Exam.Code:0930
Sub. Code: 33679

2056

B.E. (Electronics and Communication Engineering)-Sixth Semester

EC-625: Power Electronics

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section. Assume suitable data wherever necessary and clearly state the assumptions made.

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1)	a	What is the principle of chopper?	1
	b	Draw the circuit diagram of buck-boost regulator.	1
	c	What is meant by load commutation?	1
	d	What is the purpose of feedback diodes connected in antiparallel with thyristor in inverter circuits.	1
	e	What will be the total harmonic distortion of the single-phase inverter output voltage?	1
	f	Why is the continuous gate pulse required in inverter operation?	1
	g	What is the pulse width required to eliminate third harmonic?	1
	h	What do you mean by voltage ripple factor?	1
	i	Why SMPS is usually operated at very high switching frequency?	1
	j	Evaluate the minimum gate pulse width required to turn-on the SCR connected to 100 volt DC source and RL load (R=20 ohm and L=0.1 H). The load current flowing through the circuit is 100 mA.	1
SECTION-A (Attempt any two question)			
2)		Analyze the performance of single-phase full converter with highly inductive load and present the harmonic analysis on AC side of the converter using source current waveform. Also sketch the output voltage, output current, and source current waveforms.	10
3)		Explain the operation of current commutation technique using different modes and draw suitable waveforms.	10
4)		A step-up chopper has input voltage of 220 V and the output voltage of 660 V. If the non-conducting time of thyristor-chopper is 100 micro seconds. Compute the pulse width of output voltage. In case the pulse width is halved for constant frequency operation, find the new output voltage.	10
SECTION-B (Attempt any two question)			
5)		Write Fourier series expression for the output voltages and currents obtained from single-phase half bridge and full bridge inverters. Determine the RMS current rating of SCR and diode of the bridge for R=2ohm and ωL=2 ohm when the inverter is fed from 230-volt DC supply while considering only fundamental component in the output voltage wave.	10
6)		Draw the circuit diagram of full bridge type SMPS and explain the operation for all three stages with the help of voltage and current waveforms.	10
7)		Draw the block diagram of DC motor speed control? Describe armature voltage control and filed control of DC drives suing suitable converter.	10

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