JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-I Semester (CSE/IT/ECE/CE/BT/BI)

COURSE CODE (CREDITS): 18B11EC312 (4) MAX. MARKS: 25

COURSE NAME: DIGITAL ELECTRONICS AND LOGIC DESIGN

COURSE INSTRUCTORS: Dr. HARSH SOHAL MAX. TIME: 1 Hour 30 Minutes

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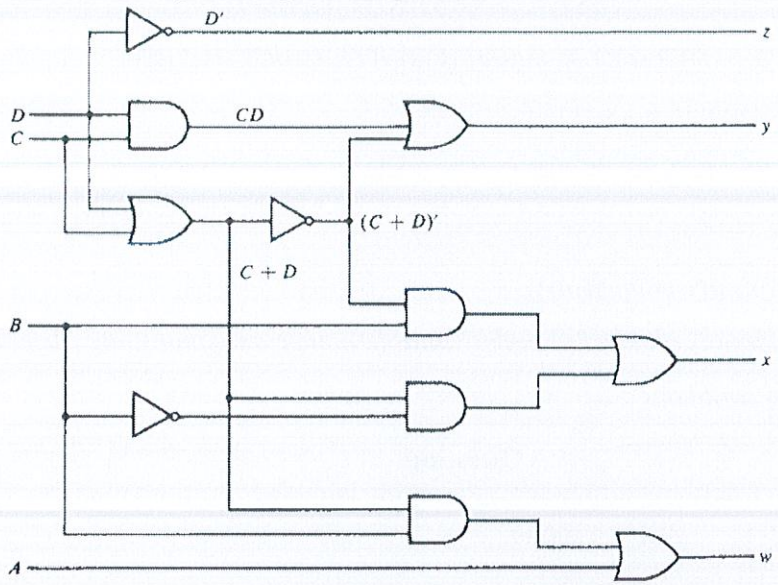
Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No.	Question	CO	Marks
Q1	Perform the following arithmetic operations with hexadecimal numbers: (i) 2BFC + 54A7 (ii) AC74 - B3F	CO2	3[1.5+ 1.5]
Q2	[CO2] Calculate the following arithmetic expressions given in decimal numbers using 1's complement method. [Convert the numbers to binary then apply 1's complement method for calculation, detailed step by step procedure execution only shall fetch the marks. " - " is for minus sign] a) 15 - 6 b) -15 - 6	CO2	2[1+1]
Q3	Design a logic circuit with inputs A, B and C that control the passage of a signal according to the following requirements: a. Output X will equal A when control input B and C are the same. b. X will remain HIGH when B and C are different. (hint: start with making a truth table)	CO1	2[1+1]
Q4	Convert the following maxterm expression to minterm expression without reducing:- $f = (A + B + \overline{D})(\overline{A} + C + D)(\overline{A} + \overline{D})$	CO1	2
Q5	Implement the following Boolean function F, using two level forms of logic (a) NAND Gates only, (b) NOR gates only $F(A, B, C) = \sum (1, 3, 4, 7)$	CO4	4[2+2]
Q6	Design a combinational circuit that multiplies two 2-bit numbers, a_1a_0 and b_1b_0 to produce a 4 bit product $p_3p_2p_1p_0$. Use AND gates and Half Adders.	CO4	2

Q7	The following circuit takes the BCD code as input. Indentify the code converter circuit by making its truth table.  	CO3	2
Q8	Differentiate between a Multiplexer and a de-multiplexer. What is a multiplexer? Design a 2:1 Mux and give its truth table, boolean equation, suitable logic diagram. How many 2:1 mux are required to implement a 4:1 mux? Give the block level design.	CO3	4[2+1]
Q9	How does a Carry Look Ahead adder differ from an RCA? Design a 3 bit Carry Look ahead adder using basic logic gates. (also give the derivation of various terms based on the full adder structure).	CO3	4[1+3]