Question Number 2 (2*5=10 Marks)

Write the short answers to the following questions.

i. Differentiate between computer architecture and computer organization.

computer architecture is study of system in which we study how computer works on the basis of registers and memory.
computer organization is a study of system which involves transfer data to [illegible] and CPU

ii. Why is it necessary for the DMA to send an ACK to CPU?

DMA send ACK to CPU because it want to tell the CPU that the process is over and the DMA transfer to [illegible] interrupt

iii. What are the drawbacks of using sign-magnitude representation to represent negative numbers?

the main drawback for signed magnitude is we compute [illegible] the signed value while operation [illegible] we first convert to its 2's complement and then we operate

iv. What are the steps involved in execution of PUSH instruction and in which order they are executed?

mov [illegible]
mov ax,[SP]
PUSH ax
[illegible]
INC SP

v. If we use single operand format for multiplication, then is there any chance that the result will not fit in the destination register(s)? Explain briefly.

when we use operand format the result will sometime not fit because the size of operand is small
as we know that when we multiply 2 operands the size will increase.

vii. What happens to SP and IP when CALL and RET instructions are executed.

When CALL and RET instructions are executed the value of SP and IP pass the instruction which are called and when the RET instruction executed the process call the function or subroutine and pass the control

viii. Write a single assembly language instruction rather than any to assert all the bits of a value stored in AX register

ROL AX,4

ix. Draw PDP - 8 instruction format for the memory reference instruction. Also define the basic difference between PDP - 8 and PDP - 10 instruction formats.

x. What are the major functions of an I/O Module?

The major function of I/O module

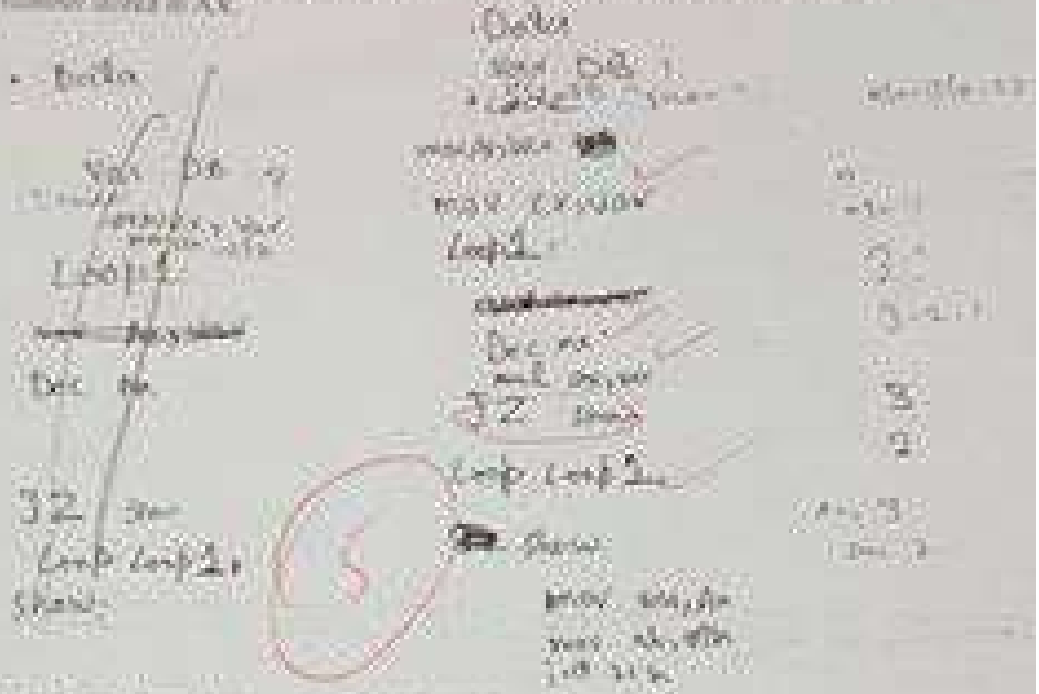
Read
write
send data
Receive data

xi. What are the two basic design issues in instruction formats?

