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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  .code  main proc far  shl bl,8  mov al,'H'  mov cl,al  push ax  add bl,al  inc bl | mov dl,bl  add dl, 5  push dx  mov ah,2  int 21h  inc dl  push dx  int 21h  sub dl,cl | add dl,8  add ah,3  shr ax,8  xor dh,dh  xchg dx,ax  div dl  mov dl,al  add dl,cl  sub dl,8 | mov ah,2  int 21h  pop bx  add dx,bx  sub dl,cl  add dl,8  int 21h  pop bx  sub bl,cl | add bl,8  xchg ah,bl  shr ax,8  div bl  add dl,al  xchg bl,ah  int 21h  endp main  end 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  .code  main proc far  mov ax, 13h  int 10h  mov ax,0c0fh  mov cx, 20  mov dx, 10  mov si,1  mov di,cx  add di,si  c:int 10h  inc cx  cmp cx,di  jnz c  sub cx,si  dec cx  add si,2  mov di,cx  add di,si  inc dx  cmp dx,30  JNE c  endp main  end main | .model small  .data  X dw 247  Y dw 221  .code  main proc far  mov ax,@data  mov ds,ax  MOV AX,X  MOV BX,Y  W:CMP AX,BX  JE R  JL E  SUB AX,BX  JMP B  E:SUB BX,AX  B:JMP W  R: MOV DX,AX  endp main  end 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 |  |