Bachelor of Science (B.Sc.) Semester—I Examination

ELECTRONICS

(Fundamentals of Digital Electronics)

Optional Paper—2

Time : Three Hours] [Maximum Marks : 50

Note :—(1) All questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagrams wherever necessary.

EITHER

1. (A) Convert the following :

(i) $(A2F.A)_{16} = (\ )_2$ $(101000101111)_2 \cdot 1010$

(ii) $(1110.11)_2 = (\ )_{10}$ $(14.75)_{10}$

(iii) $(76.3)_8 = (\ )_2$ $(111110.011)_2$

(iv) $(97.5)_{10} = (\ )_{BCD}$ ~~$(1000011)_2$~~ $(1001\ 0111\ 0101)$

(v) $(75.25)_{10} = (\ )_2$ $(1001011.01)_2$ 10

OR

(B) 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

EITHER

2. (A) Define AND Gate. Draw the symbol and truth table of AND gate. Why are NAND and NOR gates called as universal building blocks ? State and prove De Morgan's theorems.

3+1+6

OR

(B) Draw the logic symbol, truth table and logic equation for NOR and NAND gate and explain its working. Explain X-NOR gate with the help of logic diagram equation and truth table. Why X-NOR gate is called an equality gate ? 3+3+3+1

EITHER

3. (A) What is K-map ? Explain various terms related to K-map. What are its advantages ? Explain the SOP and POS terms in K-map with examples. 1+3+2+4

OR

(B) Simplify the following logic functions using K-map. Draw the logic diagram for simplified equation :

$f(A, B, C, D) = \Sigma m\ (1, 3, 5, 7, 8, 9, 10, 11, 14, 15)$

$f(A, B, C, D) = \Sigma m\ (0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$ 5+5

EITHER

4. (A) Draw the logic diagram of clocked SRFF using NAND gates and explain its working. State the limitation of SRFF. How is it eliminated in D-Flip-Flop ? 6+4

OR

(B) Draw the logic diagram of JKFF and explain its working. Discuss Race-Around-Condition in JKFF along with timing diagram. How to overcome it ? 5+3+2

5. Solve any **TEN** :

(a) Convert $(FA)_{16} = (\ )_2$ $(111101010)_2$ F A 1111 0 1 0

(b) Find 2's complement of $(111010)_2$. 000110

(c) Convert $(100101)_2 = (\ )_{gray}$. 110111

(d) Draw the truth table of OR gate.

(e) $(A + AB) = ?$ $(A+A)(A+B)$

(f) Construct OR gate using only NOR gates.

(g) Draw symbol for full adder.

(h) Write truth table for half adder.

(i) What is meant by multiplexer ?

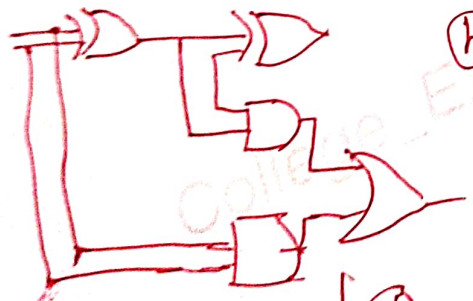
(j) What is –ve edge triggering in FF ?

(k) Define flip flops. → is a basic memory element in a digital computer. It is used to store one bit of information either a 0 or a 1

(l) Write concept of T flip flop.

1×10=10

(g)



(h)

A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

(i)

(j) FF becomes active when the clock signal goes from H-L and ignores the l-h transition

(l) a single input logic ckt that holds or toggle its o/p according to the input state.