Friday 16 June 2017 – Morning
GCSE ADDITIONAL APPLIED SCIENCE
A191/01 Science in Society (Foundation Tier)

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
• Pencil
• Ruler (cm/mm)
• Calculator

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 barcodes.

INFORMATION FOR CANDIDATES
• The quality of written communication is assessed in questions marked with a pencil (✍).
• 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 50.
• This document consists of 12 pages. Any blank pages are indicated.
1 Medical staff must respond quickly to emergencies.

(a) Draw one straight line from each **response** to an **explanation** of what the response involves.

<table>
<thead>
<tr>
<th>response</th>
<th>explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>triage</td>
<td>Make notes about previous medical conditions and lifestyle.</td>
</tr>
<tr>
<td>history</td>
<td>Find out what is wrong with the patient.</td>
</tr>
<tr>
<td>diagnosis</td>
<td>Prioritise patients so those in a critical condition get treated first.</td>
</tr>
<tr>
<td>treatment</td>
<td>Give medical care to combat the disease or disorder.</td>
</tr>
</tbody>
</table>

(b) Patients or their relatives need to give informed consent before treatment can begin.

Put a tick (✓) in the boxes next to the **two** best reasons why.

To ensure that the patient or their relatives are fully informed of ...

- ... what the treatment involves. 
- ... the cost of the treatment. 
- ... the doctors and nurses who will be involved in the treatment. 
- ... how long the treatment will take. 
- ... where the treatment will take place. 
- ... the risks and benefits of the treatment.
(c) General Practitioners (GPs) often refer patients to specialist services.

Put ticks (✓) in the boxes next to the two statements which, when taken together, best explain why.

There are more GPs than specialist services. [ ]

GPs are trained to treat all conditions. [ ]

GPs need to be able to identify what is wrong with a patient and how best to treat the condition. [ ]

Specialist services can treat more complicated conditions. [ ]

It would be too expensive to provide all GPs with equipment such as MRI scanners. [ ]

There are more specialist services than GPs. [2] [ ]

[Total: 6]
2 Describe the role of one health care practitioner, including the scientific, technical and personal skills they need to perform their job.

The quality of written communication will be assessed in your answer.

[Total: 6]
3 Neil falls and hurts his leg.
He goes to his local Accident and Emergency Department.
The doctor sends him for an X-ray.

(a) Look at the X-ray of Neil’s leg.
What conclusions can you make about Neil’s injury from the image of the X-ray?
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................................................................................................................................................... [3]

(b) The doctor puts Neil’s leg into a plaster cast.
When it is removed, Neil goes to see a physiotherapist.
Describe what the physiotherapist does when she treats Neil’s leg.
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[Total: 5]
4 Rebecca is a paramedic. She is called to a patient. She takes the patient’s temperature with a clinical thermometer.

(a) Describe and explain how she would carry out this procedure.

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(b) The image shows the clinical thermometer after the reading was taken.

[Image of clinical thermometer with a reading of 37°C]

Normal human body temperature is 37°C.

What conclusions can be made about the patient’s condition and what treatment should Rebecca give?

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(c) The patient’s body temperature could also have been measured using a liquid crystal display or an electronic sensor.

[Images of liquid crystal and electronic sensor]

Suggest which of the three instruments, clinical thermometer, liquid crystal, or electronic sensor, would be least accurate.

Explain your answer.

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[Total: 8]
Peter is a student. He wants to find out which type of food colouring is used in a fruit juice that he drinks.

He makes a chromatogram of the fruit juice and four other types of food colouring.

Peter concludes that his drink contains the food colouring called posh pink.Comment on Peter’s conclusion and explain how his investigation could be improved.

*The quality of written communication will be assessed in your answer.*

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[6] [Total: 6]
Humans need to breathe clean unpolluted air. Air pollution is measured using the Air Quality Index (AQI). The table below describes the health risks and gives advice for different levels on the AQI.

<table>
<thead>
<tr>
<th>AQI</th>
<th>Health risk</th>
<th>Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 3</td>
<td>Low</td>
<td>Behave as normal out of doors.</td>
</tr>
<tr>
<td>4 – 6</td>
<td>Moderate</td>
<td>Reduce strenuous exercise outdoors.</td>
</tr>
<tr>
<td>7 – 10</td>
<td>High</td>
<td>Reduce strenuous exercise outdoors. People with breathing problems should only go outside for short periods of time.</td>
</tr>
<tr>
<td>&gt;10</td>
<td>Very high</td>
<td>Do not undertake strenuous exercise outdoors. People with breathing problems should stay indoors.</td>
</tr>
</tbody>
</table>

(a) Explain the reasons for the advice given at an AQI greater than ten.

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(b) The graph shows the concentration of pollution from car exhausts in a city centre. Concentration of pollutants is in parts per billion (ppb).

(i) At what time was the lowest level of pollution measured? 
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(ii) The highest levels of pollution occurred at 9.00 am and 6.00 pm. Suggest why.

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(iii) What advice would you give to cyclists who use the city centre, based on the evidence from this graph?

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[Total: 5]
Samples are collected from crime scenes for analysis. Describe and explain the procedure for the collection and storage of samples of blood.

The quality of written communication will be assessed in your answer.
8 Electrophoresis is an important technique used by forensic scientists.

(a) Which of these statements about electrophoresis are correct?

Put a tick (√) in the box next to the two correct statements.

Electrophoresis …

… uses colour to identify substances.  
… uses a scanning electron microscope.  
… can be used on small biological samples.  
… can separate biological molecules.  
… measures the intensity of a colour.

(b) Look at the electrophoresis chart.

(i) Explain how scientists would use this chart to identify a crime suspect from their DNA.
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(ii) A horse breeder wants to find out which of two male horses is the father of a newborn horse.

Suggest and explain how this could be done.

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[Total: 8]