

ARYAMAN MISHRA

19BCE1027

1.  $2.85_{10} \times 10^3 = [\cancel{0.2850}] 2.85 \times 10^3 = 2850$

$$9.84_{10} \times 10^4 = 98.4 \times 10^3 = 98400$$

Shifting decimal places to match exponents  $\Rightarrow (98.4 \times 10^3) + (2.85 \times 10^3)$

Taking  $10^3$  common  $\Rightarrow 10^3 (98.4 + 2.85)$

Calculating with 3 significant figures  $\Rightarrow 10^3 (98.400 + 2.850)$

Addition of significands  $\Rightarrow 10^3 (101.25)$

$$\Rightarrow 101.25 \times 10^3$$

Adjusting sum to be normalized scientific notation

$$\Rightarrow 1.0125_{10} \times 10^5$$

We have assumed calculation for 3 significant digits, we round the sum to  $1.01 \times 10^5$

2.  $1001 \div 11$

Using Non-restoring division algorithm

$Q = \text{Dividend} = -1001$   $n = N = 4$   $A = 0000$

$\text{Divisor} = 11 = M$

N	M	A	Q	Action
4	00011 00011	00000 <u>00001</u> 11100 + 1 <u>11101</u> + 00001 <u>11110</u> <u>11110</u>	1001 001-	Start Sign bit of A = 0 ↓ Left Shift ↓ A = A - M  Sign bit is 1 ↓ Q[0] = 0
3	00011	11110 11100 11100 + 00011 <u>11111</u> <u>11111</u>	0010 010-  0100  0100	Start Sign bit of A = 1 ↓ Left Shift ↓ A = A + M Sign bit of A = 1 ↓ Q[0] = 0
2	00011	11111 11110 11110 + 00011 <u>00001</u> <u>00001</u>	0100 100-  1001	Start Sign bit of A = 1 ↓ Left Shift ↓ A = A + M Sign bit of A = 0 Q[0] = 1
1	00011	00001 00011 11100 + 1 <u>11101</u> + 00011 <u>00000</u> <u>00000</u>	1001 001-  0011	Start Sign bit = 0 ↓ Left Shift ↓ A = A - M Sign bit of A = 0 Q[0] = 1

Quotient = 0011 =  $3_{10} \Rightarrow -3_{10} = 1100 + 0001 = 1101 = Q$   
 Remainder = 00000 =  $0_{10} = A$

### Q.3. Move R4, D:-

#### 1) Fetch Process :-

- i) The program counter holds the address of the instruction.
- ii) The address is transferred to the MAR (Memory Address Register) and the ~~PC~~ Program counter is incremented to point to the next instruction.
- iii) The ~~CU~~ CU sends a read signal to the memory. The instruction is located using the value in the MAR and the content is loaded into the MDR (Memory Data Register).
- iv) The instruction is transferred to the IR (instruction register) for decoding.

#### 2) Decode and Execute Process :-

- i) The instruction in IR is decoded and a signal to perform a move operation is sent to the CU (Control Unit).
- ii) The content in Register R4 is transferred to the MDR and the address location D is transferred to the MAR.
- iii) The CU sends a write signal to the memory. The content in MDR is transferred to the memory to the address location pointed to by the MAR.