

**Wednesday 20 June 2012 – Morning**

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

**A326/01** Communications (Foundation Tier)

Candidates answer on the Question Paper.  
A calculator may be used for this paper.

**Duration:** 45 minutes

**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**

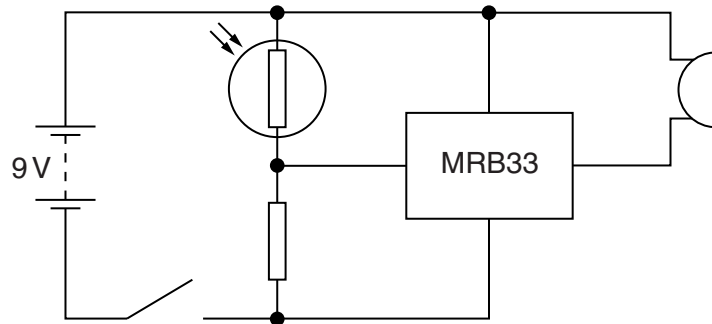
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

**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 Anne installs this theft alarm in the boot of her car.

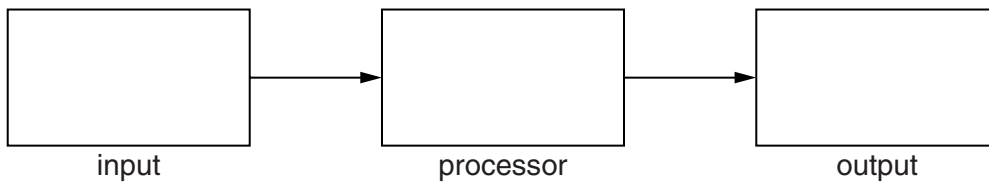


The LDR senses the light and the buzzer makes a noise when the boot is opened.

(a) Put a **ring** around the LDR in the circuit diagram. [1]

(b) The integrated circuit switches on the buzzer five seconds after the LDR senses the light.

(i) Complete the **block** diagram below for the circuit above.



[2]

(ii) The block diagram contains arrows.

What do the arrows show?

Put a tick (✓) in the box next to the correct answer.

The connections to the battery.

The flow of information through the system.

The direction of the current between components.

The order in which the circuit should be assembled.

[1]

(c) The theft alarm uses sound to communicate information.

Give **another** example of an electronic system which uses sound for communication.

.....

.....

..... [1]

(d) Anne wants a louder buzzer.

She needs one with more power.

Anne finds this data for the buzzer.

current	0.2 A
voltage	9 V
frequency	2 000 Hz

(i) Do a calculation to show that the power of the buzzer is about 2 W.

Use the rule  $P = VI$ .

[1]

(ii) Anne uses the internet to find a louder buzzer.

She wants it to have more power when she puts it in the circuit with the same battery.

Complete the sentences by putting a **ring** around the correct words in **bold**.

The current in the new buzzer must be **more than / less than / the same as** 0.2 A.

The voltage of the new buzzer must be **more than / less than / the same as** 9 V.

[2]

(iii) When the new buzzer arrives, she tests it by connecting it in series with a switch and a battery.

Draw a circuit diagram for her test circuit.

[2]

[Total: 10]

- 2 Bert is a journalist. He uses a satellite telephone to talk to people in the office.



- (a) What frequency of radio waves does the satellite telephone use?

Put a **ring** around the correct answer.

**10Hz**

**10 kHz**

**10MHz**

**10GHz**

[1]

- (b) Here is an incomplete block diagram for the **transmitter** of the satellite telephone system.



Complete the diagram. Use these words.

**aerial**

**microphone**

**modulator**

[2]

(c) The satellite telephone system does not use an **analogue** signal to carry information from Bert to the office. It uses a **digital** signal instead.

(i) Draw lines to link each **type of signal** to its best **description**.

type of signal	description
digital	can have any value
analogue	can only have one value
	can only have two values

[1]

(ii) Digital signals can be encrypted.

State the meaning of the word **encrypted**.

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

(iii) Being able to encrypt signals is a big advantage for Bert.

State **another** advantage of sending information as a digital signal.

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

(d) Bert's satellite telephone system uses radio waves as the link.

(i) Here are some other communication systems.

