Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EIE) (2011 & Onwards) (Sem.–5)

INDUSTRIAL ELECTRONICS

Subject Code : EI-309

Paper ID : [A0364]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

i. Differentiate between a thyristor and a triac.

ii. What do you understand by firing of a thyristor?

iii. Define latching current and holding current for a thyristor.

iv. Draw the symbols of SCR, UJT, diac and triac.

v. Why feedback diode is used in power electronic circuits?

vi. Name over-voltage and over-current protection devices.

vii. Differentiate between uncontrolled and controlled rectifiers.

viii. What are the purposes of rectifier, inverter, cyclo-converter and chopper?

ix. What do you understand by pulse width modulation?

x. What do you understand by a true sine wave inverter?

SECTION-B

2. Calculate the firing angle required to charge a battery of 250 V through a 10 Ω, resistance from a three phase 400 V, 50 Hz AC supply using a controlled bridge converter. Also calculate the power loss across the resistance, power delivered from the supply and power factor.

3. Explain the operation of a single-phase fully controlled bridge rectifier and derive the relation for its average output voltage.

4. Discuss various types of AC controllers with their specific applications.

5. Discuss various commutation techniques of a thyristor with the help of circuit diagrams.

6. What is integral cycle control? Explain with appropriate circuit and waveforms.

SECTION-C

7. Draw the circuit diagram of a three-phase bridge inverter for resistive load in 120° conduction mode and explain its operation with its output voltage and current waveforms for one complete cycle of operation.

8. Explain the operation of a four quadrant chopper with the help of its circuit diagram and associated waveforms.

9. Write short notes on **any two** of the following :

   i. Three phase to single phase cycloconverter

   ii. Sequential control of AC voltage

   iii. Various firing techniques for a thyristor