DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2023

DIGITAL COMPUTER FUNDAMENTALS

[Maximum Marks: **75**]   [Time: **3** Hours]

PART-A
I. Answer *all* the following questions in one word or one sentence. Each question carries *'one'* mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	Write down expansion of ASCII.	M1.04	R
2.	Write down 2's Complement of $(10100111)_2$	M1.03	A
3.	Draw logic symbols of universal gates.	M2.03	R
4.	State De-Morgan's Theorems.	M2.01	U
5.	Draw a NOT equivalent circuit using NAND gate.	M2.03	U
6.	Define encoder.	M3.04	R
7.	Write down BCD of $(45)_{10}$	M3.03	U
8.	Write down the truth table of Half Adder.	M3.01	U
9.	Define Registers.	M4.03	R

PART-B
II. Answer any *eight* questions from the following. Each question carries *'three'* marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Describe the number systems Binary and Octal. Convert $(BFA6)_{16}$ to binary and octal.	M1.01	U
2.	Explain Weighted and Non-Weighted binary codes with examples.	M1.04	R
3.	Describe Even Parity with examples.	M1.04	U
4.	Describe SOP and POS with examples.	M2.02	R
5.	Write down the truth table for 2 input X-OR gate, with inputs A and B, and write down the boolean function in SOP form as per truth table.	M2.04	A
6.	Expand A' + B' to standard SOP.	M2.02	U
7.	Reduce the expression with the help of Boolean algebra laws Y = A' B'C' + A'BC' + AB'C' + ABC'	M2.02	A
8.	Map the expression f : A'B'C + AB'C + A'BC'+ ABC' + ABC	M2.05	A
9.	Write down the steps to design and Implement a Combinational circuit.	M3.02	U
10.	Differentiate Synchronous and Asynchronous sequential circuits.	M4.04	R

Answer all questions from the following. Each question carries 'seven' marks.

(6 x 7 = 42 Marks)

Module Outcome   Cognitive level

III.	Convert i. $(10111011)_2$ to Gray Code (2)	M1.04	U
	ii. $(10111011.101)_2$ to Hexadecimal, Octal, Decimal (5)	M1.01	U
	OR		
IV.	Find $(74)_{10}$ - $(47)_{10}$ by 2's Complement Subtraction Method and write result in decimal number format.	M1.03	A
V.	Write down various any four Basic logic gates with its logic expression, logic symbol and truth table. (Hint: Consider maximum two inputs A, B).	M2.03	R
	OR		
VI.	Simplify F (A, B,C,D) = Σm(0, 1, 2, 3, 5, 7, 8, 9, 10, 12, 13) using K-map.	M2.05	A
VII.	Explain working 4-bit parallel adder circuit with a neat diagram.	M3.03	R
	OR		
VIII.	Write down truth table for full adder, design and draw the circuit for full adder.	M3.02	R
IX.	Explain a 2-bit Magnitude comparator with the help of truth table.	M3.04	U
	OR		
X.	Explain 2 to 4 Decoder with the help of truth table and logic circuit diagram.	M3.04	U
XI.	Explain sequential circuits with a block diagram.	M4.01	R
	OR		
XII.	Explain 4 bit Serial-in Parallel-out shift registers with a neat sketch.	M4.03	R
XIII.	Explain the working of JK flip-flop with logic diagram and truth table.	M4.02	U
	OR		
XIV.	Explain BCD Counter with help of a logic diagram and truth table.	M4.04	U

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