[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2123)

1407

B. Tech 5th Semester Examination

Industrial Electronics

EC-5004

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt any five questions in all by selecting at least one question from each of the section A, B, C, D and question 9th of Section E, which is compulsory. All questions carry equal marks.

SECTION - A

1. (a) Define the terms 'recombination time' and 'turn off time' of a thyristor. Explain the process of turn-off of a thyristor. **(12)**

   (b) A resonant pulse commutation circuit has a capacitor with C = 25μF and inductance L = 5μH. The initial capacitor voltage V_c (0) = 220 V. Find the circuit turn-off time, if the load current is 60A. **(8)**

2. Explain (a) Power MOSFETS (b) Series and Parallel Operation of Thyristors (c) Diac **(20)**

SECTION - B

3 (a) Draw the wave forms of a three-phase half-controlled bridge rectifier. Explain its operation with a circuit diagram. **(12)**

(b) For a full wave controlled rectifier the firing angle is 60º and the, input voltage v = 100 sin 200t. Calculate the rms and average output voltages. **(8)**

4. Explain operation single phase half wave and full wave converter with RL load. Draw the necessary waveforms. **(20)**

SECTION - C

5. (a) A dc chopper has a resistive load of 20Ω and input voltage V_s=230 V. When the chopper is ON, its voltage drop is 1.5 V and chopping frequency is 15 KHz. If the duty cycle is 80%, find the average output voltage and the chopper on time. **(9)**

(b) Explain with the help of a circuit diagram and waveforms, the operation of a single-phase cyclo-converter using a center-tap transformer. **(11)**

6. (a) Explain how constant torque and constant power operation can be obtained from a separately excited DC motor using a solid-state converter, for a wide range of speed. **(10)**

(b) Differentiate between voltage source and current source induction motor drives for speed control. **(10)**

SECTION - D

7. (a) Explain switched mode power supply. Discuss in detail step up and step down circuits for switched mode power supplies. **(10)**

(b) Explain in detail integrated circuits for switched mode regulators. **(10)**

8. Explain (a) Induction heating and its applications (b) Dielectric Heating and its applications. **(20)**

SECTION - E

9. (a) In Triacs which of the modes the sensitivity of gate is high.

(b) Define the term pinch off voltage of MOSFET.

(c) Under what conditions a single phase fully controlled converter gets operated as an inverter.

(d) State the principle of phase control in AC-DC converters.

(e) Define the term duty cycle in DC-DC converters.

(f) What is a DC chopper?

(g) Define the term Inverter gain.

(h) Differentiate between single phase and three phase rectifiers.

(i) Explain two factors on which the load voltage of a D.C. chopper circuit depends.

(j) What is basic principle of a switched mode power supply?

(2×10=20)