For this paper you must have:
- a ruler.
You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations, show clearly how you work out your answer.
A hospital dietician advised a patient to eat food containing lots of protein.

Protein is an important nutrient in our diet.

1 (a) (i) Tick (✓) two boxes which show foods that contain a lot of protein.

- Apples
- Bread
- Cheese
- Milk
- Potatoes

(2 marks)

1 (a) (ii) What is the function of protein in the diet?

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

- To provide insulation
- To repair body tissues
- To allow the blood to clot

(1 mark)
Other nutrients are also important in the diet.

Match the nutrient to the test that will show if it is found in a food.

Draw **one** line from each nutrient to the correct food test.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Food test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>When mixed with iodine, turns a blue/black colour</td>
</tr>
<tr>
<td>Glucose</td>
<td>When heated with Benedict’s solution, turns orange</td>
</tr>
<tr>
<td>Starch</td>
<td>When mixed with sodium hydroxide and copper sulfate (Biuret test), turns purple</td>
</tr>
<tr>
<td></td>
<td>When rubbed on filter paper, turns the filter paper translucent</td>
</tr>
</tbody>
</table>
1 (c) Eggs are a good source of protein.

The picture shows one method that a farm can use to produce eggs on a large scale.

The chickens on the farm are kept in cages so they cannot move around very much.

1 (c) (i) What is the name given to this type of farming?

............................................................................................................................................

(1 mark)

1 (c) (ii) The farmer can produce more eggs by controlling the environment in which the chickens live.

Apart from preventing the chickens from moving around, give two other environmental factors that the farmer is able to control.

Factor 1 ....................................................................................................................................

Factor 2 ....................................................................................................................................

(2 marks)
1 (c) (iii) Put a tick (√) in the box that shows why the farmer does not want the chickens to move about.

More of their energy is put into producing eggs

They do not get tired so easily

They do not peck each other so much

(1 mark)

1 (c) (iv) Apart from being able to control the environment, give two other advantages of producing eggs by this method.

Advantage 1 ........................................................................................................................................

Advantage 2 ........................................................................................................................................

(2 marks)
2 A materials scientist researches materials to use for sports equipment.

2 (a) The table shows some properties of materials that may be used in sports equipment.

For each material, complete the table by putting a tick (✓) in the column that shows which property matches the material for that use.

Put only one tick in each row.

<table>
<thead>
<tr>
<th>Material (use)</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flexible</td>
</tr>
<tr>
<td>Aluminium (bicycle frame)</td>
<td></td>
</tr>
<tr>
<td>Ceramic (brake discs in racing cars)</td>
<td></td>
</tr>
<tr>
<td>Polymer (nylon tennis racquet strings)</td>
<td></td>
</tr>
</tbody>
</table>

(3 marks)

2 (b) (i) What is the name given to a material that is made up of more than one type of material?

Draw a ring around the correct answer.

composite                    marble                    polyester                    silica

(1 mark)

2 (b) (ii) Fibreglass is made from two materials bonded together.

Fibreglass is made from a ceramic and a polymer. It can be used to make small boats.

Suggest two properties of fibreglass.

Property 1 ..................................................................................................................................

Property 2 ..................................................................................................................................

(2 marks)
2 (c) A sports shirt can be made from natural or synthetic materials.

From the words in the box, choose one natural and one synthetic material that would be suitable for making a sports shirt.

| ceramic | cotton | leather | nylon | silk |

2 (c) (i) Natural material for making a sports shirt:

.......................................................................................................................... (1 mark)

2 (c) (ii) Synthetic material for making a sports shirt:

.......................................................................................................................... (1 mark)

Turn over for the next question
3 A Scenes of Crime Officer (SOCO) arrives at the scene of a hit-and-run incident.

3 (a) Give two reasons why it is important to cordon off the crime scene.

Reason 1 ...........................................................................................................................................

Reason 2 ...........................................................................................................................................

(2 marks)

3 (b) The SOCO found small pieces of glass at the scene of the hit-and-run incident.

3 (b) (i) What equipment would the SOCO use to collect the pieces of glass?

..................................................................................................................................................

(1 mark)

3 (b) (ii) How would the SOCO store the glass once he had collected it?

..................................................................................................................................................

..................................................................................................................................................

..................................................................................................................................................

(2 marks)
3 (b) (iii) A forensic scientist uses the oil immersion method to measure the refractive index of the glass.

The four stages in the table describe what should be done in the oil immersion method, but they are not in the correct order.

Label the stages 1–4 to show the correct order, 1 being the first stage.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record the temperature of the oil</td>
<td></td>
</tr>
<tr>
<td>Heat the oil</td>
<td></td>
</tr>
<tr>
<td>Place the fragments of glass in the oil</td>
<td></td>
</tr>
<tr>
<td>Compare the measurements with those in a data book to find the refractive index</td>
<td></td>
</tr>
</tbody>
</table>

(3 marks)

3 (c) Two different seeds, A and B, were collected at the scene of a crime. The seeds from the crime scene were compared with some seeds found on the boots of a suspect.

