Question Paper

Exam Date & Time: 31-Dec-2019 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATIONS
NOVEMBER 2019
III SEMESTER B.sc. (Applied Sciences) in Engg.
MICROCONTROLLERS [IEE 234 - S2]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.
Missing data, if any, may be suitably assumed.

1) A) Explain the function of the following instruction of 8051. Illustrate with suitable example (8)

```
DIV AB
XCHD A,@R0
MOVX A,@R1
JNZ BACK
```

B) What do you mean by bit manipulation instruction of 8051? List all the register and RAM locations which are bit accessible. Describe the following bit manipulation instructions. Illustrate with relevant example (8)

```
ANL C,/bit
JNB bit, THERE
```

C) Explain the functions of the following signal of 8051 with respect to external memory interfacing (4)
i. ALE ii. $\overline{PSEN}$ iii. $\overline{EA}$ iv. $\overline{RD}$

2) A) Find the time delay provided by the following 8051 instruction if crystal frequency is 16MHz. (8)

a)
```
        MOV r1,#0F3H
        MOV r0,#00H
Loop:   DJNZ r0,Loop
        DJNZ r1,Loop
```

b)
```
        MOV R1,#0D0H
        MOV R0,#0c5H
Loop1:  NOP
        DJNZ R0,Loop1
Loop2:  DJNZ R1,Loop2
```

	B)	Write an 8051 ALP to add 100 BCD numbers are stored in memory location starting from 40H and store the BCD result in memory location 90H and 91H.	(8)
	C)	Describe the different addressing modes supported by the instruction set of 8051.	(4)
3)		Write an 8050 ALP to count the number of people crossing an entrance. Assume that each time a person crosses the entrance; a pulse is generated and is applied to T0 pin of 8051. After every minute load the count value to port1 and port2 for display. Reset the count back to 0000H after maximum value 0100H is reached .Use the timer 1 in mode 1 to obtain the required delay	(10)
	A)		
	B)	Describe the function of all the 8bits of timer control TCON an d IE register of 8051	(10)
4)		Interface DAC0800 to 8051 and write an 8051 ALP to generate a waveform $v_0(t)=2.5+2.5\sin\theta$.	(10)
	A)		
	B)	With a neat interfacing circuit write an 8051 ALP to generate a rectangular wave of 500Hz with 40% duty cycle on PC2 pin of 8255 in I/O mode of 8255. Assume base address of ports to be 90H. Use 8 bit registers of 8051 to obtain the delay.	(10)
5)		Write a main program to transfer message 'WAIT' continuously at 9600 baud. Enable external interrupt '0' as edge triggered interrupt and external interrupt '1' as level triggered interrupt. When external interrupt '0' is activated, turn on the LED connected to P2.3 for 5seconds and then return to main program else if external interrupt '1' is activated receive 10 bytes of data serially at 9600baud and store them in consecutive location starting from 55H onwards and then return to the main program.	(15)
	A)		
	B)	Describe the asynchronous and synchronous modes of serial data transmission.	(5)
6)		Design an interfacing circuit to interface the following memory devices to 8051. Show the complete interfacing circuit. Use absolute decoding. 1KX8 RAM as data memory starting at 8000H 2KX8 EPROM as program memory starting at 4000H 4KX8ROM as program memory starting at 6000H	(10)
	A)		
	B)	List the different interrupt of 8051 along with their vector tables. Explain the steps involved in executing an interrupt by 8051 instruction to give a serial interrupt more priority than timer 1 interrupt. Also list the changed interrupt priority order	(10)
7)		Interface a 16X2 LCD display to 8051 and write an ALP program for initialisation and display message "ELECTRICAL" in line 1. Use 5X7 matrix character display	(10)
	A)		
	B)	Write an 8051 ALP to generate 1KHZ square wave in first pin of port1. Use registers to generate required delay	(5)

C) Ten hex numbers are stored in RAM location starting from 50H onwards. Write an 8051 ALP to find the largest number in the set and store in 60H. (5)

8) Write an 8051 ALP to find first high bit (starting from LS bit) in a set of 10 unsigned number stored in memory location starting at 55H. IF first high bit is in position 4 (D_3 bit), then store all such numbers starting from 65H, otherwise ignore the number. Also obtain the count of such numbers and store it in memory location 75H. (10)

A)

B) Write an 8051 C program to toggle all the bits of port1 with a delay of 1.85s in between. Use timer 1 in mode 1 to obtain the required delay (4)

C) State whether the following instructions are legal or illegal. If legal mentioned the type of addressing mode and if illegal state the reason for the same (6)

i) ANL 40H,41H
ii) MOV DPTR,#0FFH
iii) XCH@R1,A
iv) DEC DPTR
v) ADD A,@R2

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