Knowledge Questionnaire 9010

**90 Points**

**Specific outcome 1:** Convert numbers between the decimal number system and the binary number system

**Assessment Criteria:**

* Conversion between binary and decimal numbers is done correctly
* Basic addition and subtraction calculations in the binary number system are done correctly
* Using positive whole numbers up to the 16 in decimal
* Practical applications of the decimal and binary system are explained correctly

1. Why is the binary system important? (SO1 AC4) (1)

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1. What is the binary system? (SO1, AC1) (2)

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1. What is the decimal system? (SO1, AC1). (2)

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1. Convert 100110112 to decimal. Show every step in your calculation. (SO1, AC1). (5)

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1. What is 1011 + 1011? (SO1, AC2). (1)

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1. Convert the following base 10 numbers into binary. (SO1, AC2). (3)

1. 3

2. 11

3. 140

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1. When do we use the decimal system. (SO1, AC4). (1)

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**Specific outcome 2:** Work with numbers in different ways to express size and magnitude

* The prefixes indicating magnitude in measurements are correctly related to the decimal system: From Giga to Pica (1012 to 10 -12)
* Conversions between related units in different measurement systems are correctly applied in real-life contexts: SI to Imperial; Degrees F to degrees C

1. Convert into °C. (SO2 AC2). (1)

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| --- | --- | --- |
| a | 10°F |  |

1. Convert into °F. . (SO2 AC2) (1)

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| a | 50 °C |  |

1. Fill in the table below to show the meaning of the prefixes. (SO2, AC1). (18)

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| --- | --- | --- | --- |
| Prefix | Symbol | Factor | Power of 10 |
|  |  | 1,000,000,000,000,000,000 |  |
|  |  | 1,000,000,000,000,000 |  |
|  |  | 1,000,000,000,000 |  |
|  |  | 1,000,000,000 |  |
|  |  | 1,000,000 |  |
|  |  | 1,000 |  |

1. Write the following in scientific notation. (2)

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| a | 0.0009 m |  |
| b | 367.666 km |  |

1. Convert the units in the table. Remember to show your calculations. (4)

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| a | 100 ft to m |  |
| b | 23 ft/s to m/s |  |

1. Complete the table below. (21)

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| --- | --- | --- |
| Prefix | Abbreviation | Value |
|  | G | 109 |
| mega |  | 106 |
|  | k | 103 |
|  | m | 10-3 |
| Micro |  | 10-6 |
| Nano |  | 10-9 |
|  | p | 10-12 |

1. 8. List the seven base units of the SI system. (SO2, AC2). (7)

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1. Fill in the table below to show conversions between the imperial System and the SI System. (SO2, AC2). (4)

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| **Imperial System** | **SI System** |
| **Length conversion** |  |
| Inch |  |
| Foot |  |
| **Weight conversion** |  |
| Ounce |  |
| Pound |  |

**Specific outcome 3:** Demonstrate the effect of error in calculations

* Symbols for irrational numbers such as 7c and 42 are left in formulae or steps to calculations except where approximations are required
* Descriptions are provided of the effect of rounding prematurely in calculations
* The desired degree of accuracy is determined in relation to the practical context
* The final value of a calculation is expressed in terms of the required unit

1. Convert the following repeating decimals to common fractions. (SO3 AC4) (2)

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| a | 909.9090909090 |  |
| b | 1,33333 |  |

1. What are rational numbers? (SO3, AC1). (1)

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1. What are irrational numbers? Give an example. (SO3, AC1). (2)

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1. What should you do when there is an irrational number in a formulae? (SO3, AC1). (2)

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1. How you would round 10.3 – 0.126? (SO3, AC2). (2)

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