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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CS203

Course Name: SWITCHING THEORY AND LOGIC DESIGN (CS)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1 a) Represent +51 and -51 in 1's complement and 2's complement form. (2)

b) Convert decimal $(378.93)_{10}$ to octal. (1)

2 Perform the following decimal operations in the 8421 BCD code (3)

a) $(518)_{10} + (488)_{10}$ b) $(518)_{10} - (488)_{10}$

3 Express the following function as sum of minterms and product of maxterms: (3)

a) $F(A,B,C)=\bar{B} + A\bar{C} + A\bar{B}\bar{C}$ b) $F(A,B,C)=C(A + \bar{B})(\bar{A} + \bar{B} + \bar{C})$

4 a) Find complement of function. (2)

$F=A\bar{B} + B\bar{C} + \bar{A}C$

b) Prove $AB + \bar{A}C = (A + C)(\bar{A} + B)$ (1)

PART B

Answer any two full questions, each carries 9 marks.

5 a) Write the format of single precision floating point binary numbers. Convert the decimal number 3.248×10^4 to a single-precision floating-point binary number. (5)

b) Perform the following hexadecimal operations (4)

1) $A5C4_{16} + 39A5_{16}$ 2) $A96B_{16} - 9F2C_{16}$

6 Reduce the following expressions using K-map and implement the real minimal expression in universal logic. (9)

1) $F(A,B,C,D)=\sum m(0,1,2,3,5,7,8,9,10,12,13)$
2) $F(A,B,C,D)=\prod M\,(2,8,9,10,11,12,14)$

7 a) Simplify the Boolean function $F(A,B,C,D)=\sum m(1,3,4,5,10,12,13,15)$ using Quine-McCluskey method. (9)

PART C

Answer all questions, each carries 3 marks.

8 Differentiate between combinational and sequential circuits. (3)

9 Draw the logic diagram of 4×1 MUX and list down the applications of MUX. (3)

10 Give the truth table, characteristics table, excitation table and characteristic equation of SR flip-flop. (3)

11 Compare Synchronous and Asynchronous sequential circuits. (3)

PART D

Answer any two full questions, each carries 9 marks.

12	a)	Design a 4-bit Binary to Gray code converter.	(7)
	b)	Implement the logic function $F = A \oplus B \oplus C$ using a 8:1 multiplexer.	(2)
13	a)	Explain race around condition in JK flip-flop. Explain how a master slave flip-flop avoids race around condition.	(6)
	b)	Convert JK Flip-Flop to T Flip-Flop.	(3)
14	a)	Design and implement full subtractor by using only NAND gates.	(5)
	b)	Explain 2 bit magnitude comparator using logic diagram.	(4)

PART E

Answer any four full questions, each carries 10 marks.

15		Design a synchronous counter using JK flip-flop which counts through the states 0,1,3,4,5,6,0…… Is the counter self starting?	(10)
16		Draw and explain 4 bit Johnson counter. Also draw its timing sequence.	(10)
17	a)	Draw and explain the different types of shift registers.	(8)
	b)	List down the applications of shift registers.	(2)
18	a)	Write short notes on PLA.	(3)
	b)	Give any 2 applications of ROM.	(3)
	c)	Compare Static RAM and Dynamic RAM.	(4)
19		Find the minimum size of PLA required to implement the following functions? Hence implement the following function using PLA. $F_1(A,B,C) = \sum m(0,2,4,7)$ $F_2(A,B,C) = \sum m(3,5,6,7)$	(10)
20		Explain the algorithm for floating point addition and subtraction.	(10)

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