

**GCSE**

**ADDITIONAL APPLIED SCIENCE A**

AP5 Communications

**Specimen Paper**

Candidates answer on the question paper:

Additional materials: ruler (cm/mm), calculator

**F** **A326/01**

45 mins

Candidate  
Name

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Centre  
Number

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Candidate  
Number

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**TIME** 45 mins

**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers on the dotted lines unless the question says otherwise.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- There is a space after most questions. Use it to do your working. In many questions marks will be given for a correct method even if the answer is incorrect.
- Do not write in the bar code. Do not write in the grey area between the pages.
- **DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.**

**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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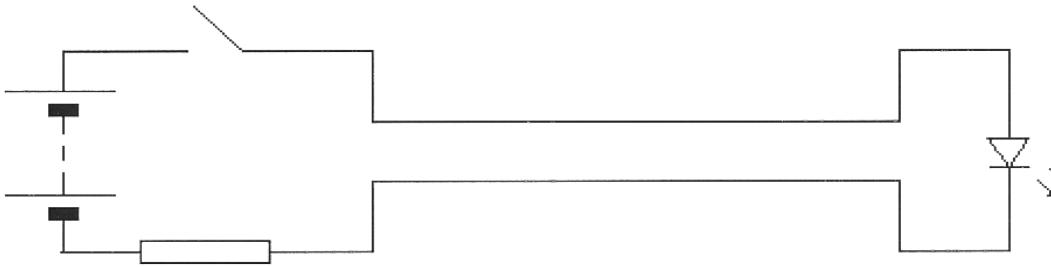
**This specimen paper consists of 17 printed pages.**

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**Answer all questions.**

1. Jo builds a simple communication system.

Here is the circuit diagram.



- (a) When Jo presses the **switch**, a signal travels down the **wires** and makes the **LED** glow.

On the circuit diagram, label:

- (i) the switch
- (ii) the wires
- (iii) the LED

[3]

- (b) Jo uses the system to communicate with Max in the next office.

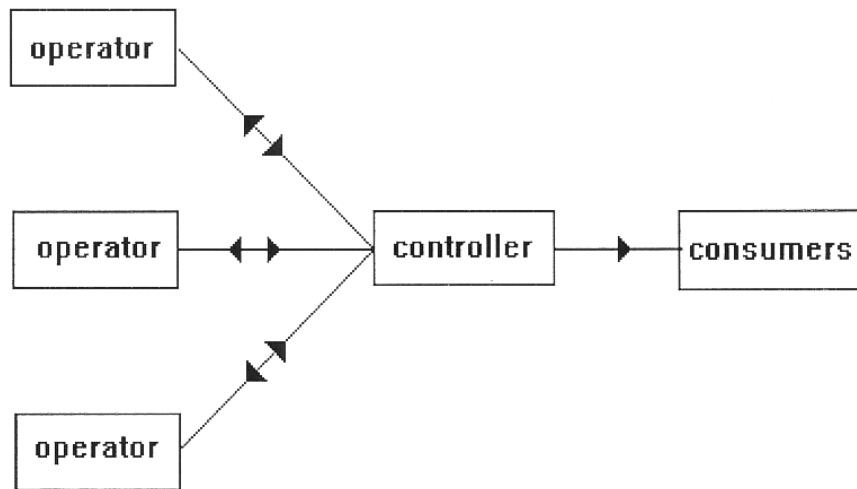
The glowing LED tells Max that Jo needs to talk to him. Sometimes Max doesn't see the LED. Jo replaces the LED with another component which makes a noise when she presses the switch.

Draw a diagram below to show her the new circuit.

[3]

[Total: 6]

2. The diagram shows some of the links in a complex communications system.



The controller is in two-way communication with three operators.

The controller passes information on to the consumers.

- (a) Name your own example of a complex communications system.

.....[1]

- (b) (i) For your example, state how the signal is carried from the operator to the controller.

.....[1]

- (ii) Describe the kind of information which the operators pass to the controller.

.....[1]

**(iii)** Who are the consumers who eventually receive the information?

.....[1]

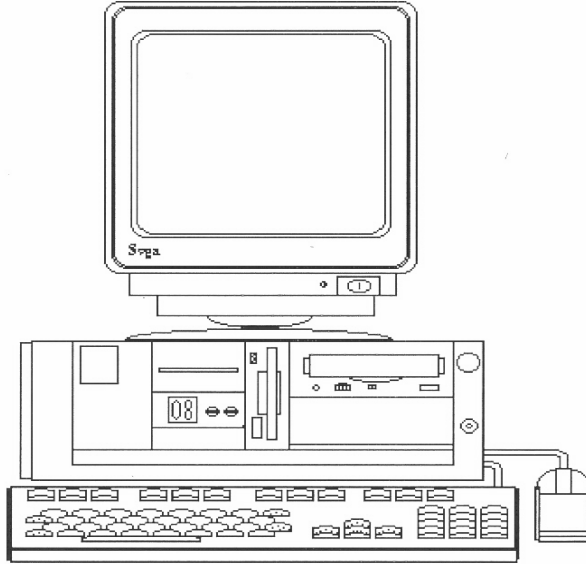
**(c)** Describe how the controller and operators work together in your system.

