

G 623

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL DRIVES AND CONTROL (E)

(Old Scheme—Prior to 2010 admissions)

[Supplementary]



Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 4 marks.

1. Write down the basic features and characteristics of an electric drive.
2. With a suitable waveform explain the discontinuous mode of operation of a 1-phase fully controlled DC drive.
3. Describe briefly the operation of four quadrant dual converter fed DC drive.
4. Draw and explain the torque slip profile of an induction motor for different voltages.
5. How will you achieve the rotor voltage control of wound rotor induction motor by thyristors ?
6. What are the various controller configurations for the stator voltage control of 3-phase induction motors ?
7. Give the schematic of a PWM drive. What are the advantages of PWM ?
8. Compare the VSI and CSI fed induction motor drives.
9. Discuss the principle of vector control for 3-phase AC motors.
10. What are the various speed control techniques for synchronous motors ?

(10 × 4 = 40 marks)

Part B

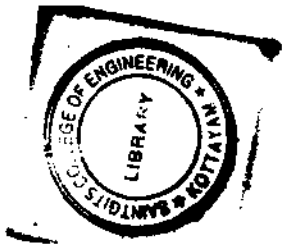
Answer all questions.

Each question carries 12 marks.

11. (a) Draw and explain the block diagram of a separately excited d.c. motor drive. Discuss the important performance parameters involved. (8 marks)
- (b) Discuss the principle of freewheeling and regeneration 1 W controlled bridge rectifier d.c. drives. (4 marks)

Turn over

Or



12. (a) Discuss the operation of a single-phase full controlled bridge rectifier fed separately excited d.c. motor with necessary circuit diagram and waveforms.

(6 marks)

- (b) A single-phase bridge rectifier (fully controlled) fed from a 250 V, 50 Hz supply is used to control the speed of a separately excited d.c. motor with armature resistance of 1.5Ω and inductance 30 mH. Back e.m.f. at one speed of operation is 100 V and converter control angle is 30° . Determine the average and r.m.s. values of armature current, power input to the motor and power factor of operation.

(6 marks)

13. (a) With neat sketch explain the speed control of chopper fed DC motor drive. (6 marks)

- (b) A d.c. chopper feeds a d.c. series motor. The supply voltage to the chopper is 500 V. The total current is found to vary between two limits having a difference of 15 A. The time ratio of chopper is 0.6 and its pulse frequency 80 cycles/s. Determine the armature inductance of the motor.

(6 marks)

Or

14. With necessary circuit diagram and waveforms explain the operation of a 3-phase fully controlled bridge rectifier fed separately excited DC motor. Derive the performance parameters.

(12 marks)

15. (a) Discuss the stator voltage control of three-phase induction motor and its applications.

(6 marks)

- (b) What are the various slip power recovery schemes ?

(6 marks)

Or

16. Describe the principle and working of u/f control of three-phase induction motors. Describe constant torque and constant power control.

(12 marks)

17. Discuss the v/f , e/f and flux weakening schemes of control of inductor motor drives. Give the applications.

(12 marks)

Or

18. Explain the application of CSI to induction motor drives.

(12 marks)

19. Explain the operation of VSI fed synchronous motor drive with open loop control with neat diagram.

(12 marks)

Or

20. Describe the self controlled synchronous motor drive with electronic commutation. (12 marks)

[5 × 12 = 60 marks]