PKS/KS/24/2583

Faculty of Science & Technology
Third Semester B.Tech. (Information Technology) (C.B.C.S.) Examination
DIGITAL ELECTRONICS AND FUNDAMENTAL OF MICROPROCESSOR

Time—Three Hours] [Maximum Marks—70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Due credit will be given to neatness and adequate dimensions.
(8) Assume suitable data wherever necessary.
(9) Illustrate your answers wherever necessary with the help of neat sketches.
(10) Use of non-programmable calculator is permitted.

1. (a) Give the statement of De-Morgan's Theorem and prove it with examples. 7
   (b) Obtain Decimal equivalent of Hexadecimal no :
      (i) 675·625
      (ii) 95·5 4
   (c) Perform the following subtraction using BCD subtraction method $(38)_{10} - (65)_{8}$. 3

OR

2. (a) What is meant by Excess 3 codes ? Explain it with examples. 7
   (b) (i) Obtain Decimal equivalent of Hexadecimal no. $(3A{\cdot}2F)_{16}$.
      (ii) Find the octal equivalent of $(100\ 1110)_{2}$. 7
3. (a) Using K Map solve the following and implement the result using universal logic gates only :
      $f(A, B, C, D) = \Sigma m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14) + d(4, 10, 13)$. 7
   (b) Explain the following function in standard SOP form
      $f(A, B, C, D) = AB + A\bar{C} + C + AD + A\bar{B}C + ABC + \bar{B}C$. 7

OR

4. (a) Simplify the given function using K map :
      (i) $f(A, B, C, D) = \Sigma m(0, 1, 4, 7, 11, 12, 13, 15) + d(3, 6, 10)$
      (ii) $f(A, B, C, D) = \pi M(1, 2, 3, 8, 9, 10, 11, 14) + d(7, 15)$. 8
   (b) Draw the logic diagram using basic logic gate for :
      (i) $Y = \bar{A}(B + \bar{C}) + \bar{B}(A + C) + \bar{C}(A + B)$
      (ii) $Y = AC + B\bar{C} + C(A + \bar{D})$. 6

5.	(a)	Explain 16×1 Multiplexer with neat diagram and truth table.	7
	(b)	Design full adder using Half Adder and one OR gate.	7
		OR	
6.	(a)	Design 1 : 32 DeMUX × using 1 : 8 DeMUX and 1 : 4 DMUX.	7
	(b)	Explain De Multiplexer using neat circuit diagram and truth table.	7
7.	(a)	What is Race Around Condition in JK flip flop ? How it can be avoided by using master slave JK flip flop ?	7
	(b)	Explain different types of triggering methods of flip flop.	7
		OR	
8.	(a)	Differentiate between Synchronous and Asynchronous counter.	6
	(b)	Draw and explain 3 bit ripple counter.	8
9.	(a)	Explain different addressing modes of 8085 in detail.	7
	(b)	Explain Interrupt pins of 8085 in detail.	7
		OR	
10.	(a)	Draw and explain architecture of 8085.	7
	(b)	Describe in brief Instruction set of 8085.	7

B.Tech. Third Semester (Information Technology) (C.B.C.S.) Summer 2023

Digital Electronics and Fundamentals of Microprocessor

P. Pages : 2

Time : Three Hours

* 0 8 3 4 *

MSP/KS/23/2543

Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.

1. a) State and prove Demorgan's first and second theorem. **5**

b) Explain why NAND and NOR is known as universal gates. **5**

c) Write the advantages of digital system over analog system. **4**

OR

2. Perform the following. **14**

i) $(6548)_D = (?)_B$

ii) $(10110101.0101)_G = (?)_B$

iii) $(ABCD.EF)_H = (?)_8$

iv) $(7654)_H = (?)_{Ex-3}$

v) $(4523.22)_0 = (\ )_b$

vi) $(1010101110.1110)_b = (\ )_d$

vii) $(10110101)b = (?)G$

3. Simplify given function using K-map and implement using Logic gates. **14**

i) $f(A,B,C,D) = \sum m(0,4,6,8,10,12,14) + d(1,13)$

ii) $f(A,B,C,D) = \pi m(1,3,5,6,9,11,14,15)$

OR

4. a) Minimize the following expression using K-map and realize using NAND gates. **10**
$f(A,B,C,D,E) = \sum m(0,1,4,6,9,10,19,22,24,25,26,27,29,31)$

b) What is mean by Maxterms & Minterms? **4**

5. a) Realize the following functions using 8:1 multiplexer and suitable gates. **7**
$F1(A,B,C) = \sum m(0,2,4,7)$ and $F2(A,B,C) = \sum m(1,2,5,6)$

	b)	Design full adder circuit using two half adder and one OR gate. Also draw the logic circuit give it's truth table.	**7**

OR

6.	a)	Design 1:32 demultiplexer by using 1:8 demultiplexer.	**7**
	b)	Design 2 bit priority encoder and explain in detail.	**7**
7.	a)	Explain S-R flipflop and also discuss racing condition.	**7**
	b)	Explain J-K flipflop and explain race around condition.	**7**

OR

8.	a)	Explain T f/f and also explain toggling condition in detail.	**8**
	b)	Explain different types of Triggering Method of Flip flop.	**6**
9.	a)	Explain different addressing modes of microprocessor 8085.	**7**
	b)	Explain hardware interrupt structure of Microprocessor 8085 in detail.	**7**

OR

10.	a)	Draw and explain the architecture of Microprocessor 8085 in detail.	**9**
	b)	Draw the flag register of Microprocessor 8085 and explain each status bits in detail.	**5**

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B.Tech. Third Semester (Information Technology) (C.B.C.S.) Winter 2022

Digital Electronics & Fundamentals of Microprocessor

P. Pages : 2 **SPM/KW/22/2543**

Time : Three Hours * 0 8 0 8 * Max. Marks : 70

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.

