

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature						Date					

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General Certificate of Secondary Education
June 2008 / June 2009



PHYSICS
ISA P3.2 Transformers

PHYC/P3.2

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>

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.

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

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 (a) Which was the **dependent** variable in your investigation?

.....

(1 mark)

(b) What instrument did you use to measure this variable?

.....

(1 mark)

3 The **independent** variable (the variable that you deliberately changed) in your investigation was the turns ratio.

How many different values of turns ratio did you try?

Was this a suitable number to choose?

Draw a ring around your answer.

Yes / No

Give a reason for your answer.

.....
.....

(1 mark)

4 Did you repeat any of your readings?

Draw a ring around your answer.

Yes / No

Give a reason for your answer.

.....
.....

(1 mark)

5 Control variables are variables that should remain constant during your investigation. The temperature of the coils is a control variable. You may not have been able to *control* this, but you might have been able to *monitor* it.

(a) What is meant by the term *monitor*?

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

(b) Write down how you could have monitored the temperature.

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

(c) Write down **one** other *control* variable that you tried to keep the same.

.....
(1 mark)

(d) If control variables are not kept the same, the investigation might not be a fair test.

What is the reason for this?

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

6 What did you find out from this investigation?

I found out that

.....

.....

.....

.....

(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)

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.

- 8** ‘Aquatrans’ is a company that makes transformers. ‘Aquatrans’ has been testing a new transformer for an audio amplifier.

‘Aquatrans’ wanted to find out whether the efficiency of this transformer depends on the frequency of the alternating current used. A signal generator was used to provide a variable frequency. The power input was measured and compared with the power output to find the efficiency.

Power = current \times potential difference

$$\text{Efficiency} = \frac{\text{useful energy transferred by the device}}{\text{total energy supplied to the device}}$$

- (a) Using knowledge from your own investigation with transformers, suggest:

- (i) **one** variable that ‘Aquatrans’ should have kept the same during the testing;

.....
(1 mark)

- (ii) **one** reason why the efficiency can never be greater than 1.

.....
(1 mark)

Here is a table of the company's results.

Frequency	Mean Efficiency
100	0.12
1050	0.35
600	0.67
300	0.44
500	0.65
750	0.63
900	0.51
200	0.28
1250	0.37
1600	0.16
1350	0.22
2000	0.13
1750	0.14

- (b) There are two things wrong with the way in which the data is presented in this table.

Write down the **two** things that are wrong.

- 1
- 2
(2 marks)

- (c) The table does not show the separate measurements of potential difference and current.

Why might it be better if it did show these?

-
-
(1 mark)

- (d) During the testing, the company took more than one reading at each value of frequency.

How can you tell this from the table?

-
(1 mark)

Question 8 continues on the next page

- (e) What kind of variable is frequency?

Draw a ring around your answer.

categoric

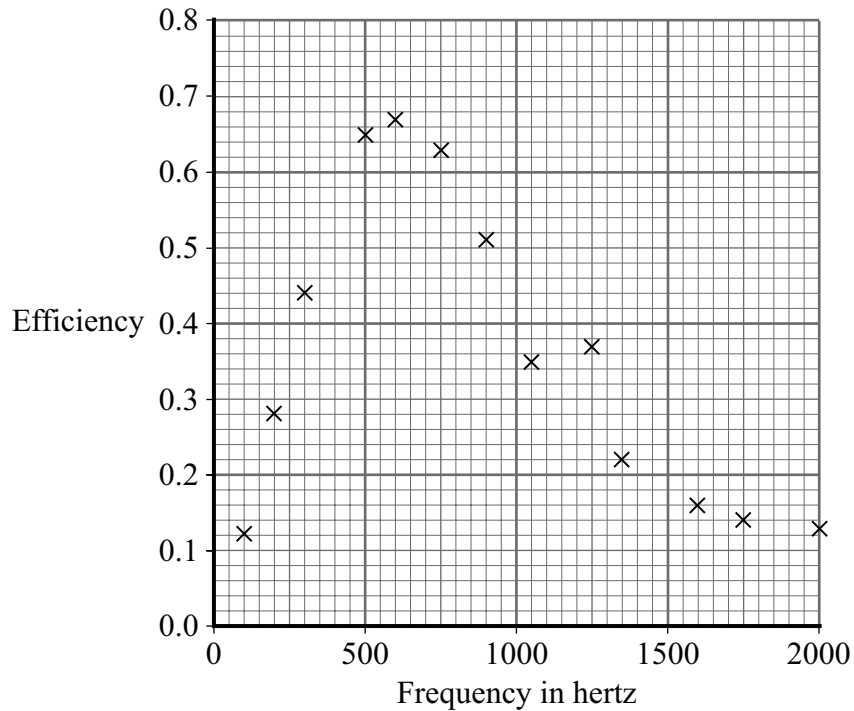
continuous

discrete

ordered

(1 mark)

