Roll No. .....

Total Pages : 2

017302

Mar. 2022

B.Tech. (EIOT/ECO) - III SEMESTER

Semiconductor Devices (ECP-302)

Time : 90 Minutes] [Max. Marks : 25

Instructions :

1. *It is compulsory to answer all the questions (1 mark each) of Part-A in short.*
2. *Answer any three questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Write the expression for the hole diffusion current density. (1)

(b) What is mobility? (1)

(c) Explain the Zener diode as a voltage regulator. (1)

(d) Draw the equivalent circuit model for the pn-junction. (1)

(e) What is solar cell? (1)

(f) Draw the symbol of n-channel depletion MOSFET. (1)

(g) What is pinch-off voltage? (1)

(h) Draw the structure of p-channel Junction FET. (1)

(i) What is the relation between Base current and Emitter current? (1)

(j) What do you understand by oxidation in fabrication process? (1)

PART-B

2. (a) Derive the expression of the electron drift current density. (3)

(b) With the help of E-k diagram explain the indirect semiconductor. (2)

3. (a) Explain the working of open circuit pn-junction. (2)

(b) Derive the expression for the contact potential for the open circuit pn-junction. (3)

4. Draw and explain the structure of the n-channel Enhancement MOSFET. Also draw and explain its V-I characteristics in detail. (5)

5. (a) Explain the working and current conduction of BJT. (3)

(b) Draw and explain the output characteristics of common-emitter configuration. (2)

6. Discuss and explain the following process of the IC fabrication :

(a) Ion implantation. (3)

(b) Etching. (2)