

ISAAC PHYSICS

Question Writing – Exam style-questions

A 27 hour course in 15 minutes?

With Dr Justin Palfreyman

A101: Introducing the Principles of Assessment (Sep-Nov 2025)

Event Type: Online

Date: 08 Sep 2025 - 09 Nov 2025

[Register your interest](#)

A101: *Introducing the Principles of Assessment* is a nine week, CPD accredited online course for anyone with an interest in educational assessment and its role in society today, including examiners, assessment writers, professional bodies, teachers and those working for exam boards.

Register for the scheduled course or to start immediately [book the A101 self-study course](#).

- No previous knowledge or experience needed
- Average 3 hours per week over nine weeks
- 27 CPD hours
- Choice of delivery models:
 - **Monitored** - Online group course delivered over 9 weeks featuring Monitor/Educator, discussion forum and journal
 - **Self-study** - Online self-paced course with 9 weeks content available to work through at your own pace*
- *Max of 150 days allowed
- Certification option for both models.



AMBASSADOR Teacher Award

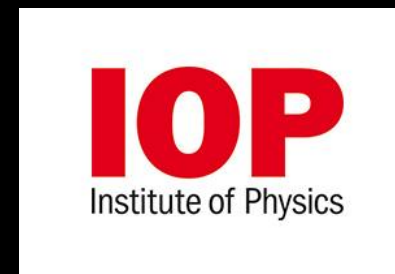
2024-2025

EXAMINER JOURNEY

13 years ago I was a PDRA at the Cavendish laboratory, supervising first year undergraduates at Churchill for beer money. Note: Lisa was Churchill director of studies.

Research funding was becoming harder and harder to come by, and the IOP was offering £20,000 tax free reasons to train as a teacher, and the Ogden Trust offered another £4,000 to be a career-changer!

Cambridge International Examinations came knocking at the Cavendish, desperate for post-grads to be examiners. I liked beer!



EXAMINER JOURNEY

During this time I have worked my way to the peak (in terms of question difficulty) and am transitioning to an easier paper as PE?

The journey essentially went like this

- Assistant examiner (but made a lot of noise)
- Question bank writer – multiple choice (mis-judged the level)
- QPEC/STM member for S-level paper
- co-setter (1 year) then Setter (until I ran out of ideas)
- & Principal Examiner
- Vetter

Examining is some of the best CPD you can do, but it will bore you to death – everyone should do it for a couple of years at least.

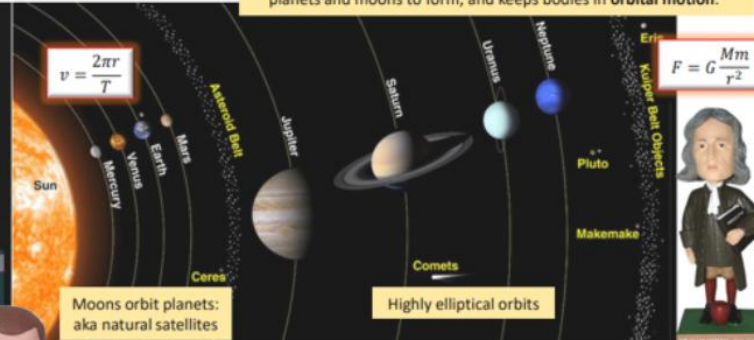
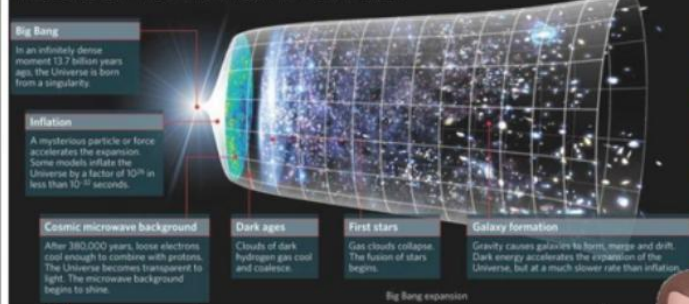


- The **universe** is 13.82 billion years old, our solar system is 4.5 billion years old and formed from the debris left-over from the death of earlier stars.
- Elements heavier than iron are only formed in supernovas when large stars die.