Seed A

Seed B

3 (c) (i) What two features of the seeds could be used to compare the seeds from the crime scene with the seeds from the suspect’s boot?

Feature 1 .................................................................................................................... ........

Feature 2 .................................................................................................................... ........

(2 marks)

3 (c) (ii) A seed found on the suspect’s boot matched a seed that was found at the crime scene.

Does this mean that the suspect committed the crime?

Draw a ring around your answer. Yes / No

Give one reason for your answer.

............................................................................................................................................

............................................................................................................................................

(1 mark)
4 A doner kebab is an example of a fast food that may be eaten as a snack.

4 (a) The table shows some nutritional information about a doner kebab.

<table>
<thead>
<tr>
<th>Nutritional information per kebab</th>
<th>Average percentage of Recommended Daily Allowance (RDA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kJ)</td>
<td>4985</td>
</tr>
<tr>
<td>Salt (g)</td>
<td>5.6</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>62.3</td>
</tr>
<tr>
<td>Saturated fat (g)</td>
<td>29.5</td>
</tr>
</tbody>
</table>

4 (a) (i) Use the figures from the table to give two reasons why eating a doner kebab as a snack is not a healthy option. Explain your answers.

Reason 1 .................................................................................................................................................. ......
Explanation ..............................................................................................................................................

Reason 2 .................................................................................................................................................. ......
Explanation ..............................................................................................................................................

4 (a) (ii) What is the average recommended daily energy allowance?

........................................ kJ

(1 mark)

4 (b) Explain why it is important to control the amount of sugar in the diet.

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..............................................................................................................................................................

(1 mark)
4 (c) A scientist at the Food Standards Agency (FSA) analysed the percentage of water in the kebab meat.

4 (c) (i) Describe how the scientist would do this, using the equipment shown in the diagrams.

Electronic balance  Oven

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(3 marks)

4 (c) (ii) What should the temperature of the oven be in this experiment?

Draw a ring around the correct answer.

\[ \text{10 °C} \quad \text{60 °C} \quad \text{160 °C} \]

(1 mark)

4 (c) (iii) Which equation should the scientist use to calculate the percentage of water in the meat?

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

\[ \frac{\text{mass after} - \text{mass before}}{\text{mass after}} \times 100 \]

\[ \frac{\text{mass before} - \text{mass after}}{\text{mass after}} \times 2 \]

\[ \frac{\text{mass before} - \text{mass after}}{\text{mass before}} \times 100 \]

(1 mark)
A sports physiologist measured the effect of exercise on an athlete’s body temperature.

The physiologist attached a temperature sensor to the athlete’s earlobe.

The sensor was connected to a data logger, which recorded the athlete’s temperature as he exercised for 6 minutes.

The results are shown on the graph.

5 (a) (i) What was the athlete’s temperature at the start of the exercise?

........................... °C

(1 mark)
5 (a) (ii) By how much did the athlete’s temperature rise during the 6 minutes exercise?

................................. °C

(1 mark)

5 (a) (iii) Give two reasons why using a data logger is a good method of recording body temperature in this experiment?

Reason 1 .............................................................................................................................................
...........................................................................................................................................................

Reason 2 .............................................................................................................................................
...........................................................................................................................................................

(2 marks)

5 (b) The flow of blood through the body is used to control temperature.

The diagrams show a blood vessel at two different stages during exercise.

Which diagram, A or B, shows the blood vessel of the athlete after exercise?

Write your answer in the box.  

Explain how the change in the blood vessel helps the body to lose heat.

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(2 marks)

Question 5 continues on the next page
5 (c) The bar chart shows how much water is lost from the athlete's body on a normal day.

The athlete ran a race.

Draw three bars on the bar chart to show how the volume of water lost through breath, sweat and urine might be different on race day.

(3 marks)
Technicians in forensic laboratories do many chemical tests to identify substances.

The table shows the positive results from some tests for a range of substances.

<table>
<thead>
<tr>
<th>Positive result</th>
<th>Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reacts with acidified potassium dichromate and turns it from orange to green</td>
<td></td>
</tr>
<tr>
<td>Gives a lilac colour in a flame test</td>
<td></td>
</tr>
<tr>
<td>When bubbled through limewater, the limewater turns milky</td>
<td></td>
</tr>
<tr>
<td>When added to sodium hydroxide solution, a blue precipitate forms</td>
<td></td>
</tr>
</tbody>
</table>

Use words from the box to complete the table.

<table>
<thead>
<tr>
<th>carbon dioxide</th>
<th>copper ions</th>
<th>ethanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>glucose</td>
<td>hydrogen</td>
<td>potassium ions</td>
</tr>
</tbody>
</table>

(4 marks)

Sodium chloride is an ionic compound.

What is the formula for sodium chloride?

.........................................................

(1 mark)

How are the particles held together in ionic compounds?

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............................................................................................................................................
............................................................................................................................................

(2 marks)

Why do ionic compounds have high melting points?

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............................................................................................................................................

(2 marks)
There are no questions printed on this page.