VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Odd Mid Semester Examination for Academic Session 2023-24

COURSE NAME: B.Tech SEMESTER: 1st

BRANCH NAME: All Non circuit Branches (A,B,C,K,L,M,N)

SUBJECT NAME: **BASIC ELECTRONICS**

FULL MARKS: **30** TIME: **90 Minutes**

Answer **All** Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

Q1. Answer all Questions. **[2 × 3]**

(a) What is "Depletion region" in p-n junction? How it is formed? - CO1

(b) What is the significance of the term field-effect in "FET"? - CO2

(c) Explain the "Identity Law" of Boolean algebra. - CO3

Q2. **[8]**CO1

(a) With neat circuit diagram explain the operation of bridge rectifier. [4]

(b) The reverse saturation current of a Si diode at 27°C is 7μA. Determine the forward current that will flow in the diode when 0.65V is applied. [4]

OR

(a) Draw and explain the output characteristics of a PNP transistor in CE configuration. [4]

(b) Mention different region of operation of BJT. How these can be achieved? Discuss applications of CB, CE and CC mode of BJT on the above regions. [4]

Q3. **[8]**CO2

(a) Compare the construction and operation of n-channel JFET and n-channel D-MOSFET. [4]

(b) Explain the operation of p-channel E-MOSFET with its characteristics. [4]

OR

(a) (i) Sketch the symbol and drain characteristic curve of p-channel JFET and n-channel E-MOSFET. [8]

(ii) Write the current expression (I_D) for JFET, D-MOSFET and E-MOSFET.

(iii) For given $I_{DSS} = 20mA$, $V_p = -4V$, find the drain current (I_D), source current (I_S) and gate current (I_G) in a D-MOSFET for $V_{GS} = -3V$

Q4. **[8]**CO3

(a) Convert (i) $(1AD.E)_{16}$ to decimal and octal equivalent. [4]

(ii) $(356.15)_8$ to binary and decimal equivalent.

(b) Simplify the Boolean expression. $Y = AB + \bar{A}C + A\bar{B}C(AB + C)$ [4]

OR

(a) State and prove De Morgan's theorem for three variables. [4]

(b) Subtract (i) $(1111.101)_2$ from $(1001.101)_2$ using 1's complement method. [4]

(ii) $(11101.111)_2$ from $(11111.101)_2$ using 2's complement method.