Model Question Paper-I/II with effect from 2022 (CBCS Scheme)

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First Semester BE Degree Examination
Course Title – Introduction to 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	With neat single line diagram explain the various steps of electrical power transmission and distribution system.	06
	b	State and explain Kirchhoff's current and voltage law.	06
	c	A circuit of two parallel resistors having resistances of 20Ω and 30Ω connected in series with 15Ω. If the current through 15Ω resistor is 3A. Find i) current in 20Ω and 30Ω resistors ii) voltage across the whole circuit iii) the total power and power consumed in all resistors.	08
		OR	
Q2	a	With block diagram explain hydel power generation.	06
	b	State and explain Ohm's law with its limitations.	06
	c	For the circuit shown in fig (i) find the current in 2Ω resistor. fig(i)	08
		Module 2	
Q3	a	Define the following by referring a sine wave i) RMS value ii) average value iii) form factor iv) peak factor v) phase and vi) phase difference.	06
	b	Show that the current through purely capacitive circuit leads the applied voltage by 90° and average power consumed is zero. Draw the wave shapes of current, voltage and power.	08
	c	An inductive coil takes a current of 10A from a supply of 100V, 50Hz and lags the voltage by 30°. Calculate i) parameters of the circuit ii) power factor iii) active, reactive and apparent power.	06
		OR	
Q4	a	With the help of circuit diagram and phasor diagram, find the phase angle, impedance and power in case of R-L series circuit.	06
	b	A circuit consists of a resistance of 20Ω, an inductance of 0.05H, connected in series. A single phase supply of 230V, 50Hz is applied across the circuit. Find i) impedance ii) current iii) power factor iv) power consumed by the circuit v) voltage drop across R&L vi) draw the vector diagram.	08

	c	Three coils having resistance of 10Ω and inductance of 0.02H are connected in star across 440V, 50Hz three phase supply. Calculate the line current, power factor and total power consumed.	06
Module 3			
Q5	a	With a neat diagram explain the construction of D.C. generator.	08
	b	Derive an expression of armature torque developed in a D. C. motor.	08
	c	An 8 pole generator has 500 armature conductors and has a useful flux per pole of 0.065wb. What will be the emf generated if it is lap connected and runs at 1000rpm? What must be the speed at which it is to be driven to produce the same emf if it is wave wound?	04
OR			
Q6	a	Explain the various methods used to control the speed of D.C. series motor.	08
	b	A 4 pole D.C. shunt motor takes 25A from a 250V supply. The armature and field resistances are 0.5Ω and 125Ω respectively. The wave wound armature has 30 slots and each slot containing 10 conductors. If the flux per pole is 0.02wb, calculate i) speed ii) torque developed iii) power developed.	08
	c	With usual notations derive an emf equation of D.C. generator.	04
Module 4			
Q7	a	Derive the emf equation of a transformer and hence obtain the voltage and current transformation ratios.	08
	b	With neat diagram explain the types of three phase induction motor.	06
	c	A transformer is rated at 100 kVA. At full load its copper loss is 1200W and its iron loss is 960W. Calculate: i) the efficiency at full load, UPF ii) the efficiency at half load, 0.8 p.f. iii) the load kVA at which maximum efficiency will occur iv) maximum efficiency at 0.85 p.f.	08
OR			
Q8	a	Explain the various losses in a transformer and how to minimize them?	08
	b	With diagrams explain the concept of rotating magnetic field.	06
	c	A three phase induction motor with 4 poles is supplied from the alternator having 6 poles running at 1000rpm. Calculate synchronous speed, rotor speed of the induction motor when slip is 0.04 and frequency of the rotor emf when the speed is 600rpm.	08
Module 5			
Q9	a	With neat circuit diagram and switching table explain two way and three way control of load.	08
	b	With diagram explain the working of fuse.	08
	c	What is earthing? With neat diagram explain the pipe earthing.	06
OR			
Q10	a	Define "unit" used for consumption of electrical energy and explain the two part tariff with its advantages and disadvantages.	08
	b	What is electric shock? Give the list of preventive measures against the shock.	08
	c	List out the power rating of household appliances including air conditioners, PCs, laptops, printers, etc. Find the total power consumed.	06

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	L2	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
b	L2	CO1	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
c	L3	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
Q. 2 a	L2	CO1	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
b	L2	CO1	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
c	L3	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
Q. 3 a	L2	CO1	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
b	L4	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
c	L3	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
Q. 4 a	L3	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
b	L3	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
c	L3	CO2	**PO1, PO2, PO3, PO4, PO5, PO6**
Q.5 a	L2	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
b	L3	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
c	L3	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
Q. 6 a	L3	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
b	L2	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
c	L3	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
Q. 7 a	L4	CO4	**PO1, PO2, PO3, PO4, PO6, PO7, PO8**
b	L2	CO4	**PO1, PO2, PO3, PO4, PO6, PO7, PO8**
c	L3	CO4	**PO1, PO2, PO3, PO4, PO6, PO7, PO8**
Q. 8 a	L2	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
b	L3	CO3	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8**
c	L3	CO4	**PO1, PO2, PO3, PO4, PO6, PO7, PO8**
Q. 9 a	L2	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
b	L4	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
c	L2	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
Q. 10 a	L2	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
b	L2	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**
c	L4	CO5	**PO1, PO2, PO3, PO5, PO6, PO7, PO8**

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*