

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**A326/01**

**TWENTY FIRST CENTURY SCIENCE  
ADDITIONAL APPLIED SCIENCE A**

**COMMUNICATIONS  
Foundation Tier**

**WEDNESDAY 24 JUNE 2009: Morning**

**DURATION: 45 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**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)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **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.**
- **Write your answer to each question in the space provided, however additional paper may be used if necessary.**

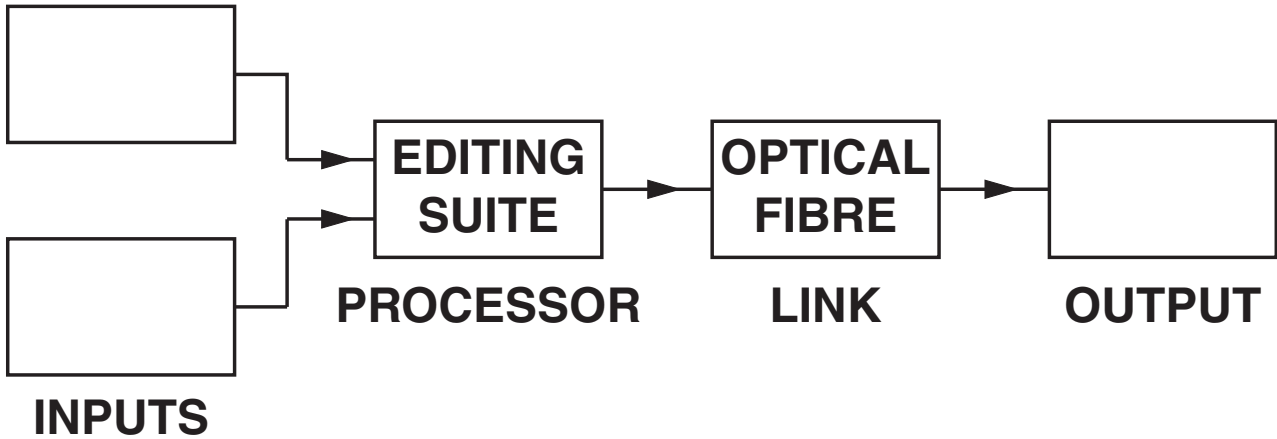
## **INFORMATION FOR CANDIDATES**

- **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.**

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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.

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[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.

Noise is present in the TV signal.

The range of the broadcast is decreased.

All the information in the image is transmitted.

The transmitters and receivers are simpler to build.

[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]**

**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.**

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**[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?**

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**[1]**

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

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**[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

WHAT IT MEASURES

VOLTMETER

POWER

VOLTAGE

CURRENT

OSCILLOSCOPE

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 \_\_\_\_\_

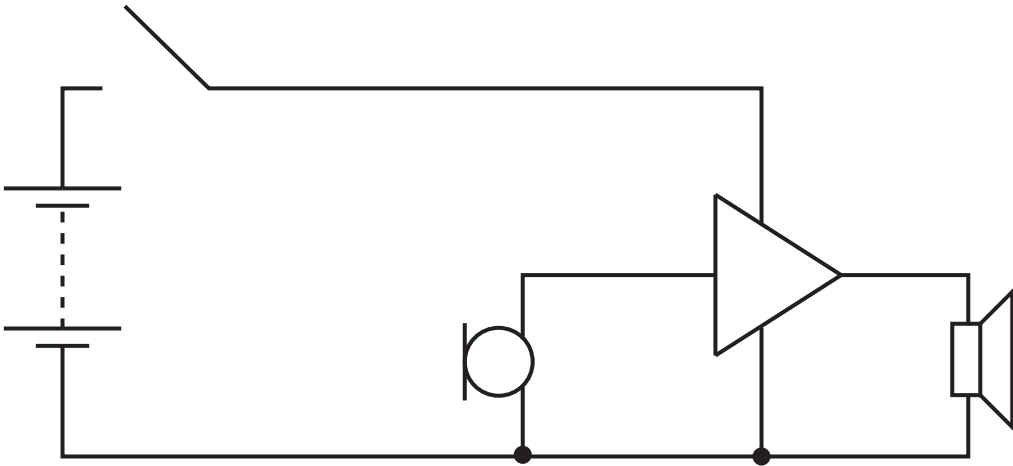
\_\_\_\_\_

2 \_\_\_\_\_

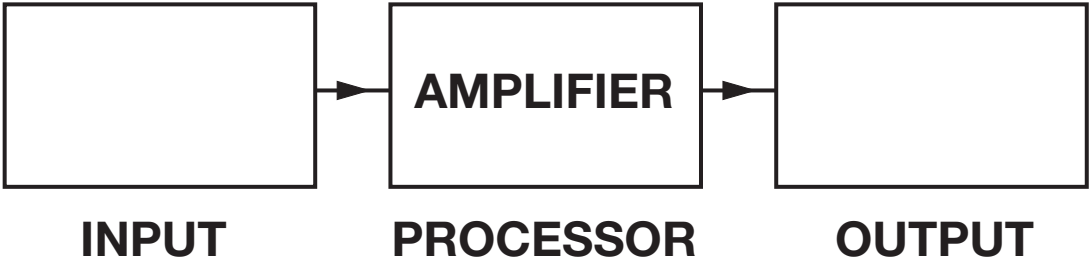
\_\_\_\_\_ [2]

[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?



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[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.

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[2]

[Total: 7]

**END OF QUESTION PAPER**

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