1.1 Data Representation - Number Systems
ANSWERS

Question	Answer	Marks
2(a)	**One** mark for each correct part of the fee, in the correct order: – 17 – 70 (Correct fee $17.70)	**2**
2(b)	**One** mark for each correct binary value: Register 1 – 00001110 Register 2 – 01100010	**2**

Question	Answer	Marks
2(c)	**One** mark for each correct hexadecimal value, in the correct order. – A – 0 – 3 – D (Ticket number A03D)	**4**
2(d)	**Two** from: – It contains **logic gates**/**switches** … – … that process the values 1 and 0 // have two states	**2**

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Question	Answer	Marks
2(a)	– 227	1
2(b)	**One** mark for each correct character in the correct order: – E3	2
2(c)		1
2(d)	**One** mark for suitable working method e.g. flip and add 1 **One** mark for correct answer – 10011101	2
2(e)	**One** mark for each correct nibble (max 2) **One** mark for correct working e.g. correct carry **One** mark for showing overflow bit 1 1 1 1 0 0 0 1 1 + 0 1 0 0 1 1 0 0 1 0 0 1 0 1 1 1 1	4

Question	Answer	Marks
2(a)	Any **two** from: – It has a base of 2 – It only uses two **values** – … that are 1 and 0	2
2(b)	– (0000)1110 – (00)111011 – 11101010	3
2(c)	– 9 – 1A – 41	3
2(d)	**One** mark for suitable working method e.g. conversion to binary **One** mark for correct answer – 01111011	2

Question	Answer	Marks
2(e)	**One** mark for each correct nibble (max 2) **One** mark for correct working e.g. correct carries 1 1 1 0 0 1 1 0 0 1 1 + 0 1 1 1 1 0 0 0 1 0 1 0 1 0 1 1	3

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Question	Answer	Marks
1(a)	• B	1
1(b)	**One** mark per each correct conversion • 00110010 • 01100110 • 11011101	3
1(c)	**One** mark for full method of working e.g. conversion to binary then flipping and adding 1 **One** mark for correct answer • 10110010	2
1(d)	**One** marks per each correct nibble **One** mark for correct working in binary (showing 4 correct carries) 1 1 1 1 0 0 1 1 0 0 1 1 0 1 1 0 0 0 0 1 10 0 1 0 1 0 0	3
1(e)	**Two** from: • The result of the calculation is greater than 255 // The value generated is larger than can be stored in the register • The result of the calculation would require more than **8 bits** to be represented // A **register** has a predetermined **number of bits** and there are **too many bits** for it	2

Question	Answer	Marks
2(a)	**One** mark per each correct character in the correct order: • 9 • 3 • 0 • D	4
2(b)(i)	• 00001111	1
2(b)(ii)	Any **one** from: • The value becomes incorrect/inaccurate as the right most bits are lost • It is divided by 8	1
2(c)	Any **two** from: • Easier/quicker to understand/read/write • Easier/quicker to debug • Less likely to make a mistake • Shorter representation // Takes up less **screen** space	2
2(d)	**One** mark for two correct characters, **two** marks for three correct characters in the correct order: • 1 • 2 • D	2

Question	Answer	Marks
1(a)	• 174	1
1(b)	• A • E	2
1(c)(i)	• 01110000	1
1(c)(ii)	• B	1
1(d)	**One** mark for each correct nibble **One** mark for correct carries (or other correct working method) **One** mark for identification of overflow error 1 1 • 1 0001 1111	4
1(e)	• 9	1
1(f)	• 12	1

