Subject Code: REC055

PAPER ID-310574

Roll No: | | | | | | | | | | | | | |

B. TECH
(SEM-V) THEORY EXAMINATION 2020-21
ADVANCE SEMICONDUCTOR DEVICES

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	What is difference between Elemental and compound semiconductor?
b.	Differentiate between Avalanche and Zener break down.
c.	List the advantages of MOSFET over BJT.
d.	What is degenerate semiconductors?
e.	Define latching current and holding current in Thyristor.
f.	Explain short channel effect.
g.	What are Nonvolatile Memory Devices?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a.	Explain the working of p-n junction diode with its VI characteristics.
b.	Draw schematic diagram and explain working principle of single electron transistor with its applications.
c.	Explain the working principle of IMPATT diode. How does the electric field and hole concentrations varies with the input ac signal.
d.	Explain the working and V-I characteristics Light Emitting Diode. Also write its applications.
e.	What is Sensor? Distinguish between Thermal Sensors and Mechanical Sensors.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Differentiate avalanche and zener breakdown mechanism. Calculate the thermal equilibrium electron and hole concentration in a compensated P-type silicon semiconductor at 300K in which $N_A=10^{16}$ cm^{-3}, $N_D= 3x\ 10^{15}$ cm^{-3} and $n_i=1.6\times10^{10}$ cm^{-3}.
(b)	Explain working principle and V-I characteristics of BJT with common emitter configuration.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain the working of Metal Semiconductor junction in detail. Also state the difference between ohmic contact and rectifying contact.
(b)	Explain working principle and V-I characteristics of Enhancement type N-MOSFET.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Describe the working of BARITT Diode with diagram & mathematical expressions.
(b)	Explain the operation of Tunnel diode. Draw the I-V characteristics of diode. List applications of Tunnel diode.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	What are transferred Electron devices? Explain the working of any one of them.
(b)	Explain the construction and working of Thyristor with gate triggering method. Also draw the I-V characteristics.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	What is Charge Coupled Device explain with suitable diagram?
(b)	Explain the working and V-I characteristics photo diode and Solar cell. Also write applications of both.