Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2020

Subject Code:2160902 **Date:27/01/2021**

Subject Name:Power Electronics – II

Time:02:00 PM TO 04:00 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Give classification of inverters. Draw circuit diagram of 1-phase half bridge center tapped inverter.	**03**
	(b)	Draw phase voltage and line voltage waveform for 120^0 conduction of 3-phase H bridge inverter.	**04**
	(c)	Draw circuit diagram of 3-phase cycloconverter. Comment on output harmonics in the cycloconverter.	**07**
Q.2	**(a)**	Define modulation index. What is over modulation region?	**03**
	(b)	Distinguish unipolar and bipolar PWM techniques.	**04**
	(c)	Explain working of line commutated inverters. Give applications of line commutated inverters.	**07**
Q.3	**(a)**	Give comparison of AC voltage controller with inverter.	**03**
	(b)	Determine output harmonics for the ratio f_c/f_m=15 in sine PWM technique.	**04**
	(c)	Explain effect of non-sinusoidal wave on the performance of rotating AC machine.	**07**
Q.4	**(a)**	Compare space vector pulse width modulation (SVPWM) technique with sine PWM (SPWM) technique.	**03**
	(b)	To eliminate 5^{th} harmonic using selected harmonic elimination technique, how many variables are to be determined?	**04**
	(c)	Explain sine PWM technique with waveform. How output voltage varies with modulation index?	**07**
Q.5	**(a)**	Distinguish load commutated cycloconverter with line commutated cycloconverter.	**03**
	(b)	Give the reason to keep voltage to frequency ratio constant in induction motor drive. Suggest the converter that can be used for such applications.	**04**
	(c)	Explain the basic principle of matrix converter. Compare it with inverter and cycloconverter.	**07**
Q.6	**(a)**	Explain basic principle of cycloconverter.	**03**
	(b)	Justify requirement of gating circuit. Mention its components.	**04**

	(c)	Explain the working of single phase full wave ac voltage controller connected to R-L load. Derive its equation for the average output voltages.	**07**
Q.7	**(a)**	Draw torque speed characteristics of induction motor. Define various region based on the slip value.	**03**
	(b)	Explain working principle of self-controlled synchronous motor drive using cycloconverter.	**04**
	(c)	Explain soft starting of induction motor. Which converter can be used for this purpose?	**07**
Q.8	**(a)**	Explain rotor resistance control of induction motor. Suggest the converter that can be used for this application.	**03**
	(b)	Explain working principle of self-controlled synchronous motor drive using load commutated thyristor inverter.	**04**
	(c)	Explain static Kramer drive.	**07**

****