R20 Regulation *Subject code: 3E6BC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, February 2024

LINE-COMMUTATED AND ACTIVE RECTIFIERS

(Electrical and Electronics Engineering)

Maximum Marks: 70 Date:24.02.2024 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 which carries 10M.
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)		CO	Bloom Tx
1	What are the benefits of the LC–rectifier filter?	CO1	L1
2	What is the minimum load current for which the inductor current is continuous?	CO1	L1
3	How the SCR is protected from high di/dt and dv/dt values?	CO2	L1
4	What are different methods to turn on the thyristor?	CO2	L2
5	What are the advantages of phase shift transformer?	CO3	L1
6	What causes voltage notching?	CO3	L1
7	List the advantages of using a single-switch AC-DC boost converter.	CO4	L1
8	Define duty ratio.	CO4	L1
9	What is the purpose of an inductor in a boost converter?	CO5	L2
10	List the advantages of a bidirectional converter compared to a unidirectional converter.	CO5	L2

Part-B

Answer All the following questions. (10MX 5=50Marks)			
11	A. What is the ripple? How does a ripple depend on load, inductor, capacitor and frequency of input waveform? (5M) B. For an LC–rectifier filter that is supplied from the 230 V, 50 Hz mains, the load power is 500 W, what is the output voltage if the current through the inductor is continuous? (5M)	CO1	L3 L3
	OR		
12	Explain 1-phase full-wave diode rectifier with LC filter with voltage waveform. (10M)	CO1	L3
13	Describe the working principle of Half-wave thermistor rectifier with RL with wave form(10M)	CO2	L3
	OR		
14	Draw and explain thyristor Converter Waveforms Operation in the Discontinuous conduction mode. (10M)	CO2	L4

15	Describe with neat circuit diagram and associated waveforms of Idealized 6-pulse ac voltage from 3-pulse phase AC. (10M)	CO3	L3
	OR		
16	Write short notes on A. Transformer phase shifting. (5M) B. Commutation overlap. (5M)	CO3	L2
17	Explain the operation and working principle of an isolated single-phase AC-DC flyback converter. (10M)	CO4	L3
	OR		
18	A. Compare and contrast non-isolated DC-DC boost converters and single-switch AC-DC boost converters. (5M) B. Discuss the advantages, disadvantages, and applications single-switch AC-DC boost converters in power electronics. (5M)	CO4	L3 L3
19	A. Explain the operation and control of a bidirectional DC-DC boost converter. (5M) B. Discuss the control strategies used in bidirectional closed-loop converters. (5M)	CO5	L3 L3
	OR		
20	Describe the operation of a three-phase inverter and discuss its advantages and applications compared to a single-phase inverter. (10M)	CO5	L3