Name : Soham Pawar
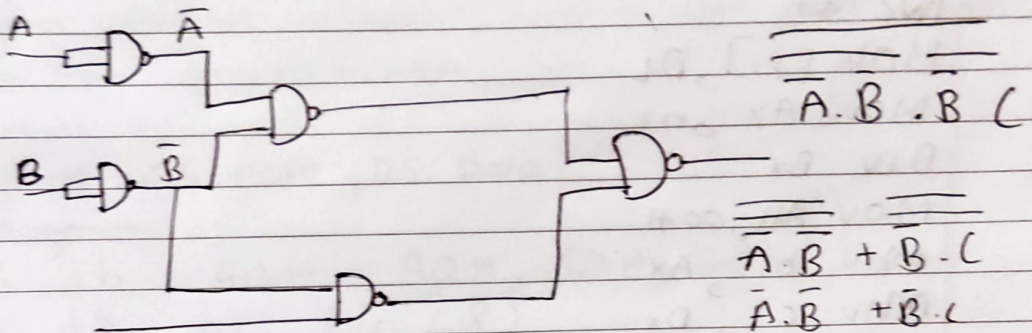Rollno : 71

Q1 Implement the following SOP Expression using NAND Gates

$$y = \Sigma m (0, 1, 3)$$

	$\bar{B}\bar{C}$	$\bar{B}C$	BC	$B\bar{C}$
$\bar{A}$	1	1	0	0
A	0	1	0	0

The SOP Expression : $\bar{A}\bar{B} + \bar{B}C$

$\overline{\overline{A}.\overline{B}.\overline{B}C}$

$\overline{\overline{A}.\overline{B}} + \overline{\overline{B}.C}$

$\bar{A}.\bar{B} + \bar{B}.C$

10

Q2 Write 8086 Assembly Languge program to multiply and divide 4-digits number by 2 digits number. List & explain the arithemetic instruction used in this program.

Ans Assume CS : Code , DS : Data

Data Segment

```
n1    dw    4568 H
n2    dw    0655H  0066 H
a     dq    (?)
b     dw    (?)
c     dw    (?)
Data Ends
code segment
```
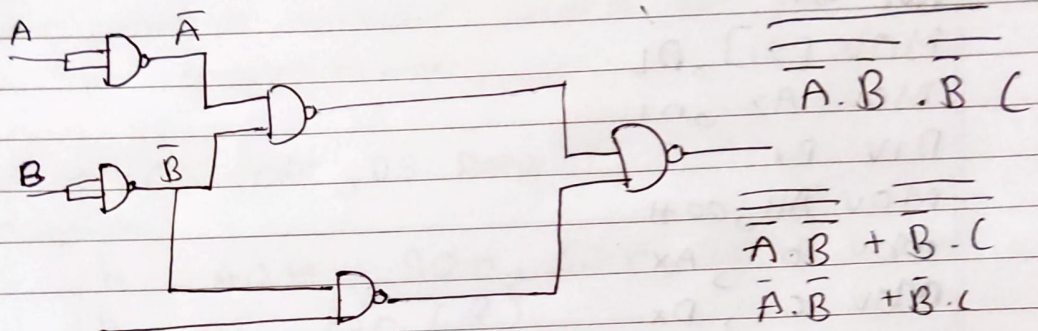
Q) Implement the following SOP Expression
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$\bar{A}$	1	1	0	0
A	0	1	0	0

The SOP Expression $= \bar{A}\bar{B} + \bar{B}C$

$$\overline{\overline{A}.\overline{B}}.\overline{\overline{B}C}$$

$$\overline{\overline{A}.\overline{B}} + \overline{\overline{B}.C}$$
$$\overline{A}.\overline{B} + \overline{B}.C$$

(10)

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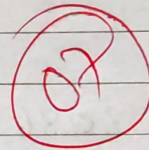n2   dw   0655H 0066 H
a   dq   (?)
b   dw   (?)
c   dw   (?)
Data Ends
code Segment

```
Start:
MOV    AX, Data
MOV    DS, Ax
MOV    AX, n1
MOV    Bx, n2
MUI    Bx
ELEA   SI, n
MOV    [SI], AL
INC    SI
MOV    [SI], AH
IWC    SI
MOV    [SI], DL
MOV    AX, n1
DIV    Bx
MOV    AH, 00H
mov    b, AX
MOV    c, Dx
MOV    AH, 4CH
INT 21H
code ends
end start
```

②

2) The Arithemetic instructions used in the above

a) Mul →

→ the mul (unsigned multiply) instruction multiplies
an 8-, 16- or 32 bit operand by either AL, AX or
EAX.

b) INC - The INC instruction is used for incrementing
an operand by one. It works on single operand
that can be either in a register or in memory.

c) DIV

→ The DIV (unsigned divide) instruction performs 8 bit, 16-bit, and 32 bit division or unsigned integers

→ A single operand is supplied (register or memory# operand) which is assume to be divisor.

Q3 Write 8086 assembly language program to find the smallest/largest number from a given set of number using loop instruction list and explain the program control instruction used in the above program

Ans 1) For the smallest number

code:

Assume CS: code, DS: Data

Data segment

NS db 40H, 90H, 60H, 20H, 10H

small db 01 dup (?)

Data ends

Code segment

Start MOV AX, data

MOV DS, AX

MOV CX, 04H

LEA SI, NS

MOV AH, [si]

INC SI

search: MOV AL, [si]

INC SI

CMP AH, AL

JC to

MOV AH, AL

to: INC Si

Loop search

MOV small, AH

MOV A+1 ,4 C+1
IN + 21 H
Code ends
end Start

2) control instructions used in program c+.

a) JC · It checks wether the carry flogs is set or not.
if yes ,then jump takes place , that is if CF=1,
then jump.

$$JC = jump \; if \; carry \; set \; (C=1)$$

b) CMP

→ the CMP instructions can be used to compare two
8-bit or two 16-bit numbers

→ The CMP operation is also Known as subtraction
method as it uses two's complement for it

→ Whenever a compare operation is performed the
resuts of such an operation reflects in one of
the six status flogs CF, AF, OF, PF, SF and ZF

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