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6E6053

B.Tech. VI Semester (Main&Back) Examination, April-2019
Electronics & Communication Engg.
6EC3A Industrial Electronics
(Common with AI, EC, EI)

Time : 3 Hours **Maximum Marks : 80**

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Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).

Unit - I

1. a) Explain the need of commutation in thyristor circuits. What are the different methods of commutation schemes? Explain in brief with neat schematic and waveforms. **(10)**

   b) Describe the triggering circuit for a triac using diac. **(06)**

(OR)

1. a) It is required to operate 250A SCR in parallel with 350-A SCR with their respective on state voltage drop of 1.6V and 1.2V. Calculate the value of resistance to be inserted in series with each SCR so that they share the total load of 600A in proportion to their current ratings. **(08)**

   b) Explain the methods adopted for the protection of SCRs with over currents. **(08)**

Unit - II

2. a) A single phase full converter feeds power to RLE load with $R = 6\Omega$, L=6mh and E= 60V. The ac source voltage is 230V, 50Hz. For continuous conduction find the average value of load current for a firing angle delay of 50°. **(08)**

   b) Describe the operation of a single phase two pulse midpoint converter with relevant wave forms. **(08)**

(OR)

2. a) Discuss the principle of working of a three phase bridge inverter with circuit diagrams and wave forms. **(10)**

   b) Draw phase and line voltage waveforms in case of each thyristor conducts for 180° and the resistive load is star connected. **(06)**

Unit - III

3. a) What is a dc chopper? Describe the various types of choppers with appropriate diagrams and waveforms. (12)

b) A step-up chopper has input voltage of 220V and o/p voltage of 660V. If the non conducting time of thyristor chopper is 100μs, compute the pulse width of output voltage. (04)

(OR)

3. a) What is an UPS? Give up its industrial applications. Describe rotating-type, short break static and no break static UPS. (12)

b) Briefly explain the high frequency electronic ballast. (04)

Unit - IV

4. a) The chopper used for on-off control of a dc separately excited motor has supply voltage of 230V dc; an on time of 10msec and off time of 15msec. Calculate the average load current when the motor speed is 1500 rpm and has a voltage constant $K_v = 0.5$ v/rad per sec. The armature resistance is 3Ω. (08)

b) Briefly discuss the methods of speed control of DC motors using choppers. (08)

(OR)

4. Describe the speed control methods of three phase induction motors. (16)

Unit - V

5. Write the short note on **any two**: (2×8=16)

a) Permanent magnet stepper motors.

b) Induction and dielectric heating control of stepper motors.

c) Hybrid stepper motors.