2014 – numbers

(a) Convert the hexadecimal number 3C to binary. [2]

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(b) Convert the hexadecimal number 3C to denary. [2]

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(c) Convert the binary number **11110111** to hexadecimal. [2]

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(d) Explain why hexadecimal numbers are often used to represent binary numbers. [2]

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2015 – numbers

(a) Convert the denary number **212** to a binary number with 8 bits. [2]

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(b) Convert the denary number **212** to hexadecimal. [2]

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(c) Convert the hexadecimal number **2F** to denary. [2]

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2016 – numbers

(a) Convert the denary number 162 to hexadecimal. Show your workings. [2]

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(b) Convert the hexadecimal number 1E to denary. Show your workings. [2]

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(a) Showing your workings, complete the table below, converting between denary, binary and hexadecimal numbers as necessary. [6]

Denary	Binary	Hexadecimal
104_{10}	01101000_2	68_{16}
	01001101_2	$4D_{16}$
28_{10}		$1C_{16}$
147_{10}	10010011_2	

2017 – numbers

(i) Showing your workings, add 01011101_2 and 00010011_2. [2]

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(ii) Using an example of binary addition, explain the concept of overflow. [4]

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2018 – numbers

Denary	Binary	Hexadecimal
41_{10}	00101001_2	29_{16}
58_{10}		$3A_{16}$
	10101111_2	AF_{16}
253_{10}	11111101_2	

(b) Complete the table to calculate the binary addition of 14_{10} to 67_{10} using an 8-bit register. [3]

67_{10}								
14_{10}								
Answer								

(c) Using a suitable example, explain the concept of overflow in relation to binary addition. [3]

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2017 – SHIFT

Perform arithmetic shifts on the numbers below and state the effect of each of these operations.

(i) Arithmetic shift left by one place on 01011110_2. [2]

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(ii) Arithmetic shift right by two places on 00111100_2. [2]

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Bit patterns can be used to represent the different states of an embedded system. These bits can be manipulated by several different operations.

Perform an arithmetic shift left by 3 places on the 16 bit binary number 0000101001001111_2 and state the effect that this has on the number. [2]

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