R22 Regulation *Subject code:4E7BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Regular/Supplementary Examinations, October 2026

ELECTRICAL DRIVES

(EEE)

Maximum Marks: 60 Date:04.11.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	List out the advantages of electrical drives.	1M	1	1
b)	Draw the speed torque characteristics of DC series motor.	1M	1	1
c)	Define Plugging.	1M	2	2
d)	Draw the circuit diagram for 1st quadrant control of chopper drive.	1M	2	1
e)	What are the different speed control techniques of induction motor?	1M	3	2
f)	Give the advantages of PWM control technique for induction motor.	1M	3	1
g)	What are the different slip recovery schemes of induction motor.	1M	4	2
h)	Give the advantages of rotor side control of induction motor.	1M	4	1
i)	What are the advantages of self-control of synchronous motor?	1M	5	2
j)	Give the applications of synchronous motor drive.	1M	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Explain the operation of Single Phase Fully Controlled Converter fed separately excited DC motor in continuous current mode with relevant waveforms.	10M	1	2
	OR			
3	a) Explain the operation of DC series motor operated with 3-phase semi converter.	5M	1	1
	b) A separately excited DC motor, operating from a single phase full controlled converter at a speed of 140 rpm, has an input voltage of 330 Sin 314t and a back emf 80 V. The SCR's are fixed symmetrically at $\alpha=30^0$ in every half cycle and the armature has a resistance of 4 ohms. Calculate the average armature current and the motor torque.	5M		3
4	a) Explain with circuit the four-quadrant chopper fed separately excited DC motor.	5M	2	2
	b) A 220V, 24A, 1000rpm separately excited dc motor having an armature resistance of 2Ω is controlled by a chopper. The chopping frequency is 500Hz and the input voltage is 230V. Calculate the duty ratio for a motor torque of 1.2 times rated torque at 500rpm.	5M		3

	OR			
5	Explain the operation of Two-Quadrant, Type-D chopper drive with necessary circuits and waveforms.	10M	2	3
6	a) Explain the operation of variable frequency control of induction motor by AC voltage controller. b) Compare Voltage Source Inverter and Current Source Inverter.	5M 5M	3	2 2
	OR			
7	Write short on the following: a) PWM control of inverter b) V/F control of induction motor.	 5M 5M	3	 2 2
8	a) What are the advantages of static rotor resistance control over conventional methods of rotor resistance control? b) Give the applications of Scherbius drive.	6M 4M	4	
	OR			
9	A Static Kramer drive is used for the speed control of a 6-pole SRIM fed from 400V,50 Hz supply. The inverter is connected directly to the supply. If the motor is required to operate at 800 rpm, find the firing advance angle of the inverter. Voltage across the open-circuited slip rings at stand-still is 600 V. Allow a voltage drop of 0.7 V and 1.5 V across each of the diodes and thyristors respectively. Inductor drop is neglected.	10M	4	5
10	a) Describe the advantages of self-controlled variable speed synchronous motor drive. b) Describe separate control mode of operation of a synchronous motor drive.	5M 5M	5	3 3
	OR			
11	Explain the closed loop operation of synchronous motor drives with neat block diagram.	10M	5	3