Reg. No.



VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING) END SEMESTER ON-LINE PROCTORED EXAMINATIONS

## SOLID STATE DRIVES [ELE 4088]

REVISED CREDIT SYSTEM

Time: 75	Minutes + 10 Minutes	Date: 17 December 202	1	Max. Marks: 20
Instructions to Candidates:				
*	Answer <b>ALL</b> the questions.			
*	Missing data may be suitably assumed.			
*	Time: 75 minutes for writing	+ 10 minutes for uploading.		

- 1A. The load inertia referred to the motor shaft of a conveyor belt system is 0.05kgm<sup>2</sup>. The materials are transported at the rate of 3600Kg/hr. The belt is of 100 meter long and moves at a uniform speed of 2 m/s. Determine the speed at which the motor is driven? (05)
- **1B.** Speed torque curve of a motor is shown in Figure 1B. Draw load curves which will give stable operation with the portion of characteristics marked as **AB**. Justify your answer.



Figure 1B.

- **1C.** Differentiate between true synchronous mode and self-control mode for variable frequency control of Synchronous motor. Suggest which method is suitable for pump drive.
- **2A.** A 220V, 1500 rpm, 12 A separately excited DC motor has armature resistance and inductance of  $2\Omega$  and 30mH respectively. This motor is controlled by a 1-phase fully controlled rectifier with an AC source of 230V, 50Hz. Identify the mode and calculate the speed for  $a = 30^{\circ}$  and T = 30Nm.

ELE 4088

(04)

(03)

(02)

**2B.** With a help of a block diagram show how closed loop speed control can be implemented in a single-phase controlled rectifier fed separately excited DC motor.

(03)

**2C.** A 440V, 3 phase, 50Hz, 6 pole, 945 rpm, delta connected induction motor has the rotor resistance referred to the stator  $Rr^1=2\Omega$ . Neglect the stator impedance and rotor leakage reactance.

The motor speed is controlled by stator voltage control. The motor drives a load whose torque varies linearly with speed i.e  $T_L = k(1-s)$ .

Determine the motor speed and torque when the terminal voltage is 280V. **(03)**