

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

A326/01

Communications
(Foundation Tier)

**Wednesday 24 June 2009
Morning**

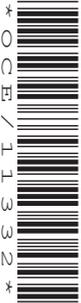
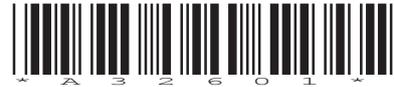
Duration: 45 minutes

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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MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

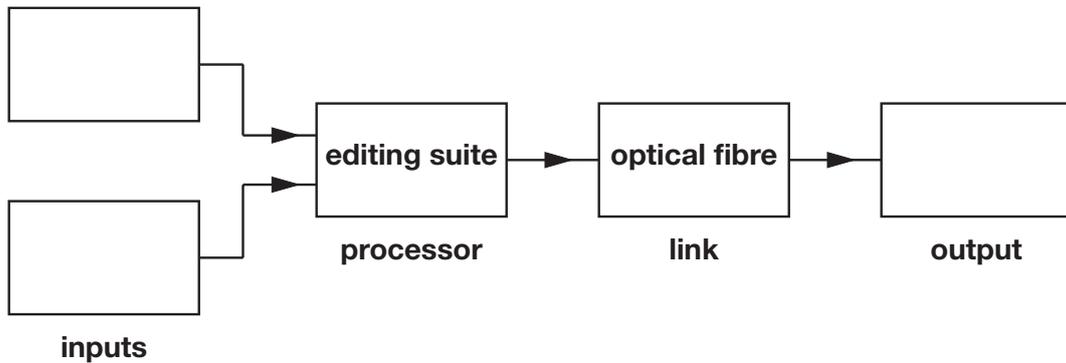
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the 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) Optical fibre is the link for the cable TV system.
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) She finds out about the **encryption** used on the website before she enters her credit card details.

(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 as a series of **letters / sentences / words**.

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

The speed of the internet depends on 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 433MHz.
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) Sam connects the radio to a recharging unit at the end of each shift.
This charges up the batteries for the next day.

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

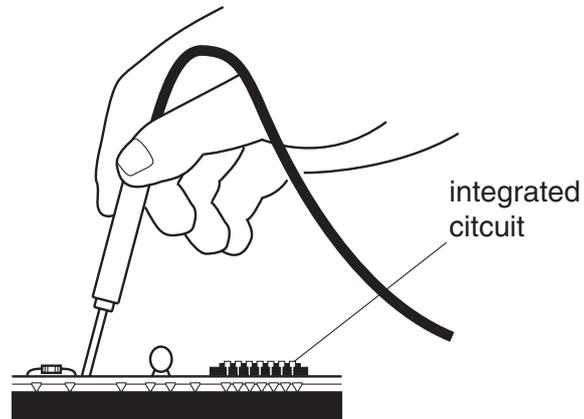
.....
.....
..... [1]

(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]

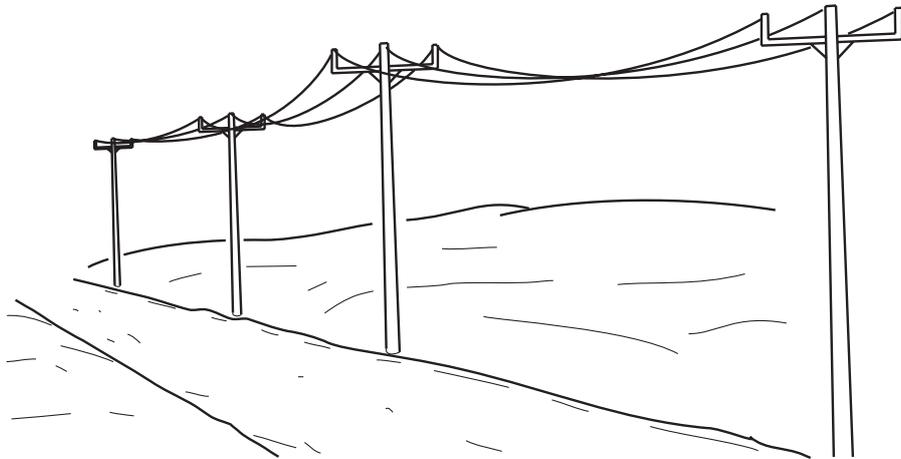
(c) Some of the integrated circuits (chips) in the equipment are programmable.

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.
The receiver and transmitter have to use the same shared code of long and short pulses if the system is to work.

- (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

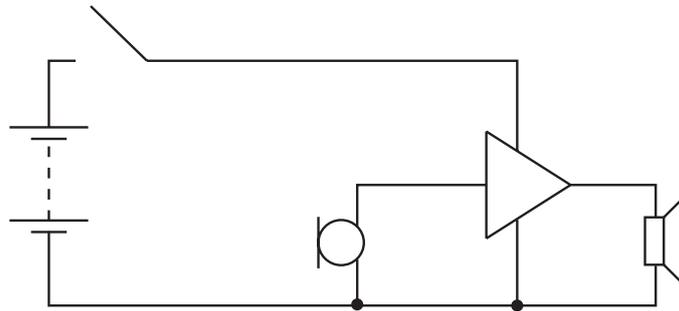
.....

2

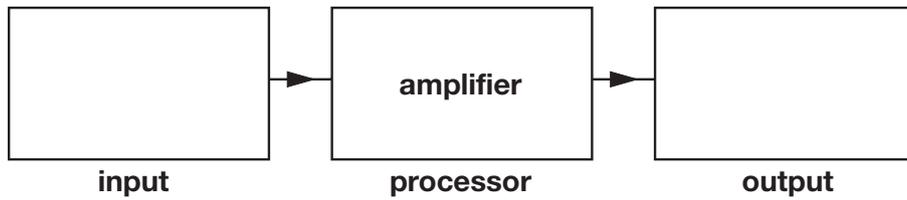
..... [2]

[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.

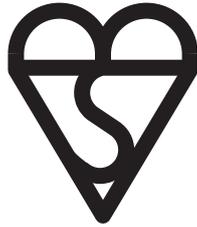
alternating digital direct amplitude frequency modulation

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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