Course BE(EEE(M))

Batch 14

Semester VII

Subject Code EE1701

Subject Name Solid State Drives

Unit-I Drive Characteristics

PART-A

1 What is meant by electrical drives?

2 Draw the electric drive system.

3 Specify the functions of power modulator.

4 Mention the different types of drives.

5 Define Passive torque.

6 What are the advantages of electric drives?

7 what are the functions performed by electric drives?

8 What are the disadvantages of electric drives?

9 What are the advantages of group drive over individual drive?

10 Define Active torque.

11 Mention the types of braking.

12 List the parts of electrical drives.

13 Mention the applications of electrical drives.

14 Mention the different types of classes of duty.

15 What is meant by regenerative braking?

16 What is meant by dynamic braking?

17 What is meant by plugging?

18 What is critical speed?

19 Which braking is suitable for reversing the motor?

20 What are the methods of operation of electric drives?

Part-B

1 Mention the different factors for the selection of electric drives?

2 Why the group drive is not used extensively?

3 Explain about electric drives classification.

4 Write short notes on types of electric drives.

5 Explain about the components of load torques.

6 Difference between AC and DC drives.

7 Explain about the dynamics of motor load system in detail.

PART-C

1 Draw and explain the Characteristics of Different types of Loads.

2 Explain in detail about Multi quadrant Operation with neat sketch.

3 Explain in detail about Steady State Stability.

4 Explain in detail about regenerative braking.

5 Explain in detail about General electric drive system.

UNIT- II CONVERTER / CHOPPER FED CHRACTERISTICS

PART-A

1 Which braking is suitable for reversing the motor?

2 What is meant by mechanical characteristics?

3 What are the advantage and disadvantages of D.C. drives?

4 What is the use of flywheel? Where it is used?

5 Why the variable speed applications are dominated by D.C. drives?

6 What are the advantages of series motor?

7 How the D.C. motor is affected at the time of starting?

8 Define and mention different types of braking in a dc motor?

9 List the drawbacks of armature resistance control?

10 Mention the methods of armature voltage controlled dc motor?

11 Mention the drawbacks of rectifier fed dc drives?

12 Write the expression for average o/p voltage of full converter fed dc drives?

13 What are the advantages in operating choppers at high frequency?

14 State the advantages of dc chopper drives?

15 What is chopper?

16 What is duty cycle?

17 What is constant frequency system?

18 What is variable frequency system?

19 What is time ratio control?

20 What is Current limit Control?

PART-B

1 Explain the operation of a two quadrant chopper fed DC drives.

2 Explain the operation of a one quadrant chopper fed DC drives.

3 Explain the two different types of speed control of D.C Motor.

4 Explain any two different types of braking in a dc motor.

5 Explain the different types of control techniques of chopper in detail.

6 Explain in detail about rheostatic braking in dc motor.

7 Describe with a neat diagram the operation of four quadrant converter.

8 Discuss the two methods of time ratio control.

9 Explain using a power circuit the working of a single phase semi converter fed separately excited motor drive.

Part-C

1 Describe the operation of single phase fully controlled rectifier control of separately excited DC motor with neat waveforms.

2 Explain in detail about CLC and TRC methods with diagram.

3 Explain the operation of four quadrant DC chopper.

4 Explain about the Ward —Leonard method of speed control of DC motor.

5 Describe the operation of three phase fully controlled rectifier control of separately excited DC motor with neat waveforms.

Unit-III INDUCTION MOTOR DRIVES

PART-A

1 what are the types of induction motor?

2 What is indirect flux control?

3 What is voltage source inverter?

4 What is the purpose of inductance and capacitance in the D.C. link circuit?

5 Define Harmonics.

6 What is slip controlled drive?

7 What are the effects of harmonics ?

8 What is a current source inverter?

9 Explain about the commutation of the current source inverter.

10 Give the features from which a slip controlled drive is developed.

11 Difference between VSI and CSI fed drive.

12 What are the advantages and disadvantages of rotor resistance control?

13 Where is rotor resistance control used?

14 What are the disadvantages of rotor resistance control?

15 How is the resistance in the output terminals of a chopper varied?

16 What is the function of inductance L and resistance R in the chopper resistance circuit?

17 What are the disadvantages and advantages of chopper controlled resistance in the rotor circuit method?

18 How is the range of speed control increased?

19 " Why the static scherbius drive has a poor power factor?"

PART-B

1 Draw and explain the torque-speed characteristics of induction motor.

2 Explain about Stator voltage control in detail.

3 Explain about stator frequency control in detail.

4 List the advantages and disadvantages of stator voltage control.

5 List the effects of low frequeny and high frequency induction motor drive.

6 Explain in detail about closed loop v/f induction motor drive.

7 Explain in detail about VSI fed induction motor drive.

8 Explain in detail about constant air gap flux control induction motor drive.

9 Explain about Rotor resistance control of induction motor drive.

10 List the advantages and disadvantages of rotor resistance control.

11 Explain in detail about closed loop of static rotor resistance ccontrol.

12 Explain in detail about closed loop of static Kramer system.

13 Explain in detail about closed loop of static scherbius system.

14 Explain in detail about CSI fed induction motor drive.

Part-C

1 Explain the operation of constant air gap flux control.

2 Explain the operation of constant slip speed control.

3 Explain the induction motor operation when the V / f ratio is held constant .

4 Draw and explain the slip power recovery scheme applicable for three phase slip- ring induction motor.

5 Using a diagram and speed- torque curve, explain the stator voltage control scheme for the speed control of a three phase induction motor.

