Page No.
Date

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Solution 1) a) The functions performed by Bus interface Unit are:

- BIU is responsible for external bus operations
- It performs fetching, reading, writing for memory as well as I/O of data for peripheral devices.
- The BIU also performs address generation and the population of instruction queue.

2. b) The Execution Unit is responsible for work:

- The instructions are decoded and executed by it.
- The EU accepts instructions from the instruction queue and from the general purpose registers it takes data.
- It has no relation with system buses.

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Solution 2>

8086 has 16-bit flag register

Bits	D_{15}	D_{14}	D_{13}	D_{12}	D_{11}	D_{10}	D_9	D_8	D_7	D_6	D_5	D_4	D_3	D_2	D_1	D_0
Flags					O	D	I	T	S	Z		AC		P		CY

Status flags.

Flag Bit	Function of bit.
S	It indicates that the number is negative.
Z	If total register is zero, then only z flag is set.
AC	It handles Carry operations.
P	It denotes the parity, odd number of 1's o parity and vise versa.
CY	This is Carry bit.
O	This is overflow flag bit.

Page No.
Date

Name: Lakhan Kumawat
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Course: Microprocessor and MicroControlles.
Course Code: CS5469
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—x—x—x—

Control flags:

Flag bit	Function.
D	This is directional flag, used in String related operations.
I	This is interrupt flag.
T	This is trap flag used for on-chip debugging.

Solution 3) The Stack pointer points to the current topmost datum on the Stack. A push operation decrements the pointer and copies the data to the Stack.

The Stack uses LIFO algorithm.

The pop operation copies data from the stack and then increments the pointer.

Page No.
Date

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Branch: CSE-1
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Course Code: CS5469
Date: 28-10-2021

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DIV CL:

Solution 4) Word in AX / byte in CL
Quotient in AL, remainder in AH.

DIV CX:

Double word in DX and AX / word in CX.
Quotient in AX.
Remainder in DX.

Page No.
Date

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Course Code: CS5469
Date: 28-10-2021

Solution 5> Assembles Directives of 8086 Microprocessor.

i> The DB Directive - It is used to declare a BYTE - 2-BYTE variable. a byte is equal to 8 bits.

ii> The DW Directive - It is used to declare a word type i.e. 16 bits.

iii> DD - It is used to declare a DWORD i.e. 32 bits.

iv> The STRUC and ENDS: The STRUCT directive tells the assembler that a user defined uninitialized data structure follows.

A structure Ends using ENDS directive meaning end of structure.

v> SEGMENT:

It is used to indicate the start of a logical statement. It is the name given to the segment.

Page No.
Date

Name: Lakhan Kumawat
Roll No: 1906055
Branch: CSE
Course: Microprocessor and Microcontrollers.
Course Code: CS5469
Date: 28-10-2021

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Solution 6.)

```
DATA Segment.
    Sum DB 01 DUP (?)
    AVG DB 01 DUP (?)
Data ENDS.
CODE SEGMENT
    ASSume CS:CODE DS : DATA.
  START:

      MOV AS.DATA
      MOV DS.AX
      MOV AX.00
       MOV AL.04
      ADD AL.02
      ADD AL.08
      ADD AL.03
      ADD AL.03
      MOV SUM AL
      MOV BL.05
      DIV BL
      MOV AVG AL
    CODE ENDS
    END START
```

Page No.
Date

Name: Lakhan Kumawat
Roll No: 1906055
Branch: CSE
Course: Microprocessor and Microcontrollers.
Course Code: CS5469
Date: 28-10-2021

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Solution 7>

```
MOV CX, 05h
MOV AX, 0000h
MOV BX, 0000h
MOV SI, 1000h
REPEAT:
 MOV BL, [SI]
 MUL AX, BX
 INC SI
 DEC CX
 JNZ REPEAT
 MOV DI, 1011h
 MOV [DI], AX
 HLT.
```

Page No.
Date

Name: Lakhan Kumawat
Roll No: 1906055
Branch: CSE
Course: Microprocessor and Microcontroller.
Course Code: CS5469
Date: 28-10-2021

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Solution 8) CMPSB

Stands for 'Compare String Byte'. It moves the pointer ^ Compares the Contents of a byte (8 bits) at DS:SI with the contents of a byte at ES:DI and sets the flag.

Solution 9) DS = 6000H , BX = 1000H

MOV CX, [BX + 0003H]

Effective Address = DS * 10 = 60000 H.

Physical Address = Effective Address + BX + 0003H
= 60000H + 1000H + 0003H

= 61003H

CX ← [61003]

CL ← will get lower 8 bits i.e. of address [61003H]

Page No.
Date

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Page No.
Date

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Solution 10) 1) Immediate addressing mode.
2) Register addressing mode.
3) Register Indirect addressing mode.
4) Implied addressing mode.