0 1 A data communication system uses asynchronous serial communication.

0 1 . 1 Explain the difference between asynchronous and synchronous communication.

[1 mark]

0 2 A data communications system can transmit four different signals. Each different signal represents two bits of data.

0 2 . 1 Describe the exact relationship between the bit rate and the baud rate **for this system**.

[1 mark]

0 2 . 2 Describe the relationship between the bit rate of the system and the bandwidth of the transmission medium that the data is transmitted through.

[1 mark]

0 2 . 3 The system uses serial transmission.

Describe the difference between the operation of serial and parallel transmission.

[2 marks]

0 3 . 1 A data communications system uses parallel data transmission.

Describe how parallel data transmission works.

[2 marks]

0 3 . 2 State **one** advantage of serial data transmission over parallel data transmission.

[1 mark]

0 3 . 3 Shade **one** lozenge to indicate which of these statements about data communications systems is **false**.

[1 mark]

A For a particular communications channel, the bit rate can be higher than the baud rate. ⬭

B Latency is the rate at which signals on a wire or line can change. ⬭

C The bandwidth of a transmission medium is the range of signal frequencies that the medium can transmit without a significant reduction in signal strength. ⬭

D The greater the bandwidth of a transmission medium the higher the bit rate that can be achieved by a communication system using it. ⬭

0 3 . 4 State the purpose of the **start bit** in asynchronous serial transmission.

[1 mark]

0 3 . 5 State the purpose of the **stop bit** in asynchronous serial transmission.

[1 mark]

0 4 . 1 A data communication system uses **asynchronous** data transmission with even parity to send character codes that are encoded using 7-bit ASCII.

Figure 9 shows five binary patterns.

Figure 9

Pattern 1:	1	0	1	1	1	0	1	1	0	1
Pattern 2:	1	1	0	1	1	1	1	0	0	0
Pattern 3:	0	1	0	0	0	0	1	1	1	0
Pattern 4:	1	0	1	1	1	1	0	0	0	0
Pattern 5:	1	1	0	0	0	0	0	1	0	0

How many of the binary patterns in **Figure 9** could represent valid transmissions of a single character in this data communication system?

[1 mark]

0 4 . 2 An alternative data communication system uses **synchronous** data transmission.

Describe what synchronous data transmission is.

[1 mark]

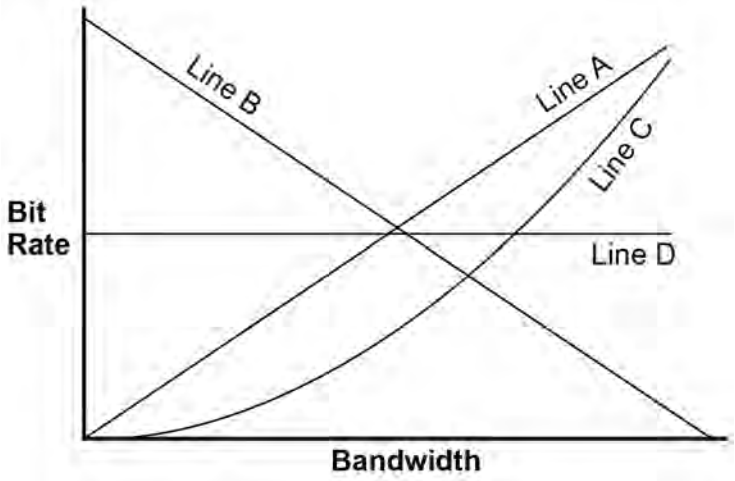
0 4 . 3 Describe **one** limitation of the use of parity bits for managing errors.

[1 mark]

0 4 . 4 Shade **one** lozenge to indicate which of the lines on the graph in **Figure 10** shows the correct relationship between the bandwidth and the bit rate of a communications medium.

[1 mark]

Figure 10



A Line A ⬭

B Line B ⬭

C Line C ⬭

D Line D ⬭

0 5 . 1 The data bus inside the computer uses synchronous parallel data transmission.

Describe what synchronous transmission is.

[1 mark]

0 5 . 2 Peripherals, such as a keyboard or printer, are connected to the computer using a USB (Universal Serial Bus) connection. USB uses synchronous serial data transmission.

Explain why serial transmission has been chosen to communicate with peripherals connected to the computer **and** why parallel transmission is used by the data bus inside the computer.

[3 marks]