Reg. No. ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code	11849

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL/MAY 2023
Sixth Semester
Electrical and Electronics Engineering
20EEPC601 – SOLID STATE DRIVES AND CONTROL
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	Compare AC and DC drives.	2,K2,CO1
2.	From the given figure mention the type of load.	2,K2,CO1

3.	Mention the drawbacks of rectifier fed DC drive.	2,K1,CO2
4.	What are the two control techniques used in dc chopper fed drives?	2,K1,CO2
5.	Why the static scherbius drive has a poor power factor?	2,K2,CO3
6.	Give the speed control on the stator side of three phase induction motor.	2,K1,CO3
7.	Why a self-controlled synchronous motor is free from hunting oscillations?	2,K2,CO4
8.	List the application of CSI fed synchronous motor.	2,K1,CO4
9.	What are the four parts of closed-loop control system?	2,K1,CO5
10.	Classify the types of closed loop control based on feedback.	2,K2,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11.	a)	Draw the speed–torque characteristics of low-speed hoist as an example in multi-quadrant operation.	13,K2,CO1
		OR	
	b)	Derive the mathematical condition for steady state stability of electric drive and explain in detail.	13,K2,CO1

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **11849**

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12. a) Explain the operation of single phase fully controlled bridge converter fed dc drive and draw its waveform.   13,K2,CO2

OR

b) Explain the operation of four-quadrant chopper fed DC separately excited motor drive with power circuit.   13,K2,CO2

13. a) Describe the operation of variable frequency control of three phase VSI fed induction motor drive with necessary diagram.   13,K2,CO3

OR

b) A 3-phase, 60 Hz, 8 pole wound rotor induction motor is controlled using slip power recovery scheme. The open circuit line voltage is1800V .If the motor has to develop 800 kW at a speed of 700 RPM, calculate (i) slip power (ii) DC line voltage (iii) DC line current.   13,K3,CO3

14. a) Explain self-control technique of synchronous motor with constant margin angle control.   13,K2,C̶4̶

OR

b) With neat block diagram, explain the operation of separate-controlled mode of synchronous motor.   13,K2,CO4

15. a) Explain in detail the design of current controller of closed loop speed control system of DC separately excited motor.   13,K2,CO5

OR

b) Derive the transfer function of DC motor load system with armature voltage control.   13,K3,CO5

PART - C (1 × 15 = 15 Marks)

16. a) (i) Explain the operation of a 'Power factor control' based self – controlled synchronous motor drive.   8,K2,CO4
      (ii) Derive the transfer function of the power converter of a dc motor load system with a neat diagram.   7,K3,C

OR

b) (i) Explain open loop V/F speed control of synchronous motor with a neat diagram.   8,K2,CO4
      (ii) Describe the closed loop speed control of separately excited DC motor by proportional Controller.   7,K2,CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 -- Create   **11849**