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Question Paper Code: 36301

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

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. List out advantages and limitations of electrical drive system.
2. Drive the equations governing motor load dynamics.
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. List out the different methods of speed control of 3 phase induction motors.
6. What is the significance of field weakening mode control in induction motor drive system?
7. What is meant by power factor control?
8. Explain power factor control of synchronous motor with relevant vector diagram.
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) Explain the multi-quadrant operation of the electric drive with the help of Hoist Load. (16)

Or

(b) (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)

12. (a) Explain in detail the single phase fully controlled rectifier control of dc separately excited motor with neat diagrams. (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 V/ F control in Induction motor. (16)

14. (a) Explain the closed loop operation of permanent magnet synchronous motor drive in detail. (16)

Or

(b) Explain self-control of synchronous motor drive operated with constant margin angle control. (16)

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

Or

(b) Explain closed loop operation of armature voltage control method with field weakening mode control in detail. (16)