Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2152407 **Date: 27/04/2017**

Subject Name: Power Electronic Circuits-I

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1		**Discuss following in brief (One Mark Each)**	**14**
	1	Draw only symbol of SCR.	
	2	Enlist various operating modes of Power BJT.	
	3	Define Latching Current in SCR.	
	4	Draw only Vertical Structure of IGBT.	
	5	What is the importance of snubber circuit?	
	6	List out different triggering methods of SCR.	
	7	Draw only Planner Structure of MOSFET.	
	8	Draw only Reverse Recovery Characteristics of Power Diode.	
	9	Draw only V-I Characteristics of IGBT.	
	10	Enlist various applications of DIAC.	
	11	State various requirements of Driver Circuits for Power Semiconductor devices?	
	12	Draw only symbol of GTO.	
	13	What is a freewheeling diode, and what is its purpose?	
	14	Draw the static V-I characteristic of TRIAC.	
Q.2	**(a)**	Draw connection diagram for transformer connections used in 24 Pulse Rectifier.	**03**
	(b)	Discuss Star – Delta transformer connection used in multi-pulse Rectifier in detail.	**04**
	(c)	Discuss the working of 1-Phase Dual Converter; also derive equation for necessary condition for operation of Dual converter.	**07**
		OR	
	(c)	Explain operation of 1-Phase Half controlled rectifier with RL Load. Derive Equation for Vo (avg).	**07**
Q.3	**(a)**	Give brief discussion on Four Quadrant Chopper Circuit.	**03**
	(b)	Compare 1-Phase Rectifier with 3-Phase Rectifier circuit.	**04**
	(c)	Discuss operation of 3-Phase full wave controlled rectifier with R Load & $\alpha = 30^o$.	**07**
		OR	
Q.3	**(a)**	Draw circuit diagram of Jones Chopper.	**03**
	(b)	Derive only equation for average o/p voltage of Full wave controlled rectifier with RL Load in continuous conduction mode.	**04**
	(c)	Draw & explain operation of 1-Phase full wave controlled rectifier with RLE Load.	**07**

Q.4	**(a)**	Enlist requirements of DC Power Supply.	**03**
	(b)	Derive only equation for Inductor used in Boost Converter.	**04**
	(c)	Discuss the working principle of resonant converters. State its classification and advantages.	**07**
		OR	
Q.4	**(a)**	Draw only circuit diagram & waveforms for Buck-Boost converter.	**03**
	(b)	Derive equation for o/p voltage & critical value of Inductor in Buck-Boost converter.	**04**
	(c)	Write a Short note on M-type ZCS Resonant converter.	**07**
Q.5	**(a)**	State advantages of Isolated DC-DC Converters.	**03**
	(b)	Explain only working of Fly-back converter with necessary diagrams.	**04**
	(c)	Write a short note on Half Bridge DC-DC Converter.	**07**
		OR	
Q.5	**(a)**	Compare Half Bridge & Full Bridge Isolated DC-DC Converter.	**03**
	(b)	Discuss SEPIC Converter in Brief.	**04**
	(c)	Write a short note on Push-Pull type DC-DC Converter.	**07**

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