

Q1. a) Using Booth's algorithm, solve  $7 \times 3$   
 $M = \text{Multiplicand} = 7$ ,  $\text{Multiplier} = 3 = Q$   
 $= 0111$   $= 0011$

2's complement of M  
 $= 1001$

	A	Q	Q <sub>-1</sub>
	0000	0011	0
1)	1001	0011	0
	1100	1001	1
2)	1110	0100	1
3)	0101	0100	1
	0010	1010	0
4)	0001	0101	0

Initially

$A - M \Rightarrow A + 2's \text{ of } M = 1001$   
 $\Rightarrow 0000 + 1001 = 1001$

Right shift.

Right shift

$A + M = 1110 + 0111 = 10101$

right shift.

right shift

00010101 = 21  $7 \times 3 = 21$ .

Q1 (b) Microinstructions for Add R3, R2, R1.

1. R1out, Y in
2. R2out, select Y, Add, Z in
3. Zout, R3 in

Q.4 (b). page address stream = 2 1 2 3 1 5 4 2 1 5.

i) FIFO

	2	1	2	3	1	5	4	2	1	5
1.	2	2	2*	2	2	5	5	5	1	1
2.		1	1	1	1	1	4	4	4	5
3.				3	3	3	3	2	2	2

Hit Hit

Hit Ratio =  $\frac{2}{10} = 20\%$ .

ii] LRU

		2	1	2	3	1	5	4	2	1	5
1.	2	2	2	2	2	2	5	5	5	1	1
2.		1	1	1	1	1	1	2	2	2	2
3.				3	3	3	4	4	4	4	5
				Hit		Hit					

Hit Ratio =  $\frac{2}{10} = 20\%$

iii] LFU → Least frequently used.

		2	1	2	3	1	5	4	2	1	5
1.	2	2	2	2	2	2	2	2	2	2	2
2.		1	1	1	1	1	1	1	1	1	1
3.				3	3	5	4	4	4	4	5
				Hit		Hit		Hit	Hit		

Hit Ratio =  $\frac{4}{10} = 40\%$