TED (21) 6031C
(Revision-2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL - 2024

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	Specify the capacity of internal RAM and internal ROM of 8051 microcontroller.	M1.03	R
2	List any two applications of microcontroller.	M1.04	R
3	Instruction DIV AB performs division of content of ………. register by ………. register.	M2.01	R
4	Assume register A (Accumulator) in 8051 microcontroller contains data 35 H. After executing the instruction SWAP A, determine the content of register A.	M2.02	A
5	PLC stands for …………..	M3.01	R
6	List any two input devices used in a PLC based system.	M3.03	R
7	Name any two Programming languages used for PLC.	M4.01	R
8	State use of rungs in ladder programming.	M4.02	R
9	Draw a ladder diagram with single input and single output and label the rung and rails on it.	M4.02	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	Compare microprocessor and microcontroller based on any three criteria.	M1.01	U
2	State the purpose of following special function registers. (i) TMOD (ii) TCON (iii) SBUF	M1.02	R
3	Draw the internal memory organization of 8051 microcontroller.	M1.03	R
4	Explain various interrupts in 8051 microcontroller and mention their priorities.	M1.04	U
5	Explain with examples any three byte level logical instructions of 8051.	M2.01	U

6	Draw the connection diagram showing interfacing of 8051 microcontroller with a stepper motor.	M2.04	A
7	Illustrate the scan cycle of PLC.	M3.03	U
8	List any six factors considered for selecting PLC for a typical application.	M3.04	R
9	List any six applications of PLC in automation.	M3.04	R
10	Build the ladder programs to realise following logic gates. (a) AND gate (b) OR 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 and label the pin out diagram 8051 microcontroller.	M1.04	U
	OR		
IV	Illustrate the block diagram of 8051 microcontroller.	M1.02	U
V	Explain with examples various addressing modes of 8051 microcontroller.	M2.01	U
	OR		
VI	Illustrate the bit format of control word register of 8255 Programmable Peripheral Interface.	M2.03	U
VII	Write an assembly language program to find the square of an 8 bit number stored in memory location 8500H and store the result in memory location 8501H and 8502H.	M2.02	A
	OR		

VIII	Identify the content of register A, Carry flag CY and external memory location 8500H after executing the following instructions. Assume the content of external memory location 8000H as 0A H. Show all necessary steps.
	MOV DPTR, #8000 H
	MOVX A, @DPTR
	MOV F0, #04
	MOV R0, F0
	ADD A, R0
	MOV DPTR, #8500 H
	MOVX @DPTR, A
		M2.02	A

IX	Illustrate the block diagram of PLC based system.	M3.03	U
	OR		
X	Summarise advantages of PLC based control panel over conventional relay based control panel.	M3.02	U

XI	Develop a ladder diagram to realise Star Delta Starter for a three phase induction motor.	M4.04	A
	OR		
XII	Write a ladder program to realize the following. (a) staircase light control. (b) DOL starter	M4.04	A
XIII	Explain various timer and counter instructions used in any standard PLC.	M4.03	U
	OR		
XIV	State and explain any seven rules for writing a ladder program.	M4.02	U

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