

Suresh Kumar. K.B

0535

Code : 9EC-41

Register
Number

--	--	--	--	--	--	--	--

IV Semester Diploma Examination, May 2012

E & C BOARD

MICROCONTROLLERS & ITS APPLICATIONS

Time : 3 Hours]

[Max. Marks : 100

- Instructions :** (1) Section – I is compulsory.
(2) Answer any *two* full questions from each of the remaining Section.

SECTION – I

1. (a) Fill in the blanks :

5

- (i) ACALL is a _____ byte instruction.
- (ii) The Address bus of 8051 has _____ address lines.
- (iii) Bank _____ is the default register bank.
- (iv) The _____ directive is always used for ASCII strings.
- (v) PUSH instruction supports _____ addressing mode.

(b) List the features of 8051 Microcontroller.

5

SECTION – II

2. (a) Define the following terms :

5 × 2 = 10

- (i) Embedded microcontroller
- (ii) Program counter
- (iii) ALE
- (iv) DPTR
- (v) SFR

(b) Define PSW. Explain the function of each bit.



3-

3. (a) Write the addressing modes for the following instructions : 3
- (i) ANL A, RI
 - (ii) CJNE@RI, # 40, NEXT
 - (iii) POP 03
- (b) Explain how RAM is allocated in 8051. 7
- (c) What are Assembler directives ? Explain. 5
4. (a) List the classification of the instruction set in 8051. Give one example for each. 5
- (b) Explain the meaning of following instructions : 6
- (i) SWAP A
 - (ii) MUL A B
 - (iii) MOVX @ RO, A
- (c) Write the function of EA and PSEN pins of 8051. 4

SECTION - III

5. (a) Explain the dual function of port 0. 5
- (b) Write an ALP to transfer data stored in internal RAM location 50 H to external memory location 5000 H. Length of the series is 5. 5
- (c) Calculate the time delay produced by the following subroutine. Assume the crystal frequency of 11.0592 MHz. 5
- Delay : MOV R3, # 300
- Here : DJNZ R3, Here
- NOP
- NOP
- RET
6. (a) Write an ALP to count the number of zero's in a given 8 bit number. 5
- (b) Explain the memory types used in 8051 C. 5
- (c) List the advantages and disadvantages of 8051 C. 5

7. (a) List the logical operators used in C. 5
(b) Write an 8051 C program to convert ASCII digits '4' and '5' to pack BCD. 6
(c) Write a note on single-bit addressability of ports. 4

SECTION - IV

8. (a) What is ISR and IVT ? Explain. 5
(b) Explain the working of timer 0 in mod 2. Illustrate with an example. 8
(c) Write the significance of C/T bit in TMOD Register. 2
9. (a) Describe the function of SBUF and SCON register. 5
(b) How the 8051 is programmed to transfer the data serially ? Explain with an example. 8
(c) Write the importance of TI flag bit. 2
10. (a) Write the steps to execute an interrupt. 5
(b) Explain the interfacing of ADC 0804 with 8051. 8
(c) Draw the connection of LED interface with 8051. 2
-

0544

Code : 9EC-41

Register
Number

--	--	--	--	--	--	--	--

IV Semester Diploma Examination, November 2011

E & C BOARD

MICROCONTROLLERS AND ITS APPLICATIONS

Time : 3 Hours]

[Max. Marks : 100

- Instructions :** (1) Section - I is compulsory.
(2) Answer any two full questions from each of the remaining Sections.

SECTION - I

1. (a) Fill in the blanks : 5 × 1 = 5
- (i) On power-up, the 8051 uses RAM location _____ as the first location of the stack.
- (ii) In mode 2, the counter rolls over which it goes from _____ to _____.
- (iii) The register which keeps track of program execution is _____.
- (iv) Each machine cycle in 8051 takes _____ clock periods.
- (v) The _____ mnemonic in 8051 tells the processor to do nothing.
- (b) Write a note on the different addressing modes of 8051. 05

SECTION - II

2. (a) Explain with a block diagram, the architecture of 8051 microcontroller. 10
- (b) Discuss the criteria for choosing a microcontroller. 05
3. (a) Explain the internal configuration of port 1 of 8051 and describe how a data can be written to a port. 07
- (b) List the pins of 8051 which are used to interface with external memory and explain. 06
- (c) Write the general format of an assembly instruction. 02
4. (a) What are assembler directives ? Explain EQU & ORG directives. 05

EC-035

- 2 -



[Turn over

- (b) Explain the following :
- (i) MOVX A, @DPTR
 - (ii) CPL A
 - (iii) XRL A, A
 - (iv) XCH A, RI
- (c) What is in register A after the execution of the following code ?
- ```
MOV A, #85H
SWAP A
ANL A, #0F0H
```

### SECTION – III

5. (a) What is in register A after the execution of the following codes ? Write the status of the flags.
- (i) MOV A, #3AH  
MOV ODOH, #00H  
ADDC A, #9DH
  - (ii) CLR A  
SETB C  
RRC A
- (b) Write an ALP to find the largest element in a given string of  $n = 6$  bytes with algorithm or comments.
6. (a) List the advantages and disadvantages of programming 8051 in 'C'.
- (b) Explain the result of the following 'C' statement :
- (i)  $P_0 = 0 \times 48 \& 0 \times 0f$ ;
  - (ii)  $P_0 = 0 \times 84 \gg 2$ ;
- (c) Write an 8051 C program to convert packed BCD  $0 \times 49$  to ASCII & display the bytes on P1 & P2.
7. (a) Write an 8051 'C' program to toggle the pin P2.4, 500 times.
- (b) Write a program to monitor the P2.0 bit. When it is high, send 'FF' to P1, otherwise send '00' to P1.
- (c) Write instructions to get the status of P2.7 and put it on P2.0.

