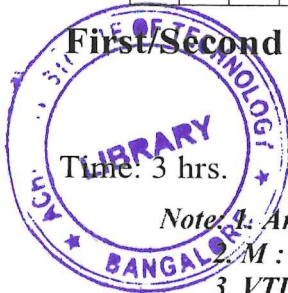


CBCS SCHEME

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1BBEE105/205



First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026 Basics of 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.
 3. VTU Formula Hand Book is permitted.

Module – 1				M	L	C
Q.1	a.	Define Absolute permittivity and relative permittivity. Mention the limitations of Ohm's law		06	L1	CO1
	b.	State and explain Kirchoff's laws as applied to DC circuit. Are these laws applicable to AC circuits?		06	L1	CO1
	c.	In the network shown find the value of R and the current flowing through it. [Refer Fig.Q1(c)].		08	L2	CO1

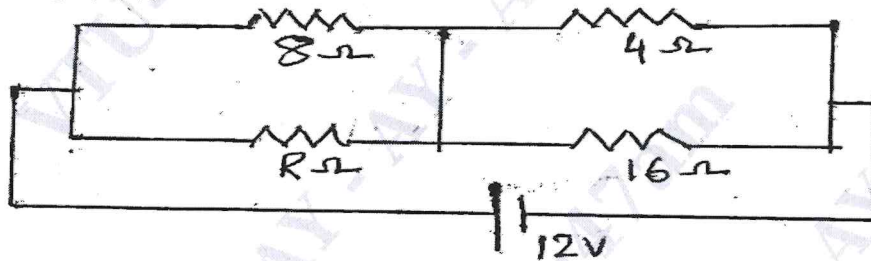


Fig.Q1(c)

OR						
Q.2	a.	State Coulomb's law and mention the factors affecting the capacitance of a parallel plate capacitor.		06	L2	CO1
	b.	Derive an expression for the energy stored in an electrostatic field.		06	L1	CO1
	c.	In the network shown find the values of E_1 and E_2 such that the power dissipated in the 5Ω resistor is 125 watts and $I_2 = 2.5$ A. [Refer Fig.Q2(c)]		08	L2	CO1

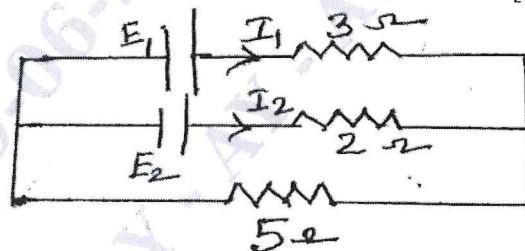


Fig.Q2(c)

Module – 2						
Q.3	a.	State Fleming's right hand rule and Fleming's left hand rule. Mention their applications.		06	L2	CO2
	b.	Define self-inductance and mutual inductance. Mention their units. Also deduce the relationship between selfinductance, mutual inductance and coefficient of coupling.		06	L1	CO2

Q.3	c.	A wire of length 50 cms moves at right angles to its length at 50 m/s in a uniform field of density 1 wb/m ² determine the emf induced in the conductor when the direction of motion is (i) perpendicular to the field (ii) inclined at 30° to the direction of the field. (iii) parallel to the field.	08	L3	CO2
OR					
Q.4	a.	Define Statically induced emf and Dynamically induced emf. Also state Lenz's law.	06	L1	CO2
	b.	Derive an expression for the energy stored in a magnetic field.	08	L1	CO2
	c.	An air cored coil has 1000 turns with an inductance of 0.12H. two hundred turns are removed from the coil and a steel core is placed around the coil. Determine the new value of the inductance. Assume μ_r of steel as 75.	06	L1	CO3
Module – 3					
Q.5	a.	Define RMS value, Average value, Form factor and Peak factor of a sinusoidal wave.	04	L2	CO3
	b.	Show that the power in a series R- L circuit is $V I \cos \phi$ and draw the waveforms of voltage, current and power.	08	L3	CO3
	c.	An emf whose instantaneous value is $100 \sin(314t - \pi/4)$ is applied to a circuit and the current flowing through it is $20 \sin(314t - 1.5708)$, find the values of the circuit elements.	08	L3	CO3
OR					
Q.6	a.	Derive an expression for the power in a pure capacitor energized from AC voltage. Draw the waveforms of voltage, current and power.	08	L2	CO3
	b.	A current of 10 A flows in a circuit with a 30° lag when the applied voltage is 100V. Find (i) Resistance, reactance and Impedance (ii) Conductance, Susceptance and Admittance.	06	L2	CO3
	c.	A circuit consists of 20Ω resistance in series with an inductance of 0.05H. A supply of 230V, 50 Hz is given to the circuit. Calculate (i) current (ii) phase angle (iii) power factor (iv) real power (v) reactive power	06	L3	CO3
Module – 4					
Q.7	a.	What are the advantages of 3Ø system over 1Ø system?	06	L2	CO3
	b.	Deduce the relationship between phase and line values of voltages currents in 3Ø star connected system.	08	L3	CO3
	c.	Each of the two watt meters connected to measure the input power to a 3Ø circuit reads 20KW. What does each instrument read when the load power factor is 0.866 lag with the total power remaining unchanged.	06	L3	CO3

OR

Q.8	a.	Briefly explain the generation of 3 phase voltages.	05	L2	CO4
	b.	With the help of a neat circuit and vector diagrams show that only two watt meters are sufficient to measure the 3ϕ input power in a balanced star connected system.	08	L2	CO4
	c.	A 500V, 3 phase motor has an output of 37.3kw and operates at a power factor of 0.85 with an efficiency of 90%. Calculate the reading on each of the 2 watt meters connected to measure the input power.	07	L2	CO4

Module – 5

Q.9	a.	What is an electric shock? What are the precautions to be taken to prevent electric shock?	06	L2	CO5
	b.	Write short notes on Fuse and MCB.	06	L3	CO5
	c.	A consumer has a maximum demand of 300KW at 35% load factor. If the tariff is Rs 125/KW of maximum demand plus 15 paise/KWh, calculate the overall cost/KWh.	08	L2	CO5

OR

Q.10	a.	With a neat wiring diagram and truth table explain 2 way and 3 way control of lamps.	06	L2	CO5
	b.	What is Earthing? With a neat diagram explain pipe – earthing.	08	L2	CO5
	c.	In a residential building, the following loads are connected. (i) Six lamps of 40 W each, switched on for 5 hours. (ii) Two fans of 60 W each, switched on for 12 hours. (iii) One 1000 W heater switched on for 2 hours. and (iv) One refrigerator of 250W working for 10 hours a day. If the cost of energy is Rs 6.50/unit what is the total cost of energy in the month of April.	06	L2	CO5
