Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Power Electronics
Subject Code: 4TE06PEL1 Branch: B.Tech (IC)
Semester: 6 Date: 09/09/2019 Time: 10:30 To 01:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

1) Draw the symbol of DIAC and its V-I characterisitcs.
2) What is the junction voltage for a practical diode?
3) A rectifier converts AC power into _____ power.
4) How many junctions exists in a SCR?
5) How many thyristors are required in a full wave bridge rectifier?
6) Define: Holding Current
7) Draw the symbol of MOSFET and IGBT.
8) Which power electronic converter converts fixed DC voltage into variable DC voltage?
9) _____ power electronic converter converts DC power into AC power.
10) An SCR is a bidirectional device. Determine whether the given statement is TRUE or FALSE.
11) Give any two applications of power electronics.
12) Reverse voltage blocking capability of power diode is more compare to the signal diode.Determine whether the given statement is TRUE or FALSE.
13) If the current through the gate terminal of SCR increases, forward break voltage of SCR_____ (Increases/Decreases).
14) What is the importance of snubber circuit in power electronics?

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

a) Explain any three turn on methods of thyristor. **07**

b) Explain the following modes of operation for SCR with help of its V-I **07**

characteristics.

i) Reverse blocking mode

ii) Forward conduction mode

Q-3 **Attempt all questions** **(14)**

a) A 110 V (rms), 50 Hz single phase half wave controlled rectifier is feeding a resistive load of 250 Ω. If the firing angle of SCR is $\alpha = 45^{\circ}$, Determine **07**

i) Average load voltage ii) DC Output Power

b) Draw the circuit diagram and waveforms of single phase full wave center tap rectifier with resistive load and explain its operation. **07**

Q-4 **Attempt all questions** **(14)**

a) Draw the circuit diagram and waveforms of single phase half wave controlled rectifier with resistive load and explain its operation. **07**

b) Draw the basic structure of power diode and explain its operation with the help of its V-I characteristics. **07**

Q-5 **Attempt all questions** **(14)**

a) Draw the circuit diagram of a step up chopper and explain its operation. Derive the equation of output voltage for a step up chopper. **07**

b) Draw the circuit diagram and waveforms of single phase half bridge inverter with resistive load and explain its operation. **07**

Q-6 **Attempt all questions** **(14)**

a) Draw the block diagram of on-line UPS and explain its operation. **07**

b) Draw the circuit diagram of class *A* chopper and explain its operation. **07**

Q-7 **Attempt all questions** **(14)**

a) Draw the circuit diagram and waveforms of single phase full bridge inverter with resistive load and explain its operation. **07**

b) Explain temperature controller using power electronics. **07**

Q-8 **Attempt all questions** **(14)**

a) Draw the circuit diagram and waveforms of single phase to single phase cyclo-converter for resistive load and explain its operation. **07**

b) Draw the circuit and waveforms of basic series inverter and explain its operation. **07**