Assignment I

1. Explain the generalized block diagram of electrical drives.
2. State the advantage of electrical drives with other prime-movers.
3. Explain the Four quadrant operation of drive with suitable example.
4. Derive the expression for the load equalization for the electrical drive.
5. Explain the function of power modulator in details
6. Describe the current status of ac and dc drive.
7. Define the fundamental torque characteristic of motor load system.
8. Draw the waveform of 1-phase fully controlled converter with R-L-E load with conduction table & performance parameter.
9. Draw the waveform of 1-phase half wave controlled rectifier with R-L-E load with necessary waveform and performance parameter
10. Explain the reverse motoring and reverse braking mode of drive.
11. Speed-torque curve of motors under different operation are shown in fig. Draw load curves which will give stable operation with the portion of chara. marked AB,BC,DE and EF.
12. Derive the expression for the steady state time domain analysis of step down chopper.
13. Derive the chopper E circuit with all four quadrant operation.

Assignment II

1	A motor drives two loads. One has rotational motion .It is coupled to the motor through a reduction gear with a=0.1,and efficiency of 90%.The load has a inertia of 10 kg-m^2 and a torque of 10 N-m. Other load has translational motion and consists of 1000 kg weight to be lifted up at an uniform speed of 1.5 m/s. Coupling between this load and the motor has an efficiency of 85%.Motor has an inertia of 0.2 kg-m^2 and runs at a constant speed of 1420 rpm. Determine equivalent inertia referred to the motor shaft and power developed by the motor.
2	A motor is used to drive a hoist. Motor characteristic are given by Qud I,II and IV: T=200-0.2N Quad II,III and IV,T= -200-0.2N When hoist is loaded net torque Tl=100 N-m, and when it is unloaded, net load torque Tl=-80 N-m. Obtain equilibrium speed for all quadrants.
3	A weight of 500 kg is being lifted up at a uniform speed of 1.5M/s by a winch driven by a motor running at a speed of 1000 rpm. The moment of inertia of the motor and winch are 0.5 and 0.3 kg-m^2 respectively. Cal. the motor torque and the eq. inertia referred to the motor shaft. In the absence of weight, motor develops a torque of 100 N-m when running at 1000 rpm.
4.	A motor is used to drive a hoist. Motor characteristic are given by Qud I,II and IV: T=200-0.2N Quad II,III and IV,T= -200-0.2N When hoist is loaded net torque Tl=100 N-m,and when it is unloaded,net load torque Tl=-80 N-m. Obtain equilibrium speed for all quadrant.
6	A 3-phase,100 KW,6 pole,960 rpm wound rotor induction motor drives a load whose torque varies such that a torque of 3000 N-m of 10 sec duration is followed by torque of 500 N-m of duration long enough for the motor to attain steady state speed. Calculate moment of inertia of the flywheel, if motor torque should not exceed twice the rated value. Moment of inertia of the motor is 10 Kg-m2.Motor has linear speed torque curve in the region of interest.

7	Obtain the equilibrium points and determine their steady-state stability when motor and load torque are T= -1-2wm and Tl=-3√wm.