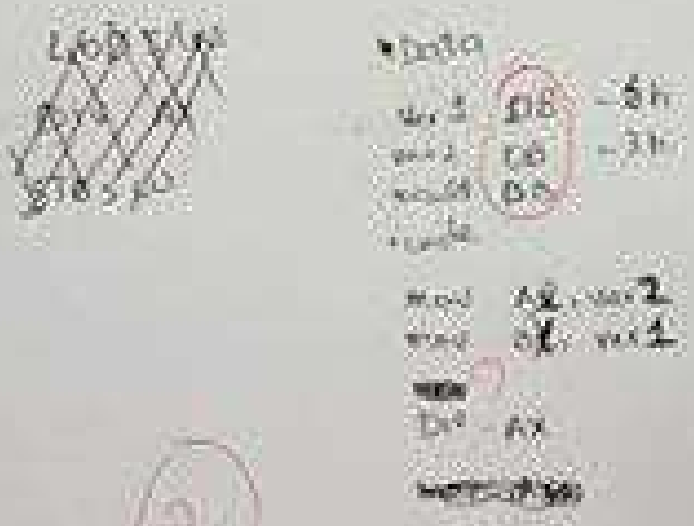
1) How to store in process
2) CPU register

estion Number 2 (5 + 5 = 10 Marks)

a) Write an Assembly language program (according to syntax of emu8086) to calculate the factorial of a number stored in AX.



b) Divide 2 signed numbers (according to syntax of emu8086) in such a way that the probability of div-zero overflow is minimum.



Question Number 2 (05 Marks)

Write the names of five available addressing modes and draw a diagram to illustrate the register indirect addressing.

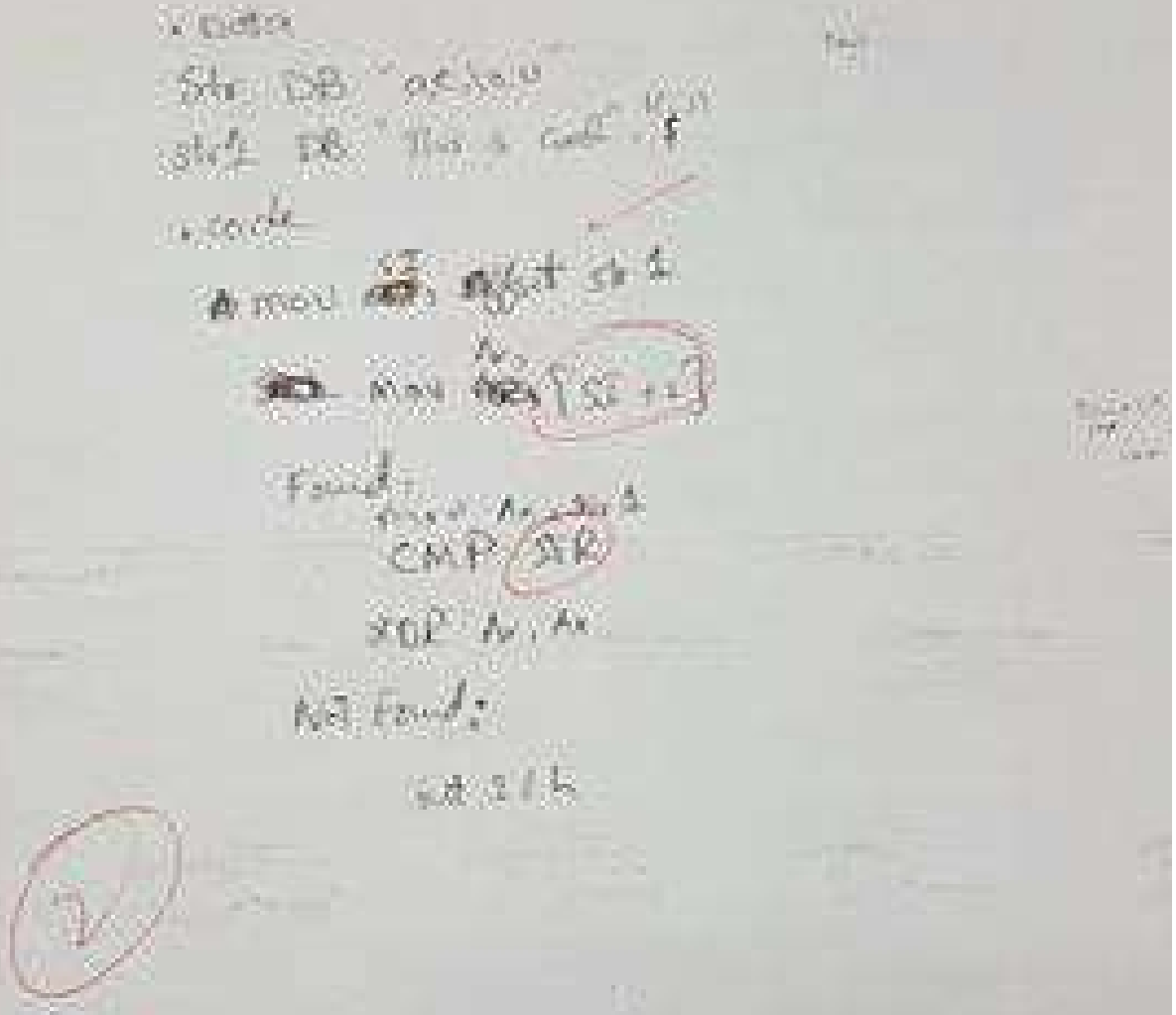
(1) Immediate Addressing
(2) Direct Addressing
(3) Indirect Addressing
(4) Register Addressing
(5) Register Indirect Addressing
(6) Indexed

