Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

ONLINE END SEMESTER EXAMINATION, MAY 2021

Course: Electrical Drives **Semester: VI**

Program: B. Tech-Electrical Engg.- **Time 03 hrs.**

Course Code: EPEG 3012 **Max. Marks: 100**

SECTION A

1. Each Question will carry 5 Marks

2. Instruction: Complete the statement / Select the correct answer(s)

S. No.		CO
Q1	In which category of load the rolling mills- motor connected with flywheel goes, a. Pulsating loads b. Continuous variable type loads c. Impact loads d. Constant loads	**CO1**
Q2	A 250V DC series motor has armature and series field resistance of 0.25Ω and 0.15Ω then the current for developing a torque of 80 Nm at 1200 rpm is _____ a. 32.3 A b. 23.2 A c. 43.3 A d. 45.3 A	**CO2**
Q3	In the thyristor power converters during discontinuous conduction a. The load current is zero even though the load voltage is present b. The load current and load voltages are both simultaneously zero c. The load current is present even though the load voltage is zero d. The current is ripple free	**CO3**
Q4	_____ drives are sometimes connected with closed loop current control during starting, breaking and speed reversal. a. Open loop b. Closed loop c. Inner current loop d. Speed control loop	**CO4**
Q5	The starting torque of a three phase induction motor a. Increases with rotor resistance b. Decreases with rotor resistance c. Increase with rotor resistance up to a certain value and decreases as the rotor resistance increases further d. Does not depend on rotor resistance	**CO1**
Q6	Which type of breaking is inefficient a. Regenerative breaking b. Dynamic breaking c. Plugging	CO2

	d. None of the above	
SECTION B **1. Each question carry 10 marks** **2. Instruction: Write short / brief notes**		
Q7	Describe various types of load torque needed for the selection of electrical drives and draw the layout of electrical drive.	**CO1**
Q8	a. Explain in detail any one method of speed control of DC motor. b. A 240V, 50A, 800rpm dc shunt motor has armature circuit resistance of 0.2 Ω. If load torque is reduced to 60% of its full-load value and a resistance of 2 Ω is inserted in series with armature circuit, find the motor speed. Armature reaction weakens the field flux by 4% at full load and by 2% at 60% of full load.	**CO2**
Q9	Discuss the operation of single-phase fully controlled rectifier fed separately excited motor and discuss the mode of operation under motoring mode in continuous conduction mode.	**CO3**
Q10	Derive the transfer function of an armature controlled DC motor using block diagram reduction technique and discuss the procedure to design the speed controller.	**CO4**
Q11	Explain in detail the working of static Scherbius drives used for speed control of induction motor.	**CO3**
Section C **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer.** **3. Attempt any one question**		
Q12	a. (i) Explain the working of class C Two quadrant chopper for the speed control of DC motor. **(10 marks)** (ii) A 230 V, 500 rpm, 90 A separately excited DC motor has the armature resistance and inductance of 0.115 Ω and 11 mH respectively is controlled by a class C two-quadrant chopper operating with a source voltage of 230 V and a frequency of 400 Hz. Calculate the motor speed for a motoring operation at δ=0.5 and half of rated torque **(10 marks)** **OR** b. (i) Explain the speed control of induction motor by varying the frequency and draw the Speed V/s Torque curves to show their variation at different frequency. **(10 marks)** (ii) A 3-Phase, Y connected, 60 Hz, 4- Pole induction motor has the following parameters for the equivalent circuit, Rs = R_r'= 0.024Ω and Xs=X_r'= 0.12Ω, the motor is controlled by the variable frequency control with a constant V/f ratio. For an operating frequency of 12 Hz calculate, 1. The breakdown torque as a ratio of its value at the rated frequency for both motoring and breaking. **(5 marks)** 2. The starting torque and rotor current in terms of their values at the rated frequency. **(5 marks)**	**CO3**