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CBCS SCHEME

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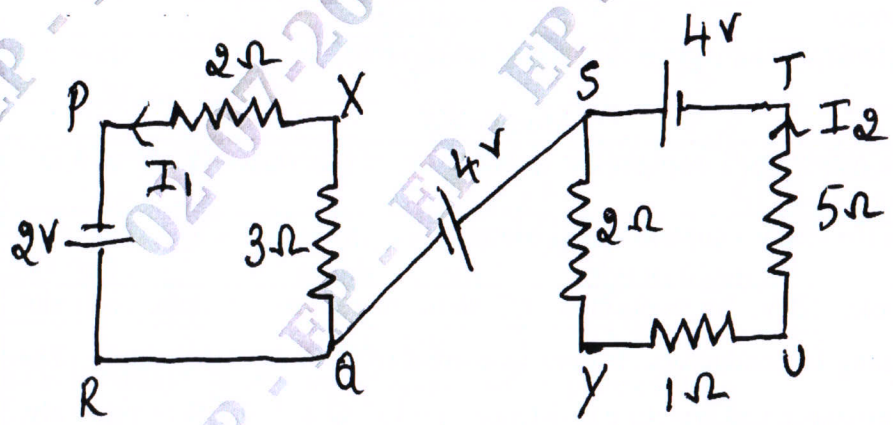
BESCK204B

Second Semester B.E./B.Tech. Degree Examination, June / July 2026
Introduction to Electrical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 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
Q.1	**a.**	State the Ohm's law and mention its limitations?	**06**	**L2**	**CO2**
	b.	Write the general structure of Electrical Power System using single line diagram approach and explain briefly.	**08**	**L2**	**CO1**
	c.	Two resistances 20Ω and 40Ω are connected in parallel. A resistance of 10Ω is connected in series with the combination. A voltage of 200 V is applied across the circuit. Find the current in each resistance and the voltage across 10Ω. Find also the power consumed in all the resistances.	**06**	**L3**	**CO1**
		OR			
Q.2	**a.**	Explain the working of Hydro power generation using relevant block diagram.	**08**	**L2**	**CO1**
	b.	State and explain Kirchhoff's Laws.	**06**	**L2**	**CO2**
	c.	Find the Potential difference between the points X & Y in the network shown in fig. Q.2(c).  Fig. Q2(c)	**06**	**L3**	**CO2**

		Module – 2			
Q.3	**a.**	Define : i) Real power ii) Reactive power iii) Apparent power	**06**	**L1**	**CO1**
	b.	Develop an equation for the power consumed by a R – C series circuit. Draw the waveform of voltage, current and power.	**08**	**L2**	**CO2**
	c.	An AC circuit consists of a pure resistance of 10 Ω and is connected across a supply of 230 V, 50 Hz. Calculate : i) Current ii) Power consumed iii) Instantaneous Equation of voltage and current	**06**	**L3**	**CO2**
		OR			
Q.4	**a.**	A pure inductor excited by sinusoidal varying AC voltage, show that the average power consumed by inductor is zero.	**08**	**L2**	**CO2**
	b.	With relevant diagram, explain the concept of line values of voltage and current and phase values of voltage and currents in 3ϕ star and delta connected.	**06**	**L2**	**CO1**
	c.	A 318 μF capacitor is connected across a 230V, 50Hz supply. Determine : i) Capacitive reactance ii) Current iii) Instantaneous equation for voltage and current.	**06**	**L3**	**CO2**
		Module – 3			
Q.5	**a.**	With a neat sketch, explain the construction of the various parts of a DC Machine.	**08**	**L2**	**CO3**
	b.	Derive the torque equation of DC Motor.	**06**	**L2**	**CO3**
	c.	A 4 pole, 220V, lap connected D.C shunt motor has 36 slots, each slot containing 16 conductors. It draws a current of 40 A from the supply. The field resistance and armature resistances are 110 Ω and 0.1 Ω respectively. The motor develops an output power of 6 KW. The flux per pole is 40 mwb. Calculate : i) the speed ii) the torque developed by the armature.	**06**	**L3**	**CO3**

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		OR			
Q.6	**a.**	Explain the N/I_a, T/I_a characteristics of DC shunt Motor.	**08**	**L2**	**CO3**
	b.	Derive an EMF equation of DC Generator with usual notations.	**06**	**L2**	**CO3**
	c.	A 8 pole wave wound DC shunt generator has 36 slots, 10 conductors in each slot. The flux per pole is 0.01 wb. It runs at 1200 rpm. The armature and Field resistances are 0.1 Ω and 100 Ω respectively. Calculate the terminal voltage when the load current is 120 A.	**06**	**L3**	**CO3**
		Module – 4			
Q.7	**a.**	Define Slip of an Induction motor. Derive an expression for effect of slip on the rotor frequency.	**06**	**L2**	**CO4**
	b.	Derive the Emf equation of a transformer and hence obtain the voltage and current transformation ratios.	**08**	**L2**	**CO4**
	c.	A 3 phase, 4 pole, 400 V, 50 Hz Induction motor runs with a slip of 4%. Find the rotor speed and frequency.	**06**	**L3**	**CO4**
		OR			
Q.8	**a.**	Explain the Losses occur in a single phase transformer.	**08**	**L2**	**CO4**
	b.	Explain the types of rotor in a three phase Induction motor.	**06**	**L2**	**CO4**
	c.	A 600 KVA transformer has an efficiency of 92% at full load, unity p. f and half full load, 0.9 p.f. Determine its efficiency at 75% of full load and 0.9 p.f.	**06**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	With a wiring diagram and Truth Table explain two way and three way control of lamp.	**06**	**L2**	**CO5**
	b.	What is fuse? With a neat diagram, explain the working principle of fuse.	**06**	**L2**	**CO5**
	c.	Mention the power rating of following electrical appliances: i) LED lights ii) Laptops iii) TV iv) Refrigerator	**08**	**L3**	**CO5**
		OR			
Q.10	**a.**	What is Earthing? With a neat diagram explain plate earthing.	**08**	**L2**	**CO5**
	b.	Define Electric Shock. What are the safety precaution to be taken against to avoid Electric Shock?	**06**	**L2**	**CO5**
	c.	Define Unit and Tariff. Explain the two part Tariff with its merits and demerits.	**06**	**L2**	**CO5**

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