



R22 Regulation

Subject code: 4E5BA

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech V Semester Regular/Supplementary Examinations, November 2025**

## POWER ELECTRONICS

(EEE)

Maximum Marks: 60

Date: 18.11.2025

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 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

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Define latching current.	1M	1	L1
b)	What is the limitation of a resistance triggering circuit?	1M	1	L1
c)	What is the effect of connecting free wheeling diode across R-L load in controlled rectifiers?	1M	2	L1
d)	Write down general expression for average voltage of p- pulse fully controlled rectifier.	1M	2	L1
e)	What are applications of ac voltage controllers?	1M	3	L1
f)	Draw the circuit diagram of buck converter?	1M	3	L1
g)	What are the applications of inverter?	1M	4	L1
h)	What do you meant by PWM control?	1M	4	L1
i)	What are the applications of CSI?	1M	5	L1
j)	Compare CSI and VSI.	1M	5	L1

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Explain the static V-I and dynamic characteristics of SCR.	10M	1	L2
OR				
3	With neat circuit diagram explain how UJT firing circuit will generate pulse for an SCR.	10M	1	L2
4	Describe with neat circuit diagram and associated waveforms, operation of a 1- $\Phi$ half wave controlled converter with Inductive load.	10M	2	L2
OR				
5	Explain the operation of 3- phase half-wave converter for resistive load with necessary waveform and circuit diagram.	10M	2	L2
6	Draw the circuit of single phase voltage controller with anti parallel connection of two thyristors and an R-L load. Explain its working. Sketch load voltage and load current waveforms. Derive an expression for output voltage	10M	3	L2

	OR			
7	Explain the working of buck-boost converter with neat diagrams.	10M	3	L2
8	A square-wave inverter has a dc source of 125 V, an output frequency of 60 Hz, and an RL series load with $R = 20 \Omega$ , and $L = 25 \text{ mH}$ . Determine (i) an expression for load current, (ii) rms load current, and (iii) average source current.	10M	4	L2
	OR			
9	Explain the operation of single phase bridge inverter with the help of load voltage and load current waveforms for R-L load.	10M	4	L2
10	Describe the operation of 3-phase bridge inverter circuit diagram with resistive load in $120^\circ$ conduction mode	10M	5	L2
	OR			
11	Compare and contrast unipolar and bipolar sinusoidal pulse width modulation?	10M	5	L2