

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V(New) • EXAMINATION – WINTER 2016

Subject Code:2152407

Date:17/11/2016

Subject Name:Power Electronic Circuits-I

Time: 10:30 AM to 01:00 PM

Total Marks: 70

## Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

	MARKS
<b>Q.1</b>	<b>14</b>
<b>Short Questions</b>	
1 What is a thyristor?	
2 Define Latching current in SCR.	
3 What is a DC chopper?	
4 Which device is used as a relaxation oscillator?	
5 Which device has large power delivering capacity? (MOSFET or Transistor)	
6 Which has higher Ripple factor? (Half wave rectifier or full wave rectifier)	
7 Give full form of IGBT.	
8 Snubber circuit is used for dv/dt protection or di/dt protection?	
9 For a buck converter to reduce the conduction losses in diode	
a) A high on - resistance switch can be added in parallel	
b) A low on - resistance switch can be added in parallel	
c) A high on - resistance switch can be added in series	
d) A low on - resistance switch can be added in series	
10 A step - down choppers can be used in	
a) Electric traction   b) Electric vehicles	
c) Machine tools   d) All of these	
11 Advantages of Cuk converter is / are	
a) Large number of reactive component	
b) Low stress on switch	
c) Low stress on capacitor	
d) None of these	
12 In a flyback converter, the inductor of the buck-boost converter has been replaced by a	
a) Flyback capacitor   b) Flyback resistor	
c) Flyback transformer   d) Flyback transistor	
13 An SCR is made up of silicon because	
a) silicon has large leakage current than germanium	
b) silicon has small leakage current than germanium	
c) silicon has small leakage voltage than germanium	
d) silicon has large leakage voltage than germanium	

<b>14</b>	The switching function of semiconductor devices can be characterized with a) Duty ratio only b) Frequency only c) Duty ratio and frequency d) Duty ratio, frequency and time delay	
<b>Q.2</b>	(a) Explain dv/dt protection.	<b>03</b>
	(b) Discuss characteristics of a IGBT.	<b>04</b>
	(c) Compare general comparison of power semiconductor devices.	<b>07</b>
	<b>OR</b>	
	(c) Draw and explain basic structure, symbol and output characteristics of MOSFET.	<b>07</b>
<b>Q.3</b>	(a) Explain single phase Half wave uncontrolled rectifier.	<b>03</b>
	(b) Discuss concept of PWM.	<b>04</b>
	(c) Discuss requirement of drive circuits for various devices.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Write a short note on power diode.	<b>03</b>
	(b) Explain UJT firing Scheme.	<b>04</b>
	(c) Explain working principle of 12 pulse rectifier.	<b>07</b>
<b>Q.4</b>	(a) Explain principle of Chopper.	<b>03</b>
	(b) Discuss First Quadrant chopper.	<b>04</b>
	(c) Discuss buck-boost DC-DC converter.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Explain importance & requirement of DC power supply.	<b>03</b>
	(b) Write a short note on Morgan chopper.	<b>04</b>
	(c) Draw the power circuit and various waveforms for single phase thyristorised semiconrolled bridge rectifier with RL load.	<b>07</b>
<b>Q.5</b>	(a) Compare Buck & Boost converter.	<b>03</b>
	(b) Discuss requirement & importance of Isolation in power electronics circuit.	<b>04</b>
	(c) Discuss ZVS resonant converter.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Compare series & parallel Resonant converter in brief.	<b>03</b>
	(b) Discuss the principle of operation of Resonant converters.	<b>04</b>
	(c) Explain principle of operation and modes of multiphase chopper.	<b>07</b>

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