

Electrical Drives

Assignments

2021-22

Assignment No. 1

1. What is power modulator? Explain in detail the different types of power modulators.
2. Draw and explain in brief block diagram of Electrical Drives". Also explain the factors affecting choice of Electrical Drives.
3. What are the advantages of Electric Drives? What are the functions of Power Modulators?
4. Explain four quadrant operation of motor driving hoist with the help of a neat diagram.
5. Explain various components of load torque. Hence draw steady state load torque speed curves for fan, hoist, traction and constant power and explain the same.
6. For motor load system how is equilibrium speed find out? Explain with neat diagram, the method of checking steady state stability of a motor load system showing one stable and one unstable equilibrium point.

Assignment No. 2

1. Explain the operation of a closed loop torque control scheme with neat diagram.
2. Explain How following Speed Transitions are Carried out
 - (i) Increase in the speed in same direction
 - (ii) Decrease in the Speed
 - (iii) Speed Reversal
3. Explain the operation of a closed loop speed control scheme with inner current control loop. What are various functions of inner current control loop?
- 4) Classify and explain types of motor duties.

Assignment No. 3

1. Unsolved problem 5.36 from the book of G. K. Dubey
2. Unsolved problem 5.37 from the book of G. K. Dubey
3. Unsolved problem 5.38 from the book of G. K. Dubey
4. Unsolved problem 5.39 from the book of G. K. Dubey
5. Unsolved problem 5.41 from the book of G. K. Dubey

Assignment No. 4

1. State various methods to obtain variable DC for motor control. Compare them in brief.
2. Explain speed control of separately excited DC motor using combined effect of armature and

field control. Explain with neat diagram the limitations on maximum allowable torque and power for maximum speed.

3. With the help of waveforms describe the operation of Single phase full controlled bridge rectifier fed DC motor drives. Derive the expression for speed Vs torque for continuous conduction.
4. With the help of waveforms describe the operation of Single phase half controlled bridge rectifier fed DC motor drives. Derive the expression for speed Vs torque for continuous conduction.
5. With the help of waveforms describe the operation of three phase half controlled bridge rectifier fed DC motor drives. Derive the expression for speed Vs torque for continuous conduction.
6. With the help of waveforms describe the operation of three phase full controlled bridge rectifier fed DC motor drives. Derive the expression for speed Vs torque for continuous conduction.

Assignment No. 5

1. What is the significance of Dual Converter in DC motor drive? Explain Three Phase Dual Converter fed DC Motor Drive.
2. Explain chopper control of separately excited dc motor during motoring operation. Derive the relation between voltage & duty cycle and motor speed & torque. Draw speed torque curve.
3. Explain chopper control of separately excited dc motor during regenerative braking operation. Derive the relation between voltage & duty cycle and motor speed & torque. Draw speed torque curve.
4. Explain two quadrant chopper controlled separately excited DC motor drive.
5. Explain Closed Loop speed control of thyristor converter fed DC motor drive.

Assignment No. 6

1. Derive an expression for torque developed by IM. Obtain speed Vs torque characteristics.
2. State various methods of speed control of IM. Explain speed control of IM by AC voltage controller.
3. Explain speed control of IM by Pole changing method.
4. What is the need of starters? State it types. Explain DOL starter.
5. Explain modes of operation and variations of I_s , W_{sl} , T and P_m with frequency for IM.

Assignment No. 7

1. Explain V/f control method of IM drives. Draw corresponding speed torque characteristics. Explain VFVS control scheme.
2. Explain 6 step VSI fed IM drive.
3. Describe the operation of PWM inverter fed IM drives.
4. What is the significance of V/f ratio in IM? Explain Closed loop control of VSI fed IM drive.
5. Explain CSI fed IM drive.
6. Explain Closed loop speed control of CSI fed IM drive.

Assignment No. 8

1. Explain conventional rotor resistance control method of IM drive. What is the advantage of rotor resistance control.
2. What is slip power? Explain Static Kramer Drive.
3. Explain rotor resistance control of IM employing semiconductor converters and its closed loop control. Explain advantages of this method.
4. Explain static Scherbius drive and its closed loop control. Draw speed draw curves for different firing angles.

Assignment No. 9

1. State and explain the modes of speed control of synchronous motor on the basis of frequency (or VSI fed).
2. Explain load commutated inverter fed synchronous motor drive.
3. Write a short note on types of synchronous motors.
4. Obtain an expression for torque developed in Cylindrical Rotor Wound Field Motor and salient Pole Wound Field Motor.
5. Explain variable frequency control of multiple synchronous motors with block diagram.
6. What do you mean by load commutation? Explain closed loop speed control of load commutated inverter fed synchronous motor drive.