

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE –SEMESTER 1&2(NEW SYLLABUS)EXAMINATION- WINTER 2018**

**Subject Code: 3110016****Date: 08-01-2019****Subject Name: basic electronics****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>	(a) Explain V-I characteristic of tunnel diode.	<b>03</b>
	(b) What is zener breakdown? What is avalanche breakdown? Compare both the type of breakdown.	<b>04</b>
	(c) Write a short note: V-I characteristic of P-N junction diode.	<b>07</b>
<b>Q.2</b>	(a) Design and explain basic NAND gate using DTL logic.	<b>03</b>
	(b) Explain following gate using their truth table, logic symbol and equation. Ex-NOR, NAND, NO	<b>04</b>
	(c) Draw and Explain bridge rectifier. Explain advantage and disadvantage of bridge rectifier over full wave rectifier.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(c) Write a short note: Biased clipper circuit.	<b>07</b>
	(a) Derive the relation between current gain $\alpha$ and $\beta$	<b>03</b>
	(b) What is DC load line? Explain with necessary diagram.	<b>04</b>
	(c) Draw and explain input and output characteristic of transistor in common emitter configuration.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) What is stability factor? Explain.	<b>03</b>
	(b) Give comparison between CE, CB and CC configuration of transistor.	<b>04</b>
	(c) What are the different method for biasing the transistor. Explain any two method with necessary circuit diagram.	<b>07</b>
<b>Q.4</b>	(a) Why biasing circuits are required?	<b>03</b>
	(b) Explain why NAND and NOR gate are called universal gate?	<b>04</b>
	(c) Explain application of transistor as a switch.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) List out the salient feature of emitter follower.	<b>03</b>
	(b) Explain various properties of CB amplifier.	<b>04</b>
	(c) Draw and explain the transistor a.c. equivalent circuit.	<b>07</b>
<b>Q.5</b>	(a) Give comparison of BJT and JFET.	<b>03</b>
	(b) Draw and explain the self bias circuit of FET.	<b>04</b>
	(c) Draw and explain various characteristic of JFET	<b>07</b>
<b>OR</b>		
<b>Q.5</b>	(a) What are the advantage of N-Channel MOSFET over P-Channel MOSFET.	<b>03</b>
	(b) Explain the application of FET as a buffer amplifier.	<b>04</b>
	(c) Write a short note: E-Type MOSFET	<b>07</b>

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– I & II (NEW) EXAMINATION – WINTER 2019****Subject Code: 3110016****Date: 06/01/2020****Subject Name: Basic Electronics****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>	(a) Draw the circuit diagram of Half wave rectifier.	<b>03</b>
	(b) Explain the bridge rectifier with diagrams.	<b>04</b>
	(c) Determine the $V_o$ for the network shown in figure 1	<b>07</b>

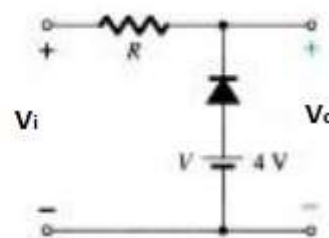
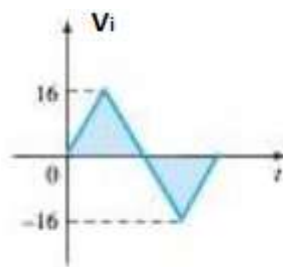


Figure 1

<b>Q.2</b>	(a) Explain Varactor diode and varistor.	<b>03</b>
	(b) Why Zener diode can be used as voltage regulator? Explain Zener as voltage regulator with necessary diagram	<b>04</b>
	(c) Compare the logic families and explain any one of them.	<b>07</b>
<b>OR</b>		
	(c) Explain Ex-OR and Ex- NOR gate with truth table and construct OR gate using diodes.	<b>07</b>
<b>Q.3</b>	(a) Explain about DC load line and Bias point of transistor	<b>03</b>
	(b) Explain the working of PIN Diode.	<b>04</b>
	(c) Briefly explain the h-parameters and draw h-parameter based equivalent circuit for CE transistor and derive equation for input impedance, output impedance and voltage gain.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Write truth table of AND, NAND and NOR gates.	<b>03</b>
	(b) Explain the selection of a Q point for a transistor bias circuit and discuss the limitations on the output voltage swing.	<b>04</b>
	(c) Explain the difference between clipping and clamping circuit. A positive voltage clamping circuit and a positive voltage clipping circuit each have $\pm 12$ V square Wave input. Sketch the output waveform for each circuit.	<b>07</b>
<b>Q.4</b>	(a) Draw voltage multiplier circuit.	<b>03</b>
	(b) Explain Transconductance and switching in FET.	<b>04</b>

- (c) Explain the Depletion region and drain characteristics of n channel JFET. **07**

**OR**

- Q.4** (a) Discuss about VI characteristic of Ideal Diode. **03**  
 (b) Explain FET as an Amplifier. **04**  
 (c) Determine the voltage  $V_o$  for the network of Figure 2. **07**  
 Give explanation for your answer.

