Logic Design CH1

Q1

(A) 100001

1 x 25 = 32

0 x 24 = 0

0 x 23 = 0

0 x 22 = 0

0 x 21 = 0

1 x 20 = 1

(100001)2 = 32 + 1 = (33)10

(B) 101010

0 x 25 = 0

1 x 24 = 16

0 x 23 = 0

1 x 22 = 4

0 x 21 = 0

1 x 20 = 1

(101010)2 = 16 + 4 + 1 = (21)10

Q2

(A) 12

HEX = 12/16 = 0 remainder 12

(12)10  = (C)16

BIN = 12/2 0

6/2 0

3/2 1

1/2 1

(12)10 = (1100)2

(B) 50

HEX = 50/16 2

3/16 3

(50)10  = (32)16

BIN = 50/2 0

25/2 1

12/2 0

6/2 0

3/2 1

1/2 1

(50)10 = (110010)2

Q3

(A) (46)16

BIN =

(4)16 = (0100)2

(6)16 = (0110)2

(46)16 = (01000110)2

DEC =

6 x 160  = 6

4 x 161 = 64

(46)16 = 64 + 6 = (70)10

(B) (54)16

BIN =

(5)16 = (0101)2

(4)16 = (0100)2

(54)16 = (01010100)2

DEC =

4 x 160  = 4

5 x 161 = 96

(54)16 = 96 + 4 = (100)10

Q4

(A) (1111)2

HEX

(1111)2 = (F)16

OCT

(001)2 = (1)8

(111)2 = (7)8

(B) (11111)2

HEX

(0001)2 = (1)16

(1111)2 = (F)16

OCT

(011)2 = (3)8

(111)2 = (7)8

Q5

(A) 42

4 × 161 = 64

2 × 160 = 2

(42)16 = 64 + 2 = (66)10

(B) 64

6 x 161 = 128

4 x 160 = 4

(64)16 = 128 + 4 = (132)10

Q6

(A) 3652

HEX = 3652/16 4

228/16 4

14/16 E

(3652)10 = (E44)16

(B) 8925

HEX = 8925/16 D

557/16 D

34/16 2

2/16 2

(8925)10 = (22DD)16

Q7

(E) 67

DEC

6 × 81 = 48

7 × 80 = 7

(67)8 = 48 + 7 = (55)10

BIN

(6)8 = (110)2  
 (7)8 = (111)2

Q8

(a) 2310

23/8 7

2/8 2

(23)10 = (27)8

(b) 4510

45/8 5

5/8 5

(45)10 = (55)8

Q9

(A) 0011 0110BCD

0011 = (3)10

0110 = (6)10

0011 0110BCD = (36)10

(B) 0110 1001BCD

0110 = (6)10

1001 = (9)10

0110 1001BCD = (69)10

Q10

(c) 9410

(9)10 = (1001)2

(4)10 = (0100)2

9410 = (10010100)2

(d) 4410

(4)10 = (0100)2

(4)10 = (0100)2

(44)10 = (01000100)2

CH2

Q1

(a) 11112 and 10102

1111

+ 1010

————

11001

1111

- 1010

————

0101

1111

x 1010

—————

0000

1111

0000

1111

————————

10010110

(b) 11112 and 10012

1111

+ 1001

————

1100

1111

- 1001

————

0110

1111

x 1001

———

1111

0000

0000

1111

————-

10000111

Q3

(a) 111101002 – 10001112

11110100

- 1000111

—————

10101101

(c) 11101102 – 1111012

1110110

- 111101

—————

111001

Q4

(b) 00011012 ÷ 1102

110 |1101

-110

———

01

Q4

(a) 2516 + 3316  = 5816

(b) 4316 + 6216 = A516

Q5

(a) 6016 - 3916 = 2716

(d) AC16 - 1016 = 9C16

Q6

(a) (- 12)10  + 1310 = -12 =00001100 1s complement 11110011

2s complement 11110011 +1 =11110100

11110100 + 00001101 = 00000001 = 12

(b) (- 11)10 + ( - 21)10 = 11110101 + 11101011 = 11100000

Q8

(a) 100 = 011

(b) 111 = 000

Q9

(a) 11 = 1s complement = 00 ,2s complement = 00+1 = 01

(b) 111 =1s complement = 000 ,2s complement = 000+1 = 001

Q10

(a) -3410 = 00100010 1s complement = 110111012

(b) +5710 = 001110012

Q11

(a) +1210 = 000011002

(c) +10110 = 010100112

Q12

(a) 100110012 = 2510

(b) 011101002 = 11610

Q13

(a) 100110012 = -2510

Q14

(a) 100110012 = 1s complement = 011001102 ,

2s complement = 011001112 =-10310

Q15

(a) 9810  = 10011000BCD

(b) 17010 = 000101110000BCD

Q16

(a) 001101010001BCD = 35110

Q17

(a) 1001 + 0100 = 9+4 = 13

Q18

1011012 = 110110gray

Q19

100111gray = 1110102