Unit-IV SYNCHRONOUS MOTOR DRIVES

PART-A

1 Give the four modes of operation of a Scherbius drive

2 " Give the use of synchronous motors."

3 How are the stator and rotor of the synchronous motor supplied?

4 What is the difference between an induction motor and synchronous motor?

5 List out the commonly used synchronous motors.

6 Mention the main difference between the wound field and permanent magnet motors.

7 what is the relation between frequency and inductive reactance ?What happens if frequency increases?

8 List the advantages of stator voltage control.

9 Mention the two modes employed in variable frequency control.

10 How power factor is improved by synchronous motor drive?

11 What are the two types of static scherbius system?

12 List the effects of low frequency control induction motor drive.

13 List the control strategies of Voltage/frequency control.

14 List the effects of high frequency control induction motor drive.

15 What are the disadvantages of VSI fed synchronous motor drive?

16 List the disadvantages of stator voltage control.

17 Define Slip.

18 What are the disadvantages of cycloconverter?

19 What are the applications of cycloconverter?

20 Give the application of CSI fed synchronous motor.

Part-B

1 Explain in detail about v/f permanent magnet synchronous motor.

2 Explain in detail about open loop volts/Hertz synchronous motor drive.

3 Explain about self control of Synchronous motor drive.

4 Explain about field oriented control of Permanent magnet synchronous motor.

5 Explain about constant torque control of synchronous motor.

6 Explain in detail about flux weakening control of PM Synchronous motor drive.

7 Explain in detail about PMSM Drive with Active Power Factor Correction.

8 Explain in detail about Closed loop control PMSM drive.

9 Explain about of power factor correction circuit with boost converter.

10 Explain about VSI fed synchronous motor drive.

11 Explain about HYSTERESIS Current Controller.

12 Explain about Power factor improvement of synchonous motor.

13 Explain about Constant torque and flux weakening of synchronous motor drive.

PART-C

1 Explain with the block diagram of marginal angle control of synchronous motor drive.

2 Explain Power factor control of synchronous drive.

3 Describe the self control of synchronous motor.

4 Explain the closed loop control system of adjustable speed synchronous motor drives.

5 Explain the construction and operation of permanent magnet synchronous motor.

6 Explain in detail about the brushless DC motor drive.

Unit-V DESIGN OF CONTROLLERS FOR DRIVES

PART-A

1 What is meant by frequency control of IM?

2 What is meant by V/F control?

3 What are the advantages of V/F control?

4 What is meant by stator current control?

5 What are the 3 modes of region in the adjustable-freq IM drives characteristics?

6 What are the two modes of operation in the motor?

7 How will you select the motor rating for a specific application?

8 What is braking? Mention its types.

9 What are the three types of speed control?

10 What are the advantages of armature voltage control?

11 What are the methods involved in armature voltage control? When the supply in A.C.

12 Give some drawbacks and uses of Ward-Leonard drive.

13 Give some advantages of Ward-Leonard drive.

14 What is the use of controlled rectifiers?

15 What is known as half-controlled rectifier and fully controlled rectifier?

16 What is called continuous and discontinuous conduction?

17 What are the three intervals present in discontinuous conduction mode of single phase half and fully controlled rectifier?

18 What is called inversion?

19 What are the limitations of series motor? Why series motor is not used in traction applications now days?

20 What are the advantages of induction motors over D.C. motors?

PART-B

1 Derive the armature control of dc motor drive.

2 Explain about closed loop speed control of dc motor.

3 Explain about inner current loop control of dc motor.

4 Explain about Speed control by armature voltage variation.

5 Explain about speed control by flux weakening method.

6 Explain the block diagram of speed controller of dc machine.

7 Explain about block diagram of current controller of dc machine.

8 Explain any two methods of speed control of dc machine.

9 Explain about different speed control of shunt motor.

10 Explain about different speed control of series motor.

11 Explain about speed control of constant speed motor.

12 Explain about speed control of constant torque motor.

13 Explain about armature voltage control of dc motor drive.

14 Expain about field control of dc motor drive.

PART-C

1 Derive the transfer function of separately excited DC motor and load.

2 Explain in detail about design of speed controller and current controller for dc drives.

3 Describe the closed loop speed control of separately excited DC motor by proportional controller.

4 Explain the current limit control of separately excited DC motor.

5 Write short notes on : (i) Field weakening mode control, (ii) Armature voltage control .

6 Explain in detail about converter selection and characteristics.