

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
TWENTY FIRST CENTURY SCIENCE  
ADDITIONAL APPLIED SCIENCE A**

**A326/01**

Communications  
(Foundation Tier)

**Wednesday 24 June 2009  
Morning**

**Duration: 45 minutes**

Candidates answer on the question paper  
A calculator may be used for this paper

**OCR Supplied Materials:**  
None

**Other Materials Required:**

- Pencil
- Ruler (cm/mm)



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**INSTRUCTIONS TO CANDIDATES**

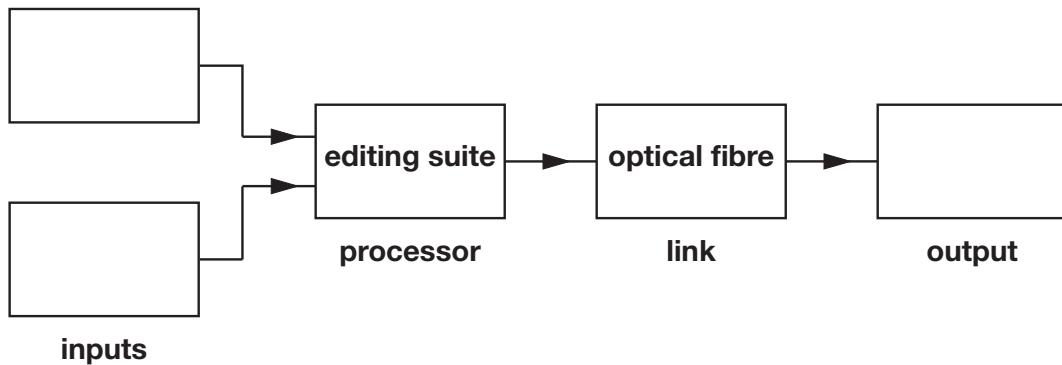
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Here is an incomplete block diagram for a cable TV system.



(a) Complete the diagram. Choose words from this list.

- camera      microphone      screen      switch      telephone**

[2]

(b) The people who work in the editing suite must be experts.  
Give **another** example of an expert who works in the communications industry.

.....  
 .....

[1]

(c) The link for the cable TV system is optical fibre.  
How do signals pass down optical fibre?  
Put a ring around the **correct** answer.

- pulses of infrared**  
**alternating current**  
**modulated radio waves**

[1]

(d) Some TV signals are still broadcast from radio masts.  
They use analogue coding of the TV signal.  
What are the advantages of using **analogue** coding instead of **digital** coding?  
Put ticks (✓) in the boxes next to the **two** correct answers.

- |  |                          |
|--|--------------------------|
| The radio waves move faster.                         | <input type="checkbox"/> |
| Noise is present in the TV signal.                   | <input type="checkbox"/> |
| The range of the broadcast is decreased.             | <input type="checkbox"/> |
| All the information in the image is transmitted.     | <input type="checkbox"/> |
| The transmitters and receivers are simpler to build. | <input type="checkbox"/> |

[2]

[Total: 6]

2 Ann uses a website to buy some clothes on the internet.



(a) Before she enters her credit card details, she finds out about the **encryption** used on the website.

(i) Why is encryption important?

.....  
..... [1]

(ii) Give **another** example where encryption of data is used.

.....  
..... [1]

(b) Ann stores the address of the website on the computer's hard disc.

(i) What **other** electronic storage device could she use?

.....  
..... [1]

(ii) Complete each sentence by putting a **ring** around the correct word.

The website address is encoded on the hard disk as a series of  
**letters / sentences / words.**

The type of coding used for each bit is  
**analogue / binary / numerical.**

The speed of the internet is measured by its  
**bit rate / electrical power / radio frequency.**

[3]

[Total: 6]

Turn over

- 3 Sam is a security guard in a shopping precinct.  
He uses a two-way radio to keep in touch with the other security guards.



(a) Complete the sentences. Choose words from this list.

**compresses      digitises      modulates      receives      transmits**

When Sam talks into the radio, his voice ..... the radio signal.

His radio aerial ..... the signal in all directions. [2]

(b) Sam checks that his two-way radio is set to channel 42 at the start of each shift.

(i) Suggest why he does this.

.....  
.....  
..... [1]

(ii) Channel 42 operates on a frequency of 85 MHz.  
Which frequency range is this in?  
Put a ring around the answer.

**long wave      medium wave      VHF      Wi-Fi**

[1]

- (c) Sam's two-way radio uses a ferrite rod aerial.  
Draw a straight line from each **type of aerial** to its **feature**.

type of aerial	feature
dish	doesn't take up much room
dipole	transmits and receives from satellites
ferrite rod	transmits and receives equally well in most directions

[2]

- (d) At the end of each shift, Sam connects the radio to a recharging unit.  
This charges up the batteries for the next day.

(i) Why is Sam's radio powered by batteries instead of the mains supply?

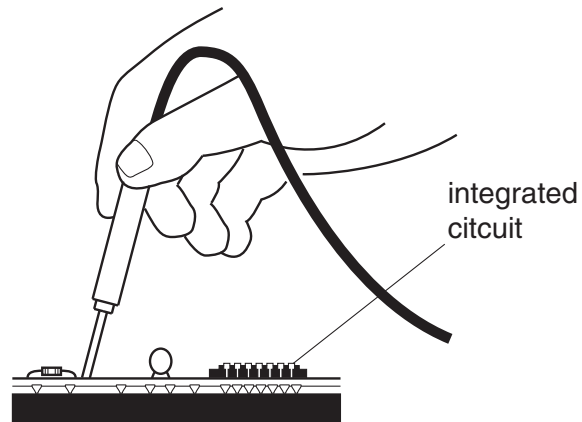
.....  
.....  
..... [1]

(ii) Give one advantage of powering equipment from the mains supply.

