

28-06-19

Total No. of printed pages = 4

EC 131403

BINA CHOWDHURY CENTRAL LIBRARY  
(GIMT & GIPS)  
Azara, Hatkhewap  
Guwahati - 781017

Roll No. of candidate

--	--	--	--	--	--	--	--	--	--

2019

B.Tech. 4<sup>th</sup> Semester End-Term Examination

DIGITAL ELECTRONICS

(New Regulation)

(w.e.f. 2017-2018)

Full Marks – 70

Time – Three hours

---

The figures in the margin indicate full marks for the questions.

Answer Question No. 1 and any *four* from the rest.

1. Choose the correct answer : (10 × 1 = 10)

(i) A NAND gate becomes \_\_\_\_\_ gate when used with negative logic.

- (a) AND                      (b) OR  
(c) XOR                      (d) NOR

(ii) When a negative number is represented in binary using sign-magnitude representation, the left most bit is called \_\_\_\_\_ bit.

- (a) Mantissa                      (b) Complement  
(c) Sign bit                      (d) Magnitude bit

[Turn over

- (iii) Each one of the 4bit BCD codes has \_\_\_\_\_ numbers of illegal states.
- (a) 1 (b) 2  
(c) 4 (d) 6
- (iv) The number of bits required to assign binary roll numbers to a class of 90 students is \_\_\_\_\_
- (a) 5 (b) 6  
(c) 7 (d) 8
- (v) A variable present in a Boolean expression in complemented or uncomplemented form is known as \_\_\_\_\_
- (a) Logic (b) Literals  
(c) SOP (d) All of the above
- (vi) Which logic gate is a basic comparator?
- (a) NOR (b) NAND  
(c) XNOR (d) XOR
- (vii) The logic function is produced by adding an inverter to each input and output of an AND gate is \_\_\_\_\_
- (a) NOR (b) NAND  
(c) XOR (d) OR
- (viii) The NAND gate can function as NOT gate if
- (a) All inputs are connected together  
(b) Inputs are left open  
(c) One input is set to 0  
(d) One input is set to 1

(ix) The code used for labeling the cells of K-map is \_\_\_\_\_

- (a) BCD (b) Hexadecimal  
(c) Gray (d) Binary

(x) \_\_\_\_\_ is the fastest logic families.

- (a) ECL (b) RTL  
(c) TTL (d) CMOS

2. (a) Represent  $(307.46)_{10}$  in \_\_\_\_\_ (5×1=5)

- (i) Binary  
(ii) Octal  
(iii) Hexadecimal  
(iv) BCD  
(v) Gray

BINA CHOWDHURY CENTRAL LIBRARY  
(GIMT & GIPS)  
Azara, Hatkhowapara,  
Guwahati - 781017

(b) Subtract  $(5E)_{16}$  from  $(2A)_{16}$  using 2's complement method. (4)

(c) Perform the addition of numbers  $(297)_{10}$  and  $(384)_{10}$  in BCD code. (3)

(d) Find the base x, if  $(292)_{10} = (204)_x$  (3)

3. (a) Reduce the Boolean expression using Boolean algebra.  $Y = A [B + \overline{C} (\overline{AB + AC})]$  (5)

(b) Convert the following Boolean expression to standard SOP and find its corresponding standard POS form

$$Y(A, B, C) = AB + BC + A\overline{C}. \quad (5)$$

(c) Simplify using K-map

$$F = \sum m(4, 5, 7, 12, 14, 15) + d(3, 8, 10) \quad (5)$$

4. (a) Design a full adder. (5)
- (b) Design a 2 bit comparator circuit. (6)
- (c) Using only NAND gate design a XOR gate. (4)
5. (a) Compare decoder and demultiplexer with suitable diagram. (3)
- (b) Implement the following expressions using 4 : 1 multiplexer.  $Y(A, B, C) = \sum m (1, 2, 4, 7)$ . (5)
- (c) Simplify the following four variable Boolean function using Quine – McClauskey method.  
 $Y(A, B, C, D) = \sum m (1, 3, 5, 10, 11, 12, 13, 14, 15)$  (7)
6. (a) What is race around condition? How it can be avoided? (5)
- (b) Design a D flip flop using JK flip flop. (4)
- (c) Describe the working of Universal Shift Register. (6)
7. (a) A counter goes through states 0, 3, 5, 6, 0, 3,... Design the counter using T flip flop. (6)
- (b) Define :
- (i) Noise margin
- (ii) Speed power product. (4)
- (c) Describe the working of CMOS inverter. (5)