UBEE304 **ELECTRICAL DRIVES AND CONTROL**

UNIT I

PART A

2 marks

1. Define Drive and Electric Drive.
2. List out some examples of prime movers.
3. List out some advantages of electric drives.
4. Give some examples of Electric Drives.
5. What are the types of electric drives?
6. Classify electric drives based on the means of speed control.
7. What is a Group Electric Drive (Shaft Drive)?
8. What are the advantages and disadvantages of Group drive (Shaft drive)?
9. What is an individual electric drive? Give some examples.
10. What is a multi motor electric drive? Give some examples.
11. Write about manual control, semiautomatic control & Automatic control?
12. What are the Typical elements of an Electric Drive?
13. What is a load diagram? What are its types? What are required to draw a load diagram?
14. What are the types Drive systems?
15. Give an expression for the losses occurring in a machine.
16. What are the assumptions made while performing heating & cooling calculation of an electric motor?
17. What are the factors that influence the choice of electrical drives?
18. Indicate the importance of power rating & heating of electric drives.
19. How heating occurs in motor drives?
20. What are the classes of duties?

PART B

6 marks

1. How will you classify electric drives based on the method of speed control?
2. List out some applications for which continuous duty is required.
3. Why the losses at starting are not a factor of consideration in acontinuous duty motor?
4. What is meant by “short time rating of motor”?
5. What is meant by “load equalization”?
6. How a motor rating is determined in a continuous duty and variable load?
7. Draw the heating & cooling curve of an electric motor.
8. What are the various function performed by an electric drive?

9. Write down the heat balance equation.
10. Explain about electrical drive system with neat diagram?
11. Define control unit in electrical drive system?
12. What are the power sources in electrical drive system?
13. Define losses in electrical drives?
14. Define cooling transient?
15. Define heating transient?

PART C

10 marks

1. Explain the components of electrical drives with suitable diagram?
2. Describe the power balance equation?
3. Describe the types of electrical drives?
4. Explain about the Classes of Motor Duty with a neat diagram?
5. Explain about heating and cooling curve in detail.
6. Briefly explain the Selection of power rating of motors?

UNIT II

PART A

2 marks

1. Write down the heat balance equation.
2. What is meant by plugging?
3. Give some applications of DC motor.
4. What is the effect of variation of armature voltage on N-T curve and how it can be achieved?
5. When does an induction motor behave to run off as a generator?
6. Define slip.
7. Define synchronous speed.
8. Why a single phase induction motor does not self-start?
9. What is meant by regenerative braking?
10. Give some applications of DC motor.
11. Compare electrical and mechanical braking.
12. Differentiate cumulative and differential compound motors.
13. What is meant by mechanical characteristics?
14. Why a single phase induction motor does not self-start?
15. Give some applications of DC motor?
16. What are the different types of electric braking?
17. What is the effect of variation of armature voltage on N-T curve and how it can be achieved?
18. Compare electrical and mechanical braking?

PART B

6 marks

1. When does an induction motor behave to run off as a generator explains?
2. Define slip with an example?
3. Define synchronous speed?
4. What is meant by regenerative braking?
5. What are the disadvantages of inserting resistance in the rotor circuit in slip ring induction motor?
6. under what condition, the slip in an induction motor is
   a. Negative b. Greater than one
7. Differentiate cumulative and differential compound motors?
8. Draw the speed torque characteristics of DC shunt motor?
9. Draw the speed torque characteristics of DC series motor?
10. Draw the speed torque characteristics of compound motor?
11. What is back emf?
12. What are all the types of electrical machines?
13. Give Types of DC machines?
14. List Types of AC machines?

PART C

10 marks

1. What are the two types of 3 phase induction motor and explain each with neat sketch?
2. What is the principle used in induction motor? Explain the working of induction motor with neat sketch?
3. What are the advantages of the slip-ring induction motor over squirrel cage Induction motor? Explain the working of squrriel cage induction motor with neat sketch?
4. What are the types of single phase induction motors? Explain about any one with neat sketch?
5. Why regenerative braking not possible in DC series motor? And why it is called as an universal motor? Explain the working of DC series motor with neat sketch?
6. What is meant by dynamic braking? How it works in DC shunt motor explain with neat sketch?

UNIT III

PART A

2 marks

1. What is the need for starter in an induction motor?
2. Write the starting torque to full load torque ration in case of D.O.L starter?
3. What is the starting torque to full load torque ratio in case of primary resistance (or) reactance starter?
4. What is the starting torque to full load torque ratio in case of Auto –transformer starter?

5. What is starting torque to full load torque ratio in case of star-delta starter?
6. Mention the Starters used to start a DC motor?
7. Mention the Starters used to start an Induction motor?
8. What are the protective devices in a DC/AC motor Starter?
9. Is it possible to include/ Exclude external resistance in the rotor of a Squirrel cage induction motor? Justify
10. Give the prime purpose of a starter for motors?
11. Why motor take heavy current at starting?
12. What are the methods to reduce the magnitude of rotor current (rotor induced current) at starting?
13. What is the objective of rotor resistance starter (stator rotor starter)?
14. Why squirrel cage induction motors are not used for loads requiring high starting torque?
15. How reduced voltage starting of Induction motor is achieved?
16. Give the relation between line voltage and phase voltage in a
17. (i) Delta connected network (ii) Star connected network
18. Give some advantages and disadvantages of D.O.L starter?
19. Explain double stage reduction of line current in an Auto transformer starter?
20. Draw the Speed-Torque characteristics of an Induction motor with various values of Rotor Resistance.
21. Mention any two methods of making a single phase induction motor self starting?

