

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

III B.Tech II Semester Regular/Supplementary Examinations, April - 2024

**ELECTRIC DRIVES
(EEE)**

Time: 3 hours

Max. Marks: 70 M

**Answer ONE Question from each Unit
All Questions Carry Equal Marks**

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) With a neat block diagram, explain the different components of an electric drive. Mention the advantages of electric drives.	K2	CO1	7M
	b) Explain in detail about classification of load torques.	K2	CO1	7M
OR				
2.	a) Explain the different types of torques that are involved in a drive system.	K2	CO1	7M
	b) Derive the mathematical condition to obtain the steady state stability of equilibrium point.	K3	CO1	7M
UNIT – II				
3.	a) Explain the operation of three phase half controlled separately excited DC motor drive under continuous conduction.	K2	CO2	7M
	b) A 30 kW, 230V, 860 rpm, 144 A dc motor has an armature resistance of 0.07Ω . It is fed by a 3-phase fully controlled rectifier from an ac source of 170.3 V (line), 60 Hz. Assuming continuous conduction, calculate motor speeds for $\alpha = 60^\circ$, $T_a = 300 \text{ N-m}$.	K3	CO2	7M
OR				
4.	a) Explain the speed torque characteristics of three phase fully controlled separately excited DC motor drive.	K2	CO2	7M
	b) Explain in detail about the different modes of operation in a dual convertor.	K2	CO2	7M
UNIT – III				
5.	a) A 230V, 960 rpm and 200 A separately excited dc motor has an armature resistance of 0.02Ω . Motor is operated in dynamic braking with chopper control with a braking resistance of 2Ω . (i) Calculate duty ratio of chopper for a motor speed of 600 rpm and braking torque of twice the rated value. (ii) What will be the motor speed for a duty ratio of 0.6 and motor torque equal to twice its rated torque?	K3	CO3	7M
	b) Explain in detail about regenerative braking of separately excited dc motor by chopper control.	K2	CO3	7M
OR				
6.	a) Explain the operation of four quadrant chopper fed dc motor drive with necessary diagrams	K2	CO3	7M

	b)	Explain the dynamic braking operation of chopper fed separately excited dc motor drive. Draw speed torque curves in motoring and braking mode.	K2	CO3	7M
UNIT – IV					
7.	a)	With a neat block diagram, explain the closed loop control of the slip power recovery-controlled induction motor drive. Also discuss its merits.	K2	CO4	14M
OR					
8.	a)	Explain briefly about VSI fed induction motor drive.	K2	CO4	7M
	b)	Explain closed loop speed control of induction motor drive with stator resistance.	K2	CO4	7M
UNIT – V					
9.	a)	Explain in detail about separate control of synchronous motor.	K2	CO5	7M
	b)	With a neat control diagram, explain the functionality of closed loop control of synchronous motor.	K2	CO5	7M
OR					
10.	a)	Explain the operation of PMSM in detail.	K2	CO5	7M
	b)	Discuss the variable frequency control of a synchronous motor drive.	K2	CO5	7M