COMPUTER ARCHITECTURE COE 308

QUIZ-2

Name and ID:…….

COMPUTER ARITHMETIC

1. Evaluate the decimal value corresponding to the unsigned binary number

   A = 0000 0000 **1111 1111 1111** 0000 0000 **1111.**

   as the sum the decimal numbers corresponding to the two sequence of 1s (in bold).

2. Use Multiply Algorithm Version 3 (V-3) to carry out the unsigned product of (13)*(10) = (1101)*(1010), where 1101 is the Multiplier and 1010 is the Multiplicand.
   Complete the multiply table shown below.
   Comment your steps and show the obtained result.

Solution:

1. Question-1: The decimal value of A can be computed in a variety of ways which can be accepted.
   However, the question request to following sum of (1) sequence 0000 0000 1111 1111 1111 0000 0000 0000, and (2) sequence 1111. This gives (2^23-1) –(2^12-1) for the first sequence and 2^4-1 for the second. The sum gives 16,773,135.

   Another acceptable way is by computing the value of 1111 1111 1111 after shifting it left 12 times which is (2^12 – 1) x 2^12, and (2) value of 1111 which is + 2^4 -1. Thus the result is (2^12 – 1) * 2^12 + 2^4 -1 = 4095 x 4096 + 15 = 16,773,135.

2. Question 2: TheV-3 Multiply Algorithm works as follows:

Multiplier	Multiplicand	Product	Comments
1101	**1010**	**0000 1101**	**Place Mplier in lower half**
	1010	**0000 1101**	**Lsb of product is 1**
	1010	**1010 1101**	**Add Mcand to U-Half and shift right**
		0101 0110	**Shift-right, Lsb of product is 0**
		0010 1011	**Shift-right**
		0010 1011	**Lsb of product is 1**
		1100 1011	**Add Mcand to U-Half of product**
		0110 0101	**Shift product right**
		0110 0101	**Lsb is 1, Add Mcand to U-Half**
		10000 0101	**Shift product right**
		1000 0010	**Result is 128+2=130**

The result is 1000 0010 which is 130.