NOTE: Use of internet is not permitted, calculators are permitted and your answers must include worked solutions. If you require extra sheet(s) please write your name and student number at the top of each additional sheet.

**Part A**

**Objective**

Convert decimal numbers to binary showing in detail the conversion process

|  |
| --- |
| * Convert the number of days in a leap year 36610 to Base2 |
| 256 128 64 32 16 8 4 2 1  1 0 1 1 0 1 1 1 0  0001 0110 1110  basically checking if the number divides into the remainder, then subtracting that number from it and continuing  366 - 256 - 64 - 32 - 8 - 4 - 2 |
| * Convert the number of available seats in the new Páirc Uí Chaoimh 45,00010 to Base2 |
| 32768 16384 8192 4096 2048 1024 512 256 128 64 32 16 8 4 2 1  1 0 1 0 1 1 1 1 1 1 0 0 1 0 0 0  1010 1111 1100 1000 |
|  |

**Part B**

**Objective**

Convert numbers basen to hexadecimal showing in detail the conversion process

|  |
| --- |
| * Convert the number 18133678210 to Base16 |
| 16777216 1048576 65536 4096 256 16 1  A C E F A C E  same as above pretty much but using the single-digit number values of hexadecimal |
| * Convert the number C0FF.EE16 to Base10 directly |
| 1048576 65536 4096 256 16 1  C 0 F F E E  (1048576 \* 12) + (4096 \* 15) + (256 \* 15) + (16\*14) + (1\*14)  = 12648430 |

**Part C**

**Objective**

Convert numbers basen to basen showing in detail the conversion process

|  |
| --- |
| * What is the Base16 value of 8 bit 2’s complement number 1001 01012 |
| 1001 0101 subtract 1  1001 0100  0110 1011  break into 4's  make each block of 4 a hexadecimal  0110 1011  6 B |
| * Subtract 1310 from 4210 using 8 bit 2’s complement and convert to Base8 |
| 42 - 13 = 29  00001101  0010 1010 - 0000 1101  0000 1101 + 1 = 0000 1100  1111 0011 inversed  0010 1010  +1111 0011 2's complement  =1 0001 1101 = 29  Octal =  64 8 1  3 5 |

**Part D**

**Objective**

Convert numbers basen to hexadecimal showing in detail the conversion process

|  |
| --- |
| * Add -3210 to 6110 using 8 bit 2’s complement |
| 0010 0000 = 32  0011 1101 = 61  1101 1111 + 1 = 1110 0000  1110 0000  +0011 1101  =1 0001 1101 = 29  0001 = 1 1101 = 13  1 D |
| * Add -410 to 4610 using 8 bit 2’s complement |
| 0010 1110 = 46  0000 0100 = 4  1111 1011 + 1 = 1111 1100  0010 1110  +1111 1100  = 0010 1010  0010 1010  2 A |

Hand up this practical report at the end of session and ensure it has been checked

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Name** | Matias Kutt | **Student Number** | c00250720 |
| **Date** | 12/11/2020 | **Checked** |  |
| **Group** | **A / B** |  |  |