine the voltages V_1, V_2, power factor and power dissipated in 20Ω resistor.</p>	08

OR

Q4	a	Show that voltage and current in pure resistive circuit is in phase with each other. Also derive the equation for power consumed.	06
	b	Define average and RMS values of sinusoidal voltage. Also derive the respective expressions.	06
	c	Two impedance $(150 - j157)\Omega$ and $(100 + j 110)\Omega$ are connected in parallel across 200 V, 50 Hz supply. Find branch currents, total current and total power consumed in circuit. Draw the phasor diagram.	08

Module 3

Q5	a	Obtain the relationship between line and phase values of voltage and current in a balanced 3 phase delta connected system.	06
	b	Three similar coils each having resistance of 10Ω and 8Ω inductive reactance is connected in star across 400 V, balanced 3phase supply. Determine (i) Line current (ii) Total power (iii) reading of each of two watt meter connected to measure power.	08
	c	A balanced three phase star connected load draws power from 440V supply. The two wattmeters connected indicate $W_1 = 5kW$ and $W_2 = 1.2 kW$. Calculate power, power factor and current in the circuit.	06

OR

Q6	a	With a neat circuit diagram and phasor diagram, prove that two wattmeters are sufficient to measure 3ϕ power.	08
	b	A three phase load of three equal impedances connected in delta across balanced 440V, 50Hz supply, takes a current of 10 A at 0.7 lagging power factor. Calculate (i) The phase current (ii) Total power (iii) Total VAR	06
	c	What are the advantages of three phase system over single phase system?	06

Module 4

Q7	a	Explain the construction and working of Wheatstone's Bridge.	07
	b	Mention the difference between current transformer and potential transformer.	06
	c	Explain case and capping wiring.	07

OR

Q8	a	Explain two way and three way control of lamp with the truth table.	06
	b	Explain the construction of Maxwell's Bridge and derive the expression for unknown inductance.	08
	c	Explain the construction and working of Megger.	06

Module 5

Q9	a	Define earthing. With neat diagram, explain pipe earthing.	06																												
	b	In a 4BHK flat, total 8 persons are residing. The average consumption of electricity per day for this flat is as follows:	08																												
		<table border="1"> <thead> <tr> <th>No</th> <th>Appliance(s)</th> <th>Wattage</th> <th>Hours</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4 Geysers</td> <td>1.5kW</td> <td>15min</td> </tr> <tr> <td>2</td> <td>4 Air conditioners</td> <td>1.8kW</td> <td>1hour</td> </tr> <tr> <td>3</td> <td>1 refrigerator</td> <td>450W</td> <td>3hours</td> </tr> <tr> <td>4</td> <td>1 induction heater</td> <td>1500W</td> <td>30 min</td> </tr> <tr> <td>5</td> <td>8 LED tube lights</td> <td>20W</td> <td>6hours</td> </tr> <tr> <td>6</td> <td>8 ceiling fans</td> <td>100W</td> <td>2hours</td> </tr> </tbody> </table>		No	Appliance(s)	Wattage	Hours	1	4 Geysers	1.5kW	15min	2	4 Air conditioners	1.8kW	1hour	3	1 refrigerator	450W	3hours	4	1 induction heater	1500W	30 min	5	8 LED tube lights	20W	6hours	6	8 ceiling fans	100W	2hours
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If the tariff of electric supply company is as follows, estimate the total electricity bill for this flat for the month of March.																															
i)Up to 100 units :Rs 4.00 per unit																															
ii)From 101 to 200 units :Rs 5.00 per unit																															
iii)From 200 to 400 units :Rs.6.50 per unit																															
iv)Above 400 units :Rs.8.00 per unit																															
c	With a neat circuit diagram explain the operation of RCCB.	06																													
OR																															
Q10	a	What are the desirable characteristics of tariff and explain two part tariff.	06																												
	b	Write a short note on precautions against electric shock.	06																												
	c	Write a short note on fuse and MCB.	08																												

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Program Outcome
Q. 1	a	L1&L2	CO1	PO1,PO2,PO3,PO4,PO5, PO6,PO7, PO8,PO12
	b	L3	CO1&CO3	PO1, PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12
	c	L1&L2	CO1	PO1, PO2,PO3,PO4,PO5, PO6,PO7,PO8,PO12
Q. 2	a	L1&L2	CO1	PO1, PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12
	b	L3	CO1&CO3	PO1, PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12
	c	L3	CO1&CO3	PO1, PO2,PO3,PO4,PO5, PO6,PO7,PO8,PO12
Q. 3	a	L1&L2	CO2&CO3	PO1,PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12
	b	L3	CO2&CO3	PO1, PO2,PO3,PO4,PO5, PO6,PO7,PO8,PO12
	c	L3	CO2	PO1, PO2, PO3, PO4, PO5, PO6,PO12
Q. 4	a	L1&L2	CO2	PO1, PO2, PO3, PO4, PO5, PO6,PO12
	b	L1&L2	CO2	PO1, PO2, PO3, PO4, PO5, PO6,PO12
	c	L3	CO2&CO3	PO1, PO2, PO3, PO4, PO5, PO6,PO7,PO8,PO12
Q.5	a	L1&L2	CO3	PO1, PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12
	b	L3	CO2&CO3	PO1, PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12
	c	L3	CO2&CO3	PO1, PO2, PO3,PO4,PO5,PO6,PO7, PO8,PO12
Q. 6	a	L1&L2	CO2	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12
	b	L3	CO2&CO3	PO1,PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO12

	c	L2	C02	PO1, PO2, PO3, PO4, PO5, PO6, PO12
Q. 7	a	L1&L2	C04	PO1, PO2, PO3, PO4, PO6, PO7, PO8,PO12
	b	L1&L2	C04	PO1, PO2, PO3, PO4, PO6, PO7, PO8,PO12
	c	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
Q. 8	a	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
	b	L2	C04	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8
	c	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
Q. 9	a	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
	b	L3	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
	c	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
Q. 10	a	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
	b	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12
	c	L1&L2	C05	PO1, PO2, PO3,PO5 PO6, PO7, PO8,P11,P12

Blooms Taxonomy Levels	Lower order thinking skills		
	Remembering (knowledge):L1	Understanding (Comprehension): L2	Applying (Application): L3
	Higher order thinking skills		
	Analyzing (Analysis): L4	Valuating (Evaluation): L5	Creating (Synthesis): L6