



R22 Regulation **Subject code:4E5BA**
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A+' Grade)
B.Tech V Semester Regular Examinations, December 2024

Power Electronics
(Electrical and Electronics Engineering)

Maximum Marks: 60

Date:23.12.2024

Duration: 3 hours

- Note:** 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	List the importance of Snubber circuit.	1	1
b)	Define latching current.	1	1
c)	Write the equation of average voltage in single phase half-controlled converter?	2	1
d)	Draw the diagram of Single phase fully controlled converter.	2	1
e)	Write the advantages of DC Chopper?	3	1
f)	Define Duty Cycle.	3	1
g)	List applications of Inverter.	4	1
h)	What is meant by PWM Control?	4	1
i)	Write any two advantages of VSI?	5	1
j)	Define modulation index.	5	1
Part-B			
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
2	a) With a neat sketch explain the operation of SCR and its V-I Characteristics. b) With a neat sketch explain the dynamic characteristics of MOSFET. [5+5]M	1	3
OR			
3	a) Explain the voltage commutation technique for Thyristor. b) Explain the R and RC firing circuits for Thyristor operation. [5+5]M	1	3
4	a) Explain about single phase semi-controlled converter with R load and derive the necessary equations for average output voltage and current. b) Trace the input and output load voltage waveform of 1- Phase semi-controlled bridge converter having highly inductive load with firing delay angle of 60° . Justify your comments about the power flow. [5+5]M	2	3
OR			
5	Write the expressions for input power factor of a three phase fully controlled converter. How does the output voltage and current vary with the firing angle. [10M]	2	3

6	a) Explain the operation of boost converter and derive output voltage and current equations. b) For the buck chopper input voltage is 25V, load resistance is 50Ω and duty cycle is 50%. Calculate the average output voltage and current [5+5]M	3	3
	OR		
7	Explain the operation on single phase AC voltage controller with R load with necessary wave forms [10M]	3	3
8	Draw the power circuit and operation of a single-phase voltage source inverter with neat wave forms. [10M]	4	3
	OR		
9	Explain the bipolar mode of sinusoidal PWM for VSI. [10M]	4	3
10	With a neat sketch explain the 180 degrees mode of inverter operation and derive output voltage equation. [10M]	5	3
	OR		
11	a) List out the difference between VSI and CSI. b) Describe sinusoidal PWM control of single phase VSI with the help of suitable waveform. [5+5]M	5	3