Name: **Enrolment No:**	

UPES

End Semester Examination, May 2024

Course: Electrical Drives **Semester: VI**

Program: B. Tech (Electrical Engineering) **Time : 03 hrs.**

Course Code: EPEG 3026 **Max. Marks: 100**

Instructions: Read all the questions carefully. Assume if any data is missing.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the principle of phase control. What is its significance?	**4**	**CO1**
Q 2	Describe various components of load torque? Explain briefly.	**4**	**CO1**
Q 3	List the factors affecting the selection of electric drives.	**4**	**CO1**
Q 4	With schematic explain single phase half bridge inverter.	**4**	**CO2**
Q 5	Classify different methods for slip power recovery? Explain Kramer drive briefly with neat sketch.	**4**	**CO2**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Explain V/F method for controlling speed of induction motor.	**10**	**CO3**
Q 7	Describe various methods of speed control for DC motors. Explain with the help of equations in detail.	**10**	**CO3**
Q 8	With the help of neat sketch, waveform, and expression, explain the working of a single-phase full converter drive feeding a separately excited dc motor.	**10**	**CO3**
Q 9	A 4 pole, 50 Hz, 3 phase induction motor has rotor resistance of 0.2 Ω per phase and rotor standstill reactance of 1 Ω per phase. On full load it is running with a slip of 4 %. Calculate the extra resistance required in the rotor circuit per phase to reduce the speed to 1260 RPM, on the same load condition.	**10**	**CO4**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	The speed of a 10 HP, 210 V, 1000 rpm separately excited DC motor is controlled by a single-phase full converter. The rated motor armature current is 30 A, and the armature resistance is Ra = 0.25 Ω. The AC supply voltage is 230 V at 50 Hz. The motor voltage constant is KaΦ = 0.172 V/rpm. Assume that sufficient inductance is present in the armature	**20**	**CO4**

	circuit to make the motor current continuous and ripple free. For a firing angle $\alpha = 45$, and rated motor armature current, determine: 1) The motor torque 2) Speed of the motor at rated armature current.		
Q 11	Describe torque slip characteristics of the induction motor and explain various regions for low, moderate, and high slip with the help of mathematical expressions. OR For a 3-phase delta connected 6-pole 50 Hz 400 V, 925 rpm squirrel cage induction motor is having R1 = 0.2 Ω, R2 = 0.3 Ω, X1 = 0.5 Ω and X2 = 1.1 Ω. The motor is operated from voltage source inverter with constant V/f ratio from 0 to 50 Hz and having a constant voltage of 400 V above 50 Hz frequency. Calculate: i). speed for a frequency of 35 Hz with half full load torque. (i) ii). Torque for a frequency of 35 Hz for a speed of 650 rpm.	**20**	**CO4**