Put a tick (✓) in the box next to the one which often uses an **optical fibre** link.

- email
- doorbell
- fire alarm
- police radio

[1]

(ii) Some communication systems use **copper wire** as the link.

State an example of a communication system which uses copper wire as the link. Give a reason why the link is copper wire.

.....

.....

.....

..... [2]

[Total: 9]

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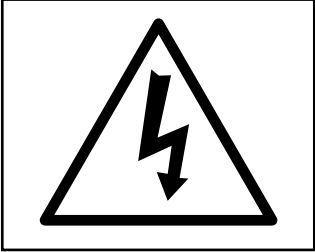
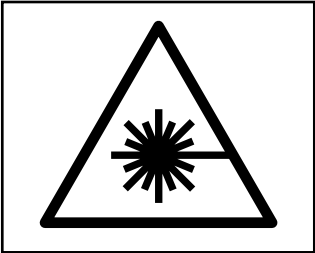

**Question 3 begins on page 8**

**PLEASE DO NOT WRITE ON THIS PAGE**

3 Felix's job is to repair amplifiers.

(a) He needs to know the meaning of hazard symbols.

Draw lines to link each hazard **symbol** to its **meaning**.

symbol	meaning
	laser
	danger
	high voltage
	emergency stop
	double insulated

[2]

(b) Felix repairs amplifiers that use mains electricity.

(i) Why must Felix be careful when he mends these amplifiers?

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

(ii) Describe **two** actions Felix can take to reduce the risk.

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



(c) Some amplifiers use batteries.

These are safer for Felix when he repairs them.

Give **another** advantage of using batteries instead of mains electricity for an amplifier.

.....

.....

..... [1]

[Total: 6]

4 Don likes listening to the radio.



(a) Draw lines to link each **part** of a radio receiver with its **function**.

part	function
tuner	input device
aerial	output device
amplifier	lets one station through
demodulator	increases amplitude of signal
loudspeaker	separates the signal from the carrier

[3]

(b) Don's favourite station is RadioOCR at 102.8MHz.

Give a reason why **only** RadioOCR is allowed to broadcast on that frequency in the UK.

.....

.....

..... [1]

(c) RadioOCR broadcasts using frequency modulation.

This gives a high quality sound for Don, with no distortion or hiss.

Give **another** example of an electronic technology which has improved the quality of communication and describe the difference it makes to people's lives.

.....

.....

.....

.....

.....

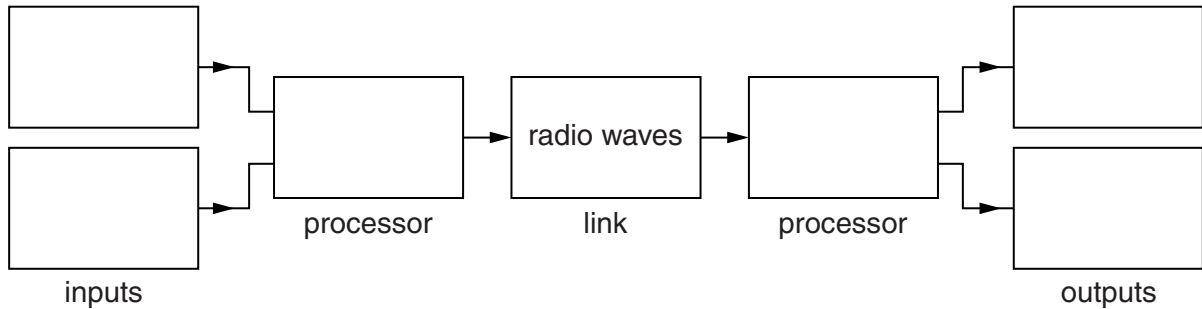
.....

..... [2]

[Total: 6]

5 Television is a part of many people's lives.

(a) Here is an incomplete block diagram for a simple television broadcasting system.



(i) Complete the block diagram. Choose words from this list.

**camera    loudspeaker    microphone    receiver    screen    transmitter**

[3]

(ii) Which one of the blocks contains an **encoder**?

answer ..... [1]

(b) How is the picture built up on the screen?

.....

.....

..... [1]

[Total: 5]

**END OF QUESTION PAPER**



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