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Question Paper Code : 86599

B.E/B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh Semester

Electrical and Electronics Engineering

EE 1403— SOLID STATE DRIVES

(Regulations 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the different factors for the selection of electric drives.
2. What are the different modes of operation of electric drives?
3. State the conditions for continuous current conduction mode for DC motor.
4. What are the advantages of closed loop control of DC drives?
5. What are the drawbacks of stator voltage control method?
6. What are the differences between scalar and vector control techniques of induction motor?
7. Define the term “open loop volts/Hz control”. -
8. Define Marginal angle control.
9. What are the advantages of BLDC motor?
10. Write any two applications of SRM.

PART B — (5 × 16 = 80 marks)

11. (a) Draw the block diagram of an electric drive and explain in detail about major parts of electric drive system. (16)

Or

- (b) How do you determine the rating of motor for various duty cycles of load time variations? (16)

12. (a) Explain the steady state analysis of single phase fully controlled converter fed separately excited DC motor drive. (16)

Or

- (b) (i) Explain motoring control and regenerative braking control of chopper fed DC motor drive. (10)

- (ii) A 220V, 24A, 100rpm separately excited DC motor has an armature resistance of 2Ω . Motor is controlled by a chopper with frequency of 500Hz and source voltage of 230V. Calculate the duty ratio for 1.2 times rated torque and 500rpm. (6)

13. (a) Explain in detail about the VSI fed Induction motor drive. And explain how the Multi – quadrant operation of VSI fed Induction motor drive is achieved? (16)

Or

- (b) Discuss about the various slip power recovery schemes. (16)

14. (a) (i) Compare open loop V/f control with self-control. (4)
(ii) Explain the synchronous motor drive self-control operation with power factor improvement. (12)

Or

- (b) Explain how vector control is implemented in a permanent magnet synchronous motor drive. (16)

15. (a) Explain the operation of BLDC motor in detail with necessary waveforms and equations. (16)

Or

- (b) Explain the different controllers used in Switched Reluctance Motor in detail with neat sketches. (16)