PAPER ID-411025

Subject Code: KEC052

Roll No: | | | | | | | | | | | | | |

**B. TECH**
**(SEM V) THEORY EXAMINATION 2021-22**
**INDUSTRIAL ELECTRONICS**

***Time: 3 Hours*** ***Total Marks: 100***

**Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

**1. Attempt *all* questions in brief. 2 x 10 = 20**

a. Define regenerative feedback?
b. Define Latching Current.
c. Explain Holding Current.
d. What is FACLF?
e. Explain di/dt protection.
f. How dv/dt protection is done?
g. What is the use of Freewheeling diode?
h. Define Duty Cycle of a chopper.
i. Define Soft Switching.
j. Explain Transducer.

## SECTION B

2. **Attempt any *three* of the following: 10 x 3 = 30**

**a.** Describe different modes of operation of thyristor with the help of its static V-I Characteristics. Also explain Gate Characteristics of SCR.

**b.** Draw R and RC firing circuits for SCR and discuss the function of various components used. Also draw the voltage waveforms.

**c.** Explain the working of UPS with the help of block diagram.

**d.** Explain Opto-SCR.

**e.** Write brief note on Industrial Robots.

## SECTION C

3. **Attempt any *one* part of the following: 10 x 1 = 10**

(a)Explain the operation and working of TRIAC.

(b)Explain the operation and working of IGBT.

4. **Attempt any *one* part of the following: 10 x 1 = 10**

(a)Explain series and parallel operations of SCR.

(b)Explain the working of SCR using two transistor model.

5. **Attempt any *one* part of the following: 10 x 1 = 10**

(a)Explain single phase bridge inverter with the help of load voltage and load current waveforms.

(b)Explain SMPS through block diagram.

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6. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a)Explain Variable Frequency Drives.

(b)Explain Programmable Timers and their industrial applications.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a)Explain slip power Recovery Scheme for the speed control of AC drive.

(b) The speed of separately excited dc motor is controlled through 1-phase half wave-controlled converter from 230V mains. The motor armature resistance is 0.5 Ω and motor constant is K=0.4V-s/rad. For load torque of 20 Nm at 1500 rpm and for constant armature current, calculate

(i) Firing angle of converter

(ii) Rms value of thyristor current