Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50489

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Sixth Semester
Electrical and Electronics Engineering
EE 6601 – SOLID STATE DRIVES
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. What are the typical elements of an Electric Drive ?
2. What are the different modes of operation of an electric drive ?
3. What are the speed control methods of DC motors ?
4. What are the advantages in operating choppers at high frequency ?
5. What are the advantages of induction motors over D.C. motors ?
6. Draw the speed - torque characteristics of Induction motor.
7. State the advantages of permanent magnet synchronous motors.
8. Why a self controlled synchronous motor is free from hunting operation ?
9. How is speed feedback achieved in speed controller design ?
10. What is the role of current limiter in the closed loop control of DC drives ?

PART – B (5×16=80 Marks)

11. a) Explain in detail with an example (low speed hoist), multi-quadrant dynamics in the Speed-Torque plane. (16)

(OR)

b) i) What are the factors governing the selection of electric drives for any particular application ? (8)

ii) Write equations governing motor load dynamics. (8)

12. a) Explain in detail the operation and steady state analysis of single phase fully controlled converter fed DC drives with neat waveforms in continuous and discontinuous conduction modes. **(16)**

(OR)

b) Explain the operation of four quadrant chopper fed DC separately excited motor drive with necessary diagrams. **(16)**

13. a) Explain the operation of v/f control technique of speed control method of induction motor. **(16)**

(OR)

b) i) Explain the speed control scheme of induction motor drive with stator voltage control and also state the disadvantages of this method. **(10)**

ii) Compare VSI and CSI fed induction motor drives. **(6)**

14. a) Explain in detail the construction, principle of operation and applications of permanent magnet synchronous motor. **(16)**

(OR)

b) Explain in detail about the open loop v/f control and self controlled mode of the synchronous motor drives. **(16)**

15. a) i) Discuss the design procedure for current controller of an electric drive. **(8)**

ii) Mention the factors involved in converter selection and equations involved in controller characteristics. **(8)**

(OR)

b) Derive the transfer function of DC motor-load system with converter fed system. **(16)**
