1. **Fundamentos tecnológicos. (0.50 puntos)**

**1.1 Completar la siguiente tabla utilizando los procedimientos estudiados en clase. (0.25 puntos).**

|  |  |  |
| --- | --- | --- |
| Decimal | Binario | Hexadecimal |
| 97,32 | 1100001,010 | 61,4 (61,5) |
| 87,75 | 1010111,110 | 57,6 (57,C) |

(Considere 1, 2 y 3 posiciones significativas para la parte fraccionaria en hexadecimal, decimal y binario respectivamente). Justifique los resultados obtenidos con las operaciones matemáticas adecuadas.

|  |  |
| --- | --- |
| Parte entera: 97  División entre 2 y Resto   * 97 1 * 48 0 * 24 0 * 12 0 * 6 0 * 3 1   Conversión: 97(10)=1100001(2) | Parte fraccionaria: 0,32  Producto Resultado Parte Entera  0.32 X 2 = 0.64 0  0.64 X 2 = 1.28 1  0.28 X 2 = 0.56 0  Conversión: 0,32(10)=0,010(2) Con 3 bits existe error de precisión  Con agrupaciones de 4 dígitos binarios obtenemos su valor hexadecimal: 61,4(H) |
| Parte Entera: 1010111  Num Peso Valor  1 1 1  1 2 2  1 4 4  0 8 0  1 16 16  0 32 0  1 64 64  suma: 87 | Parte fraccionaria: 0,110  Posición Peso Valor  1 0.5 0.5  1 0.25 0.25  0 0.125 0  Suma = 0.7500  Con agrupaciones de 4 dígitos binarios obtenemos su valor hexadecimal: (H) |

La conversión a hexadecimal puede dar diferentes resultados por errores de precisión, se lo realizamos tomando grupos de 4 posiciones binarias consecutivas o mediante divisiones sucesivas entre 16.

* 1. **El circuito de la figura es una función lógica F=f(A,B) realizada con transistores MOS. (0.25 puntos).**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | |  | |  | |  | |  | | A | B | | Q1 | | Q2 | | Q3 | | Q4 | | | **F** | | 0 | 0 | | ON | | ON | | OFF | | OFF | | | 1 | | 0 | 1 | | ON | | OFF | | OFF | | ON | | | 0 | | 1 | 0 | | OFF | | ON | | ON | | OFF | | | 0 | | 1 | 1 | | OFF | | OFF | | ON | | ON | | | 0 | | |

|  |  |
| --- | --- |
|  |  |

a)- Complete la tabla de verdad del circuito indicando los valores “0” ó “1” para A, B y F, e indique además el estado (ON u OFF) de los transistores Q1,Q2, Q3 y Q4 (0.15 puntos).

c)- ¿Qué función lógica realiza este circuito? Dibuje su símbolo en circuitos digitales. (0.10 puntos).

Es la función NOR de dos entradas:



1. **Dado el siguiente circuito: (0.50 puntos).**



**2.1 Determine a partir del circuito la expresión algebraica de la función F. (0.10 puntos)**

**2.2 Complete la tabla de verdad. (0.20 puntos)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **c** | **b** | **a** | **F** |
| **m0** | **0** | **0** | **0** | **1** |
| **m1** | **0** | **0** | **1** | **0** |
| **m2** | **0** | **1** | **0** | **0** |
| **m3** | **0** | **1** | **1** | **1** |
| **m4** | **1** | **0** | **0** | **1** |
| **m5** | **1** | **0** | **1** | **1** |
| **m6** | **1** | **1** | **0** | **1** |
| **m7** | **1** | **1** | **1** | **1** |

**(Considere a bit menos significativo, y c bit más significativo)**

**2.3 Determine la forma canónica de F. (0.20 puntos)**

En minitérminos: