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Centre Number						Candidate Number					
Candidate Signature						Date					

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General Certificate of Secondary Education
June 2008 / June 2009



BIOLOGY
ISA B3.2 Pulse Rate and Exercise

BLYC/B3.2

To be conducted before 4 May 2009
For submission in May 2008 or May 2009 or May 2010

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • results tables and charts or graphs from your own investigation. <p>You may use a calculator.</p>

For Teacher's Use	
Section	Mark
1	
2	
Total (max 34)	

Time allowed: 45 minutes

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in **Section 1** and **Section 2**.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The maximum mark for this paper is 34.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

Did this candidate take part in the practical activity?	YES / NO
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Signature of teacher marking this ISA Date

SECTION 1

These questions are about the investigation that **you** did.

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

1 What were you trying to find out in your investigation?

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

(2 marks)

2 Look at your results table.

(a) In your investigation, what was the **independent** variable (the variable that was deliberately changed)?

.....

(1 mark)

(b) What was the **range** of resting pulse rates?

From to

(1 mark)

3 Control variables are variables that should remain the same to make a fair test.

State **one** variable that you were **not** able to control in your investigation.

.....

(1 mark)

4 It is important to wait for several minutes after collecting the results for one exercise before beginning another exercise.

Explain why.

.....
.....

(1 mark)

5 Pulse rate is usually recorded in ‘beats per minute’.

Explain why it is better to record your pulse rate for 15 seconds instead of for a whole minute.

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

(2 marks)

6 (a) What did you find out from your investigation?

I found out that
.....
.....
.....

(2 marks)

(b) Do you consider that you have sufficient results to be sure about your findings?
Put a tick (✓) in the box next to your choice.

Yes No

Explain your answer.

.....
.....

(1 mark)

7 Choose a word from the box to complete the sentence.

precision	reliability	validity
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Collecting results from several people, rather than just one, improves the
..... of your investigation.

(1 mark)

8 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)

SECTION 2

These questions are about an investigation that may be similar to the one that you did.

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

Identical 20-year-old twins, Adam and Ben, visit the doctor. The doctor tells them that they are overweight. He advises them to reduce their weight to avoid long-term health problems.

Adam decides to do more exercise and joins a gym. He works on an exercise cycle and lifts weights.



Every month, for the next four months, he visits the healthcare nurse who carries out some tests on him.

The results of the nurse's tests on Adam are shown in **Table 1**.

Table 1 Adam's results

Time in months	Body mass in kg	Resting pulse rate in beats per minute	Percentage of body mass that is fat	Percentage of body mass that is muscle
0	114	88	62	10
1	102	81	48	11
2	94	77	38	12
3	88	74	29	14
4	85	72	23	17

9 Look at Adam’s results in **Table 1**.

Describe the changes in Adam’s percentage of body mass that is fat over the four months.

.....

.....

.....

.....

(2 marks)

10 Adam says that his results “prove that exercise makes your heart fitter”.

This statement is **not** correct.

Explain why.

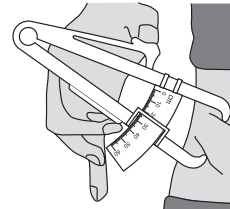
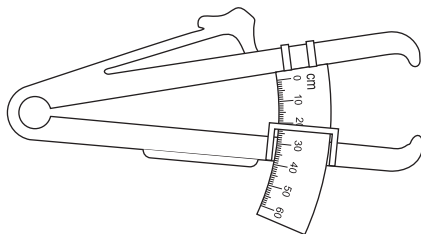
.....

.....

(1 mark)

11 Adam uses a type of scales that measures body fat.

He also uses a pair of fat callipers to measure his body fat.



(a) Suggest how the callipers work to measure body fat.

.....

.....

.....

(2 marks)

(b) The use of the fat callipers improves the reliability of Adam’s information about body fat. Explain why.

.....

.....

(1 mark)

- 12 After each visit to the nurse, Adam weighs himself at home. The readings at home are always 2 kg higher than the nurse's readings. This type of error is called a zero error. What does this mean?

.....

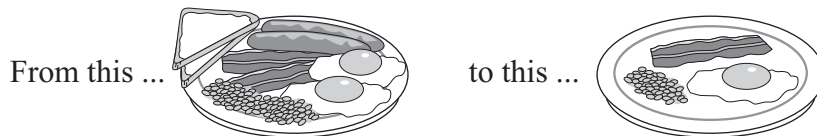
 (1 mark)

- 13 It is important for Adam to visit the nurse at the same time of day, each month. Explain why.

.....

 (1 mark)

Adam's twin brother, Ben, also wants to reduce his weight. Ben decides to reduce the amount of food he eats, instead of going to the gym.



Ben visits the nurse at the same time as Adam.

Table 2 shows Ben's results.

Table 2 Ben's results

Time in months	Body mass in kg	Resting pulse rate in beats per minute	Percentage of body mass that is fat	Percentage of body mass that is muscle
0	116	87	60	10
1	109	84	56	11
2	103	81	49	11
3	97	79	43	12
4	93	78	39	13

To help you with these questions, **Table 1** is reprinted here.

Table 1 Adam's results

Time in months	Body mass in kg	Resting pulse rate in beats per minute	Percentage of body mass that is fat	Percentage of body mass that is muscle
0	114	88	62	10
1	102	81	48	11
2	94	77	38	12
3	88	74	29	14
4	85	72	23	17

- 14** For each of the following compare Ben's results with those of Adam.

Change of body mass that is fat

.....

.....

.....

Change of body mass that is muscle

.....

.....

.....

(3 marks)

Turn over for the next question

15 Adam thinks that the results show exercise works better than dieting for losing weight.

Discuss whether Adam is correct.
Use the data in **Tables 1** and **2** to help you.

*To gain full marks in this question you should write your ideas in good English.
Put them into a sensible order and use the correct scientific words.*

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

(4 marks)

16 Adam and Ben wish to display the results for their resting pulse rate at the end of the four months.

Which type of graph or chart would be the best way to do this?

Put a tick (✓) in the box next to your choice.

Bar chart	<input type="checkbox"/>
Line graph	<input type="checkbox"/>
Pie chart	<input type="checkbox"/>

(1 mark)

END OF QUESTIONS

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