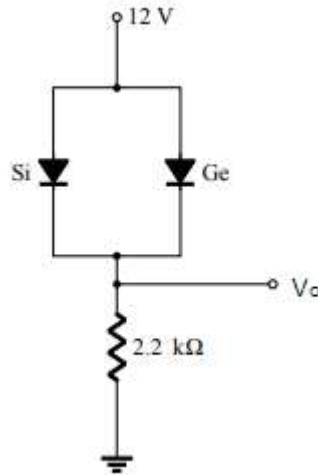


Figure 2

- Q.5** (a) Explain the working of Transistor as Switch **03**  
 (b) Write a short note on E MOSFET as an Amplifier. **04**  
 (c) Design a series noise clipping circuit which rectify the noise signal with amplitude lower than  $\pm V_F$ . **07**

**OR**

- Q.5** (a) Explain the AC load line of transistor. **03**  
 (b) Draw and explain seven segment display. **04**  
 (c) Compare BJT with FET and explain D MOSFET. **07**

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-I &II (NEW) EXAMINATION – SUMMER-2019****Subject Code: 3110016****Date: 07/06/2019****Subject Name: Basic Electronics****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>	(a)	Differentiate between insulator, conductor and semiconductor	<b>03</b>
	(b)	Explain forward bias PN junction diode with diagram	<b>04</b>
	(c)	Explain full wave bridge rectifier with neat diagram	<b>07</b>
<b>Q.2</b>	(a)	Explain LED diode	<b>03</b>
	(b)	State different types of diodes. Describe process of testing diode with multi meter.	<b>04</b>
	(c)	What is break down diode?? Explain working of zener break down and avalanche break down	<b>07</b>
<b>OR</b>			
	(c)	Why biasing is important in transistor? Explain voltage divider bias with diagram.	<b>07</b>
<b>Q.3</b>	(a)	What is use of coupling and bypass capacitor?	<b>03</b>
	(b)	Explain PIN photo diode	<b>04</b>
	(c)	Draw the circuit of transistor in CE configuration. Sketch the output characteristics and explain active, saturation and cutoff regions	<b>07</b>
<b>OR</b>			
<b>Q.3</b>	(a)	What is varactor diode? How capacitance of a diode varies with reverse voltage?	<b>03</b>
	(b)	Explain AC loadline with respect to BJT	<b>04</b>
	(c)	Compare CE, CB and CC configuration with respect to different transistor characteristics	<b>07</b>
<b>Q.4</b>	(a)	What is FET? State important features of FET.	<b>03</b>
	(b)	Compare BJT and FET	<b>04</b>
	(c)	Write short note on MOSFET.	<b>07</b>
<b>OR</b>			
<b>Q.4</b>	(a)	Explain clipping circuit	<b>03</b>
	(b)	Explain (i) Unipolar device (ii) Transconductance	<b>04</b>
	(c)	Write shortnote on JFET	<b>07</b>
<b>Q.5</b>	(a)	Draw the symbol of NPN and PNP transistor. What is use of transistor?	<b>03</b>
	(b)	Among TTL and CMOS digital logic family which one is better and why?	<b>04</b>
	(c)	Draw symbol and explain truth table of all basic logic gates	<b>07</b>
<b>OR</b>			
<b>Q.5</b>	(a)	State advantage of transistor	<b>03</b>
	(b)	Explain (i)universal gate (ii) EX-OR logic gate	<b>04</b>
	(c)	Give comparison between different types of digital logic families	<b>07</b>

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-I & II(NEW)EXAMINATION – SUMMER 2022****Subject Code:3110016****Date:24-08-2022****Subject Name:Basic Electronics****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.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
<b>Q.1</b>	(a) What is a diode? Write its types and applications.	<b>03</b>
	(b) Explain the diode V-I characteristics of ideal and practical PN junction semiconductor diode.	<b>04</b>
	(c) Enumerate the different types of clipping circuits with their different names and input-output waveforms.	<b>07</b>
<b>Q.2</b>	(a) Why are junction transistors called bipolar devices?	<b>03</b>
	(b) The metal lead of the p-side of a p-n diode is soldered to the metal lead of the p-side of another p-n junction diode. Will the structure form an n-p-n transistor? If not, why?	<b>04</b>
	(c) Sketch the circuit of the common collector mode of BJT and its output characteristics. Derive the expression for the collector current and gain.	<b>07</b>
	<b>OR</b>	
	(c) Draw the fixed-biased circuit by considering an n-p-n transistor in the CE mode. Derive the expressions for stability factors. What are the functions of the coupling capacitors?	<b>07</b>
<b>Q.3</b>	(a) Write a short note on the optocoupler device?	<b>03</b>
	(b) Explain the sixteen segment display and its applications with the necessary circuit diagram.	<b>04</b>
	(c) Draw the approximate hybrid model for any transistor configuration at low frequencies. Show that only $h_{ie}$ and $h_{fe}$ are essential in the model. Is the approximation justified?	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Explain the varactor diode.	<b>03</b>
	(b) Explain the construction of the solar cell with its operational principle.	<b>04</b>
	(c) What is self-bias? Draw the circuit showing self-bias of an n-p-n transistor in the CE mode. Explain physically how the self-bias improves stability.	<b>07</b>
<b>Q.4</b>	(a) What is MOSFET device? Draw its construction diagram.	<b>03</b>
	(b) Write short notes on the following : (i) Advantages of JFET (ii) Difference between MOSFET and JFET	<b>04</b>
	(c) Compare the different characteristics of the following semiconductor devices: bipolar junction transistor, field-effect transistor.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) How will you determine the drain characteristics of JFET? What do they indicate?	<b>03</b>
	(b) Explain the common drain configuration for a JFET.	<b>04</b>
	(c) Explain the JFET parameters and establish the relationship between them	<b>07</b>

- Q.5** (a) What is the thermal runaway in transistors, and how can it be avoided? **03**  
(b) What is an Early effect, and how can it account for the CB input characteristics? **04**  
(c) What do you mean by the logic gate and its types? Explain the universal logic gates. **07**

**OR**

- Q.5** (a) What is the ac load line in the transistor? Write its significance. **03**  
(b) The value of alpha increases with the increasing reverse-bias voltage of the collector junction. Why? **04**  
(c) Explain the logic families and their types. Describe the characteristics of the same. **07**

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