PART B

6 marks

1. Mention the Starters used to start a DC motor. Give short notes to each?
2. Mention the Starters used to start an Induction motor.
3. What are the protective devices in a DC/AC motor Starter?
4. Is it possible to include/ Exclude external resistance in the rotor of a Squirrel cage induction motor? Justify
5. Give the prime purpose of a starter for motors.
6. What are the methods to reduce the magnitude of rotor current (rotor Induced current) at starting?
7. What is the objective of rotor resistance starter (stator rotor starter)?
8. Why squirrel cage induction motors are not used for loads requiring High starting torque?
9. How reduced voltage starting of Induction motor is achieved?
10. Explain double stage reduction of line current in an Auto transformer starter.
11. Draw the Speed-Torque characteristics of an Induction motor with various values of Rotor Resistance.
12. Explain the starters for slip –ring induction motors?
13. Compare the Induction motor starters?
14. Explain the starters for squirrel cage induction motors?

PART C

10 marks

1. Give brief classification of Induction motors?
2. Draw and explain toque-speed characteristics of dc motor?
3. Derivation torque-slip equation for autotransformer starter:
4. Drive the torque-current equation for DOL starter?
5. Explain with neat sketch about four point starter?

UNIT IV

PART A

2 marks

1. Give the expression for speed for a DC motor?
2. What are the ways of speed control in dc motors?
3. Give the Limitation of field control?
4. What are the 3 ways of field control in DC series motor?
5. What are the main applications of Ward-Leonard system?
6. What are the merits and demerits of rheostat control method?
7. What are the advantages of field control method?
8. Compare the values of speed and torque in case of motors when in parallel and in series.
9. Mention the speed control method employed in electric traction.
10. What is the effect of inserting resistance in the field circuit of a dc shunt motor on its speed and torque?
11. While controlling the speed of a dc shunt motor what should be done to achieve a constant torque drive?
12. What are the advantages of ward –Leonard Scheme?
13. Differentiate controllable and uncontrollable rectifiers
14. Define holding current in SCR?
15. Define chopper?
16. What is time ratio control?
17. Write the methods of obtaining time ratio control?
18. How to classify rectifier circuits? Define phase controlled rectifier? And write the applications
19. What is meant by step -up and step -down chopper?

PART B

6 marks

1. Define duty cycle with neat sketch?
2. Write the application and advantages of chopper?
3. What are the different types of commutation in chopper? Define it.
4. What are the different types of controlled rectifier?
5. Define half controlled rectifier, full converter?
6. What is the function of free-wheeling diode in controlled rectifier? And write its advantages?
7. What is the control techniques used in chopper controlled drives?

8. Explain in brief about Time ratio control?
9. What are the advantages of chopper drives over rectifier drives?
10. What are the advantages in using chopper for speed control of DC motors?
11. What are the applications of DC drives?
12. Write some special features of thyristor drive motors?
13. write short notes on controlled rectifier.
14. write short notes on chopper
15. Flux control of series motors-explain.

PART C

1. 10 marks
2. Explain about the necessity of speed control?
3. How is the speed control of the dc drive achieved using half, fully controlled rectifier
4. Explain ward-Leonard system of speed control?
5. Compare D.C. and A.C. drives?
6. Explain the control of dc drives using chopper?
7. Explain the field control methods used for d.c series motor for speed control.

UNIT V

PART A

2 marks

1. What are the speed control methods available for speed control of induction motor on stator side?
2. What are the disadvantages of inserting resistance in the rotor circuit in slip ring induction motor?
3. Under what condition, the slip in an induction motor is
   a. Negative b. Greater than one
4. How the speed is controlled by changing the supply voltage?
5. How the speed is changed by changing the supply frequency?
6. What is “slip” in an induction motor?
7. How the speed is controlled by changing the supply voltage?
8. How speed control can be achieved by inserting resistance in the rotor circuit of slip ring induction motor?
9. What is slip power?
10. What is slip power recovery scheme?
11. What is meant by inverter?
12. What are the applications of inverters?
13. What is the main classification of inverters?
14. What is meant by VSI?
15. What is meant by CSI?
16. What is meant by series inverter write its applications?

PART B

6 marks

1. Compare VSI and CSI?
2. What is a controlled rectifier? Give short notes.
3. What is firing angle?
4. Give some applications of phase control converters.

5. What is the main purpose of freewheeling diode?
6. What is a full converter?
7. What is natural or line commutation?
8. What is forced commutation?
9. What is a chopper?
10. What are the two main difficulties of variable frequency system?
11. At low voltage, a large value of toff makes the motor current discontinuous.
12. What is voltage commutation?
13. What is load commutation?

PART C

10 marks

1. Explain VSI and CSI with neat sketch?
2. Explain the speed control of induction motor from starter side?
3. What are the speed control methods available to control speed of motor from rotor side?
4. Explain the slip recovery scheme in induction motor?
5. Explain the methods of speed control of three phase induction motor using inverters.
6. What do you mean by slip power recovery? Explain any method of slip power recovery scheme.