Astrophysics

- The solar system is a part of the **Milky Way** galaxy (a collection of billions of stars). The universe contains billions of galaxies.
- Gravity** provides the universal force of attraction that allows stars, planets and moons to form, and keeps bodies in **orbital motion**.

TIMELINE OF THE INFLATIONARY UNIVERSE



- Since Aristotle's time people believed the universe was permanent and never changing: **Steady State**
- Red-shift, Cosmic Microwave Background (CMB)** radiation and the composition of elements (3 H to 1 He) are strong evidence for the **Big Bang Theory**

- The life-cycle of a star depends on its size. Large stars can become black holes or neutron stars.
- The inward pull of gravity is balanced by radiation pressure from **nuclear fusion** in the core.

Protons (H nuclei) fuse to form alpha



Justin Palfreyman - A-level Physics Tutor

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FREE RESOURCES & GROUP TUITION

THE HISTORY OF SCIENCE LECTURE SERIES

Part I: Greece to Galileo (600BC - 1600AD)

Part II: Newton's World (1600 - 1727)

Part III: The Nature of Light (1702 - 1862)

Part IV: The Electrical War (1801-1888)

Part V: The Quantum Realm (1890-1940)

I started a facebook business page last week to...

- Support teachers with free resources & teaching ideas
- Advertise teacher and student events, competitions and CPD
- Offer an affordable alternative to private tuition, putting together a 24 lesson course on year 12 content →

Please help me grow with a like and/or follow and if you know anyone looking for tuition ask them to check out my course:

<https://www.facebook.com/profile.php?id=61575232231954>

<https://forms.gle/RGmznuRJQXfp2fL9A> Discount code (25% off) ISAAC

COURSE OVERVIEW

Each session has been designed to include about 90 minutes of material, with 30 minutes reserved for problem solving and/or questions and discussion.

Lesson 1: Development of Practical Skills in Physics*

Lesson 2: Effective Revision Strategies

Lesson 3: Practical Write-ups

Lesson 4: History of Science I: Greece to Galileo

Lesson 5: Foundations of Physics*

Lesson 6: Exam technique

Lesson 7: History of Science II: Newton's World

Lesson 8 Motion*

Lesson 9: Forces in Action*

Lesson 10: Moments, density & Archimedes' principle*

Lesson 11: Work, Energy and Power*

Lesson 12: Materials*

Lesson 13: Newton's Laws of Motion and Momentum*

Lesson 14: Exam-focus, synoptic mechanics questions and 6-markers

Lesson 15: Waves*

Lesson 16: History of Science III: The nature of light

Lesson 17: Electromagnetic Waves part I*

Lesson 18: Electromagnetic Waves part II*

Lesson 19: History of Science IV: The Electrical War

Lesson 20: Charge and Current*

Lesson 21: Energy, Power and Resistance*

Lesson 22: Electrical Circuits*

Lesson 23: History of Science V: The Quantum World

Lesson 24: Quantum Physics*

QUESTION PAPER + MARK SCHEME

If you write an exam paper, you also have to write the provisional mark scheme – this will get updated when you look at the standardization scripts in light of what candidates have actually written.

Ideally candidates will write down what you expect them to do so you don't need to make many changes. If they don't, but they write something valid it can be a nightmare to add it to the mark scheme and allocate the marks fairly. Should they be A B C or M marks?

To encourage them to do it the desired way, you have to be very clear with your instruction line. A large part of that is selecting the appropriate
COMMAND WORD

COMMAND WORDS

The brief is to try to guide the students to give you the expected answer, using the expected method, which will appear on the mark scheme.

Each specification has its list of command words with explanations of their meanings – some of these can be/seem interchangeable. Most exam boards largely use the same command words across GCSE/A-level sciences.

Following the (carefully crafted) question stem, the instruction will appear nicely spaced out and formatted, immediately above the answer space, so it is clear exactly what is required.

PICK THE APPROPRIATE COMMAND WORD/STRATEGY

You want to ask something beyond the specification, maybe applying their expected knowledge to a novel situation.



In Physics there's often multiple different valid approaches to solve a problem, some may be easier than others, and can cause problems when trying to allocate marking points.



