Centre Number						Candidate Number				
Surname						Other Names				

Notice to Candidate. The work you submit for assessment must be your own. If you copy from someone else or allow another candidate to copy from you, or if you cheat in any other way, you may be disqualified.

Candidate Declaration. I have read and understood the Notice to Candidate and can confirm that I have produced the attached work without assistance other than that which is acceptable under the scheme of assessment.

Candidate Signature		Date	

Teacher's Initials	
Section	Mark
$1_{/18}$	
$2_{/16}$	
$PSA_{/6}$	
TOTAL (max 40)	

General Certificate of Secondary Education
June 2012

Human Health and Physiology 44152

Unit 2 Investigations in Human Health and Physiology
ISA 1 – Energy from food

Valid for submission in May 2012

For this paper you must have:
- results tables and charts or graphs from your own investigation.
- a calculator.

Time allowed 45 minutes

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 34.
- You are expected to use a calculator where appropriate.
- In some questions you will be marked on your ability to use good English, organise information clearly and use correct scientific words where appropriate.

Details of additional assistance (if any). Did the candidate receive any help or information from anyone other than the subject teacher(s) in the production of this work? If the answer is yes give the details below or on a separate page.

Yes ☐ No ☐

Did this candidate take part in the practical activity?	**YES / NO**

Teacher Declaration:

I confirm that the candidate's work was conducted under the conditions laid out by the specification. I have authenticated the candidate's work and am satisfied that to the best of my knowledge the work produced is solely that of the candidate.

Signature of teacher ..... Date .....

Section 1

These questions are about the investigation that you carried out on the amount of energy released from food.

Answer **all** questions in the spaces provided.

1 This question is about the **independent** variable in your investigation.

1 (a) What was the **independent** variable (the variable that you deliberately changed)?

.....

(1 mark)

1 (b) Which term describes your **independent** variable?
Draw a ring around the correct answer.

Categoric **Control** **Continuous**

(1 mark)

2 For a **fair test** some variables must be kept the same throughout an investigation.
State **two** variables that you kept the same in your investigation.

1 .....

2 .....

(2 marks)

3 In your investigation, you used at least one measuring instrument.

3 (a) Name **one** measuring instrument that you used.

.....

(1 mark)

3 (b) You could have used a measuring instrument with a smaller scale division.
Draw a ring around the correct word to complete the sentence.
Using a smaller scale division would make the result

more . . . precise. / reliable. / valid.

(1 mark)

4 (a) Doing several repeats is better than just testing each food type once.

Give **one** reason why.

.....

.....

(1 mark)

4 (b) Describe how you calculated the mean temperature increase.

.....

.....

(1 mark)

4 (c) Look at your results table and graph or chart.

Which food type gave the largest **mean** temperature increase?

.....

.....

(1 mark)

5 All of the energy from the burning food was **not** transferred to the water.

Suggest **three** reasons why.

1 .....

.....

2 .....

.....

3 .....

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(3 marks)

6 Make sure that **your** results tables, and charts or graphs are handed in with this paper. You will be awarded up to 6 marks for these. *(6 marks)*

18

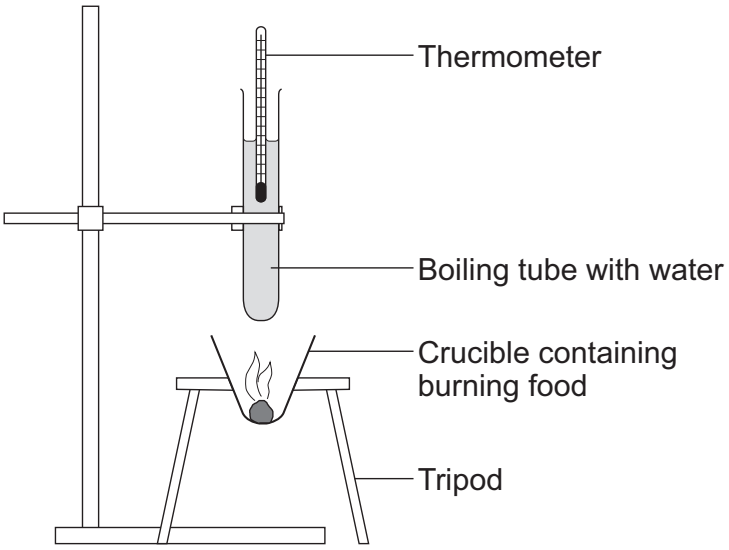
Section 2

These questions are based on a vocational application of your own investigation.
In some questions you will also be required to relate your own method/results to this new context.

Answer **all** questions in the spaces provided.

