



4.5.5 Information Coding Systems

- 1) A communication system is currently using a parity bit to detect errors during transmission and characters are being encoded using ASCII.

It is proposed that the system is modified so that:

- A majority voting system is used instead of the parity bit
- Unicode is used to encode the characters to be transmitted instead of ASCII

Discuss the **improvements** that will occur in the communication system as a result of these changes and any **disadvantages** that will result from them.

[4 marks]

- 2) **Figure 1** shows some of the fields contained in a packet, transmitted on a computer network.

Figure 1

Destination Address	Source Address	Payload(data)	Checksum
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- a) Explain what the checksum is used for **and** outline how the checksum's value will be determined.

[2 marks]

- 3) Describe **one** limitation of the use of parity bits for managing errors.

[1 mark]





4) **Figure 2** contains a bit pattern.

Figure 2

0	0	1	1	1	0	0	1
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- a) The ASCII code for the numeric character "0" is 48_{10} ; other numeric characters follow on from this in sequence.

What character is represented by the bit pattern in **Figure 2** if it is an ASCII code?

[1 mark]

- b) Parity bits are often used to detect errors during data transmission. If the most significant bit in the bit pattern in **Figure 2** (the leftmost bit) is a parity bit, explain how the value of this was calculated by the sending device before the byte was transmitted. You should assume that the even parity system is being used.

[2 marks]

- c) Majority voting is an alternative to using parity bits. Explain how the majority voting system works in the context of data transmission.

[2 marks]

