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BMT402

Electrical Drives and Control

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.

		Module – 1	M	L	C
Q.1	a.	Define electric drive. Explain with block diagram essential parts of electric drive.	10	L2	CO1
	b.	List advantages of electric drives and explain the factors influencing choice of electric drives.	10	L2	CO1
		OR			
Q.2	a.	Explain different components of load torque with its characteristics. Also give a brief description of classification.	10	L2	CO1
	b.	Define forward motoring operation and explain the speed torque conventions and multi-quadrant operation of motor driving a hoist load.	10	L2	CO1
		Module – 2			
Q.3	a.	Discuss thermal model of motor for heating and cooling.	10	L3	CO2
	b.	Illustrate different classes of motor duty with examples of applications for each class.	19	L3	CO2
		OR			
Q.4	a.	Demonstrate with block diagram current limit control and closed loop speed control.	10	L3	CO2
	b.	A constant speed drive has the following duty cycle: (i) Load rising from 0 to 400 KW : 5 min (ii) Uniform load of 50 KW : 5 min (iii) Regenerative power of 400 KW returned to the supply : 4 min (iv) Remains idle for : 2 min Estimate power rating of the motor. Assume losses to the proportional to $(power)^2$.	10	L3	CO2
		Module – 3			
Q.5	a.	Explain the single phase fully controlled rectifier control of separately excited DC motor. Also obtain equations for average output voltage V_a. Assume discontinuous conduction mode.	10	L2	CO3
	b.	Demonstrate dynamic braking method employed to DC motors with speed torque characteristics.	10	L3	CO3

OR

Q.6	a.	Explain Chopper control of separately excited DC motor for motoring control.	10	L2	CO3
	b.	Illustrate starting of dc shunt motor with variable resistance controller.	10	L2	CO3

Module – 4

Q.7	a.	Demonstrate different starting methods and types of single phase induction motors.	10	L3	CO4
	b.	Explain different modes of synchronous motor variable speed drives.	10	L2	CO4

OR

Q.8	a.	Illustrate servo drive employing sinusoidal PMAC motor fed from a current regulated voltage source inverter.	10	L3	CO4
	b.	Explain Brushless DC Motor drive for servo applications.	10	L2	CO4

Module – 5

Q.9	a.	Discuss applications areas and functions of microprocessors in drive technology.	10	L2	CO5
	b.	Explain with block diagram the operation of a separately excited DC motor drive using a microprocessor.	10	L2	CO5

OR

Q.10	a.	Explain stages in control system design of microprocessor based variable speed drives.	10	L2	CO5
	b.	Explain with construction working of variable reluctance stepper motor.	10	L2	CO5

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