Question Bank (I scheme)

Name of Subject: Digital Techniques and Microprocessor (DTM) **Unit Test: I**
Subject code: 22323 **Course: IF**
Semester: III

CHAPTER-1 Number Systems, Digital Logic families and Logic Gates (16 Marks)

Marks 2

1. List the applications of digital system.(CO1)
2. Convert the following: - a) $(420)_{10} = (?)_2$ (CO1)
   b) $(10110)_2 = (?)_{10}$
3. Compare analog and digital signal.(CO1)
4. Define: - 1) Propagation delay 2) Noise margin 3) Fan in – fan out (CO1)
5. Perform the binary arithmetic.(C01)
   a) $(11011.11)_2 + (11011.01)_2 = (\ ?\ )_2$
   b) $(11101.1101)_2 - (101.011)_2 = (\ ?\ )_2$
6. Convert a) 1110 gray to binary (CO1)
   b) 1011 binary to gray

Marks 4

1. Covert the following:- (C01)
   1) $(498.25)_{16} = (\ )_{10}$
   2) $(101100101)_2 = (\ )_{16}$
   3) $(B689D)_{16} = (\ )_8$
   4) $(110110111)_2 = (\ )_{10}$
2. Perform BCD addition:- (CO1)
   a) $(435)_{10} + (129)_{10}$
   b) $(299)_{10} + (498)_{10}$
3. Subtract using 2's complement:- (CO1)
   a) $(11011)_2 - (1010)_2$
   b) $(10111)_2 - (11000)_2$

4. Compare between TTL and CMOS logic families.(CO1)
5. State any 6 Boolean laws. (CO1)
6. State and prove De Morgan's theorems.(CO1)
7. Draw symbol, truth table and logic equations of Ex-OR and EX-NOR gate(CO1)
8. Simplify the following and realize it using basic gates.(CO1)

a) $Y = A + \bar{A}\bar{B}C + A\bar{B}\bar{C} + AB\bar{C} + \bar{A}\bar{B}$

b) $Y = AB + \bar{A}\bar{B} + \bar{A}B$

CHAPTER-2 Combinational Logic Circuits (Marks 14)

Marks 2

1.Convert following expressions into canonical sop form(CO2)

a) $\overline{A} + B\,\overline{C}\,\overline{D}$

b) $A\,\overline{B}\,C + B\,\overline{D}$

2. Convert following expression into canonical pos form (CO2)

a) $(A + \overline{B})\,(A + C)\,(B + \overline{C})$

b) $(A + C)\,(\overline{A} + B)\,(A + \overline{C})$

3. Design half adder using k-map and basic gates.(CO2)
4. Design half substractor using k-map and basic gates.(CO2)

Marks 4

1. Simplify the following using k-map and realize using NAND gates: .(CO2)

a) f(A,B,C,D)=∑m(0,2,5,13,15)
b)f(A,B,C,D)=∑m(1,5,7,9,11,13,15)

2. Simplify the following equation using k-map and realize it using logic gates: .(CO2)

a)Y=∑m (0 , 1 , 2 , 3 , 8 , 10) + ∑d(5 , 7)
b)Y=∑m (0, 1 , 4 , 5) + ∑d(6 , 7 , 14 , 15)

3.Solve pos expression using k-map: .(CO2)

a)f (A , B , C) = πm (2 , 3 , 4 , 5 , 6 , 7)
b)f (A , B , C , D) = πm (1 , 3 , 5 , 7 , 8 , 10 , 14)

4. Draw block diagram , truth table , logical expressions of logic diagram of 4:1 multiplexer. .(CO2)
5.Obtain an 8:1 Mux using 4:1 multiplexer. .(CO2)
6. Draw block diagram of 1:4 De-multiplexer and write down truth table. .(CO2)

CHAPTER-3 Sequential Logic Circuits (Marks -12)

Marks 2

1. Differentiate between combinational circuit and sequential circuit.(CO3)
2.Describe different types of triggering methods for a flip-flop.(CO3)

Marks 4

3. Draw S-R latch using NAND gate only.(CO3)