Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature		Date	

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General Certificate of Secondary Education
June 2008 / June 2009

PHYSICS **PHYC/P3.1**
ISA P3.1 Generators

ASSESSMENT and QUALIFICATIONS ALLIANCE

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

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

You may use a calculator.

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**

Signature of teacher marking this ISA ..... Date .....

LEAVE MARGIN BLANK

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?

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(2 marks)

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

.....

(1 mark)

(b) How many different values of this variable were used? .....

(1 mark)

Was this a suitable number to test?

Draw a ring around your answer. **Yes / No**

Explain your answer.

.....

.....

(1 mark)

3 In your investigation, there were several control variables.

(a) Explain what is meant by the term *control variable*.

A control variable is one that .....

.....

.....

(1 mark)

(b) Name **one** of the control variables in your investigation.

.....

(1 mark)

4 Think about the different variables that you measured during your investigation.

(a) Which **one** do you think was the source of the biggest error?

Measuring the ..... was the source of the biggest error.

(1 mark)

(b) If you were to repeat the investigation, what improvement could you make to reduce this error?

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(1 mark)

5 Before you carried out your investigation, either you or your teacher may have done a preliminary trial.

What is the reason for doing a preliminary trial?

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(1 mark)

6 Look at the graph or chart that you have drawn of your results.

Describe in as much detail as possible what it shows.

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(2 marks)

7 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

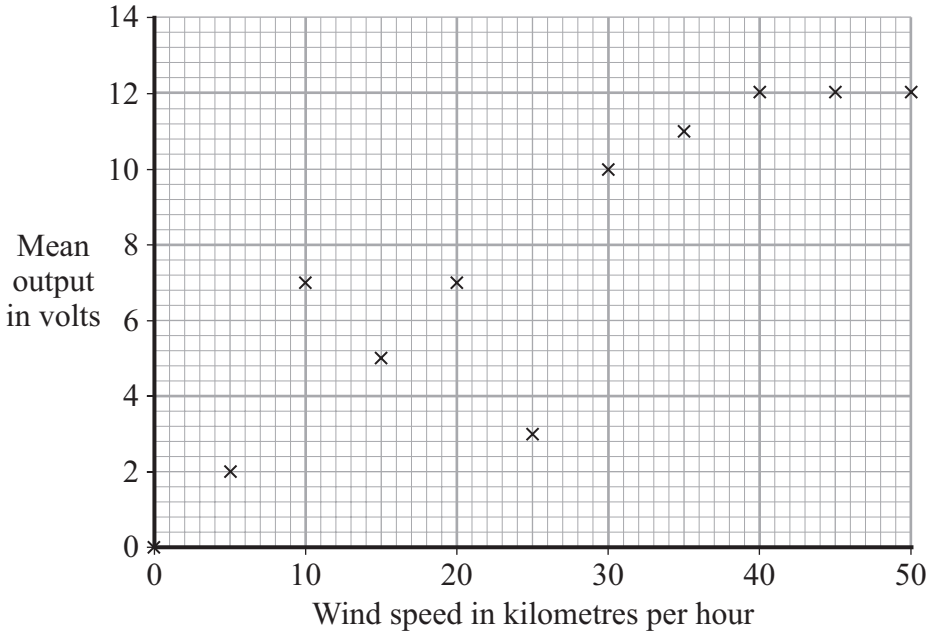
These questions are about an investigation that may be similar to the one that you did.

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

A householder had a small wind-turbine generator fitted to her house. It is designed to recharge a 12-volt battery. It was not working well, so she sent it back to the company that made it to be tested.

The company tested it and sent this report.

> We have tested your generator and found that it works well at all the wind speeds for which it was designed (between 20 and 50 km/h). We have produced a graph of our test results.



8 (a) On the graph, circle any results that you think are anomalous. *(1 mark)*

(b) What should the company have done about any anomalous results?

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(2 marks)

(c) Draw a line of best fit on the graph. *(1 mark)*

(d) Describe the relationship between the wind speed and the output voltage, as shown by the graph.

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(2 marks)

(e) What was the measurement interval for the wind speed?

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(1 mark)

(f) The company stated that the generator works well at all the wind speeds for which it was designed.

Do you agree with this?

Draw a ring around your answer. **Yes / No**

Explain your answer.

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.

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(3 marks)

Turn over for the next question

9 The householder was not satisfied with this report. She sent the generator to another company for testing. The second company used the **same method** as the first company to provide another set of results.

(a) Why was it a good idea to send the generator to another company?

Put a tick (✓) in the **two** boxes next to your choices.

A second test would make the results more precise.	☐
Comparing the two sets of results would check their reliability.	☐
The data would be more valid if it came from two different sources.	☐
The first company manufactured the generator, and so may be biased.	☐
Two tests would always reduce the number of systematic errors.	☐

(2 marks)

(b) The second company also produced a report.

> We have tested your generator at wind speeds of between 10 km/h and 50 km/h. As well as the original method, we used a second method of testing. At each wind speed, we used the two different methods of testing, and repeated each reading three times.

(i) Explain why using two **different methods** of testing is better than using only one method.

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(2 marks)

(ii) How would the company calculate the mean of the three different readings?

.....

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(1 mark)

LEAVE MARGIN BLANK

10 The company that produced the wind generator states in its brochure:

"Science has proved that using wind generators to produce mains electricity will cut 20 % off your electricity bill."

Do you agree with this statement?

Draw a ring around your answer. **Yes / No**

Explain your answer.

.....

.....

(1 mark)

16

END OF QUESTIONS

There are no questions printed on this page