Model Question Paper-I

CBCS SCHEME

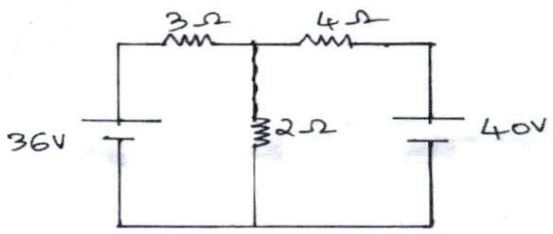
First/Second Semester B.E Degree Examination,

Introduction to Electrical Engineering (1BESC104B/204B)

TIME: 03Hours **Max. Marks: 100**

Notes:

1. *Answer any FIVE full questions, choosing at least ONE 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	State and explain Ohm's law with its limitations	6	L2	CO1
	b	Write the general structure of electrical power system using single line diagram approach and explain briefly	8	L2	CO1
	c	Using Kirchhoff's law find loop current and voltage drop across each resistor for the figure shown below 	6	L3	CO1
		OR			
Q.2	a	State and explain Kirchhoff's laws applicable to d.c circuits	6	L2	CO1
	b	Distinguish between conventional and nonconventional sources of energy.	8	L2	CO1
		A resistance R is connected in series with a parallel circuit comprising of two resistance 12Ω and 8Ω. The total power in the circuit is 70W, when the applied voltage is 20V. Calculate R and also calculate the power drawn	6	L3	CO1
		Module–2			
Q.3	a	Explain the generation of three phase a.c and list the advantages	6	L2	CO2
	b	A Pure capacitor is excited by sinusoidal varying AC voltage. Show that the average power consumed by capacitor is zero.	8	L3	CO2
	c	A circuit consists of a resistance of 10Ω, inductance of 16mH and capacitor of 150μF connected in series. A supply of 100V at 50Hz is given to the circuit. Find the i) Current ii) Power factor iii) Power consumed by the circuit	6	L3	CO2
		OR			
Q.4	a	Define RMS value, Average value, Form factor and Peak factor	6	L2	CO2
	b	Derive the equation of the power consumed by R-L series circuit. Also draw the waveforms of voltage current and power	8	L3	CO2
	c	A balanced Y—connected load is supplied from a balanced 3ϕ, 400V, 50Hz system. The current in each phase is 30A and tags 30° behind the phase voltage. Find the phase voltage and total power	6	L3	CO2

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Module–3					
Q5	a	Explain the function of following parts of DC machine: i) Yoke, ii) Field winding, iii) Commutator iv) Pole shoe v) Pole core vi) Brush	8	L2	CO3
	b	Derive the torque equation of a D.C. motor	6	L3	CO3
	c	The emf generated in the armature of a shunt generator is 625V,when delivering its full load current of 400A to an external circuit. The field current is 6A and the armature resistance is 0.06Ω. What is the terminal voltage?	6	L3	CO3
OR					
	a	Explain the following characteristics of a D.C. shunt motor: (i) Torque vs armature current (ii) Speed vs armature current	8	L2	CO3
	b	Derive an EMF equation for DC generator with usual notations.	6	L3	CO3
	c	A 4 pole 250V series motor has wave connected armature with 254 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	6	L3	CO3
Module–4					
Q.7	a	Explain the working principle of single phase transformer and its necessity in power system	6	L2	CO4
	b	Define slip of an induction motor. Derive an expression for effect of slip on the rotor frequency.	6	L3	CO4
	c	The maximum efficiency at full load and unity power factor of a single – phase 25KVA, 500V/ 1000V, 50Hz, transformer is 98%. Determine its efficiency at i)75% load, 0.9p.f. ii) 50% load, 0.8 p.f	8	L3	CO4
OR					
Q.8	a	Explain the construction and working of 3-phase induction motor	8	L2	CO4
	b	Derive the emf equation of a transformer and hence obtain the voltage and current transformation ratios.	6	L3	CO4
	c	A3-ϕ, 6pole, 50 Hz 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.	6	L3	CO4
Module–5					
Q.9	a	With neat wiring diagram and truth table explain two way and three way control of lamp	8	L2	CO5
	b	What is Fuse? With neat diagram, explain the working principle of fuse	6	L2	CO5
	c	Mention the power rating of the following electrical appliances. (i) Air conditioners ii) Laptops iii) LED Lights iv) Washing machines Calculate the total power consumed by these four appliances	6	L3	CO5

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		OR			
Q.10	a	Define Electric shock. What are the safety precaution to be taken against to avoid electric shock	8	L2	CO5
	b	What is Earthing? With a neat diagram, explain plate earthing.	6	L2	CO5
	c	In a residential house, the following loads are connected : (i) Six lamps of 40w each, switched on for 5 hours a day ii) Two fans of 60w each, switched on for 12 hours a day (iii) One 1000w heater working for 2 hours per day (iv) One refrigerator of 250wworking for 10 hours per day. If each unit of energy costs Rs. 6.50, what will be the total cost in the month of April	6	L2	CO5