1.4 DATA TYPES & STRUCTURES · 1.4.1

Primitive types, binary & hexadecimal — Mark scheme

30 marks · spec 1.4.1(a)(b)(e)(f)

AO key: AO1 = knowledge · AO2 = application. For conversions, award the working mark even if a transcription slip gives a wrong final value (follow-through). Do not award the same point twice.

Q	ANSWER	AO	MARKS
1(a)	Real / floating point. (1)	AO2	1
1(b)	Integer. (1)	AO2	1
1(c)	Boolean. (1)	AO2	1
1(d)	String. (1)	AO2	1

Q	ANSWER	AO	MARKS
2(a)	Place values 64+32+8+2 identified (1); = `106` (1). (2)	AO2	2
2(b)	128+64+8 = 200 (largest-first subtraction) (1); = `11001000` (1). (2)	AO2	2

Q	ANSWER	AO	MARKS
3(a)	(2 × 16) + (F = 15) (1); 32 + 15 = `47` (1). (2)	AO2	2
3(b)	Split `1101 0110` (1); = `D6` (1101=D, 0110=6) (1). (2)	AO2	2
3(c)	`1010` (A = 10). (1)	AO2	1

Q	ANSWER	AO	MARKS
4(a)	States place values are powers of 2 (128…1) (1); uses 128+16+4+1 (1); sum = 149 / bits `10010101` (1). (3)	AO2	3
4(b)	Split `1001 0101` → 9 and 5 (1); = `95` (0x95) (1). (2)	AO2	2

Q	ANSWER	AO	MARKS
5(a)	3 = 0011, A = 1010 (1); = `00111010` (1). (2)	AO2	2
5(b)	6 bytes (one per pair). (1)	AO1	1
5(c)	Hex is shorter / easier to read (1); easier to type accurately and remember than long binary (1). (2)	AO1	2

Q	ANSWER	AO	MARKS
6(a)	For n bits the number of combinations is 2^n (1); so 2^8 = 256 values (1). (2)	AO1	2
6(b)	255. (1)	AO1	1
6(c)	Electronics has two reliable/stable states (on/off, high/low voltage) (1); easy to distinguish even with a noisy signal, so reliable (1). (2)	AO1	2
6(d)	`FF` = (15×16)+(15) = 255 (1); this is the maximum intensity for the channel (1). (2)	AO2	2

Total for paper: 30 marks