FACULTY OF ENGINEERING
B.E VI Semester (CBCS)(EEE) (Main) Examination, May / June -2019
Subject: Basics of Power Electronics (Elective –I)

Time: 3 hours   **Max. Marks: 70**
Note: Answer all questions from Part – A, & answer any five questions from Part – B

PART – A (20 Marks)

1	List the advantages of power electronic converters.	2
2	What is meant by commutation? List the methods for commutating SCR.	2
3	Explain how a freewheeling diode improves power factor in a system.	2
4	What is a dual converter? List the advantages of a dual converter.	2
5	Enumerate the applications of D.C choppers.	2
6	A step up chopper has output voltage of two to four times the input voltage. For a chopping frequency of 2000Hz, determine the range of off periods for the gate signal.	2
7	What is an inverter? List few industrial applications of inverter.	2
8	List the pulse width modulation techniques used for inverter control.	2
9	A single phase full wave ac voltage controller feeds a load of R=20Ω with an input voltage of 230V, 50Hz. Find the rms value of output voltage if firing angle is 45^0.	2
10	List the advantages of circulating mode of operation in cycloconverter.	2

PART – B (50 Marks)

11	a)	Explain the switching performance of BJT with relevant waveforms. Indicate clearly turn-on and turn-off times and their components.	
	b)	Draw and explain the switching characteristics of a thyristor.	5+5
12		Describe the operation of a single phase two-pulse converter with relevant voltage and current waveforms and obtain an expression for the output voltage.	10
13		Describe the working of buck-boost converter with neat wave forms. Derive the expression for output voltage.	10
14		Discuss the working principle of a three phase inverter with neat waveforms for a star connected resistive load, when each thyristor operates for 180^0 mode.	10
15		Discuss the principle of phase control in single phase ac voltage controller. Derive expression for the rms value of its output voltage.	10
16	a)	Explain with relevant circuit diagram and waveforms how complementary impulse commutation is achieved?	
	b)	A 3-Φ full converter charges a battery from a three phase supply of 230V, 50Hz. The battery emf is 200V and its internal resistance is 0.5Ω. On account of inductance connected in series with the battery, charging current is constant at 20A. Compute the firing delay and the supply power factor.	5+5
17		Explain any two from the following a) Thyristor Protection b) Sinusoidal pulse width modulation c) Step up cyclo converter	5+5

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