AQA Computer Science A-Level
3.9.1 Communication
Past Paper Questions

January 2010 Comp 2

8 Computers connected to the Internet use the TCP/IP suite of protocols for data transmission.

8 **(a)** What is a protocol?

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(1 mark)

January 2011 Comp 2

10 (b) What is a protocol?

....

(1 mark)

June 2011 Comp 3

10 A home desktop computer is connected to a number of peripherals including a printer and a keyboard. It is also connected to the Internet and to a wired Local Area Network (LAN).

10 (a) The keyboard is connected to the computer using a serial connection at a speed of 9,600 bits per second with a baud rate of 9,600 baud.

Explain what is meant by *baud rate*.

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....

(1 mark)

10 (b) A printer is connected to the same computer using a faster serial connection at a speed of 128,000 bits per second and a baud rate of 64,000 baud.

10 (b) (i) Explain how it is possible for the number of bits transmitted per second to be higher than the baud rate.

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(1 mark)

June 2012 Comp 3

4   A particular long-distance data transmission system transmits data signals as electrical voltages using copper wire.

4 (a)   What is the relationship between the bandwidth of the copper wire and the bit rate at which the data can be transmitted?

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(1 mark)

4 (b)   The system is affected by latency.

What is *latency* in the context of data communications?

....

....

(1 mark)

4 (c)   What, **precisely**, is the relationship between the bit rate and the baud rate for this system?

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....
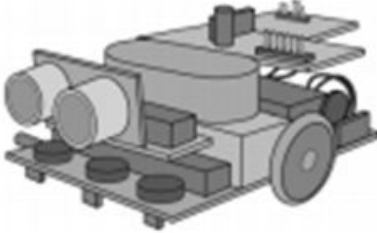
(1 mark)

4   A school robotics club has recently purchased a robotics kit after the teacher in charge saw an advert in a magazine. The advert is reproduced below.

RoboEddy - a new educational robot

Specification

Hardware

500 Mhz processor
32 MB RAM
4 timers
Wi-Fi communications via WLAN 802.11g radio
Dual H-bridge motor driver

Software

Built in interpreter for the high level language RobotC
Directly run assembly code
XMODEM protocol for reliable file transfer
Support for various analogue and digital sensors

Available NOW!

Only £199

4 (a)   Using the XMODEM protocol, students at the robotics club can copy a RobotC program prepared on a desktop computer to the robot.

What is meant by the term *protocol*?

....

....

(1 mark)

| 0 | 8 |

Devices can communicate using either parallel or serial transmission.

Parallel transmission sends many bits at the same time whilst serial transmission only sends one bit at a time.

| 0 | 8 | . | 1 |

Describe **two** reasons why serial transmission might be preferred to parallel transmission.

[4 marks]

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| 0 | 8 | . | 2 |

In the context of networking, define the following terms.

[2 marks]

Bit rate: _____

_____

Latency: _____

_____

June 2017 Paper 2

0 3 In a particular communications system, eight different voltage levels are used to encode the value of groups of bits. Each voltage level encodes the value of one group of bits.

0 3 . 1 Given that eight different voltage levels are used, how many bits can be in a group that is encoded by a voltage level?

[1 mark]

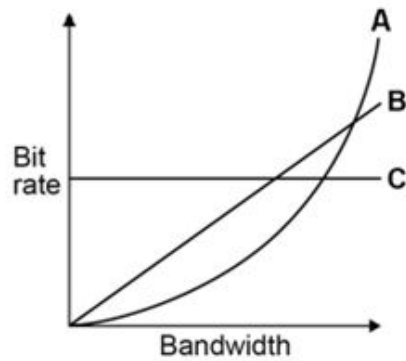_____

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0 3 . 2 The baud rate for this system is 500 baud.

What is the system's bit rate?

[1 mark]

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Figure 3 shows three suggested relationships between bandwidth and bit rate.

Figure 3

| 0 | 3 | . | 3 | Shade **one** lozenge to indicate which of the lines, **A**, **B** or **C** in **Figure 3**, shows the correct relationship between bandwidth and bit rate.

[1 mark]

| A | ○ | | B | ○ | | C | ○ |

The system sends the data over a long distance using serial communication.

| 0 | 3 | . | 4 | Explain why serial communication is more appropriate in this instance than parallel communication.

[2 marks]

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3   Data is being transmitted along a serial link using asynchronous data transmission and odd parity.

3 (a)   Explain what *serial data transmission* is and how it differs from *parallel data transmission*.
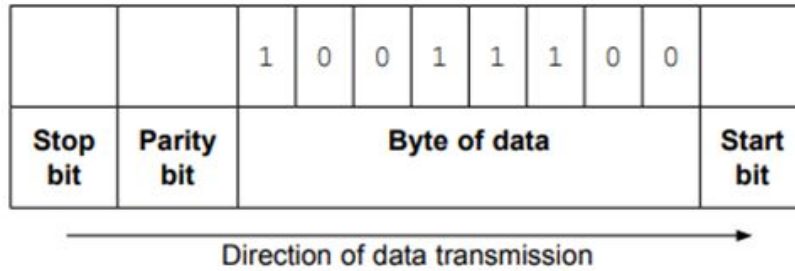
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(2 marks)

3 (b)   **Figure 4** shows a byte of data being transmitted along the serial link using odd parity.

Write the missing values of the **Stop bit**, **Parity bit** and **Start bit** on **Figure 4**.

Figure 4

		1	0	0	1	1	1	0	0	
Stop bit	**Parity bit**				**Byte of data**					**Start bit**

Direction of data transmission ⟶

(2 marks)

3 (c)   Explain what *asynchronous data transmission* is.

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....

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....

(1 mark)

Specimen AS Paper 2

0 4 . 3 Explain why browsing the Internet might be slower at a public hotspot in a coffee shop than at home on a wireless network.

[2 marks]

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Specimen Paper 2

0 2 The internal buses in a computer use parallel communication while most peripherals communicate with a computer using serial communication.

0 2 . 1 Explain the differences between the ways in which parallel and serial communication is carried out.

[2 marks]

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Most peripherals, such as printers and keyboards, communicate with a computer using a serial connection.

0 2 . 2 Apart from the widespread availability of USB (Universal Serial Bus) ports, explain why peripherals usually use a serial communication method such as USB instead of parallel communication.

[1 mark]

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In communications systems, a distinction is made between the bit rate and the baud rate.

| 0 | 2 | . | 3 | Define the term baud rate.

[1 mark]

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| 0 | 2 | . | 4 | Explain how it is possible for the bit rate to be higher than the baud rate.

[1 mark]

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