TED (21) 6031C
(Revision-2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2025

MICROCONTROLLER & PLC

[Maximum marks: 75] [Time: 3 Hours]

PART A

I. Answer all the following questions in one word or one sentence. Each question carries 1 mark

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	List any two features of 8051 microcontroller.	M1.01	R
2	Write the functions of the accumulator in an 8051 microcontroller.	M1.02	R
3	The addressing mode of the instruction MOVX A, @DPTR in 8051 microcontroller is ……..	M2.01	A
4	List the syntax of instructions for Multiplication and Division operation in 8051 microcontroller.	M2.02	R
5	Assume 8051 microcontroller contains [A]= 25 H, after executing the instruction CPL A content of register A becomes ……..	M2.02	A
6	List any two general features of PLC.	M3.01	R
7	List any two input devices used in a PLC based system.	M3.03	R
8	Horizontal lines in a ladder diagram are called……...	M4.02	R
9	Write any Two Timer instructions in PLC.	M4.03	R

PART B

II. Answer any eight questions from the following. Each question carries 3 marks.

(8 x 3 = 24 Marks)

		Module outcome	Cognitive level
1	Draw the 8-bit format of PSW register in 8051 microcontroller and label it.	M1.02	R
2	Identify the functions of the following registers: i) B register ii) Program Counter ii) TMOD register	M1.02	U
3	List any six applications of microcontroller.	M1.04	R
4	Illustrate the internal memory organization of 8051 microcontroller.	M1.03	U
5	Differentiate between RL and RLC instructions of 8051 microcontroller.	M2.02	U
6	List any three advantages of PLC.	M3.01	R
7	Draw the scan cycle of PLC.	M3.03	R
8	List any six output devices used in a PLC based system.	M3.03	R
9	State any three applications of PLC.	M3.04	R
10	Develop the ladder programs for the following digital gates. a) OR gate b) AND gate	M4.04	A

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Draw the architecture of an 8051 microcontroller and label all the blocks.	M1.02	U
	OR		
IV	Draw the pin diagram of 8051 microcontroller IC.	M1.04	U
V	An 8 bit number is stored in the memory location 4500 H. Write a) algorithm b) assembly language program to find 2's complement of this number and save the result in the memory location 4501H.	M2.02	A
	OR		

VI	The hex number 2A H is stored in the memory location 4000 H. Write the contents of Accumulator, Register R1, Carry Flag and DPTR after executing the following instructions:
	CLR C
	MOV DPTR,#4000
	MOVX A,@DPTR
	ADDC A,#5D H
	MOV RI,A
	INC DPTR
	RR A
		M2.02	A

VII	Explain with examples various conditional jump instructions of 8051 microcontroller.	M2.02	U
	OR		
VIII	Draw the circuit for interfacing a DC motor with 8051 microcontroller.	M2.04	U
IX	Illustrate the block diagram of PLC.	M3.03	U
	OR		
X	Enumerate any seven factors taken into consideration when selecting a PLC for a typical application.	M3.04	U
XI	Explain following instructions used in ladder programming. i) Normally open contact ii) Normally closed contact iii) Output Relay coil iv) On Delay timer v) OFF Delay timer	M4.03	U
	OR		
XII	Summarize the math instructions used in PLC.	M4.03	U
XIII	Develop a ladder program for the following circuits: i) Staircase light control ii) Go-down light control	M4.04	A
	OR		
XIV	Develop a ladder program to realize a star delta starter for a three phase induction motor.	M4.04	A

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