You don't want to over-penalize a simple arithmetic mistake, but you've got a beautiful long question with parts that rely on previous answers



PICK THE APPROPRIATE COMMAND WORD/STRATEGY

You are not interested in their method, just that they get the right numerical answer.

You do care about seeing them use a particular method.

They need to pick the right effect (increase/decrease/no change), but you're not giving credit for guessing it.

HOW ELSE CAN YOU DIRECT STUDENTS?

The number of marks available must relate to the number of unique marking points or steps that can be identified. Not necessarily the difficulty of the question.

Often 1 mark SUGGEST questions are harder than 4-5 mark multi-step calculations.

The space you provide.

- usually 2 lines per mark if it's a written response,
- (maybe also include) blank space for diagrams/equations/calculations.

Explicit hints: you MAY (=WILL) find it useful to use... / draw a diagram

POLITICAL CORRECTNESS^N

Questions must not discriminate or prejudice (or give an advantage to) anyone based on their background or characteristics.

If introducing a person into a question it's safest not to use names, or even genders anymore. The evolution went something like this...

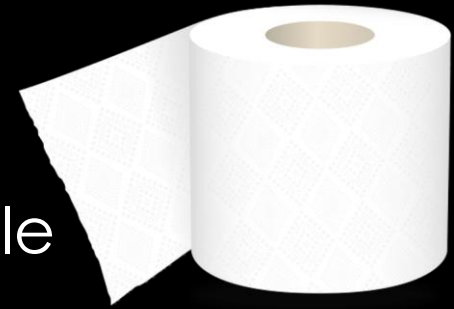
- We used to arbitrarily introduce a student into a question and then “he” would do something.
- We then tried to alternate (like the named storms) but we didn't want “her” to suggest something that would be wrong incase people thought “*women can't do physics*”, so it just became easier to leave them gender-neutral.
- Now we're moving away from even using “a student” as this probably means they're wrong and we don't want to create / reinforce stereotypes. So instead we describe them as “a cyclist” for example.

POLITICAL CORRECTNESS^N

If you write international exam papers you need to know the subject of your questions is something they will be familiar with. Certain scenarios that we may be common may not be globally.

In the end, I was made to describe what a toilet roll and pool table were in excruciating detail before I was allowed to use them.

Thankfully trains, rockets and helicopters were accepted as common.



Some scenarios could be triggering – for projectiles, replace bullets and bombs with sports and aid packages? Are aid packages safe to use?

AVOIDING AMBIGUITY

The intention of a question may be perfectly clear to you (and the people discussing it), but could it be legitimately misinterpreted by a cyclist?

Therefore, questions might “need” to be broken down into several short sentences, with a lot more repetition than would be natural in conversation.

“A large metal rod is pivoted at one end. The other end of the large metal rod is released from a horizontal position at time = 0. A stopwatch is also started at time = 0.”

Common words like “it” and “this” are usually replaced so there can be zero chance of misinterpretation.

Every term given should be defined again in the question stem (even if on the formula sheet) if this is the “house” style.

Avoid the use of slang or colloquialism. Obvs!



AMBIGUITY V SUPERFLUOUSNESS

It's nice to join up the parts of a question in a theme with a context and an end goal, but sometimes you need to lose the context if it's not strictly helpful and the question is becoming too verbose.

You'll need to be thick skinned and have your most beautiful questions torn to shreds by various committees (QPEC, Ministry of Education).

You'll likely be asked to introduce some diagrams to make the question clearer and easier to understand.

The skill of being able to translate a purely wordy question into physics is difficult to test.



CHECK THE FRAMEWORK

If you're writing a multiple choice question, all the distractor answers need to be legitimate – could a candidate arrive at this answer somehow?

You need to ensure a balance of assessment objectives AO1 etc, and a balance of difficulties. We categorise them into PASS / MERIT / DISTINCTION and will probably want an even(ish) distribution.

You may also be restricted by coverage – you want to try to make sure every spec point has been tested at least once every 3-4 years (this is what those who make predicted papers rely on).

Check the spec BEFORE you write a 20-mark question! It's good to have some extra questions or marks up your sleeve.