



Regulation R21

Subject Code: D121PC1

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

M.Tech I Semester Supplementary Examinations, March 2024

POWER ELECTRONIC CONVERTERS

(Power Electronics)

Maximum Marks: 70

Date:04.03.2024 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 (5X4M=20 Marks)

- 1 What are the applications of the 1-phase AC voltage controllers? Explain. 4
- 2 Write the limitations & advantages of the cyclo-converters? 4
- 3 What are the applications of the 1-phase converters? 4
- 4 Write the D.C. to D.C. Converters Advantages & Applications? 4
- 5 What are the advantages of SVM & sinusoidal PWM? 4

Part-B

Answer All the following questions. (5X10M=50Marks)

- 6 Explain the Effects of source and load inductances on the performance of the AC-Voltage controller. 10
- OR
- 7 Explain the operation of single-phase Full wave AC voltage controllers with Resistive – inductive load with the help of neat circuit diagrams, output voltage and current wave forms. 10
 - 8 Explain an analysis of the midpoint and bridge Configurations of the 1-phase to 1-phase cyclo-converters with the help of neat circuit diagrams. 10
- OR
- 9 Explain an analysis of the midpoint and bridge Configurations of the 3-phase to 3-phase cyclo-converters with the help of neat circuit diagrams. 10
 - 10 A) A resistive load of 10 ohms is fed from a single phase supply of 230V, 50Hz through a half wave controlled rectifier. The firing angle is 60° . Determine the output voltage, ripple factor and harmonic factor. 5
B) Explain in details about extinction angle control. 5
- OR
- 11 A 3-phase half wave converter is operated from a 3-phase 400V, 50Hz supply. The load consists of a 100V battery in series with resistor of 5 ohms. The output current of the converter is 5A ripple free. Find the average, RMS and peak SCR currents. 10

- 12 a) Explain Analysis of step – down and step-up DC to DC converters with RL-load 5
b) What are the advantages & disadvantages of buck - boost regulators? Explain. 5
- OR
- 13 a) Explain the Switched mode regulators and Cuk regulators. 5
b) What is a Multi-output boost converter? And Explain its Applications. 5
- 14 Explain about the sinusoidal PWM? & Third-harmonic PWM? 10
- OR
- 15 The 3-phase bridge inverter (VSI) has a star connected resistive load of $R=5$ ohms and $L=23$ mh. The inverter frequency is $f_0=60$ Hz and the dc input voltage of $V_s=220$ V.determine RMS phase and line voltages? 10