Digital Circuits and Systems

NOC, Spring 2015

Quiz 9 Solutions

For questions, refer to the Quiz page. Only the solutions are given below.

1. Answer : B

0011 + 0111 = 3 + 7 = 10
which cannot be represented by 4 bit number in 2's complement form as it crosses the range (-8 to 7) of possible 4-bit numbers.

2. Answer : 11000100

A = -6, B=10. A*B =-60

3. Answer : A, C

We can never get a overflow when two numbers with different sign bit are added as the result is the difference which can be represented in the range.

4. Answer : -2048

$2 * A = (1\ 1111\ 1000\ 0000\ 0000)_2$ which is equivalent to -2048

5. Answer : 11

1 unit time for AND gate
2 * 5 = 10 units time for Full Adders
Total = 11 units

6. Answer : C

7. Answer : A

If sign bits are same then the number is positive so all the bits from P_4 - P_7 should be zero otherwise there might be an overflow.

This condition is checked by $(P_7 + P_6 + P_5 + P_4) \cdot (X_3 Y_3)'$

If sign bits are different then the number is negative so all the bits from P_4 - P_7 should be one otherwise there might be an overflow.

This condition is checked by $(P_7 . P_6 . P_5 . P_4)' . (X_3 Y_3)$

8. Answer : B

9. Answer : B

10. Answer : 11000.11

   10100.01 = -11.75

   11011.10 = -4.5

-11.75 - (-4.5) = -7.25