Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester V Electronics & Communication Engineering

CBCS Regular Examination, December-2013

2EC503 Power Electronics & Applications

Time: 3 hours **Total Marks: 70**

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

Que.-1	(A)	Explain reverse recovery characteristics of power diode and relate I_{RM} with Q_R.	6
	(B)	Draw and explain block diagram of power electronics control system in detail.	4
	(C)	Draw Symbol and characteristics of IGBT and GTO.	2
		OR	
Que.-1	(A)	What is a Uni-junction transistor? Explain its configuration and characteristics. What is snow balling effect?	6
	(B)	List and explain various power electronic converter circuits in detail.	4
	(C)	Explain di/dt protection.	2
Que.-2	(A)	Explain basic structure and two transistor model of thyristor. Derive equation for anode current.	6
	(B)	Explain static and dynamic equalizing network design for series operation of SCRs.	5
		OR	
Que.-2	(A)	Explain resistance capacitance full wave triggering circuit in detail.	5
	(B)	Draw and explain switching characteristics of power BJT.	4
	(C)	Explain string efficiency.	2
Que.-3	(A)	Explain working of TRIAC in all four modes.	5
	(B)	Write a short note on: operating principle of IGBT.	5
	(C)	Effects of freewheeling diode.	2

SECTION-II

Que.-4	(A)	Explain with neat circuit diagram and waveforms: Single phase half wave controlled rectifier circuit with R-L load with and without freewheeling diode.	7
	(B)	Explain principle of step up chopper with related waveforms and equations.	5

OR

Que.-4	(A)	Explain with neat circuit diagram and waveforms: Single phase full wave controlled rectifier circuit (M-2 connection, α=30°) with R-L load with and without freewheeling diode.	7
	(B)	Explain class B chopper circuit with related waveforms.	5

Que.-5	(A)	Describe the working of a single phase half wave converter dc drives.	5
	(B)	Write a short note on classification of inverters.	4
	(C)	Draw possible configurations of single phase AC regulators.	2

OR

Que.-5	(A)	Explain with neat circuit diagram and waveforms: Single phase full bridge inverter circuit with R and R-L load.	6
	(B)	What is UPS? Explain online and offline UPS with related block diagrams.	5

Que.-6	(A)	What is SMPS? List various types of SMPS and explain any one of them.	6
	(B)	Explain principle of dual converter.	3
	(C)	Calculate number of SCRs, each with rating of 500V, 75 A required in each branch of a series and parallel combination for a circuit with total voltage and current rating of 7.5kV and 1000A. Assume derating factor of 14%.	3

END OF PAPER