BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY

QUESTION BANK

Unit Test-I

Program: - Computer Engineering Group Program Code: **IF**

Course Title: Digital Techniques and Microprocessor Semester: - III

Course Abbr. & Code: -DTM (313337) Scheme: K

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CHAPTER 1 Number System and Digital Logic Gates 12 Marks (CO1)

2 Marks

1. List the applications of digital system. (CO1)
2. Convert the following: - a) $(420)_{10} = (?)_2$ (CO1)
   b) $(10110)_2 = (?)_{10}$
3. Convert
   a) 1110 gray to binary (CO1)
   b) 1011 binary to gray
4. Perform the binary arithmetic. (C01)
   a) $(11011.11)_2 + (11011.01)_2 = (?)_2$
   b) $(11101.1101)_2 - (101.011)_2 = (?)_2$
5. Covert the following: - (C01)
   1) $(498.25)_{16} = (?)_{10}$
   2) $(101100101)_2 = (?)_{16}$
   3) $(B689D)_{16} = (?)_8$
   4) $(110110111)_2 = (?)_{10}$
6. Find 2's complement of $(10010010)_2$

4 Marks

7. State any 6 Boolean laws. (CO1)
8. State and prove De Morgan's theorems. (CO1)
9. Draw symbol, truth table and logic equations of Ex-OR and EX-NOR gate (CO1)
10. Perform BCD addition: - (CO1)
    a) $(445)_{10} + (149)_{10}$
    b) $(399)_{10} + (598)_{10}$

11. Simplify the following and realize it using basic gates. (CO1)

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

b) $Y=A\,B+\overline{A}\,\overline{B}+\overline{A}\,B$

12.Implement AND, OR, NOT, NOR gates by using NAND gate only. (CO1)

13.Implement AND, OR, NOT, NAND gates by using NOR gate only. (CO1)

14.Implement following Boolean expression using NAND gates only. (CO1)

$$Y=(A+\overline{B}C)\,(C+AB)$$

15.Implement following Boolean expression using NOR gates only. (CO1)

CHAPTER-2 Combinational and Sequential Logic Circuits (CO2) 16 Marks

2 Marks

16. Differentiate between combinational circuit and sequential circuit. (CO2)
17.Write concept of Flip Flop (CO2)
18.Write concept of Counter. (CO2)
19.Explain the term Clock Signal. (CO2)
20. Convert following expressions into canonical SOP form (CO2)

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

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

21. Convert following expression into canonical POS form (CO2)

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

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

22.Design half adder using k-map and basic gates. (CO2)
23.Design half subtractor using k-map and basic gates. (CO2)

Marks 4

24. 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)

25.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)

26.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)

27.Draw block diagram, truth table, logical expressions of logic diagram of4:1 multiplexer. .(CO2)
28.Obtain an 8:1 Mux using 4:1 multiplexer. .(CO2)
29.Draw block diagram of 1:4 De-multiplexer and write down truth table. .(CO2)

CHAPTER-3 16-Bit Microprocessor 8086 (CO3) 12 Marks

2 Marks

30.List any four features of 8086 Microprocessor. (CO3)
31.State the functions of following pins of 8086. (CO3)
a) READY b) HOLD

4 Marks

32.Draw 8086 Architecture Block Diagram. (CO3)
33.Draw and explain functional block diagram of 8086. (CO3)
34.Draw Flag register of 8086 and explain it.
35.Write the function of Execution Unit.