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Course No	:	CSE 3110
Course Title	:	Digital System Design Lab
Section	:	B
Group	:	B2
Date	:	11-09-2021

Ans. to the Q. No. 1 (Set 2)

(a)

$21 \times (-24)$

$x = 010101 \quad (21)$

$y = 101000 \quad (-24)$

$-y = 011000 \quad (24)$

ALU Operation :

S_1	S_0	Operation
0	0	u+0
0	1	u+y
1	0	u−y
1	1	u+0

Step	u	v	x	x_{-1}
	000 000 011 000	000 000	01 01 01	0
Step-1	011 000 00 11 00 10 1 000	000 000 000 000	010101 001010	0 1
Step-2	11 0 1 00 11 1 0 10 0 11 0 00	000 000 000 000	001010 000101	1 0
Step-3	0 1 00 1 0 00 1 00 1 10 1 000	000 000 000 000	000101 000010	0 1
Step-4	11 000 1 11 1 000 0 11 000	000 000 100 000	000010 0000 01	1 0
Step-5	0 10000 0 0 1000 10 1 000	100 000 010 000	000001 000000	0 1
Step-6	11 0000 11 1 000 (-504)	010000 00 1 000	000000 000000	1 0

∴ The result is (u+v) ⇒ 111000 001000 = (-504)

Ans. to the Q. No. 1

(b)

Six (6) addition operations are needed for the operation in 1(a).

Among them 3 are addition with $(+y)$ and others are addition with $(-y)$.