

## Model Question Paper-1 with effect from 2022-23 (CBCS Scheme)

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**Fourth Semester B.E. Degree Examination**  
**Electrical Drives and Controls**

TIME: 03Hours

Max. Marks: 100

Note: 01. Answer any FIVE full questions, choosing at least ONE question from each MODULE.

<b>Module -1</b>			<b>COs</b>	<b>*Bloom's Taxonomy Level</b>	<b>Marks</b>
Q.01	a	Explain the components of electric drive system with a neat block diagram.	CO1	L2	10
	b	Summarize the classifications of electric drives with neat diagram and mention the advantages and limitations of each type.	CO1	L2	10
<b>OR</b>					
Q.02	a	Derive an expression for Torque in an electric motor with load and show the relationship between speed and torque.	CO1	L2	10
	b	With a neat graph, explain the four-quadrant operation of an electric motor driving a load.	CO1	L2	10
<b>Module-2</b>					
Q.03	a	Derive an expression for thermal model of an electric motor and plot the heating and cooling curves to represent the same.	CO2	L3	10
	b	Outline the various classes of duty and represent each class with the variation in temperature and torque.	CO2	L2	10
<b>OR</b>					
Q.04	a	Outline the motor rating classification for the following i. Fluctuating loads ii. Short-time and intermittent duty	CO2	L2	10
	b	Half-hour rating of a motor is 100 kW. Heating time constant is 80 min and the maximum efficiency occurs at 70% full load. Determine the continuous rating of the motor.	CO2	L3	5
	c	Explain the various quadrant operation of an electric motor driving a load.	CO2	L2	5
<b>Module-3</b>					
Q.05	a	Explain the Plugging type braking process in DC shunt and series	CO3	L2	10
	b	Draw and explain the circuit to control the speed of DC shunt motor with the Armature control method.	CO3	L3	
<b>OR</b>					
Q.06	a	Explain the Plugging type braking process in DC shunt and series	CO3	L2	10
	b	Draw the circuit and explain the operation of chopper control of separately excited DC motor.	CO3	L3	10

<b>Module-4</b>					
Q.07	a	List and brief the parameters which impact the Speed-Torque characteristics of AC motor drive systems.	CO4	L2	10
	b	With a neat sketch, explain the permanent magnet AC motor control structures with silent features.	CO4	L2	10
<b>OR</b>					
Q.08	a	Explain the stator-based methods to control the speed of AC induction motor.	CO4	L2	10
	b	Illustrate the braking technique involved in single phase induction motor.	CO4	L2	10
<b>Module-5</b>					
Q.09	a	List and brief the functions of a microprocessor in variable speed drives and electric motors.	CO4	L2	10
	b	With a neat block diagram, explain a thyristor converter fed separately excited dc motor using hardware.	CO4	L2	10
<b>OR</b>					
Q.10	a	Outline the working of PWM inverter with current control in microprocessor-based control.	CO4	L2	10
	b	Explain the main stages of control system design of microprocessor based variable speed drives.	CO4	L2	10