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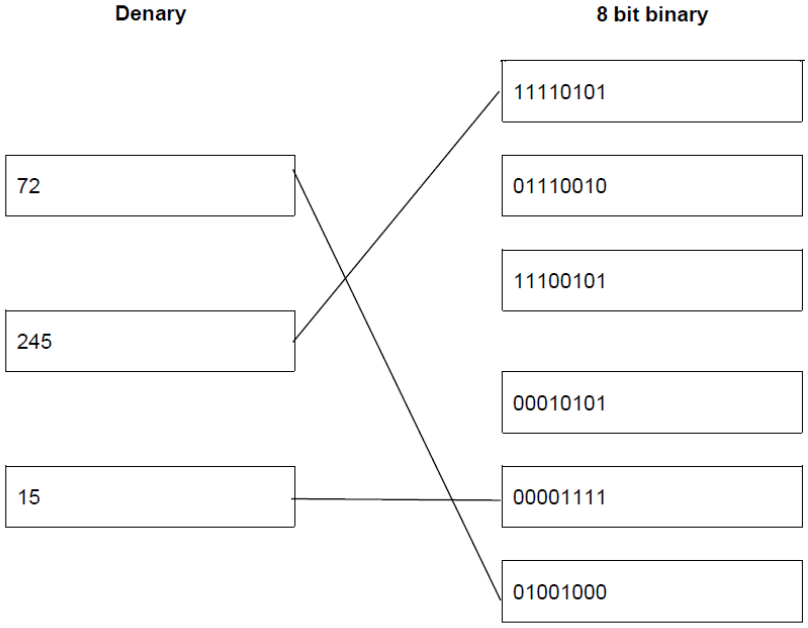
Question	Answer	Marks
3(a)	**One** mark for two correct characters, **two** marks for three, in the correct place • 0100 0000 0100	**2**
3(b)	**One** mark for two correct characters, **two** marks for three • 0001 0010 1011	**2**
3(c)	**One** mark for each correct denary conversion • 34 • 172	**2**
3(d)	**One** mark for two correct characters, **two** marks for three, in the correct place • 9E0	**2**
3(e)	Any **two** from: • It is easier for user to read/recognise/understand • It takes up less space on a **display**	**2**

Question	Answer	Marks
2(a)	**One** mark for each correct line 	**3**
2(b)	**One** mark for two correct characters, **two** marks for three correct characters, **three** marks for four correct characters, in the correct place • 09AE	**3**

Question	Answer	Marks
4(a)	• Computer consist of transistors / logic circuits/gates … • … that can only **store/process** data in **two states / high-low / on-off / 1 and 0**	**2**
4(b)	• 01000000 • 01100101 • 11110010	**3**
4(c)	• 0100 (1 mark) 0010 (1 mark) • 1100 (1 mark) 1110 (1 mark)	**4**

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Question	Answer	Marks
2(a)	**Two** marks each correct conversion (**one** mark for the first four bits, **one** mark for the second four bits) 2F: 0 0 1 0 | 1 1 1 1 15: 0 0 0 1 | 0 1 0 1 D6: 1 1 0 1 | 0 1 1 0	**6**
2(b)	Any **two** from: • IP address • Error messages/codes • Assembly language // low-level language • URL // web address • Memory dumps • Locations in memory	**2**

Question	Answer	Marks
1(a)	85	**1**
1(b)	C0	**1**
1(c)	26	**1**
1(d)	16	**1**

Question	Answer	Marks
1(a)	– Base-2	**1**
1(b)	– 9 – 16 – 40 – 161	**4**

Question	Answer	Marks
2(a)	**One** mark for correct binary value, **one** mark for leading zeros 00000000 01000111	**2**
2(b)	**One** mark for leading zeros, **one** mark for correct binary value 00000001 00000001	**2**

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8)

(ii)	One mark per each correct binary value. – 00010100 – 10100000 – 11001001	**3**
(iii)	One mark per each correct denary value. – 41 – 200	**2**

Question	Answer	Marks
1(a)	1 mark each	**2**

Denary Value	8-bit binary							
46	**0**	**0**	**1**	**0**	**1**	**1**	**1**	**0**
171	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**1**

1(b)	– 255	**1**
1(c)	– 11	**1**

5 **(a)** 112 [1]

(b) 56 [1]

(c) divided by 2 // value 112 was halved // multiplied by 0.5 [1]

(d) **(i)**

0	**0**	**0**	**0**	**1**	**1**	**1**	**0**

[1]

(ii) 14 [1]