Printed Pages: 01 **Subject Code: EEC 301**

Paper Id: 130309 **Roll No:** | | | | | | | | | | |

B TECH
(SEM-III) THEORY EXAMINATION 2018-19
FUNDAMENTALS OF ELECTRONICS DEVICES

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a) What is meant by unit cell and lattice constant?
b) Discuss diffusion and drift of carriers.
c) distinguish between crystalline and amorphous solids
d) define absorption coefficient?
e) What is contact potential?
f) What is a metal semiconductor junction?
g) How is FET advantageous in comparison with BJT?
h) What are the different types of field effect transistors?
i) Why silicon is not used for the construction of tunnel diode?
j) Why do we need microwave devices?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a) What is a p-n-p-n diode? What is the reason why it can exist in either of the two stable states?
b) Give the operating principle of an enhancement type MOSFET? Also explain its V-I characteristics?
c) What is meant by p type semiconductor? Explain with the help of diagram how holes contribute to electric current.
d) Explain the energy band diagram of a P-N junction Discuss the variation of charge density, electric field intensity and potential within depletion region.
e) What is photoconductivity? What are its applications in semiconductor devices?

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

a) Explain the construction, working and V-I characteristics of a tunnel diode.
b) Give the energy band structure of insulators ,semiconductors and conductors

4. Attempt any *one* part of the following: 10 x 1 = 10

a) What do you mean by optical absorption? Discuss the variation of optical absorption coefficient as a function of photon energy.
b) Explain the construction, Principle and V-I characteristics of a IMPATT diode.

5. Attempt any *one* part of the following: 10 x 1 = 10

a) Explain the working of a PNP transistor with the help of its energy band diagram.
b) Describe the construction of schottky diode .Explain its working.

6. Attempt any *one* part of the following: 10 x 1 = 10

a) Describe the ebers moll model of a transistor.
b) Discuss the direct recombination of electrons and holes.

7. Attempt any *one* part of the following: 10 x 1 = 10

a) What do you mean by Fermi level? Prove that Fermi level in N type semiconductor is given by
$$E_F = E_C - KT \log (N_c/N_D)$$
b) What is a heterojunction? Explain an ideal heterojunction with the help of energy band diagram.