

A LEVEL

Examiners' report

PHYSICS A

H556

For first teaching in 2015

H556/01 Autumn 2021 series

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.



Reports for the November 2021 series will provide a broad commentary about candidate performance, with the aim for them to be useful future teaching tools. As an exception for this series they will not contain any questions from the question paper nor examples of candidate responses.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

Would you prefer a Word version?

Did you know that you can save this PDF as a Word file using Acrobat Professional?

Simply click on **File > Export to** and select **Microsoft Word**

(If you have opened this PDF in your browser you will need to save it first. Simply right click anywhere on the page and select **Save as . . .** to save the PDF. Then open the PDF in Acrobat Professional.)

If you do not have access to Acrobat Professional there are a number of **free** applications available that will also convert PDF to Word (search for PDF to Word converter).

Paper 1 series overview

H556/01 (Modelling Physics) is one of three examination components for the A Level Physics A specification. This component focuses on:

- mechanics
- properties of matter
- thermal physics
- simple harmonic motion
- Astrophysics.

To do well on this paper, candidates need to be comfortable with performing both simple and multi-step calculations, describing and explaining ideas and phenomena as well as experimental techniques and data analysis.

Where candidates had extensive practical experience, this clearly allowed them to answer both planning investigations and data evaluation questions.

The style, difficulty and content of the paper were in keeping with those of previous series.

<i>Candidates who did well on this paper generally did the following:</i>	<i>Candidates who did less well on this paper generally did the following:</i>
<ul style="list-style-type: none"> • made their working in calculations clear • showed each step in 'show that' questions carefully • made clear which instruments would be used in investigations • explained what they would do with data taken in investigations clearly. This would often be in the form of a graph, stating what the graph would show and how the gradient and/or the y-intercept of that graph was relevant to the investigation • used the data and relationships book wisely • worked through the multiple choice questions logically having removed unlikely answers first • remembered definitions of important terms and could reproduce them correctly • performed calculator operations accurately. 	<ul style="list-style-type: none"> • showed their thinking in a disorganised way • forgot ideas about how investigative work is performed and reported • muddled trigonometric functions • accidentally used degrees or radians in their calculators • forgot some aspects of GCSE Physics, such as ideas about resultant force and conservation of momentum • used the data and relationships book sparingly if at all • misread the question.

Comments on responses by question type

Multiple choice questions

The multiple choice questions covered the full range of intended difficulty.

Level of response (LoR) questions

One LoR question, 17(b), tested ideas about investigative experiments: there was a solid focus on elements of data-taking and instruments that should be used. Typically at A Level, analysis should include an appropriate graph and a comparison between the line of best fit and the equation under test. Putting the general equation below the given equation would make it much clearer how the candidate linked the gradient or y-intercept with the required property. This idea was tested again in Q22(a)(i). The other LoR question, 20(b), explored multiple ideas about geostationary orbits. It was accessible to most candidates, many of whom calculated the magnitude of the GPE correctly yet forgot that this value must be negative.

Other

Calculations remain a good source of marks to well-practised candidates, particularly simple calculations. Multi-stage calculations are, by their nature, trickier. Candidates might signpost their responses with words so that they don't get lost between the different stages.

	AfL	Practising extending writing, such as that required for Level of Response questions, is an excellent idea. It would be useful to use scaffolding to help students construct responses with a logical structure.
--	------------	---

Common misconceptions

Almost all candidates forgot that Gravitational Potential Energy is negative in Q20(b). The principle of moments only applies when an object is in equilibrium as required in Q19a. In Q16(b)(iii), the momentum of the trapdoor is not equal to the final momentum of the ball but is equal to the impulse provided to the ball by the trapdoor (albeit in the opposite direction to that of the rebounding ball). Q21(b)(ii) showed that many candidates thought that the time of flight of the car depended on the take-off speed of the car. Since the car is travelling horizontally the time of flight only depends on the height of the car above the horizontal track.

Key teaching and learning points – comments on improving performance

The first LoR question would provide an excellent teaching and learning opportunity as a classroom investigation. Definitions should be learned carefully in preparation for examinations.

	OCR support	Teachers and students all have access to the Practical Skills handbook which includes techniques and ideas that prove useful in answering Level of Response and other questions that check practical experience.
---	--------------------	--

Guidance on using this paper as a mock

This paper would make for a successful, challenging mock with plenty of opportunities for candidates of all abilities.

Supporting you

Review of results

If any of your students' results are not as expected, you may wish to consider one of our review of results services. For full information about the options available visit the [OCR website](#).

Supporting you through 2021-2022

Our priority is supporting you and your students this autumn and to support you as you prepare for summer 2022 exams. We'll update our [website information](#) regularly with resources, guidance and key information.

Take a look at our support for:

- [Teachers](#)
- [Students](#)
- [Exams officers](#)

Keep up-to-date

We are sending a weekly roundup to tell you about important updates. You can also sign up for your subject specific updates. If you haven't already, [sign up here](#).

OCR Professional Development

Attend one of our popular CPD courses to hear directly from a senior assessor or drop in to a Q&A session. All our courses for the academic year 2021-2022 are being delivered live via an online platform, so you can attend from any location.

Please find details for all our courses on the relevant subject page on our [website](#) or visit [OCR professional development](#).

Signed up for Exambuilder?

ExamBuilder is the question builder platform for a range of our GCSE, A Level, Cambridge Nationals, Cambridge Technicals and Functional Skills qualifications. See the full list of available qualifications in the [sign up form](#).

ExamBuilder is **free for all OCR centres** with an Interchange account and gives you unlimited users per centre. We need an [Interchange](#) username to validate the identity of your centre's first user account for ExamBuilder.

If you do not have an Interchange account please contact your centre administrator (usually the Exams Officer) to request a username, or nominate an existing Interchange user in your department.

Supporting you

Active Results

Review students' exam performance with our free online results analysis tool.

For the Autumn 2021 series, results analysis is available for GCSE English Language, GCSE Mathematics and Cambridge Nationals (moderated units) only.

It allows you to:

- review and run analysis reports on exam performance
- analyse results at question and/or topic level
- compare your centre with OCR national averages
- identify trends across the centre
- facilitate effective planning and delivery of courses
- identify areas of the curriculum where students excel or struggle
- help pinpoint strengths and weaknesses of students and teaching departments.

Find out more at ocr.org.uk/activeresults.

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on
01223 553998

Alternatively, you can email us on
support@ocr.org.uk

For more information visit

 **ocr.org.uk/qualifications/resource-finder**

 **ocr.org.uk**

 **/ocrexams**

 **/ocrexams**

 **/company/ocr**

 **/ocrexams**

We really value your feedback

Click to send us an autogenerated email about this resource. Add comments if you want to. Let us know how we can improve this resource or what else you need. Your email address will not be used or shared for any marketing purposes.



I like this



I dislike this



OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored. © OCR 2021 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA. Registered company number 3484466. OCR is an exempt charity.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up to date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please [contact us](#).

You can copy and distribute this resource freely if you keep the OCR logo and this small print intact and you acknowledge OCR as the originator of the resource.

OCR acknowledges the use of the following content: N/A

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our [Expression of Interest form](#).

Please [get in touch](#) if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.