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

[Total: 6]

3. Many electronic devices have been invented over the last hundred years.

They have changed our lives.



The invention of the personal computer allows people to use emails for communication.

It has increased the **quantity** of communication between people.

(a) Other inventions have increased the quantity of communication between people.

(i) State **another** example of an electronic device which has increased the quantity of communication between people.

.....[1]

(ii) For your example, describe how it transfers information between people.

.....  
.....  
.....  
.....[3]

**(b)** Security is important when communicating.

**(i)** What could you do to information to make it more secure?

Put a ring around the word.

**compression**

**encryption**

**modulation**

**sampling**

[1]

**(ii)** Give another example of a communication system which needs to be secure.

.....[1]

**(c)** Emails received by a personal computer can be stored on a floppy disc.

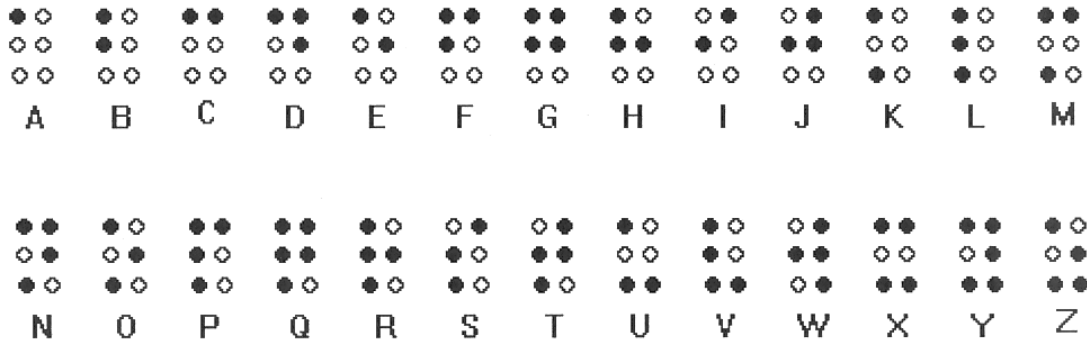
Name **another** example of an electronic storage device.

.....[1]

[Total: 7]

4. In 1822 Louis Braille invented a code for communicating with blind people.

In this code, each letter of the alphabet is represented by a different pattern of raised bumps on a surface. The bumps are arranged in three rows of two, as show below.



- (a) Braille's code is an example of a **digital** code.

Describe the difference between an analogue code and a digital code.

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

- (b) (i) Name another example of a code used in communications.

.....[1]



(ii) Explain how your example of a code works.

.....

.....

.....[2]

5. Max buys and sells cars.

He needs to buy a mobile phone which can transmit and receive pictures of cars. He narrows the choice to just two models. They each cost £250.

<b>Model</b>	RGB4096	BGW16384
<b>Display</b>	Full colour, 41mm x 34mm	Black, grey and white, 41mm x 34mm
<b>Screen</b>	4,096 pixels	16,384 pixels
<b>Battery Lifetime</b>	5 hours	20 hours
<b>Weight</b>	1.1 N	0.9 N
<b>Size</b>	102mm x 48mm x 23mm	90mm x 42mm x 21mm
<b>Speed</b>	1.2 s per picture	0.9 s per picture



Microsoft ©

Max will use the phones to send pictures of cars to customers.

- (a) The two phones have different speeds. Does this really matter? Give a reason.

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

**(b)** Suggest **two** important differences between the phones.

1. ....

2. ....[2]

**(c)** Suggest which phone Max should buy. Give reasons for your choice.

.....

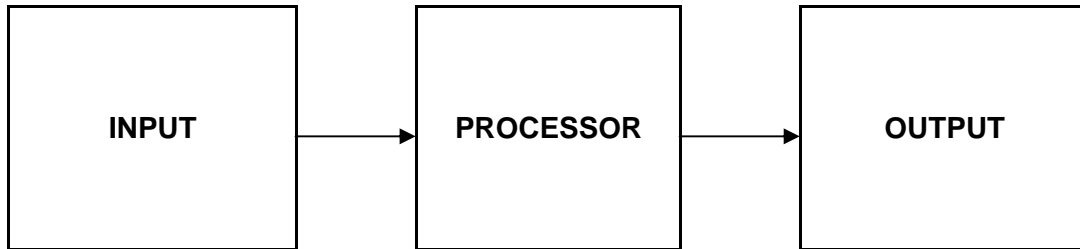
.....

.....

.....[2]

[Total: 5]

6. Here is a block diagram of a single communication system.



(a) Complete the sentence. Choose from

**current**

**information**

**waves**

The arrows show the direction of flow of ..... in the system. [1]

(b) Name an example of a simple communication system.

.....[1]

(c) Complete the table for your example.

<b>Input Device</b>	
<b>Processor</b>	
<b>Output Device</b>	

[3]

**(d)** Describe what your chosen output device does.

.....

.....

