Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2018

Subject Code:2160902 **Date:27/11/2018**

Subject Name:Power Electronics – II

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 an inverter? List a few industrial applications of inverters.	**03**
	(b)	Describe about PWM control in inverters.	**04**
	(c)	Discuss the principle of working of a three-phase bridge inverter with an appropriate circuit diagram. Draw gate signal, phase voltage and line voltage waveforms for 180^o conduction of SRCs with star connected load.	**07**
Q.2	**(a)**	What are the control strategies for the regulation of output voltage in ac voltage controllers?	**03**
	(b)	Explain the concept of ON-OFF or integral cycle control.	**04**
	(c)	Discuss the principle of phase control in single-phase full-wave ac voltage controller with RL load. Illustrate your answer with relevant circuit diagram and waveforms. Derive expression for rms output voltage.	**07**
		OR	
	(c)	With neat circuit diagram and waveforms explain 3-Φ ac voltage controller with Y connected load.	**07**
Q.3	**(a)**	Draw the circuit diagram and waveforms for current source inverter and give the applications of current source inverter.	**03**
	(b)	A single phase full bridge inverter is connected to a dc source of V_s. Resolve the output voltage wave shape into Fourier series.	**04**
	(c)	Explain the operation of a single phase parallel commutated inverter without freewheeling diode, with the help of voltage and current waveforms.	**07**
		OR	
Q.3	**(a)**	Define: (1). Harmonic factor, (2). Total Distortion Factor and (3). Distortion Factor.	**03**
	(b)	Compare voltage source inverter and current source inverter in brief.	**04**
	(c)	What is space vector modulation? Explain the working principle of SVM(Space Vector Modulation).	**07**
Q.4	**(a)**	List the speed control methods for synchronous motor.	**03**
	(b)	Enlist advantages and disadvantages of cycloconverter.	**04**
	(c)	Draw and explain the operation of three phase cycloconverter with relevant waveforms.	**07**
		OR	
Q.4	**(a)**	Draw and Discuss briefly self-controlled synchronous motor drive.	**03**
	(b)	Explain operation of single phase to three phase cycloconverter.	**04**
	(c)	Derive an emf equation for the line-commutated phase-controlled cycloconverters.	**07**
Q.5	**(a)**	Draw the equivalent circuit of an induction motor referred to stator side.	**03**
	(b)	Explain the speed-torque characteristic of an induction motor.	**04**
	(c)	Draw and explain cyclocnverter based induction motor drive.	**07**
		OR	

Q.5	**(a)**	Discuss effect of harmonics on machine performance.	**03**
	(b)	Explain in brief the different speed control methods for induction motor.	**04**
	(c)	Discuss closed loop V/f technique used for induction motor drive.	**07**

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