Qualification Accredited

OCR
Oxford Cambridge and RSA

A LEVEL

Examiners' report

PHYSICS A

H556

For first teaching in 2015

H556/01 Autumn 2021 series

Version 1

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.

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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.

Candidates who did well on this paper generally did the following:	***Candidates who did less well on this paper generally did the following:***
• 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.	• 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

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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.

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