Roll No. .....

Total Pages : 03

007605

May 2024

B. Tech. (EL) (Sixth Semester)

Electrical Drives (ELPE-611)

Time : 3 *Hours*] [*Maximum Marks :* 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Why DC-series motor should never be started on no-load ? **1.5**

(b) What are the advantages of DC chopper drives ? **1.5**

(c) Give the limitations of field control. **1.5**

(d) What is the slip power ? **1.5**

(e) What are advantages of closed loop control of DC motor drives ? **1.5**

(f) List out the advantages of electrical drives. **1.5**

(g) List the applications of rotor resistance speed control in three, phase induction motor. **1.5**

(h) What do you mean by stator frequency control ? **1.5**

(i) What is meant by regenerative braking in DC motor ? **1.5**

(i) What is vector control ? **1.5**

Part B

2. (a) Explain the speed-torque characteristics of DC shunt motor with suitable graph and equations. **8**

(b) What are the key elements of the control structure in a DC drive system, particularly focusing on the integration of inner current loop and outer speed loop ? 7

3. (a) With neat diagram explain the working of four quadrant DC motor drives. **8**

(b) Draw and explain the chopper controlled separately excited DC motor drive. 7

4. (a) Derive the expression for transfer function in case of closed loop control of separately excited DC motor derives. 7

(b) What is flux weakening control of induction motor ? **8**

5. (a) Discuss any *two* methods for modifying the speed-torque characteristics of a three-phase induction motor. **8**

(b) Define Pulse Width Modulation (PWM) and explain, how is it utilized in generating three-phase PWM signals. Discuss the significance of PWM in motor control applications. 7

(a) Define constant V/f control and explain its significance in the speed control of induction motors. Discuss the key challenges associated with implementing constant V/f control. 8

(b) Explain in detail about slip power recovery scheme. 7

7. (a) Compare the advantages and disadvantages of power electronic-based rotor side control with traditional methods of controlling slip-ring induction motors. 7

(b) Draw and explain the armature voltage control method for speed control of DC motor. **8**