B.TECH.
(SEM VII) THEORY EXAMINATION 2019-20
ELECTRIC DRIVES

Time: 3 Hours   *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   Attempt *all* questions in brief.   **2 x 10 = 20**

a.	Draw the torque-speed characteristics of a separately excited DC motor during dynamic braking.
b.	`
c.	What are the conditions to be satisfied for the regenerative braking operation to take place?
d.	Why the cooling time constant of a rotating machine is usually larger than its heating time constant?
e.	Derive the equations governing motor load dynamics from the basic principles
f.	Give the classifications of load torques.
g.	What are the selection criteria of motor for particular application?
h.	What are the necessary modifications are required while braking a dc series motor?
i.	Mention the types of electric braking employed for electric drives.
j.	What are the reasons for using load equalization in an electrical drive?

SECTION B

2.   Attempt any *three* of the following: **10x3=30**

a.	Explain the operation of chopper controlled dc series motor.
b.	Explain the operation of Brushless DC motor drives. What kind of braking is more effective in induction motor? Justify, it
c.	Compare voltage source and current source inverter fed drives with neat sketch.
d.	Derive the expression to calculate the energy loss during starting of Induction motor.
e.	Classify the electric drives. State their advantages and disadvantages.

SECTION C

3.   Attempt any *one* part of the following: **10x1=10**

a.	Explain the operation of a single phase fully controlled converter fed separately excited DC motor with neat waveforms and derive the speed torque characteristic.
b.	A 220 V, 17.6 KW dc shunt motor at its rated speed of 1200 rpm is to be braked by plugging. The armature resistance is 0.1 Ω and the rated efficiency of motor is 80%. Calculate the resistance to be connected in series with the armature to limit the initial braking current to twice the rated current.

4.   **Attempt any *one* part of the following:**   **10x1=10**

a.	A 200V 875 rpm, 150 A separately excited dc motor has an. armature resistance of 0.0 ohms. It is fed from a single phase fully controlled rectifier with an ac source voltage 220 V, 50 Hz assuming continuous conduction. Calculate
	   i) Firing angle for rated motor torque and 750 rpm.
	   ii) Firing angle for rated motor torque and (-500 rpm).

b.	Draw the circuit diagram and briefly explain the dynamic braking of a three phase induction motor.

5.   **Attempt any *one* part of the following:**   **10x1=10**

a.	Classify mechanical loads based on their speed torque characteristics and develop a criterion for evaluating the steady state stability of an electrical drive.
b.	Explain in brief the working of a multi quadrant control of chopper fed DC series motor.

6.   **Attempt any *one* part of the following:**   **10x1=10**

a.	Draw the block diagram of an electric drive. Explain the function of power modulator in detail.
b.	 intermittent duty.

7.   **Attempt any *one* part of the following:**   **10x1=10**

a.	Explain the operation of a single phase fully controlled converter fed separately excited motor with neat waveforms for continuous current mode and discontinuous modes.
b.	Explain how the static scherbius drive is used in slip power recovery scheme?