A group of students investigated the energy content of four different snacks.
This is what they did:

- A known mass of food was placed in a crucible.
- The food was ignited with a Bunsen burner.
- The burning food was positioned under a boiling tube containing water.
- The rise in temperature of the water was recorded.
- The energy content of the food was calculated.



7 The students first did a pilot experiment to check that their method was suitable.

7 (a) It was difficult to ignite the food in the crucible. The students decided to use another way of holding the burning food.

Which apparatus is suitable for holding food in a Bunsen flame before positioning under the boiling tube of water?
Draw a ring around the correct answer.

Metal forceps **Mounted needle** **Scalpel**

(1 mark)

7 (b) In the pilot experiment the water boiled.
Why is it important that the water does **not** boil?

.....

.....

(1 mark)

7 (c) What could the students have changed to make sure the water did **not** boil?

.....

.....

(1 mark)

8 After making some improvements the students carried out their investigation.
Table 1 shows their results.

Table 1

Food type	Mass of food burned in grams	Temperature of water at the start in °C	Temperature of water at the end in °C	Rise in temperature in °C	Energy content in kJ per gram
Bread	1.7	22	57	35	3.03
Standard biscuit	1.0	20	60	40	5.88
Low fat biscuit	0.8	25	47	22	4.04
Cereal bar	1.4	21	69		5.04

8 (a) What was the rise in temperature of the water when the cereal bar was burned?
Put your answer in **Table 1**. *(1 mark)*

8 (b) The temperature of the water at the start of each test was **not** the same.
Explain why this did **not** affect the validity of the results.

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(1 mark)

8 (c) It is important to weigh the food before burning it.
Give **two** reasons why.

1 .....

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2 .....

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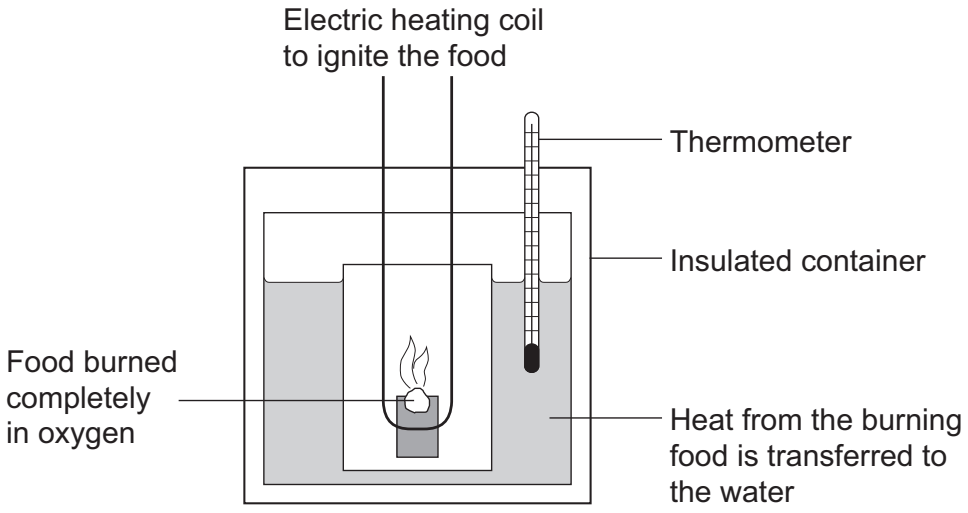
(2 marks)

9 The teacher showed the students a bomb calorimeter.
Food scientists use bomb calorimeters to measure the energy values of foods.
The diagram shows a bomb calorimeter.



The energy values obtained using the bomb calorimeter may be more accurate than those obtained by the students.
Use ideas gained from your own investigation to suggest **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

10 The company who make the biscuits claim that the low fat biscuits contain 30% less energy compared to the standard biscuit.
Table 2 shows the energy content displayed on the food packets.

Table 2

Food type	Energy content in kJ per gram
Standard biscuit	20.00
Low fat biscuit	16.00

Do you think that the food company's claim is true?
Use data from **Table 2** to explain the reason for your answer.
To gain full marks you should show calculations in your answer.

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(3 marks)

Turn over for the next question

An apple a day keeps the fat away

11 Apple growers claim that eating an apple before each meal will help overweight people to lose weight as part of an energy controlled diet.

Use ideas from your own investigation and your knowledge of experimental design to answer this question.

Describe how dieticians could carry out a valid investigation to test the claim made by the apple growers.

In this question you will be assessed on your ability to use good English, organise information clearly and use correct scientific words.

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(4 marks)

16

END OF QUESTIONS