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| **Cairo University** | **CMP201A** | **Total:75 Points** |
| **Faculty of Engineering** | **Microprocessor Systems** | **2018-2019** |
| **Computer Eng. Department** | **Final Exam**  | **Two Hour** |

**This is an open-book, open notes exam. All electronic devices - Except calculators - are forbidden.
Make any reasonable assumptions (if necessary)
Answer the following questions**

**Q1- A - [7] Indicate if the statement is True or False by writing TR or FL**

|  |  |
| --- | --- |
| Line status register is used to check if there is a character received |  |
| Serial communication is cheaper than parallel communication. |  |
| For slow computers, it is recommended to use two stop bits instead of only one. |  |
| Full assembly program (All segments) could be written inside inline assembler  |  |
| To check if the result is negative, it is required to check the NEG flag |  |
| For serial communication, increasing the transmission distance requires transmission speed to be increased  |  |
| overflow flag is always equal to carry flag for signed operations |  |

**Q1-B-[10]Allocate syntax errors and write V(Valid) or I (Invalid)for each of the following instructions**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **V/I** |  | **V/I** |
| MOV BX,AL |  | MOV CS,0ABABH |  |
| POP CX |  | ADD ESI,0ABABABABH |  |
| ADD BX,[AX] |  | PUSHA |  |
| REP LODSB |  | POPF AX |  |
| DEC ECX |  | OUT 20,AX |  |

**Q1-C-[6] Trace the following code showing the content of destination register after each step (in HEX)**

|  |  |
| --- | --- |
| MOV AL,5 |  |
| MOV BL, AL |  |
| SHL BX,8 |  |
| MUL BH |  |
| SBB AH, 4 |  |
| DIV BL |  |

**Q2-A- [15] For the following program**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| .model small.codemain proc far shl bl,8 mov al,'H'mov cl,alpush axadd bl,alinc bl | mov dl,bladd dl, 5push dx mov ah,2int 21hinc dlpush dxint 21hsub dl,cl | add dl,8add ah,3shr ax,8xor dh,dhxchg dx,axdiv dl mov dl,al add dl,clsub dl,8 | mov ah,2int 21h pop bxadd dx,bxsub dl,cladd dl,8int 21h pop bx sub bl,cl | add bl,8xchg ah,bl shr ax,8div bl add dl,alxchg bl,ahint 21h endp mainend main |

**What is the output of the program?**

**Q2-B- [4] Choose Parallel or Serial communication for each of the following devices by putting (√) under your choice**

|  |  |  |
| --- | --- | --- |
|  | **Parallel** | **Serial** |
| 1. Land line telephones
 |  |  |
| 1. Internet cables
 |  |  |
| 1. Old Printers
 |  |  |
| 1. Modern ( new ) hard disks
 |  |  |

**Q2-C- [20] What is the output of each of the following programs**

|  |  |
| --- | --- |
| .model small.codemain proc far mov ax, 13h int 10h mov ax,0c0fhmov cx, 20mov dx, 10mov si,1mov di,cxadd di,sic:int 10hinc cxcmp cx,dijnz csub cx,sidec cxadd si,2mov di,cxadd di,siinc dxcmp dx,30JNE cendp mainend main | .model small.dataX dw 247Y dw 221 .codemain proc far mov ax,@datamov ds,axMOV AX,XMOV BX,YW:CMP AX,BX JE RJL ESUB AX,BX JMP BE:SUB BX,AXB:JMP WR: MOV DX,AXendp mainend main |
|  |  |

**Q3 – A - [5] Complete the following statements**

To increase the available memory size, it is required to increase…………………………………memory

Knowing that DS=CCCC and IP = ABAB the physical address of the current command is …………………

The content of AL after executing ADD AL,0DDH where AL=0CCH is ……………………………

To Avoid overflow one of the following commands could be used …………………. Or ……………….

**Q3-B- [6] State three methods that used to increase processor speed ( For a single core processor)**

1-…………………………………………… 2-………………………………………………………

3-……………………………………………………………………………………………………………

**Q3-C- [6] A system designer wants to increase communication speed by using both serial and parallel communications at the same time. He decided to use eight isolated cables to send eight bits at the same time. Each line sends bits serially. Therefore, data sent serially byte by byte instead of bit by bit.**

**State two problems. (only ONE LINE per problem)**

1-…………………………………………………………………………………………………………….

2-…………………………………………………………………………………………………………….

**Q4-A- [26] Write a single instruction for each of the following operations. Note that no other changes should occur.** **(With default flags)**

|  |
| --- |
| Set the zero flag (Nine different commands) |
|  |  |  |
|  |  |  |
|  |  |  |
| invert the parity of AX |
|  |
| Set the upper nibble of AH |
|  |
| Decrement AX by one using two methods |
|  |  |

**Q4-B- [3] State the usage of each of the following commands**

|  |  |
| --- | --- |
| DEC |  |
| XCHG |  |
| SUB |  |