First Semester B. Sc. Examination

ELECTRONICS

Paper – II

(Fundamentals of Digital Electronics)

Time : Three Hours] [Max. Marks : 50

N. B. : (1) All questions are compulsory and carry equal marks.

(2) Draw neat and well labelled diagrams wherever necessary.

EITHER

1. (A) Explain how decimal numbers are converted to their binary equivalent with the help of examples. Explain 1's and 2's complement method for binary subtraction with suitable example. 4+6

OR

(B) Do as directed.

(i) $(1010)_2 = (\text{——})_8$

(ii) $(60)_{10} = (\text{——})_{16}$

(iii) $(1234)_{10} = (\text{——})_{BCD}$

Explain how negative integers are represented using 2's complement number representation. Explain BCD and gray code. 3+4+3

EITHER

2. (A) Explain X-OR and X-NOR gates with the help of logic diagrams equations and truth tables. State and prove De'Morgan's theorems. 6+4

OR

(B) Explain why NAND and NOR gates are called universal gates. Draw the logic diagram of construction of basic logic gates using NAND and NOR gates. 1+9

EITHER

3. (A) What is k-map ? Explain formation of pairs, quads and octets in k-map. Explain how SOP and POS equations can be converted to their standard forms. 1+6+3

OR

(B) Reduce the following four variable functions using k-map alos draw the logic circuit for reduced equation. $f(A,B,C,D)=\Sigma m(0,1,2,3,8,9,10,11)$ 5+5

EITHER

4. (A) Explain the working of full subtracter with the help of block, logic diagrams and truth table. What is demultiplexer ? Explain 1:4 demultiplexer. 5+5

OR

(B) Draw and explain half subtracter. Define encoder and decoder. Explain 4 bit Binary adder/subtractor with logic diagram. 3+2+5

5. Solve any Ten questions :—

(a) What is the radix of hexadecimal number system ?

(b) $(345)_{16} = (---)_2$.

(c) What is the 2's complement of $(11011)_2$?

(d) What is the dual of A.O. ?

(e) Write the truth table of XNOR gate.

(f) Draw the logic symbol of XOR gate.

(g) What is a quad in a k-map ?

(h) How many variables are eliminated in an octet ?

(i) What is POS ?

(j) What is a decoder ?

(k) How many select lines are reguired for 32 input multiplexer ?

(l) Draw a half subtractor circuit. 10x1=10