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Question Paper Code : 20462

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth Semester

Electrical and Electronics Engineering

EE 6601 — SOLID STATE DRIVES

(Regulations 2013)

(Common to PTEE 6601 – Solid State Drives for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the fundamental torque equation of motor load system.

2. Write down the components of load torque.

3. Why does the armature voltage control is not preferred for the speeds above the rated value in DC motors?

4. What are the types of control strategies used in a chopper fed DC drive?

5. List out the merits and demerits of stator voltage control.

6. Write down the consequences of increasing the frequency of induction motor without a change in the terminal voltage.

7. When is a synchronous motor said to be self-controlled?

8. Mention the different types of Permanent Magnet Synchronous Motor.

9. What are the advantages of using PI controller in closed loop control for DC drive?

10. What is the role of current limiter in the closed loop control of DC drives?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail about the multi-quadrant dynamics in the Speed-Torque plane with an example. (13)

Or

(b) (i) What are the Classification of an Electric Drives? (3)

(ii) Draw the Block diagram of Solid State Drive and explain the functions of an essential parts. (10)

12. (a) Explain the operation and steady state Speed-Torque equation of single phase fully controlled converter fed DC drives with neat waveforms in continuous and discontinuous conduction modes. (13)

Or

(b) Explain the operation of four quadrant chopper fed DC separately excited motor drive with power circuit. (13)

13. (a) Explain the principle of V/f control for induction motor drives. (13)

Or

(b) Describe the closed loop speed control of CSI fed induction motor drives. (13)

14. (a) Explain in detail, the open loop control of synchronous motor with constant v/f ratio. (13)

Or

(b) Draw and explain the block diagram of closed loop control of Permanent magnet synchronous motor in detail. (13)

15. (a) Derive the transfer function of DC motor- load system with converter fed system. (13)

Or

(b) Explain the design procedure of Speed controllers. Used in Electrical Drives. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the design procedure and derive the transfer function of the current controller. (15)

Or

(b) Mention the factors involved in converter selection and equations involved in controller characteristics. (15)

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