

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019**

**MICROCONTROLLER AND PROGRAMMABLE
LOGIC CONTROLLERS**

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

- I Answer *all* questions in one or two sentences. Each question carries 2 marks.
1. Specify the size of the internal code memory in 8051 microcontroller.
 2. Identify the addressing mode used in the instruction, `movc a, @a + dptr`.
 3. Identify two types of serial communication.
 4. Write any two features of AVR micro controller.
 5. Suggest any two programming language suitable for a standard micro PLC. (5×2 = 10)

PART — B

(Maximum marks : 30)

- II Answer any *five* of the following questions. Each question carries 6 marks.
1. Sketch the block diagram of 8051 microcontroller.
 2. Illustrate how to set priority levels of various interrupts in 8051.
 3. Mention what is happening while executing following logical operations
CPL A, RLC A, SWAP A and RR A
 4. Compare the 8051 instructions `CJNE R0, #33h,label 1` and `DJNZ R0,label2`
 5. Illustrate control word format and suggest a control word to program the 8255 PPI for following configuration in mode zero.
Port A-output, Port B and C-input.
 6. Sketch the block diagram of a standard micro PLC and name each block.
 7. Suggest factors to be considered while selecting PLCs for industrial control applications. (5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

- III (a) Identify the purpose of following special function registers of 8051.
 (i) TMOD (ii) IE (iii) DPTR (iv) SCON 8
 (b) Sketch the 8051 DIP chip and indicate pin functions. 7

OR

- IV (a) Explain the purpose of each bit of the Program status word register. 8
 (b) A 5V LED is connected to p1.3 of port1 through a resistor. Explain the role of port1 register to make this LED on and off. 7

UNIT — II

- V (a) Develop an assembly language program to solve the following equation and save the result in the external memory location 8200h.

$$y = n + \frac{(n-6)x}{2} \quad n = 08h, \quad x = 02h$$
 8
 (b) List out any seven jump instructions of 8051 in proper format. 7

OR

- VI (a) Write down four important steps to program timer 1 in mode 1. 8
 (b) Differentiate between register addressing and register indirect addressing modes in 8051. 7

UNIT — III

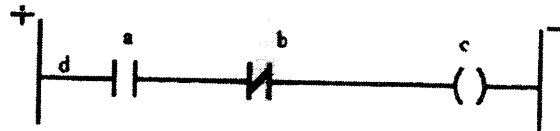
- VII (a) Define the following terms :
 (i) Asynchronous serial communication (ii) Baud rate
 (iii) Data framing. (iv) Synchronous serial communication 8
 (b) A 5V, solid state relay drives 12V lamp. Draw the control and the power circuit to make the lamp blinking using 8051 controller. 7

OR

- VIII (a) Explain AVR architecture with a block diagram. 8
 (b) Draw the block diagram of 8255 PPI chip and name each block. 7

- IX (a) Develop a ladder program to control a three phase induction motor in star - delta mode. Provide start and stop buttons, over load trip and 40 second time delay between star to delta transition.
- (b) Name the elements a, b, c and d shown in the ladder diagram and specify the condition to make c true.

8



7

OR

- X (a) Develop a ladder program to control the traffic lights in the following fashion.

<i>Indicator lamps</i>	<i>Phase 1</i>	<i>Phase 2</i>
Red 1	On	Off
Red 2	Off	On
Green 1	On	Off
Green 2	Off	On

Repeat each phase one after another. Provide 120 second time delay between each transition.

8

- (b) Illustrate how the PLC interact with the input and output devices to realize control logic.

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