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| HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY  **SCHOOL OF ELECTRONICS AND TELECOMMUNICATIONS**  --------  **ID :614 Number of pages: 2** | | **SUBJECT : Digital Design 2**  *Final*  *Date : Jun 14/2018*  *Duration: 90 minutes*  ***(Closed book exam)*** |
| Name:  Student ID:  Class: |  | Administrator signature: |

**Part I.** Multiple choice questions (5 points)

Draw the below table to your exam paper and answer the questions.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| No | Answer | No | Answer | No | Answer | No | Answer |
| 1 |  | 6 |  | 11 |  | 16 |  |
| 2 |  | 7 |  | 12 |  | 17 |  |
| 3 |  | 8 |  | 13 |  | 18 |  |
| 4 |  | 9 |  | 14 |  | 19 |  |
| 5 |  | 10 |  | 15 |  | 20 |  |

**01:** When designing with 8086, what happen if the designer swaps D0 and D1 pins:

**A**. System works normally **B**. The system does not work, need to redesign.  
 **C**. If one writes to RAM 00010001b, when he reads, he gets 00010010b **D**. B and C is correct

**02.** Which of the following name is not valid in assembly language

**A.** 1\_variable **B.** fET **C.** .Bien **D.** \_xyz

**03.** Which programming structure is it?

LABEL:

DEC SI

JS END

JMP LABEL

END:

**A**. While **B**. Do While **C**. If **D**. If Else

**04.** The microprocessor using in sensor node for Internet of Things applications should be?

**A**. Low cost **B**. Fast **C**. having many core **D**. All three are not correct

**05.** Which of the following memory do not lost data if there is no power:

**A.** DDR-SDRAM **B.** EDO-RAM **C.** MRAM **D.** SRAM

**06.** In personal computer, the number -127 in 8bit signed representation is:

**A.** 11111111 **B.** 11111110 **C.** 01111111 **D.** 10000001

**07.** Which of the following is NOT valid

**A.** MOV SP, 0040h **B.** MOV DS, 0040h **C.** MOV AX, 0040h **D.** MOV SP, 40h

**08.** After performing the following code, AL holds which value

PUSH 0EC6h

MOV BP,SP

MOV AL,[BP+1]

**A.** 0Eh **B.** ECh **C.** C6h **D.** Undefined

**09.** Let SI=1000H. When executing MOV AH,[SI+1], what is the signal on pins ~BHE và A0 of 8086?

|  |  |  |  |
| --- | --- | --- | --- |
| **A.** 0 1 | **B.** 0 0 | **C.** 1 0 | **D.** No correct answer |

**10.** Let SS=1020h, SP=0100h, what is the value of physical address of the top of stack?

|  |  |  |  |
| --- | --- | --- | --- |
| **A.** 02020h | **B**. 0F20h | **C**. 10300h | **D**. 1120h |

**11.** What is the coding mistake of the following sub-routine (procedure)?

SUBPROC PROC

MOV CL,3

SHL AX,CL

SUBPROC ENDP

|  |  |  |  |
| --- | --- | --- | --- |
| **A**. Lack of register storage to stack | **B**. Lack of parameter input | **C**. Lack of RET instruction | **D**. All 3 |

**12.** How large is the following data declaration?

MSG DB 10 DUP(48)

A DW 20,120

|  |  |  |  |
| --- | --- | --- | --- |
| **A.** 10 | **B.** 14 | **C.** 52 | **D.** 12 |

**13.** The main difference between MOV AL, 0Fh and IN AL, 0Fh is

**A.** the data destination **B.** the data source **C.** The instruction size **D.** The instruction type

**14.** Which instruction checks bit 2 of AL?

|  |  |  |  |
| --- | --- | --- | --- |
| **A.** OR AL, 4 | **B.** XOR AL, 4 | **C.** AND AL, 0FBh | **D.** TEST AL, 4 |

**15.** Let AX=000Ah. How many times the following code folds AX:

MOV BX, AX

SHL AX, 2

ADD AX, BX

**A.** 2 times **B.** 10 times **C.** 3 times **D.** All wrong

**16.** Let DS= 2AF3, AX=4C6D, BX=0000. The signaling at pin AD3...AD0 of 8086 at clock sycle T3 when executing MOV [BX+2], AX is

**A.** 1101 **B.**0100 **C.**1100 **D.** Undefined

**17.**Apple iPhone or Samsung Galaxy microcontroller systems use

**A.** 1 CISC microprocessor **B.** One RISC microprocessor

**C.** Many CISC microprocessor **D.** Many RISC microprocessor

**18.** How large is the following data declaration?

MSG DB 10 DUP(48)

A DW 20,120

|  |  |  |  |
| --- | --- | --- | --- |
| **A.** 10 | **B.** 14 | **C.** 52 | **D.** 12 |

**19:** According to Moore law, number of transistors on a chip increases ….. times each 18 months

**A.** 1.5 **B.** 2 **C.** 2.5 **D.** 3

**20.** Let BX=0004 and the data in memory be: DS:0000 00 5A 47 C1 50 1A B8 90

After instruction “ MOV AX, [BX+2] “, AX will be

**A.** B81A **B.** 1AB8 **C.** B890 **D.** 90B8

**Part II.** (5 points)

**Q1.** Write the assembly program for 8086 to do the following: (2 points)

1. Input N. Check if the input is valued from 0 to 9. If not, redo the task.

2. Calculate 21+22+…2N

3. Write the result to the screen using predefined function PRINT. (Student do not need to realize this function)

|  |  |
| --- | --- |
| PRINT: print a 16 bit number to screen | Input: AX the value to display  Usage: CALL PRINT |

**Q2. (**2 points**)**

Design memory for 8086 using 74138, 74139, and other logic circuits:

Using chip 27256 (8Kx8bit) for having memory of size 112KB ending at 1FFFFh

**Q3. (**1 points**)**

The sound decoration system is defined as follows:

The 8086 is connected to a 8255 with PA is at A0h and PB is at A2h. PA is connected with 8 LEDs , PB is connect with 8 Buttons. If PAx is 1, LEDx is ON (with x is from 0 to 7). If Button x is pressed, PBx is 1.

1. Draw the circuit. You can assume ADC as a block having 8 pins connected to PA.
2. Write the assembly code such that if Button x is pressed, LEDs from 0 to x is ON, otherwise, LED is OFF.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Control Word Register | | | | | | | | MA=Mode for Port A (00, 01, 1x)  MB=Mode for port B (0, 1)  D=Direction (0 – out, 1- in) |
| 1 | MA | MA | DA | DCH | MB | DB | DCL |

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Good luck