- (f) A work-experience student at 'Aquatrans' was asked to draw a graph of the results.



- (i) Complete the graph by drawing a line of best fit. (1 mark)
- (ii) Using the graph, describe the relationship between the frequency and the efficiency of the transformer.

.....

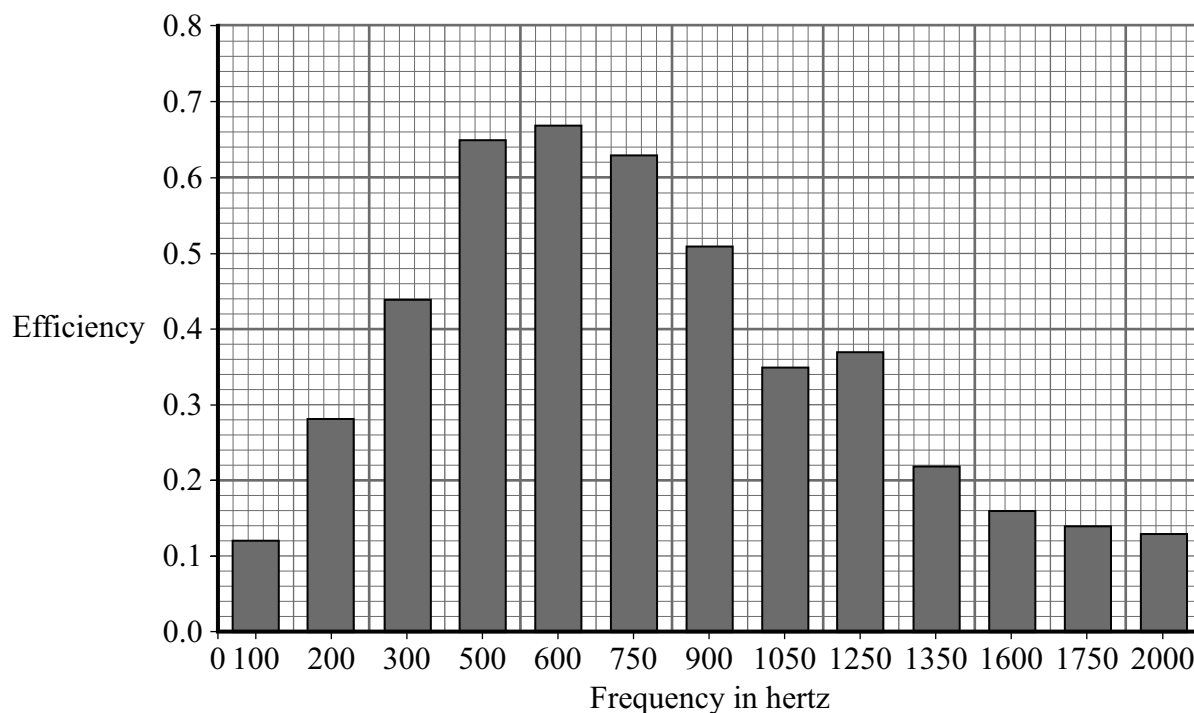
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(2 marks)

(g) The work-experience student also produced the following bar chart.



(i) What mistake did the student make in the way he produced the bar chart?

.....

.....

(1 mark)

(ii) Give **one** reason why a bar chart is not the most appropriate way to present this data.

.....

.....

(1 mark)

Turn over for the next question

9 'Aquatrans' wants to publish its findings in a sales brochure.

Before publishing, 'Aquatrans' wants to find out whether its data is reliable.

Explain what 'Aquatrans' could do to:

- check the reliability of its data
- reduce or eliminate errors.

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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.....

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(4 marks)

END OF QUESTIONS