1. a) What is Gate. Explain the basic gates with its truth table. **6**

b) Explain and prove the De-Morgan's Theorem. **8**

OR

2. a) Write short notes on Gray Code and Excess-3 Code. **6**

b) Prove the following: **8**

i) $\bar{A}BC + A\bar{B}C + AB = AB + BC + AC$

ii) $A + \bar{A}B + A\bar{B} = A + B$

3. a) Express the following function in standard SOP form **8**

i) $f(ABCD) = (\bar{A} + BC)(B + \bar{C}D)$

ii) $f(PQRS)(P)(QRS + \bar{P}Q)(RS + \bar{P}\bar{Q})$

b) What do you mean by minterms and maxterms? Express the following function of minterms as well as maxterms **6**

$Y = \bar{A}\bar{B}\bar{C}\bar{D} + AB\bar{C}\bar{D} + \bar{A}B\bar{C}D + ABCD + \bar{A}BCD + A\bar{B}\bar{C}D$

OR

4. a) Write the significance of K-map in Digital logic **5**

b) Simplify using k-map and Implement using logic gates. **9**

$f(ABCDE) = \pi M(0,2,5,7,8,10,16,21,23,24) + d(27,29,31)$

5. a) Design a 4-line to 2-line priority encoder with D3 as has the highest priority. **7**

b) Implement the given function using 8:1 MUX f(W, X, Y, Z) = $\pi M(0,4,7,11,12,15)$. **7**

OR

6. a) Draw and explain Half and full Substractor with logical diagram. **7**

b) Design BCD to Excess -3 code Converter and Explain. **7**

7. a) Convert the following Flip-Flop: **8**

i) S-R to J-K Flip-flop

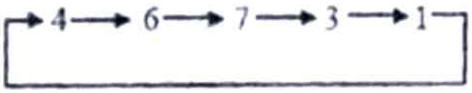
ii) J-K flip flop to D flip-flop

b) Explain the working of JK flip flop. What is race around condition and how it is eliminated. **6**

OR

8. a) Explain the working of Twisted Ring counter with waveforms. **6**

b) Design a synchronous counter for the following sequence. **8**



Avoid lockout condition. Use JK flip flop for design.

9. a) Explain the following pin in microprocessor 8085 **7**
i) Trap ii) HOLD iii) SID

b) Explain the different addressing modes in 8085 with example. **7**

OR

10. a) Write a program to add two 16 bit data present in memory from location 8000H and place the result starting at 8900H **7**

b) Draw and Explain the timing diagram of LDA 7000H. **7**

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B.Tech. (Information Technology) Third Semester (C.B.C.S.)

Digital Electronics & Fundamentals of Microprocessor

P. Pages : 2 **PSM/KW/23/2583**

Time : Three Hours * 2 7 8 6 * Max. Marks : 70

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6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Define Digital System. Compare Digital and Analog System? **6**

b) State and prove De-Morgan's theorem. Why NAND and NOR Gates are called as a Universal Gates. **8**

OR

2. a) Perform the following. **6**

i) $(4CE.12E)_H = (?)_8$

ii) $(10011.001)_B = (?)_G$

iii) $(156.56)_{10} = (?)_{BCD}$

b) i) Perform the following subtraction using BCD Subtraction Method. **4**
$(38)_{10} - (65)_8$

ii) Perform the following subtraction using $2's$ complement method **4**
$(AE)_{16} - (6)_{10}$

3. a) Simplify the following function $F(A,B,C) = \Pi M(0,2,4,6)$ and realize using NAND Gates only. **7**

b) Simplify following expression using K-MAP and realize the minimum Expression Using logic gates. **7**
$F(A,B,C,D) = \Pi M(4,6,8,9,10,12,13,14) + d(0,2,5)$

OR

4. a) Find reduced SOP form for the following equation by using K-MAP? **6**
$F(A,B,C,D) = \Sigma m(1,3,7,11,15) + \Sigma d(0,2,5,8,14)$

b) Design Logic Diagram for 4 bit binary to Grey code convertor. **8**

5.	a)	Design 8 bit BCD Adder Circuit by using 4 bit adder circuit (IC 7483).	**8**
	b)	Design Binary Parallel Subtractor using 1's Complement Method. Use full Adder circuit.	**6**

OR

6.	a)	Draw the logic diagram of 4:1 MUX using NAND gate only along with its truth table and explain it.	**7**
	b)	Construct 16:1 multiplexer by using 4:1 multiplexer.	**7**
7.	a)	Explain different methods of Triggering of Flip Flops.	**6**
	b)	Convert the following.	**8**
		i) T to D Flip Floop	
		ii) JK to SR Flip Flop	

OR

8.	a)	Explain the working of JK flip flop. What is race around condition and How it is eliminated.	**7**
	b)	Draw and explain the 4 bit Ripple counter with waveforms.	**7**
9.	a)	Give the format of flag Register in 8085 microprocessor and explain each flag.	**5**
	b)	Draw & Explain the Architecture of 8085 microprocessor in detail.	**9**

OR

10.	a)	Explain the addressing modes of 8085 microprocessor.	**6**
	b)	Explain the following instruction:	**8**
		i) STAX B	
		ii) PUSH B	
		iii) LXI H, address	
		iv) LHLD address	

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