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Question Paper Code: 31361

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Sixth Semester

Electrical and Electronics Engineering

01UEE601 - ELECTRIC DRIVES AND CONTROL

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define dynamic torque.
2. List out advantages and limitations of electrical drive system.
3. Write down the speed - torque relation for single phase fully controlled converter fed DC motor in continuous conduction mode.
4. What is time ratio control?
5. What are the merits and demerits of stator voltage control?
6. What is the significance of field weakening mode control in induction motor drive system?
7. What is meant by power factor control?
8. List out advantages and disadvantages of PMSM.
9. What is field weakening mode control in dc drives?
10. What are all the factors involving to select converter for motor drive operation?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain in detail about steady state stability of equilibrium point in electric drive.

(8)

(ii) Derive the fundamental torque equation for a motor load system. (8)

Or

(b) (i) Classify the electrical loads according to the speed-torque characteristics and explain with examples. (8)

(ii) Explain the multi-quadrant operation of the electric drive with the help of Hoist Load. (8)

12. (a) With neat sketches explain about the 3phase controlled rectifier fed DC drives. (16)

Or

(b) Explain the operation of four quadrant chopper control in dc drives. (16)

13. (a) (i) Explain about variable frequency control in induction motor drives. (8)

(ii) A three phase 60KW,4000 rpm, 460V, 60 Hz, 2 pole star connected induction motor has the following parameters: $R_s = 0$, $R_r = 0.28 \text{ ohm}$, $X_s = 0.23 \text{ ohm}$, $X_r = 0.3 \text{ ohm}$. The motor is controlled by varying the supply frequency. If the breakdown torque requirement is 70 Nm. Calculate supply frequency and speed at maximum torque. (8)

Or

(b) Explain about VSI induction motor drives and also closed loop control for induction motor drives. (16)

14. (a) Explain the operation of power factor control and v/f control method of synchronous motor. (16)

Or

(b) Explain the principle of working, construction and applications of permanent magnet synchronous motor. (16)

15. (a) Derive the transfer function of a separately excited DC motor load converter system. (16)

Or

(b) Discuss the current controller design using (i) P controller and (ii) PI controller for separately excited DC motor drive system. (16)