

**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.

**OCR supplied materials:**  
None

**Other materials required:**

- Pencil
- Ruler (cm/mm)

**Duration:** 45 minutes



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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### MODIFIED LANGUAGE

#### INSTRUCTIONS TO CANDIDATES

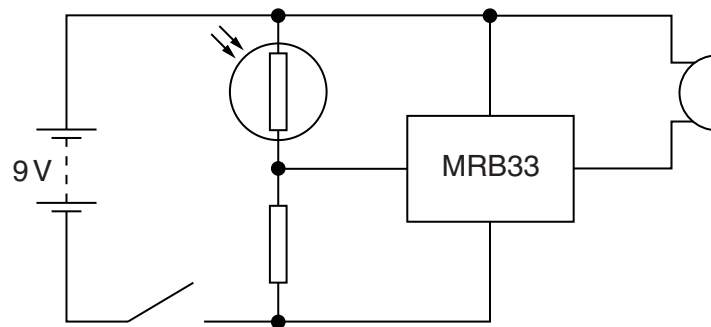
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting 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 fits this theft alarm in the boot of her car.

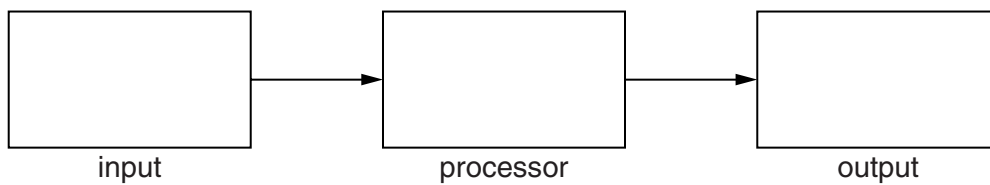


The LDR senses the light when the boot is opened and the buzzer makes a noise.

- (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.

**10 Hz**

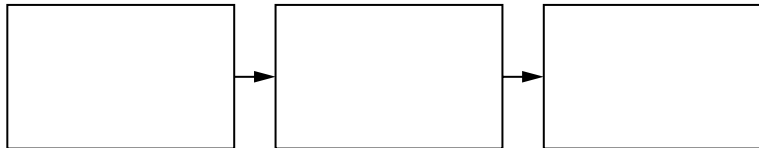
**10 kHz**

**10 MHz**

**10 GHz**

[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 uses a digital signal to carry information from Bert to the office. It does not use an analogue signal.

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

**type of signal**

**description**

digital

can have any value

can only have one value

analogue

can only have two values

[1]

(ii) Digital signals can be encrypted.

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

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

(iii) Encrypting signals is one advantage of digital signals 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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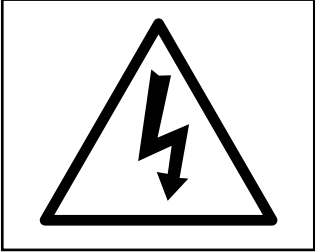
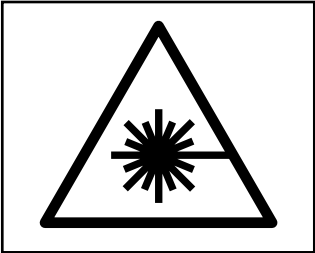

**Question 3 begins on page 8**

**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
	<input type="text" value="laser"/>
	<input type="text" value="danger"/>
	<input type="text" value="high voltage"/>
	<input type="text" value="emergency stop"/>
	<input type="text" value="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. Describe how it has made people's lives different.

.....

.....

.....

.....

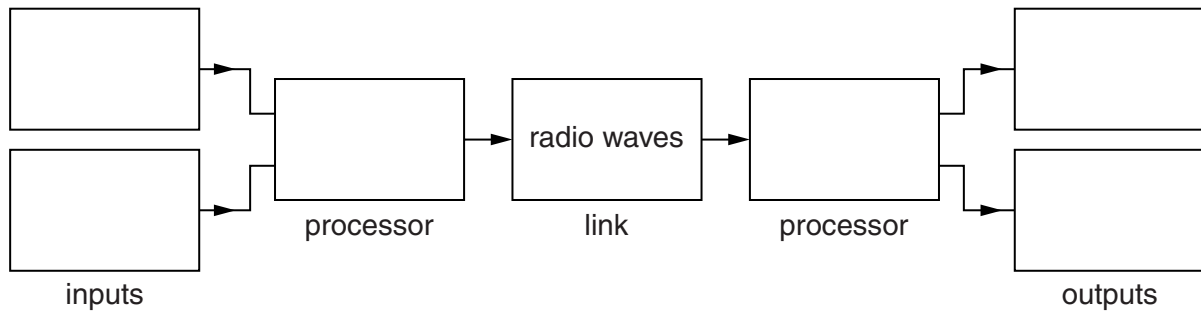
.....

..... [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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