Register Indirect Addressing

5

Question Number 1 (10 Marks)

Write an assembly language program to count the number of vowels in a given string.



Question Number 5 (05 Marks)

Identify the errors in the following codes and correct them by re-writing the code.

	Incorrect Code	Errors	Corrected Code

a)	COUNT = 500
	COUNT1 EQU 400
	COUNT = 5
	mov al,COUNT
	COUNT = 10.5
	mov al,COUNT
	COUNT2 EQU 100
	mov al,COUNT1
		Count
		Count = 10.
			Count = 500
			Count1 EQU 400
			Count = 5
			mov al, Count
			Count = 10.5
			mov al, Count
			Count2 EQU 100
			mov al, Count2

b)	mov ax,8002h
	mov cx,210h
	div cx
		mov ax,8002h
		mov cl,10h
		div cx
			mov ax,8002h
			mov cx,10h
			div cx

c)	.data
	var DB 48
	.code
	mov al, var
	mov bl,45
	div al
		mov al,var
		div bx
			.data
			var DB 48
			.code
			mov al, var
			mov bl,45
			div bx

Question Number 4 (10 Marks)

Suppose that the following string has been declared

String DB "HTTP COURSES ARE BEST"

Write instructions that will cause each "T" to be replaced with "E"

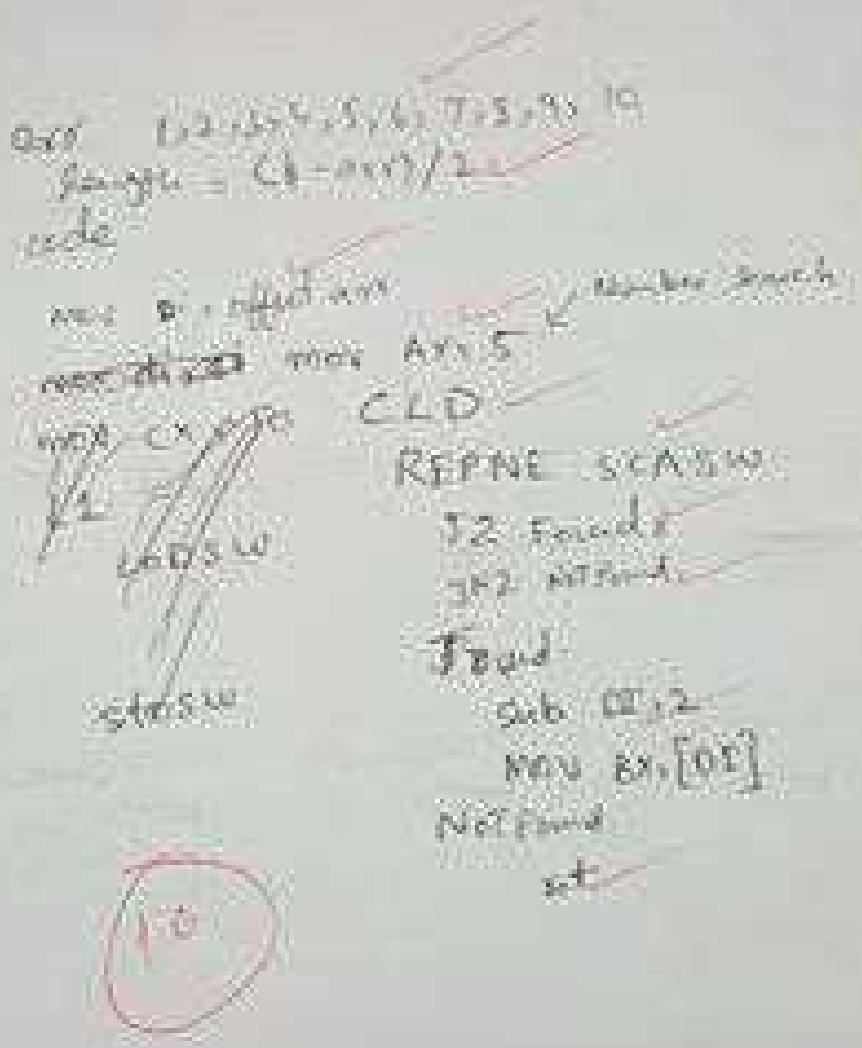
```
.DATA
STR DB "HTTP COURSES ARE BEST"
LENGTH = ($-STR)
.CODE
MOV DS, AGAIN AAA
MOV BX, OFFSET STR
CLD
REPNE SCASB
JZ FOUND
JMP NOTFOUND
FOUND:
MOV SI, BX
MOV BX, [SI]
MOV BX, 'E'
CHANGE:
INC
```

