

S.Y. Diploma : Sem. IV  
[DE/EJ/ET/EN/EX/EQ/IS/IC/IE]  
**Microcontroller and Applications**  
Prelim Question Paper



Time: 3 Hrs.]

[Marks : 70

- Instructions :** (1) All questions are compulsory.  
(2) Illustrate your answers with neat sketches wherever necessary.  
(3) Figures to the right indicate full marks.  
(4) Assume suitable data, if necessary.  
(5) Preferably, write the answers in sequential order.

1. Attempt any **FIVE** of the following : [10]
- (a) Define the term BUS. List out the different types of BUSES.
  - (b) Find out the number of address lines required to access 8 kb of RAM.
  - (c) Compare between microprocessor and microcontroller. (any two points)
  - (d) Comparison of Von-Neumann and Harvard architecture.
  - (e) List and explain the important features of 8051 microcontroller (any four)
  - (f) Write the operation of the following instructions of 8051 :
    - (i) CJNE A, direct, rel
    - (ii) SWAP A
  - (g) Give the different applications of Stepper Motor.
2. Attempt any **THREE** of the following : [12]
- (a) Explain the interfacing diagram of DAC to 8051. Write an ALP to generate triangular waveform using DAC.
  - (b) Draw pin diagram of 8051 microcontroller.
  - (c) Draw the format of PSW register of 8051  $\mu$ C and state the function of each flag.
  - (d) State and describe the alternate functions of port 3 pins of 8051.
3. Attempt any **THREE** of the following : [12]
- (a) Explain the following directives with example :
    - (i) ORG, (ii) DB, (iii) EQU, (iv) END
  - (b) Develop a program to transfer block of 10 numbers from memory location 7000 to 8000 H stored in internal memory.
  - (c) Describe the function of following instructions of 8051 microcontroller :
    - (i) XCH A, R1
    - (ii) RRA
    - (iii) MOV A, #40H
    - (iv) SWAP A
  - (d) Write an ALP for 8051 microcontroller to multiply two 8-bit numbers 23H and 15H. (Assume suitable memory addresses to store the result)
4. Attempt any **THREE** of the following : [12]
- (a) Develop an ALP to read temperature from LM 35 sensor. Draw the interfacing diagram with 8051.
  - (b) State and explain the use of SCON and SBUF register of 8051.
  - (c) Write assembly language program for 8051 to generate square wave of 10 KHz on port pin P1.7. Assume XTAL, frequency = 12 MHz.
  - (d) Draw the interfacing of Stepper Motor and write an ALP to rotate in clockwise direction.
  - (e) Develop an ALP to transmit message WELCOME serially at baud rate of 9600, 8 bit data, 1 stop bit. Assume crystal frequency of 11.0592 MHz.
5. Attempt any **TWO** of the following : [12]
- (a) Write an ALP for 8051  $\mu$ C to find smallest numbers from the array of ten numbers stored in external memory location 3000 H to onwards. Store result at 6000 H. (Assume suitable data)

(b) Write and ALP to arrange the given data in ascending order in 8051 microcontroller :

Data : (40 H) = 09 H

(41 H) = 07 H

(42 H) = 12 H

(43 H) = 25 H

(44 H) = 01 H

Store the result in (50 H) to (54 H)

(c) Sketch 8021 interfacing diagram to interface 4 LED's and 4 switches, interface LED to port 0 upper nibble and switches to port 1. Develop an ALP to read status of switches and operate LEDs as per switch status.

6. Attempt any **TWO** of the following :

[12]

(a) Develop an 8051 based system for traffic light controlling. Draw interfacing diagram and write and ALP for the same.

(b) Differentiate between the uses of 8051 as timer and counter.

(c) State and explain the need of the following development tools microcontroller board :  
(i) Editor, (ii) Assembler, (iii) Compiler.

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**Paper Discussion Schedule for : S.Y. Diploma Sem. IV**

Date	Day	Timing	Centre
21 April 2019	Sunday	9 a.m. to 11 p.m.	Dadar