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COA Assignment

Solution 2

(i) Q = 0 10 111

D = 110110

−D = 2's compliment of D

= 001010

Cycle	AC	Q	Q_{-1}	operation
1)	000000	010111	0	AC = AC−D = 000000 001010 001010
	001010	010111	0	ASR
2)	000101	001011	1	ASR
3.)	000010	100101	1	ASR
4.)	000001	010010	1	AC = AC+D = 000001 110110 110111
	110111	010010	1	ASR
5)	111011	101001	0	AC = AC−D = 111011 001010 000101
	000101	101001	0	ASR

E	000 E1C	110100	1	AC = AC + D = 111000
	111000	110100	1	ASR

Ans = (111100 011010)

= −1 × (0000 1110 0110)

= −1 × 230

= −230 Ans

(ii) M = 110011

−M = 001101

Q = 101100

Cycle	AC	Q	Q	Operation
1	000000	101100	0	ASR
2.	000000	010110	0	ASR
3.)	000000	001011	0	AC = AC − M
	001101	001011	0	ASR
4.)	000110	100101	1	ASR
5.)	000011	010010	1	AC = AC + M
	110110	010010	1	ASR
6.)	111011	001001	0	AC = AC − M
	001000	001001	0	ASR
	000100	000100	1	

Answer = $(000100\ 000100)_2 = (260)$ Ans

(iii)

$M = 110101$

$Q = 011011$

$-M = 001011$

Cycle	Ac	Q	Q	operation
1.	000 000	011011	0	AC = AC − M
	001011	011011	0	ASR
2.)	000101	101101	1	ASR
3.)	000010	110110	1	AC = Ac + M
	110111	110110	1	ASR
4.)	111011	111011	0	AC = Ac − M
	000110	111011	0	ASR
5.)	000011	011101	1	ASR
6.)	000001	101110	1	Ac = Ac + M
	110110	101110	1	ASR
	111011	010111		

Answer = $(1110110101111)_2$

(iv) $M = 1111$

$-M = 0001$

$Q = 1111$

cycle	AC	Q	Q_1	operation
1.)	0000	1111	0	Ac = AC − M
	0001	1111	0	ASR

2.	0000	1111	1	ASR
3.)	0000	0111	1	ASR
4.)	0000	0011	1	ASR
5.)	0000	0001	1	ASR

Answer = $(0000\ 0001)_2$ = 1 Answer