.....[2]

[Total: 7]

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**GCSE**

**ADDITIONAL APPLIED SCIENCE A**

AP5 Communications

**Specimen Mark Scheme**

Maximum mark for this paper is [36]

**F** **A326/01**

45 mins

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**This specimen mark scheme consists of 3 printed pages.**

Question Number	Answer	Max Mark
<p><b>1(a)i</b></p> <p><b>1(a)ii</b></p> <p><b>1(a)iii</b></p> <p><b>1(b)</b></p>	<p>Switch clearly labelled</p> <p>Any wire clearly labelled</p> <p>LED clearly labelled</p> <p>Complete circuit drawn</p> <p>includes battery, switch (open or closed) and resistor</p> <p>LED replaced with buzzer or loudspeaker symbol</p> <p>Note - if LED left in circuit, 1 mark only</p> <p>If wrong symbol drawn, but correctly labelled as buzzer or loudspeaker, 1 mark only</p> <p>If both errors made, neither mark awarded</p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[6]</p>
<p><b>2(a)</b></p> <p><b>2(b)i</b></p> <p><b>2(b)ii</b></p> <p><b>2(b) iii</b></p> <p><b>2(c)</b></p>	<p><b>Any sensible example e.g.:</b></p> <p>tv or radio broadcast system, traffic monitoring network, cctv system</p> <p><b>Appropriate answer consistent with part 2(a) :</b> e.g. for cctv system, signal transferred by cable or radio / microwave link</p> <p><b>Appropriate answer consistent with part 2(a) :</b> e.g. for cctv system, video images</p> <p><b>Appropriate answer consistent with part 2(a) :</b> e.g. for cctv system, building / shop security service, emergency services, local council, traffic news service</p> <p><b>Appropriate answer consistent with part 2(a)</b></p> <p>1 mark for describing how operator sends information</p> <p>1 mark for describing how controller processes multiple inputs</p> <p>e.g. for cctv system, operator sends continuous video feed, controller can record all inputs, or select 1 operator for live viewing.</p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[6]</p>
<p><b>3(a)i</b></p> <p><b>3(a)ii</b></p> <p><b>3(b)(i)</b></p> <p><b>3(b)(ii)</b></p>	<p><b>Any sensible example e.g.:</b></p> <p>telephone, mobile telephone, pager, fax machine</p> <p><b>Appropriate answer consistent with part 3(a)(i)</b></p> <p>1 mark for describing how information is input / encoded</p> <p>1 mark for describing method of transmission</p> <p>1 mark for describing how information is output</p> <p>e.g. for mobile telephone, sound converted to (analogue/digital) electrical signal by microphone, transmitted by radio/microwave signal, converted to sound by loudspeaker in handset.</p> <p>Encryption</p> <p>Any sensible (<b>different to 3(a)(i)</b>) example of a secure communication system e.g.:</p> <p>Web commerce transactions, credit card / EPOS, cash machines, military</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p>



<p><b>3(c)</b></p>	<p>communications etc.  <b>Any sensible example e.g.:</b>  cd-rom, dvd, magnetic tape, usb memory stick, iPod, mp3 player, hard disk, video cassette etc.</p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[1]</p> <p>[7]</p>
<p><b>4(a)</b>  <b>4(b)i</b> <b>4(b)ii</b></p>	<p>digital codes have limited number of states (e.g. 1,0)  analogue codes have lots of different values, wtte acceptable  <b>Any reasonable code</b> e.g. Morse, semaphore, DAB Digital TV, AM radio etc.  Picture, sound, alphanumeric character etc.  1s and 0s, pits and flats, light or no light etc.</p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[5]</p>
<p><b>5(a)</b>  <b>5(b)</b>  <b>5(c)</b></p>	<p><b>Any sensible reason e.g.:</b>  both times quite short, much less time to set up shot, slower speed compensated by colour picture</p> <p><b>any [2] of the following :</b>  battery lifetime  pixels  display</p> <p>decision made by considering context backed by sensible arguments,  <b>maximum [2]</b> e.g. :colour is important for customer choice  large number of pixels gives clearer picture  long battery lifetime allows longer away from office</p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[1]</p> <p>[2]</p> <p>[2]</p> <p>[5]</p>
<p><b>6(a)</b> <b>6(b)</b>  <b>6(c)</b>  <b>6(d)</b></p>	<p>Information</p> <p><b>Any sensible example e.g.:</b>  telephone, television, fax, radio, computer scanner</p> <p><b>Appropriate answer consistent with part 6(b)</b>  1 mark for input device, 1 mark for processor, 1 mark for output device  e.g. scanner, CPU, printer : telephone, exchange, telephone etc.</p> <p><b>Appropriate answer consistent with part 6(c)</b>  1 mark for transformation of information  1 mark for how device functions  e.g. printer converts electrical signal to paper output (wtte)  uses laser &amp; toner / inkjet / dot matrix / thermal transfer etc.</p> <p style="text-align: right;"><b>Total marks</b></p> <p style="text-align: right;"><b>Overall marks</b></p>	<p>[1]</p> <p>[1]</p> <p>[3]</p> <p>[1]</p> <p>[1]</p> <p>[7]</p> <p>[36]</p>

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