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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2152407 **Date:06/05/2016**

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.**

Q.1	**(a)**	What is PWM? Explain its generation, importance and application.	**07**
	(b)	Explain the working of 1-Ø Uncontrolled Rectifier with RL load. Draw necessary figure and waveforms.	**07**
Q.2	**(a)**	Explain Morgan's Chopper with necessary figures, waveforms and applications.	**07**
	(b)	Explain the construction and working of IGBT along with its VI characteristics.	**07**
		OR	
	(b)	Draw the switching characteristics of IGBT. Explain Latch Up in IGBT.	**07**
Q.3	**(a)**	Discuss the working principle of resonant converters. State its classification and advantages.	**07**
	(b)	Derive the output voltage equation for a Buck (Step Down) Converter using necessary figures. Draw output current waveforms for CCM mode of operation.	**07**
		OR	
Q.3	**(a)**	Explain in brief ZVS and ZCS and compare ZVS and ZCS topologies.	**07**
	(b)	Derive the output voltage equation for a Boost (Step Up) Converter using necessary figures. Draw output current waveforms for DCM mode of operation.	**07**
Q.4	**(a)**	Explain the TRC & CLC control strategies for the control of chopper.	**07**
	(b)	A buck type chopper operates from 250V DC voltage with switching frequency of 200 Hz. The load has a resistance of 0.5Ω, inductance of 5mH and corresponding back emf E = 80 V. The device is ON for 2ms during a cycle. Find out: 1) Minimum and maximum current passing through the load. 2) Average current through the load.	**07**
		OR	
Q.4	**(a)**	Explain the principle of a chopper and list its classification. Elaborate the advantage of using chopper over conventional methods of voltage control.	**07**
	(b)	A boost chopper operates from 24V battery supply and supplies voltage to a load of 16Ω resistance through an inductance of 10mH. Frequency of switching is 1kHz. The device is ON for 0.75ms. Filter capacitor is 1000uF (500V). Determine: 1) Average load current I_o. 2) Current Locus (Minimum I_1 and Maximum I_2 current through the inductor). 3) Current supplied by the battery I_s.	**07**
Q.5	**(a)**	Explain the working of flyback SMPS. Draw circuit diagram and waveforms.	**07**
	(b)	Explain the working of 1-Ø Half Wave Controlled Rectifier with RLE load with necessary waveforms.	**07**
		OR	
Q.5	**(a)**	Explain the working of Half Controlled Rectifier with R load with necessary waveforms.	**07**
	(b)	Explain the working of full bridge isolated DC-DC converter.	**07**

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