



GCE AS Examiners' Report

PHYSICS
AS
Summer 2024

Introduction

Our Principal Examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each component.¹

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.²

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	Eduqas offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.edugas.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the Eduqas subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For linear specifications, a single grade is awarded for the subject, rather than for each component that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results and Grade Boundaries and PRS (edugas.co.uk)

¹ *This is the full and final report. There is no interim report in this qualification.*

² *Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.*

Exam Results Analysis	Eduqas provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.edugas.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	Portal by WJEC or on the Eduqas subject page.
Become an examiner with WJEC.	We are always looking to recruit new examiners or moderators. These opportunities can provide you with valuable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Become an Examiner Eduqas

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Executive Summary

This qualification had a very small cohort which was very able. The exam papers were of a comparable standard to previous series. Due to the low entry no valid information can be obtained from the item level data and the mark distribution. The candidates exhibited excellent mathematical skills and very few marks were lost on quantitative responses. Where marks were lost they were invariably for question parts requiring qualitative responses. The QER question on both papers involved a qualitative response, one based on theory (solids under stress) and the other on a practical method and for many candidates it was their lowest scoring question. Topics that were particularly well understood by candidates were D.C. circuits, kinematics and particles.

Areas for improvement	Classroom resources	Brief description of resource
Qualitative responses	<u>TEXT TOOLS</u>	A bank of tools that allow teachers to use their own piece of text to generate a range of activities.
Diffraction grating derivation	<u>WAVE PROPERTIES</u>	Blended learning

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COMPONENT 1 – MOTION, ENERGY AND MATTER

Overview of the Component

This was a small but very able cohort. Candidates performed very well especially on the more mathematically based questions, some of the descriptive questions however were not as well answered. Examples of this are discussed below. Topics that were well answered were equations of motion, particles and using radiation to investigate stars. Qualitative responses linked to the topic of solids under stress caused issues for some. The practical question was answered very well.

Comments on individual questions/sections

Question 1

This was a nice straightforward start to the paper. It was generally very well answered with the vast majority understanding the difference between vectors and scalars and applying Pythagoras correctly. It was pleasing to see in (b)(i) that candidates included the angle with the magnitude. However, in (b)(ii) a number only obtained one mark because they did not include the direction.

Question 2

It was apparent that the candidates understood equations of motion very well. In (b)(i) six marks were available and many candidates scored full marks.

Question 3

The definition in part (a) was generally well done. Few problems were seen with applying the equations in parts (b)(i)-(iii). In (b)(iv) a few candidates added the energies together before dividing and so lost one mark. Surprisingly in part (c) most candidates only gave one reason even though the question was worth 2 marks.

Question 4

In part (a)(ii) a number of candidates did not refer to cross linking / tangled molecules and some of the responses seen were rather confused. In the QER some candidates only commented on the shape / gradient of the graph and ignored the molecular element of the question. Hence, they could only access a maximum of a middle band mark. In the last part most realised the molecules were realigning but missed out the fact that energy was being dissipated.

Question 5

This question was very well done by the vast majority of the cohort and it was apparent that the topic of particles was very well understood.

Question 6

Part (a) was not very answered with many candidates not stating that drag increases with velocity. In part (b)(ii) many candidates omitted the percentage uncertainty in time so losing one mark, however ecf was applied for the rest of the question. In (b)(iv) candidates referred to more distances which is unclear, a bigger range is the required response here.

Question 7

This question was very well done, a few had problems with powers of 10 but this was only penalised once.

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COMPONENT 2 – ELECTRICITY AND LIGHT

Overview of the Component

This was a small but very able cohort. Candidate responses were very good and the general standard of numeracy and maths skills was excellent. The overall standard of presentation of answers in the papers was excellent which showed clearly the candidates' approach.

However, a few questions or sub-sections of questions did not score well. For example, an AO1 style question which asked for the derivation of $n\lambda = d\sin\theta$ for a diffraction grating was not well answered along with fully explaining the concentric rings in an electron diffraction pattern. Similarly, the QER based on an experiment to measure the speed of sound in air using a resonance tube was not answered well. Most candidates were not able to give a full analysis of the data and the practical details were not always given clearly and concisely.

Aspects such as the knowledge of the laser and how to analyse DC circuits was answered really well by all the candidates with many scoring high marks for these parts. Responses to the practical question to determine the resistivity of nichrome in question 6 was satisfactory. However, many candidates did not indicate clearly on their graphs how the gradient was calculated by drawing a large triangle or clearly showing the two points on the line that they have used to determine the gradient.

Comments on individual questions/sections

Question 1

The majority of candidates in part (a) were able to explain what is meant by a transverse wave. Part (b) was also answered well with the majority being able to explain what is meant by the amplitude and were able to proceed to determine the wavelength correctly as well as applying $v = f\lambda$ to determine the frequency. Many candidates lost marks in part (c) for not identifying that Q leads P by either 90° or $\frac{\pi}{2}$.

Question 2

As noted previously, part (a) was not answered well by the majority of the candidates. The diagram to explain the process was poorly drawn with the spacing between the slits not clearly indicated or the angle of diffraction and the path difference to explain $d\sin\theta$. Consequently, the candidates were not able to explain fully the path difference in terms of d and the angle of diffraction to derive the required equation. By contrast the rest of the question was well answered.

Question 3

Parts (a) and (b)(i) were well answered. The determination of the minimum pd needed proved to be more difficult as well as explaining the effects of increasing the intensity of the radiation on the minimum pd in parts (b)(ii) and (iii). Several candidates were able to state correctly that the number of photons per second increases by increasing the intensity but did not state that the energy of the photon remains the same.

In part (c)(i) nearly all the candidates were able to explain that the pattern shows the wave-like properties of electrons and that it corresponds to a diffraction pattern. However, in part (c)(ii), several candidates were not able to explain that the pattern is due to interference after the electrons have been diffracted by the atoms in the graphite that act as a diffraction grating. The last part proved to be more challenging with few correct answers and an understanding of the approach needed to determine the de Broglie wavelength.

Question 4

The QER was based on the experiment to measure the speed of sound in air using stationary waves in a resonance tube. This was not answered well by many candidates with only few answers scoring top band marks. Several answers used poorly labelled diagrams to show the experimental set-up and the description based on the formation of stationary waves in the set-up without discussing the steps needed to obtain data to measure the speed of sound. There were only a few candidates that were able to give a graphical analysis of how the speed of sound could be determined from the graph of length against $\frac{1}{f}$ or an equivalent method.

The most common answer for part (b)(ii) was that most countries do not need to develop an earthquake early warning system due to the rare occurrence of earthquakes. Candidates could have developed this and discussed the benefits an early warning system where needed.

Question 5

This question was very well answered and it was apparent the topic was well understood by candidates.

Question 6

This question was answered really well by all the candidates with many gaining full marks and showing a clear understanding of D.C circuit analysis. Part (a)(iii) proved to be the most challenging part of this question for candidates as the relevant approach proved to be difficult using the correct equations for energy and the charge stored to determine the time.

Supporting you

Useful contacts and links

Our friendly subject team is on hand to support you between 8.30am and 5.00pm, Monday to Friday.

Tel: 029 2240 4252

Email: science@eduqas.co.uk

Qualification webpage: [AS and A Level Physics | Eduqas](#)

See other useful contacts here: [Useful Contacts | Eduqas](#)

Regional Rep Team

Our regional team covers all areas of England and can provide face-to-face and online advice at a time which is convenient to you.

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[Regional Support Team | Eduqas](#)

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We support our education communities by providing trusted qualifications and specialist support, to allow our students the opportunity to reach their full potential.



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