KADI SARVA VISHWAVIDHYALAYA

BE Semester IV Electronics & Communication Dept.

Examination – April/May 2015

Sub code: EC-603 **Sub Name: Power Electronics**
Date: 01/05/2015 **Time: 10:30am to 01:30pm**
Total Marks: 70

Instructions:

1. Answer Each Section in Separate Answer sheet.
2. Use of Scientific Calculator is permitted.
3. All questions are separate.
4. Indicate clearly, the options you have attempted along with its respective question number.
5. Use the last page of supplementary for rough work.

SECTION I

Q.1 (a) Explain the turn-on and turn-off characteristics of the SCR. **[05]**

(b) Compare MOSFET, BJT and IGBT. **[05]**

(c) Draw the two-transistor model of SCR and derive an expression for anode current. **[05]**

OR

(c) Explain the protection of power devices by snubber circuit. **[05]**

Q.2 (a) Explain the principle of natural commutation. How it is used in controlled rectifiers. **[05]**

(b) Explain the working of single-phase semiconverter with the help of waveforms for resistive load. **[05]**

OR

Q.2 (a) Explain the working of three-phase semiconverter with the help of waveforms for inductive load. **[05]**

(b) Explain the full-wave RC firing circuit for the SCR. Draw the necessary waveforms. **[05]**

Q-3 (a) Write short note on Switched mode power supply. **[05]**

(b) With the help of necessary circuit and waveforms, explain the operation of UJT triggering circuit. **[05]**

OR

Q-3 (a) Write short note on Uninterruptible power supply. **[05]**

(b) Give the comparison between single-phase and three-phase controlled rectifier. **[05]**

SECTION II

Q.4 (a) Draw the circuit diagram and explain the operation of step-down chopper with the help waveforms. [05]

(b) Explain the operation of step-up chopper with the help of waveforms. [05]

(c) Explain the four-quadrant chopper. [05]

OR

(c) For the step-down chopper having resistive-load derive an expression for the following: [05]

i) Average output voltage $V_{o(avg)}$

ii) rms output voltage $V_{o(rms)}$

Q.5 (a) Explain the buck boost converter with the help of waveform and explain the reason behind its name. [05]

(b) Derive an expression for rms value of output voltage for half bridge inverter having square wave output. The peak value of output is $V_s/2$. [05]

OR

Q.5 (a) Explain the operation of half bridge inverter with resistive load. [05]

(b) With the help of circuit diagram and waveforms, explain the working of single-phase bridge inverter. [05]

Q-6 (a) State advantages, disadvantages, and applications of SMPS. [05]

(b) Write a short note on Battery charger. [05]

OR

Q-6(a) Explain the structure and V-I characteristic Gate Turn-off Thyristor. [05]

(b) What is the necessity parallel connection of SCRs? [05]

KADI SARVA VISHWAVIDHYALAYA

BE Semester VI Electronics & Communication
Examination – November 2015

Sub code: EC-603 **Sub Name: Power Electronics**
Date: 03/11/2015
Time: 10:30am to 01:30pm **Total Marks: 70**

Instructions:

1. Answer Each Section in Separate Answer sheet.
2. Use of Scientific Calculator is permitted.
3. All questions are separate.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of supplementary for rough work.

SECTION I

Q.1 (a)	Draw and Explain V-I charactristics of SCR.	[05]
(b)	Explain protection circuit of SCR for di/dt and dv/dt.	[05]
(c)	Compare Power MOSFET and power BJT.	[05]
	OR	
(c)	What is Power diode?	[05]
Q.2 (a)	List out all turn on techniqes of SCR and explain any one of them.	[05]
(b)	Explain two transistor analogies and derive the equation for anode current.	[05]
	OR	
Q.2 (a)	Explain serise operation of SCR with problems.	[05]
(b)	List out all turn off techniques of SCR and explain any one in detail.	[05]
Q-3 (a)	Explain single-phase half wave controlled rectifier with waveforms.	[05]
(b)	A single-phase full converter feeds power to RLE loads with R= 5Ω, L= 5mH and E= 50V.The ac source voltage is 230 V, 50 Hz. For continuous conduction, Find the average value of current for a firing angle delay of 50°.	[05]
	OR	
Q-3 (a)	Explain three-phase half wave controlled rectifier with waveforms.	[05]
(b)	Explain GTO in detail.	[05]

SECTION II

Q.4 (a)	Explain UPS with its types.	[05]
(b)	Write short note on SMPS.	[05]
(c)	Define : 1) Holding current 2) Forced commutation 3) Latching current 4) Radiation triggering 5) Triggering	[05]
(c)	Define inverter and chopper.	[05]
Q.5 (a)	Explain principle of step down chopper with necessary diagram.	[05]
(b)	Classify the choppers in turms of quadrant.	[05]

OR

Q.5 (a)	Explain principle of cycloconverter operation in detail.	[05]
(b)	Explain single-phase half bridge inverter.	[05]
Q-6	Explain battery charger in detail.	[10]

OR

Q-6(a)	Explain buck regulator.	[05]
(b)	Explain boost regulator.	[05]
