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Question Paper Code : 80128

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third Semester

Manufacturing Engineering

EE 8353 — ELECTRICAL DRIVES AND CONTROLS

(Common to Mechanical Engineering/Mechanical and Automation Engineering)

(Regulation 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the factors affecting the selection of electric drives.
2. Mention the application of electrical drives.
3. Why the DC series motor is never started on no-load?
4. What is meant by regenerative braking?
5. What is the necessity of starter?
6. What are the advantages of electronic starter?
7. List the different methods of speed control of DC series motor.
8. What are the advantages of Ward-Leonard speed control?
9. Define slip power control, What is meant by slip power recovery system?
10. What is meant by v/f control?

PART B — (5 × 13 = 65 marks)

11. (a) (i) List and Discuss the classification of electric drives. (8)
(ii) Explain the various classes of duty. How it affects the selection of rating of a motor for the drive? (5)

Or

- (b) (i) Draw a typical temperature rise-time curve and derive equation for temperature rise in an electric drive. (8)
(ii) A motor has heating time constant of 45 minutes. When the motor runs continuously on full load, its final temperature rise is 80 C
(1) What the temperature rise after 1 hour, if the motor runs continuously on full load?
(2) If the temperature rise of 1 hr rating 80 C find the maximum steady state temperature at this rating. (5)

12. (a) (i) What is meant by braking? Explain in details. (8)
(ii) Draw and explain the torque-speed characteristics for the DC motors. (5)

Or

- (b) (i) What are the braking methods available for induction motors and explain any one detail? (5)
(ii) Draw and explain the speed-torque characteristics curve of 3-phase induction motor. (8)
13. (a) (i) What are the different types of AC motor starter? (5)
(ii) Draw and explain rotor resistance starter with a relevant diagram. (8)

Or

- (b) (i) Draw and explain a three point starter for a DC motor. (8)
(ii) Discuss the electronics starters for induction motor. (5)
14. (a) (i) With a neat circuit diagram, explain chopper fed four quadrant DC drive? (5)
(ii) Explain in detail, the armature control method of speed control with neat diagram. (8)

Or

- (b) (i) A 220 V DC shunt motor having a field flux of 0.8 Wb, runs at a speed of 900 rpm. Find the speed of the motor, if the field flux reduced to 0.6 Wb by field resistance control method. (8)
(ii) List out the methods of speed control in DC motors. (5)

15. (a) (i) Discuss the operation of pole changing method of speed control. (6)
(ii) Explain the V/f control method of AC drive with neat sketches. (7)

Or

- (b) Elaborate the working of following methods with relevant circuit diagram: (13)
(i) Kramer system
(ii) Scherbius system.

PART C — (1 × 15 = 15 marks)

16. (a) (i) A three phase induction motor is supplied from a 50 Hz supply and runs at 1200 rpm when the slip is 4%. Determine the synchronous speed. (7)
(ii) Explain in detail, the rotor resistance method of speed control of a slip ring induction motor. (8)

Or

- (b) (i) Discuss the speed control of AC motors by using three phase AC Voltage regulators. (8)
(ii) A 50 Hz induction motor uses a pole amplitude modulation method to control the speed. The stator has 16 poles while the pole modulating function has 4 poles. At what speeds motor can run? (7)