## SECTION - IV

8. (a) List the advantages of having interrupts over polling method. 04  
(b) Explain the steps the microcontroller goes through when it accepts an interrupt. 05  
(c) Explain the bit structure of TMOD register. 06
9. (a) Explain the steps to program the 8051 timers in mode 1 operation. 06  
(b) Write an ALP to generate a delay of 12  $\mu$  sec using Timer 0 in mode 1 with a XTAL frequency of 22 MHz. 06  
(c) What is the role of the SCON register in serial data transfer? 03
10. (a) Write an ALP to transfer a letter "A" serially at 4800 baud rate continuously from serial port using mode 1 operation. 06  
(b) Write the schematic diagram and algorithm for interfacing LCD with the 8051. 06  
(c) Write an ALP to generate a saw tooth waveform. Assume a DAC 0808 interfaced to 8051 at port 1. 03

Code : 9EC-41

Register Number 

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|

IV Semester Diploma Examination, May 2011

ELECTRONICS & COMMUNICATION ENGG. BOARD

MICROCONTROLLERS & APPLICATIONS

Time : 3 Hours ]

[ Max. Marks : 100

- Note : (1) Section – I is compulsory.  
(2) Answer any *two* full questions from each of the remaining Sections.

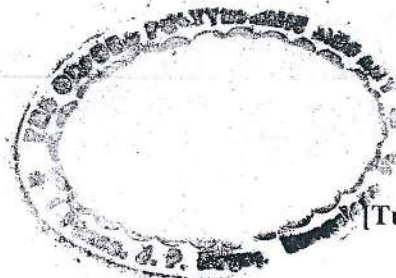
SECTION – I

1. (a) Fill in the blanks : 5  
(i) MOVA, @ Ri is an example of \_\_\_\_\_ addressing mode.  
(ii) \_\_\_\_\_ port lines of 8051  $\mu$ c require external pull up.  
(iii) To transfer a data byte serially, it must be place in \_\_\_\_\_ register.  
(iv) Upon power up, the SP register has a value of \_\_\_\_\_.  
(v) Registers SBUF and SCON are declared in 8051 C using the \_\_\_\_\_ keyword.  
(b) What are assembler directives ? Explain any two. 5

SECTION – II

2. (a) What is a microcontroller ? List the applications of microcontroller. 5  
(b) What is Stack ? What is the function of SP, PC, ALU and Reg A in 8051. 5  
(c) Explain PSW of 8051. 5
3. (a) What is the function of ALE, TO, TXD and  $\overline{EA}$  pins of 8051 ? 4  
(b) Explain the internal configuration of PORT  $\uparrow$ . 5  
(c) Define : 6  
(i) Compiler  
(ii) Cross Assembler  
(iii) Loader

EC-033



[ Turn over

4. (a) Explain any four addressing modes of 8051 with an example for each. 6
- (b) Explain the following instructions : 6
- (i) DA A
- (ii) XCHD A, @Ri
- (iii) SWAP A
- (c) Write an assembly language program to add two 8 bit data present in memory locations 40 H and 41 H and to place the 8 bit result (sum) in M.L. 42 H. 3

## SECTION - III

5. (a) Explain the following instructions : 10
- (i) RET
- (ii) ACALL
- (iii) JBC bit, label
- (iv) DJNZ Ru, label
- (v) CPL C
- (b) Write an assembly language program to transfer a series of data (8 bit) from internal RAM (starting from address 40 H) to external RAM starting from address 0200 H. The length of the series in bytes is in memory location 3 FH. 5
6. (a) List the advantages and disadvantages of using embedded C. 4
- (b) Write a note on data types in 8051 C. 5
- (c) Explain the result of following C statements : 6
- (i)  $P_1 = 0 \times 04 | 0 \times 68;$
- (ii)  $P_2 = 0 \times 54 \wedge 0 \times 78;$
- (iii)  $P_0 = 0 \times 9A \gg 3;$
7. (a) Write a 8051 C program to convert packed BCD 34 to ASCII and to display the bytes on P<sub>1</sub> and P<sub>2</sub>. 5
- (b) Write a 8051 C function using for loop to create sometime delay. Use it in a program to toggle all the bits of P0 and P2 continuously with that delay. 6
- (c) Write an assembly language program to create a square wave of 66.66% duty cycle at Bit 3 of port ↑. 4