

Enrollment No: _____

Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Power Electronics

Subject Code: 4TE06PEL1

Branch: B.Tech (IC)

Semester: 6

Date: 30/10/2018

Time: 02:30 To 05:30

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.
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Q-1 Attempt the following questions: (14)

- 1) Draw the symbol of DIAC and SCR
- 2) In a SCR, holding current is less than latching current, Determine whether the given statement is true or false.
- 3) How many junctions are in reverse biased condition when anode is positive with respect to cathode in a SCR?
- 4) Define: Holding Current.
- 5) How many thyristors are required in a full wave bridge rectifier?
- 6) What is the importance of snubber circuit in power electronics?
- 7) Which power electronics converter is used to convert DC voltage into AC voltage?
- 8) What is the function of free wheeling diode in a phase controlled rectifier circuit?
- 9) Give the types of thyristor commutation techniques.
- 10) How many power switches are used in single phase full bridge inverter?
- 11) Draw the V-I characteristics of ideal diode and practical diode.
- 12) Which power electronics converter is used to convert fixed input frequency into variable output frequency?
- 13) Give any two advantages of on-line UPS over off-line UPS.
- 14) Give any two applications of power electronics.

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

Q-2 Attempt all questions (14)

- a) Draw the basic structure of power diode. Explain its operation with the help of its **07**



V-I characteristics.

- b) Draw the structure and V-I characteristics of power MOSFET. Explain its operation. **07**

Q-3 Attempt all questions (14)

- a) Draw the circuit diagram of class A chopper and explain its operation. **07**
- b) Draw the circuit diagram and waveforms of single phase full wave bridge controlled rectifier with R-L 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) A 120 V (rms), 50 Hz single phase full wave bridge controlled rectifier is feeding a resistive load of 470Ω . If the firing angle of SCR is $\alpha = 50^\circ$, Determine
i) Average load voltage ii) RMS load voltage iii) PIV across SCR **07**

Q-5 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-6 Attempt all questions (14)

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

Q-7 Attempt all questions (14)

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

Q-8 Attempt all questions (14)

- a) Explain the two transistor analogy of SCR. **07**
- b) Draw the circuit diagram and waveforms of Jones chopper and explain its operation. **07**

