Q.P. Code: 18EE0206 **R18**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021

POWER ELECTRONICS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Define Latching current.	**2M**
	b	Define Transformer utilization factor.	**2M**
	c	What is meant by step-down chopper?	**2M**
	d	What are the different methods for forced commutation employed?	**2M**
	e	What is meant by VSI?	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	**a**	Explain V-I Characteristics Of Diode.	**5M**
	b	Necessity Of Commutation, What are the Types Of Commutation?	**5M**

OR

3		Briefly explain about insulated gate bipolar transistor (IGBT) and it's switching characteristics.	**10M**

UNIT-II

4		Explain the operation of Three phase fully controlled rectifier with RL load and also derive the average and RMS load voltage.	**10M**

OR

5		A single phase half wave converter is operated from a 230V, 50Hz supply. If the load is Resistive of value 10 ohms and firing angle is 600 Determine i) the rectification efficiency ii) form factor iii) ripple factor iv) Transformer utilization factor v) Peak inverse voltage of thyristor.	**10M**

UNIT-III

6		Derive the expression for output voltage of step down chopper with neat diagrams.	**10M**

OR

7		The boost converter has an input voltage of Edc=5V.the required average output voltage is E0=15V And the average load current I0=0.5A. The switching frequency is 25 kHz. If the L=150μH and C=220μF, determine (a) the duty cycle (b) the ripple current of inductor ΔI (c) the peak current of inductor I2, (d) The ripple voltage of filter capacitor ΔVC, and (e) the critical values of Land C.	**10M**

UNIT-IV

8		Analyze the single-phase half bridge Voltage Source Inverter and perform steady state analysis?	**10M**

OR

9		Explain briefly single pulse width modulation with neat diagrams.	**10M**

UNIT-V

10 Explain the three-phase Voltage Source Inverter with 120^0 conduction mode .Also derive the output voltage, output current. **10M**

OR

11 1-Ø half bridge inverter has a resistive load of R= 3Ω,and the d.c input voltage Edc=50V.calculate i)RMS output voltage at the fundamental frequency E1. (ii) the output power P0 (iii) the average and peak current of each thyristor and (iv) the peak reverse –blocking voltage of each thyristor. **10M**

END