

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2022**

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.	Convert 28_{16} to binary.	M1.01	A
2.	Find 2’s complement of 10001	M1.01	A
3.	How negative numbers are represented in computers?	M1.03	U
4.are called Universal gates.	M2.03	R
5.	Draw the truth table of two input OR gate.	M2.04	R
6.	Expansion of BCD is.....	M3.03	R
7.	The asynchronous inputs of Flip Flops are.....and	M4.02	U
8.	Write the equation of the outputs of Half adder circuit.	M3.02	R
9.	Define sequential logic circuit.	M4.01	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.	Add the decimal numbers 25 and 48 converting of BCD format.	M1.05	A
2.	Explain Gray codes.	M1.04	U
3.	State Demorgan’s Laws.	M2.01	R
4.	Draw the truth table corresponds to the function. $F(x,y,z) = \Sigma(1,3,4,6)$	M2.05	A
5.	Prove that $x+xy=x$	M2.01	A
6.	Design the logic diagram of AND gate using NOR gate, and write the truth table.	M2.04	A
7.	Draw the circuit and truth table of 2 to 1 multiplexer.	M3.04	U
8.	Construct the combinational circuit for Boolean equation. $F=(A+B).CD$	M3.01	U
9.	Draw the circuit of 3 bit Parallel In Parallel Out shift register and explain its working.	M4.03	A
10.	Construct SR latch with NAND gates.	M4.02	U

PART-C

Answer all questions. Each question carries 'seven' marks.

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Write the result of the following operations. a) Convert 11011_2 to decimal and hexadecimal. (2 marks) b) $11A_{16}$ to Decimal (2 marks) c) 242_{10} to Binary and Octal (3 marks) OR	M1.01	A
IV.	a) What are error detection codes? How parity bit helps to detect transmission errors? (4 marks) b) What is BCD codes? Add BCD numbers 1000 and 0101. (3 marks)	M1.04 M1.05	U A
V.	Implement the logic functions of Basic Gates using NAND gate. (7 marks) OR	M2.04	U
VI.	Construct the logic diagram for the Boolean function by simplifying using K-Map. $F(x,y,z) = x'yz + xy'z' + xy'z + xyz$ (7 marks)	M2.05	A
VII.	Develop the truth table of full adder and draw its logic diagram. (7 marks) OR	M3.02	U
VIII.	Construct a 4 bit binary adder subtractor and explain its working. (7 marks)	M3.04	A
IX.	Construct the logic diagram of magnitude comparator and explain. (7 marks) OR	M3.04	A
X.	Explain Decoders and Encoders with block diagram. (7 marks)	M3.04	U
XI.	Construct the Logic diagram of JK Flip flop and explain its working with the help of characteristics table. (7 marks) OR	M4.02	A
XII.	Construct a 3 bit Ring counter and explain its working. (7 marks)	M4.04	A
XIII.	Design an Asynchronous 4 bit Binary UP counter and explain its working. (7 marks) OR	M4.03	A
XIV.	Explain different types of Shift registers. (7 marks)	M4.03	U
