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(Revision – 2021)

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Reg. No……
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 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 '*one*' mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	Number of I/O ports in 8051 microcontroller is----------	M1.02	R
2.	List any one register associated with interrupt handling.	M1.02	R
3.	Write the mnemonics employed in 8051 assembly language programs for stack operation.	M2.02	R
4.	Write the instruction for clearing the Accumulator in 8051 assembly language.	M2.02	R
5.	List any two disadvantages of PLC.	M3.01	R
6.	Name any two output devices used in a PLC based system.	M3.03	R
7.	List any two applications of PLC.	M3.04	R
8.	The vertical lines in a Ladder diagram of PLC are called----------	M4.02	R
9.	Draw the ladder logic diagram for NOT gate.	M4.04	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.	Draw the bit format of TMOD register and label all the bits.	M1.02	R
2.	Draw the schematic block diagram of 8051 microcontroller.	M1.02	U
3.	Define interrupts in the 8051 microcontroller and list them in the order of their priorities	M1.04	R
4.	List the alternate functions of port 3 pins in 8051 microcontroller.	M1.04	R
5.	Distinguish between SWAP and XCH instructions in 8051 microcontroller.	M2.02	U
6.	Illustrate the control word register of 8255 PPI.	M2.03	U
7.	List any six general features of PLC.	M3.01	R
8.	Explain the operation of a PLC with a neat diagram.	M3.03	U
9.	Enumerate any six factors to be considered for the selection of PLC for an industrial process control.	M3.04	R
10.	Develop the ladder program to realize following digital gates a) Two input AND gate b) Two input OR gate	M4.04	A

PART-C

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

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	Explain the internal memory organisation of 8051 microcontroller.	M1.03	U
	OR		
IV.	Illustrate the bit format of PSW register in 8051 microcontroller.	M1.02	U
V.	Draw the block diagram of 8255 programmable peripheral interface and explain the functions of each block.	M2.03	U
	OR		
VI.	List the various addressing modes of 8051 microcontroller and explain any three with examples.	M2.01	U
VII.	Write an assembly language program to add two numbers stored in register R0 and R1, and store the result in external memory location 2500H. Also write the bit format of accumulator and carry flag after executing the program. Assume [R0] = 33H and [R1] = 45H.	M2.02	A
	OR		
VIII.	Identify the content of Accumulator and carry flag after executing the following instructions in 8051 microcontroller. MOV A, #5AH RR A SWAP A CLR C RRC A CPL A RL A	M2.02	A
IX.	Compare PLC based panel system with a conventional relay panel system based on any seven criteria.	M3.02	U
	OR		
X.	Illustrate the block diagram of PLC.	M3.03	U

XI.	Develop the ladder diagrams for realising following circuits. a) Starter for 2 hp induction motor with necessary protective elements b) Stair case wiring **OR**	M4.04	A
XII.	Develop a ladder program to realize starter for a 10 hp three phase induction motor.	M4.04	A
XIII.	Explain any four comparison instructions used in PLC ladder programming. **OR**	M4.03	U
XIV.	Explain following instructions used in ladder programming of PLC. (i) Normally open contact (ii) Normally closed contact (iii) OFF delay timer (iv) Output relay coil.	M4.03	U

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