



R20 Regulation

Subject code: 3P5BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, November 2025

POWER ELECTRONICS

(EEE)

Maximum Marks: 70

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 (10X2M=20 Marks)		Marks	CO	BTL
1	Define latching current.	2M	1	L1
2	What is the limitation of a resistance triggering circuit?	2M	1	L1
3	What is the effect of connecting free wheeling diode across R-L load in controlled rectifiers?	2M	2	L1
4	Write down general expression for average voltage of p- pulse fully controlled rectifier.	2M	2	L1
5	What are applications of ac voltage controllers?	2M	3	L1
6	What is meant PWM control in dc chopper?	2M	3	L1
7	What are the applications of inverter?	2M	4	L1
8	What do you meant by PWM control?	2M	4	L1
9	What are the applications of CSI?	2M	5	L1
10	Compare CSI and VSI.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain the static characteristics and modes of operation of SCR.	10M	1	L2
OR				
12	With neat circuit diagram explain how UJT firing circuit will generate pulse for an SCR.	10M	1	L2
13	Describe with neat circuit diagram and associated waveforms, operation of a 1- Φ half wave controlled converter with Inductive load.	10M	2	L2
OR				
14	Explain the operation of 3- phase half-wave converter for resistive load with necessary waveform and circuit diagram.	10M	2	L2
15	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			
16	A 1 – phase a.c.regulator feed power to a resistive load of 4Ω from 230 V, 50 Hz a.c.source. Determine i) the peak value of average and rms thyristor currents for any firing angle α . ii) the minimum circuit turn-off time for any firing angle α .	10M	3	L2
17	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			
18	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
19	Describe the operation of 3-phase bridge inverter circuit diagram with resistive load in 120° conduction mode	10M	5	L2
	OR			
20	Explain the various PWM techniques in detail.	10M	5	L2