

Advanced GCE

G486

PHYSICS A

Unit G486: Practical Skills in Physics 2:
Evaluative Task

Specimen Task

For use from September 2008 to June 2009.

All items required by teachers and candidates for this task are included in this pack.

INFORMATION FOR CANDIDATES

- Evaluative Task: Evaluating the experiment to determine the capacitance of a capacitor.

INFORMATION FOR TEACHERS

- Mark scheme.
- Instructions for Teachers and Technicians.

SPECIMEN

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Candidates answer on this task sheet.

INSTRUCTIONS TO CANDIDATES

- Answer **all** parts of the task.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each part.
- The total number of marks for this task is **10**.

ADVICE TO CANDIDATES

- Read each part carefully and make sure you know what you have to do before starting your answer.

FOR TEACHER'S USE		
Part	Max.	Mark
TOTAL	10	

This task consists of **5** printed pages and **1** blank page.

Introduction

You have already carried an experiment to determine the capacitance of a capacitor. You are now going to assess the reliability of your experimental value for capacitance and suggest how you would improve the experiment if you had to do it again.

In this assessment, you have an opportunity to evaluate your results and experimental procedures.

What you have to do

You are expected to answer on the question paper in the spaces provided on pages 3 and 4, with the following headings:

- Evaluating my results.
- Evaluating my methodology.

If you do not have reliable data from your earlier experiment, then you may use the data below.

When the resistor of resistance R was connected to the power supply the potential difference across the terminals of the power supply was (6.0 ± 0.1) V and the current in the resistor was

88 μ A.

The manufacturer's value for the capacitance of the capacitor is 1000 μ F.

The variation of the current I in the resistor with time t is shown in the table below.

t / s	I / μ A
0	88
10	76
20	65
30	56
40	49
50	42
60	36
70	31
80	27

Total [10]

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The maximum mark for this task is **10**.

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	Answer	Max Mark
	Strand C: Quality 3	
1	Determines percentage uncertainty in the resistance R correctly; Determine the percentage uncertainty in the capacitance C , by a suitable method. (E.g. takes into account percentage uncertainty in R ; draws a worst fit line); Determine the percentage difference between the experimental value of the capacitance C and the manufacturer's value.	[3]
2	Comments on the reliability and accuracy of the experiment. E.g. refers to scatter of data points about best fit straight line; gives some meaningful detail regarding the difference in values for the capacitance C .	[2]
	Strand C: Quality 4	
1	Identifies one relevant limitation of the experimental procedure; Identifies further relevant limitations of the experimental procedure.	[2]
2	Suggests an appropriate improvement to the experimental procedure; Suggests further appropriate improvements of the experimental procedure.	[2]
3	Suggests detailed limitations and improvements to the experimental procedures which clearly link it to minimising significant sources of error in the experimental procedure.	[1]
	Total	[10]

Sample Limitations and Improvements

Limitation	Improvement
Precision in measurement of R not high	Use digital voltmeter reading to ± 0.01 V. Take several values of V/I and take an average.
Difficult to look at stopwatch and ammeter at same time. Current reading lags time measurement.	Have stopwatch that beeps every 10 s, measure I at each beep. OR: Use a datalogger and retrieve I values later or use excel to plot graph.
Difficulty in reading a changing current.	Slow experiment down by using higher value resistor. OR use datalogger as above.
Uncertainty in I depends on size of I .	Use a higher voltage so starting I is near $100 \mu\text{A}$.
There might be a systematic uncertainty in the clock (e.g. running slow) or in the microammeter.	Use a recently calibrated stopwatch and microammeter.

Notes for Teachers

This task should not be given to pupils until the previous Task 2 is complete.

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OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced GCE

PHYSICS A

G486 MS

Unit G486: Practical Skills in Physics 2: Evaluative Task

Instructions for Teachers and Technicians

For use from September 2008 to June 2009.

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There is no time limit for this task, but it is expected that it can be completed within one timetabled lesson.

It is assumed that you will have completed the teaching of the above module before setting your students this task. This module has links to other modules which contain related learning experiences – please refer to your specification.

Candidates may attempt more than one evaluative task with the best mark from this type of task being used to make up the overall mark for Unit G486.

Preparing for the assessment

It is expected that before candidates attempt Practical Skills in Physics 2 (Unit G486) they will have had some general preparation in their lessons. They will be assessed on a number of qualities such as demonstration of skilful and safe practical techniques using suitable evaluative methods, the ability to make and record valid observations, and the ability to organise results suitably. It is therefore essential that they should have some advance practice in these areas so that they can maximise their attainment.

Preparing candidates

At the start of the task the candidates should be given the task sheet.

Candidates must work on the task individually under controlled conditions with the completed task being submitted to the teacher at the end of the lesson. Completed tasks should be kept under secure conditions until results are issued by OCR.

Candidates should not be given the opportunity to redraft their work, as this is likely to require an input of specific advice. If a teacher feels that a candidate has under-performed, the candidate may be given an alternative task. In such cases it is essential that the candidate be given detailed feedback on the completed assessment before undertaking another Evaluative Task. Candidates are permitted to take each task **once** only.

Assessing the candidate's work

The mark scheme supplied with this pack should be used to determine a candidate's mark out of a total of 10 marks. The cover sheet for the task contains a grid for ease of recording marks. To aid moderators it is preferable that teachers mark work using red ink, including any appropriate annotations to support the award of marks.

Notes to assist teachers with this task

Teachers must trial the task before candidates are given it, to ensure that the apparatus, materials, chemicals etc provided by the centre are appropriate. The teacher carrying out the trial must complete a candidate's task sheet showing the results attained, and retain this, clearly labelled, so that it can be provided to the moderator when requested.

Health and Safety

Attention is drawn to Appendix E of the specification.

NOTES FOR TEACHERS

This task should not be given to pupils until the previous Task 2 is complete.