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Specimen Paper

GCE A AND AS LEVEL

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 9702/31

PHYSICS
Paper 31 (Advanced Practical Skills)

| Mark Scheme | Syllabus | Paper |
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Question 1

Manipulation, measurement and observation (9 marks) Successful collection of data (7 marks)

(c) Measurements
One mark for each set of readings for *I* and *R*.

(c) Repeats 1

Range and distribution of values (1 mark)

1

1

Quality of data (1 mark)

Graph Quality of results

Judge by scatter of points about the best fit line.
At least 5 plots are needed for this mark to be scored.

Presentation of data and observations (7 marks) *Table of results: layout (1 mark)*

(c) Layout: Column headings

Each column heading must contain a quantity and a unit.

Ignore units in the body of the table.

There must be some distinguishing mark between the quantity and the unit (i.e. solidus is expected, but accept, for example, *I* (A)).

Table of results: raw data (1 mark)

(c) Consistency of presentation of raw readings

All values of *I* must be given to the same number of decimal places.

Table of results: calculated quantities (2 marks)

- (c) Significant figures in calculated quantities
 Apply to 1/I. Accept two or three significant figures only.
- (c) Correct values of total resistance and 1/I calculated

 All values should be correct for this mark.

Graph: layout (1 mark)

Graph Axes

Sensible scales must be used. Awkward scales (e.g. 3:10) are not allowed. Scales must be chosen so that the plotted points occupy at least half the graph grid in both *x* and *y* directions.

Scales must be labelled with the quantity which is being plotted.

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|----------|-------------------|--|-------------|----------------------|
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| Graph: | plotting | of points (1 mark) | | |
| Graph | Ring | of points bservations must be plotted. and check a suspect plot. Tick if correct. Re-plot if incorr k to an accuracy of half a small square. | ect. | 1 |
| Graph: | trend line | e (1 mark) | | |
| Graph | Thei | est fit ge by scatter of points about the candidate's line. The must be a fair scatter of points either side of the line. The cate best line if candidate's line is not the best line. | | 1 |
| • | | lusions and evaluation (4 marks) graph (2 marks) | | |
| (d)(iii) | Rea | hypotenuse of the Δ must be greater than half the length d-offs must be accurate to half a small square. ck for $\Delta y/\Delta x$ (i.e. do not allow $\Delta x/\Delta y$). | of the drav | 1 vn line. |
| (d)(iii) | If a f | pt es must be read to the nearest half square. alse origin has been used, then label FO. value can be calculated using ratios or $y = mx + c$. | | 1 |
| Drawing | g conclu | sions (2 marks) | | |
| (e) | Value for Unit | required. | | 1 |
| (e) | Value for Unit | required. | | 1 |

Mark Scheme

Syllabus

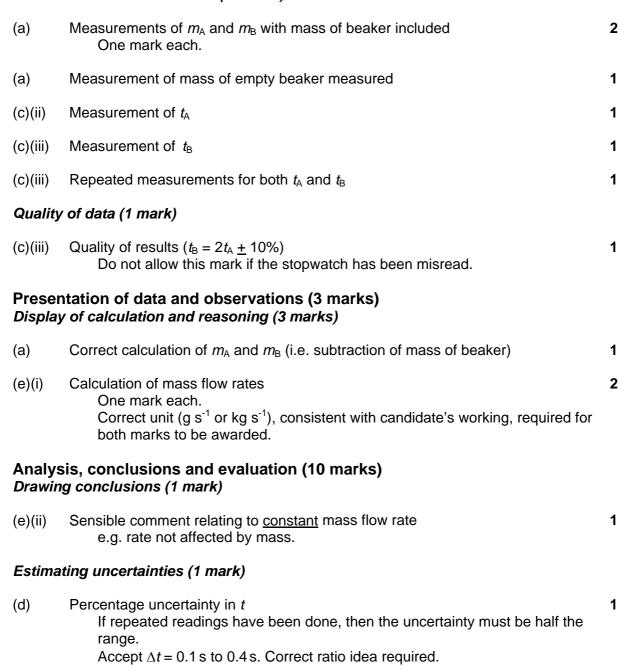
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Question 2

Manipulation, measurement and observation (7 marks) Successful collection of data (6 marks)



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Identifying limitations (4 marks)

(f)(i) Sources of error or limitations of procedure

4

Relevant points might include:

Two readings are not enough to draw a valid conclusion

Difficulty with removing finger and starting the stopwatch at the same time

Length of pipe at bottom of funnel may affect results

Salt may contain 'lumps' which affect the flow rate

Moisture content of salt may affect flow rate

Hard to see the point at which all the salt has passed out of the container

Human error in starting/stopping the stopwatch

Salt sticks to the sides of the funnel

(f)(i) Improvements

4

Relevant points might include:

Take many readings and plot a graph of the results

Use greater masses of salt to increase t

Greater masses reduce uncertainty in t

Use mechanical method (joined to timer) to start the flow

Use light gates to determine when salt ceases to pass out of the hole

Use of a second person

Do not allow 'repeated readings'.

Do not allow 'use a computer to improve the experiment'.