

**VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA**  
**Mid Semester Examination, May - 2019**

COURSE NAME: B.TECH

SEMESTER: 2<sup>nd</sup>

BRANCH NAME: Sec A, B, C, D, E, F, G (Common to all)

FULL MARKS: 20

TIME: 2 Hours

SUBJECT NAME: BASIC ELECTRONICS

Answer All Questions.

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

- Q1** Answer all Questions. [1×5]
- a) Draw the frequency response of a high pass filter (HPF) with proper labelling. -CO1
  - b) If the frequency of the input signal to a full wave rectifier is 'f', then calculate the frequency of the rectified output signal. -CO1
  - c) Calculate peak inverse voltage for the diodes in full wave bridge rectifier which produces an average output voltage of 30 V. -CO1
  - d) Perform the conversion:  $(145.51)_{10} = (?)_2 = (?)_8 = (?)_{16}$  (1/2) -CO5
  - e) Simplify using Boolean algebra -CO5

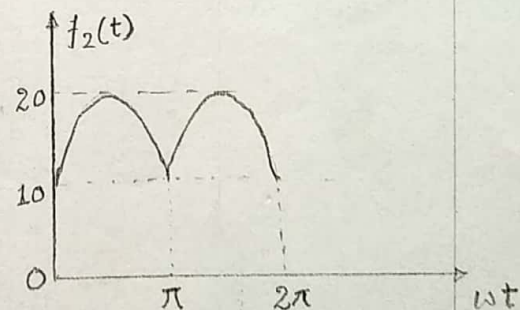
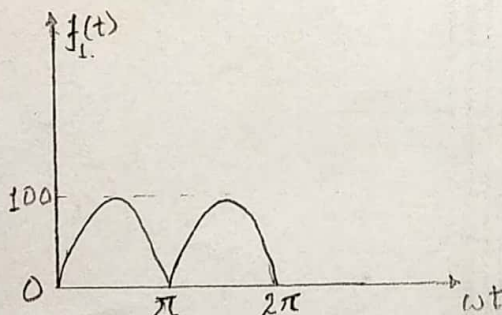
$$Y = A.\bar{B} + A.B.C + A(B + A.\bar{B}) \quad (1/2)$$

- Q2** [5]
- (a) 1. Explain the operation of bridge rectifier with the help of a circuit diagram. Mention its advantages and disadvantages when compared to a center-tap full wave rectifier. -CO1

2. A bridge full wave rectifier is used to supply 60 V DC to a resistive load of 800  $\Omega$ . The diodes used in rectifier circuit have internal resistance of 25  $\Omega$  each. Calculate the AC voltage required at the input. Also calculate the ripple factor at output.

OR

- b) 1. Draw and explain the forward and reverse characteristics of a P-N junction diode. Also, discuss the reverse breakdown mechanism of a diode. -CO1
2. Determine average value of the functions given in fig 1 and 2 below. (1/2)





Q3

[5]

- a) What do you understand by universal gates? Mention the types of universal gates. -CO5  
Implement NOT, AND, OR, EX-OR and EX-NOR gates using NAND gates only.

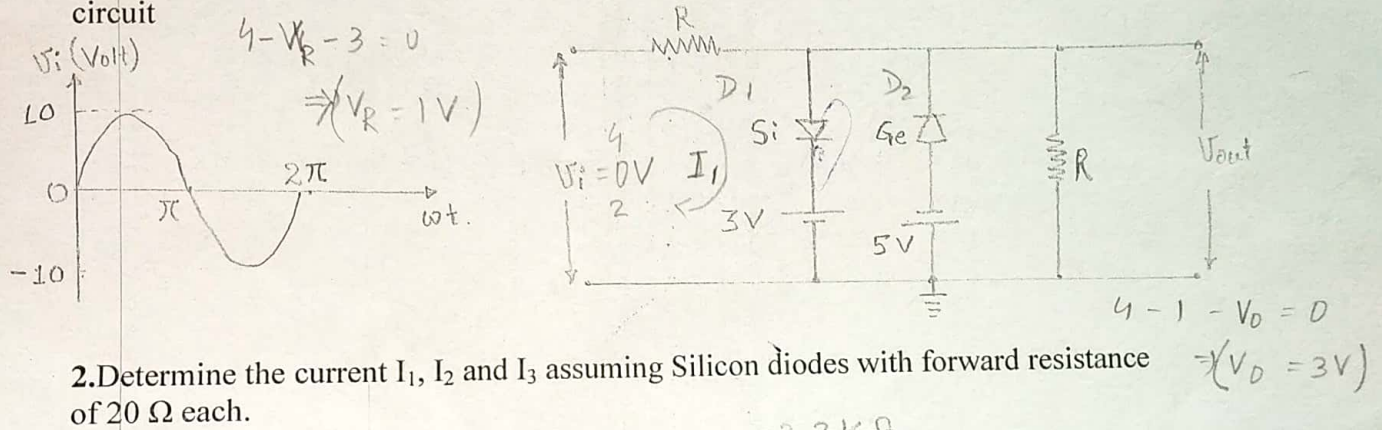
OR

- b) 1. Subtract  $(136)_{10}$  from  $(125)_{10}$  using 1's and 2's complement method. (1/2)  
2. Construct the truth table for the logical function:  $Y = \overline{A + B} + C\overline{D}$  (1)

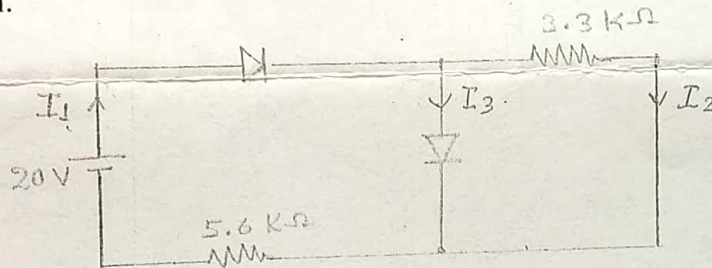
Q4

[5]

- a) 1. Considering the diodes as ideal ones analyze and draw the output of the following circuit -CO1



2. Determine the current  $I_1$ ,  $I_2$  and  $I_3$  assuming Silicon diodes with forward resistance of  $20 \Omega$  each.



OR

- b) 1. State and Prove DeMorgan's theorem. Perform the addition of three binary numbers—111000111, 101010101 and 11011. (3) -CO5  
2. Write the Boolean expression in Sum of Product (SOP) format for Y from the truth table given below. Minimize the expression using Boolean algebra and implement the minimized Boolean expression with gates. (0)

A	B	C	Y
0	0	0	0
0	0	1	1 ✓
0	1	0	1 ✓
0	1	1	0
1	0	0	1 ✓
1	0	1	0
1	1	0	1 ✓
1	1	1	1 ✓