(10 Marks)

Question Number 7

Write an assembly language code to count the number of 1's in AX register and then set or reset the parity flag accordingly.

on Number 8 (10 Marks)
code by using string primitive instructions to find the number stored in AX from an of 10 unsigned words. If the required number is found then store that number in BX at using AX and stop searching otherwise search the entire array.



Question Number 2 (10 Marks)

If you have following variable defined in data segment

```
var1 DW 1563
var2 DB 38
var3 DB 20
var4 DW 1200
var5 DD 45000
var6 DB 23
res DW ?
```

Then write a program to implement the following arithmetic expression (5 points)

res = var1 + var2 × var3 − var4 + (var5 / var6) × (var5 MOD var6)

Then check the bit number 10 in the answer. If the bit is set then set the zero flag, otherwise set the parity flag.

```
.code
mov AX, var1
mov BL, var2
CBW
Add AX, BX
mov BL, var3
CBW
mul AX
mov BX, var4
sub AX, BX
mov BX, var5
mul BX, var6
DIV BX
CBW
Add AX, BX
mov BX, var5
mul CX, var6
MOD BX
CBW
Add AX, BX

MOV res, AX
JZ cond1
JNZ cond2
cond1:
STP
int 21h
cond2:
STZ
int 21h
ret
```

(3)

Question Number 10 (10 Marks)

- Two's complement method
- Booth's algorithm

And then compare the results generated by both the approaches.