.....  
.....  
..... [1]

[Total: 8]

- 4 Sally is a communications engineer.  
She tests a piece of faulty equipment.



- (a) She uses instruments to test the equipment.

Draw straight lines to link each **test instrument** to **what it measures**.

**test instrument**

voltmeter

oscilloscope

**what it measures**

power

voltage

current

frequency

[2]

(b) The equipment that she is testing is powered from the mains supply.

Which of the following features of the equipment increase her safety?

Put a tick (✓) in the boxes next to the **two** correct features.

- a fuse in the mains cable
- a mains switch on the equipment
- double insulation in the equipment
- a metal handle on her screwdriver
- plastic screws on the equipment casing

[2]

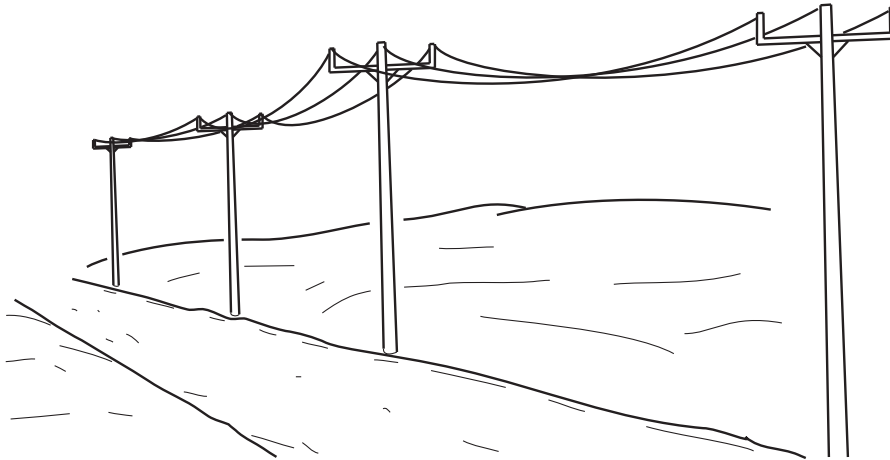
(c) Some of the integrated circuits (chips) in the equipment are programmable.

Why does this make the equipment cheaper to make?

.....  
..... [1]

[Total: 5]

- 5 The invention of the Morse telegraph in 1844 increased the **distance** over which people could communicate.



The Morse telegraph uses long and short pulses of electricity to transmit information along copper wires.  
For the system to work, the receiver and transmitter have to use the same shared code of long and short pulses.

- (a) Give two **other** examples of shared codes which are used in communications.

1 .....

.....

2 .....

..... [2]

- (b) Morse code is digital. State **two** advantages of sending information in a digital code.

1 .....

.....

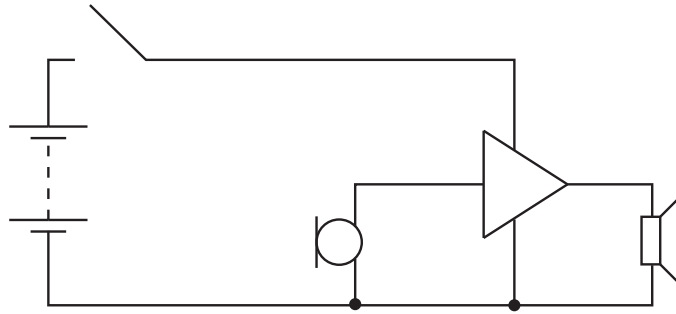
2 .....

..... [2]

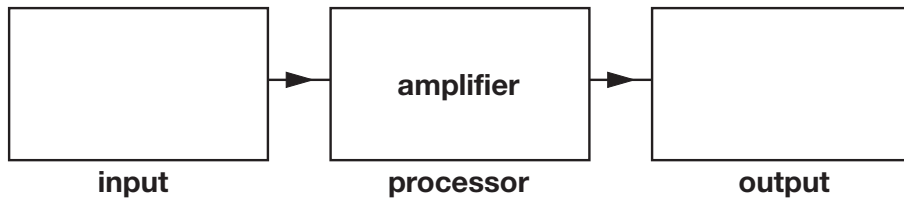
[Total: 4]



6 Here is a circuit diagram of a simple intercom.



(a) Complete the block diagram for the system.



[2]

(b) The intercom contains an amplifier. Complete the sentences for the amplifier. Choose words from the list.

**alternating      digital      direct      amplitude      frequency      modulation**

The amplifier increases the ..... of the input signal.

Amplifiers only work with ..... voltage signals.

[2]

(c) The intercom has this symbol stamped on its casing. What does the symbol mean?



.....  
.....  
..... [1]

(d) The intercom uses copper wire as the link.  
This is because copper wire is cheap and easy to use over a short distance.

Give an example of a communications system which uses **radio waves** as the link.  
Explain why radio waves are used for the link.

.....  
.....  
..... [2]

[Total: 7]

END OF QUESTION PAPER

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