IB DP PHYSICS · EXAM SPECIAL · SL & HL · MARKING POINTS, ECF, OWTTE AND WHAT EXAMINERS LOOK FOR · ~7 MIN READ

IB Physics Command Terms and How Markschemes Award Marks

What every IB Physics command term asks for, and how Paper 2 markschemes award marks: marking points, "max" totals, alternative answers, essential words, OWTTE, error carried forward and the rules on units and significant figures.

Command terms | Marking points | "max" totals | Alternatives & essential words | OWTTE | Error carried forward | Units & s.f. | Answering to the markscheme

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No tag = **SL and HL** HL ONLY HL students only DATA BOOKLET given in the exam

M1 A1 how marks are awarded highlight = comes up again and again HANDY worth memorising

Test yourself at the end

IN 30 SECONDS

- **Physics markschemes award one mark per correct point.** Each point is a separate idea or step (a "marking point"), so a 3-mark answer needs three distinct, correct things.
- **The command term sets the type of point.** "State" wants a fact, "explain" wants a cause, "determine" wants a calculated value with working.
- **Knowing how the markscheme is written** shows you how to write: short, precise statements in the right order, with the key physics words.

BY THE END YOU CAN

- Know what each command term asks for in Physics.
- Understand marking points, alternatives, OWTTE and ECF.
- Write answers that match how marks are awarded.

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1 Command terms in Physics

Objective 1 and 2 terms

Command term	What it asks for	Typical marks
State	A name, value or brief fact; no explanation	1
Identify	Pick out the answer from options or from data	1
Label	Add names to a diagram	1
Define	The precise meaning of a term (often a ratio or a law)	1–2
Draw	A labelled, accurate diagram or line on a graph	1–3
Outline	A brief account or summary	2
Describe	A detailed account of what happens or what you see	2–3
Calculate	A numerical answer with the working	2–3
Estimate	An approximate value (order of magnitude is often enough)	1–2
Sketch	A graph showing the trend and key features, axes labelled	2–3

Objective 3 terms

Command term	What it asks for	Typical marks
Explain	Causes and reasons: link the physics to the effect	2–4
Determine	A value from data, a graph or several steps	2–4
Deduce	A conclusion that follows from the information given	2–3
Show that	Every step to a given value, ending with one more s.f.	2–3
Suggest	A plausible answer using physics (more than one may be right)	1–2
Discuss	Several arguments or factors, with a balanced conclusion	3–4
Evaluate	Strengths and limitations, and a judgement	3–4
Predict	An expected result, with a reason	1–2
Compare	Similarities and differences, both mentioned	2

EXAM TIP

Define is strict: learn definitions word for word in meaning. "Specific heat capacity: the energy needed to raise the temperature of 1 kg of a substance by 1 K."

2 How a Physics markscheme is written

- **Ticks:** each marking point ends with a tick (✓). One tick = one mark.
- **"max":** sometimes there are more marking points than marks, written as e.g. "3 max". Any three correct points score full marks.
- **Order:** points can usually be made in any order, unless the notes say otherwise.
- **Slash (/):** alternative wording; either is accepted ("speed / velocity").

- **OR:** an alternative answer or method.
- **Angled brackets « »:** words that are helpful but **not needed** for the mark.
- **Underlined words: essential**. Without that exact idea, the point doesn't score.
- **OWTTE** ("or words to that effect"): the meaning matters, not the exact words. Clear communication beats perfect grammar.
- **ALTERNATIVE 1 / 2:** different valid approaches, each fully marked.

Error carried forward (ECF)

- **If you get a wrong value in one part and use it correctly later,** the later marks can still be awarded. The markscheme says "Allow ECF".
- **ECF only works if your working is visible.** A bare number can't be followed.
- **The first error is still penalised,** so check key values (a converted temperature, a calculated radius) before moving on.

Units and significant figures

- **Usually not penalised** in Paper 2 unless the notes say so, for example when the question asks for units or a stated precision.
- **But the answer must be the right size.** Forgetting to convert cm to m gives a wrong value, and that loses the answer mark.
- **Don't rely on leniency:** give units and 2–3 significant figures every time; some questions do test them.

3 Writing to the markscheme

WORKED EXAMPLE

Explain why a satellite in a circular orbit at constant speed is accelerating. [2]

1. The direction of the velocity is **continuously changing**, so the velocity changes ✓
2. **acceleration is the rate of change of velocity, caused by the gravitational force towards the centre of the orbit (centripetal)** ✓

WORKED EXAMPLE

State what is meant by two sources being coherent. [1]

1. **They have a constant phase difference** ✓ **("same frequency" alone doesn't score; "constant phase difference" is the essential idea)**

WORKED EXAMPLE

A gas is heated at constant volume. Explain why its pressure increases. [3]

1. The mean kinetic energy of the molecules increases with temperature, so they move faster ✓
2. they collide with the walls **more often** ✓
3. **and with greater change in momentum per collision, so the force per unit area increases** ✓

- **One idea per sentence.** It is easier for the examiner to tick, and easier for you to count.
- **Use the key word the markscheme will look for:** "constant phase difference", "rate of change of flux", "resultant force", "mean kinetic energy".
- **Don't repeat the question.** If the stem says "the temperature is constant", that sentence earns nothing in your answer; reports note that restating the stem scores zero.
- **Don't contradict yourself.** A correct point followed by a wrong one can cancel the mark.

COMMON MISTAKE

Writing a long paragraph for a 2-mark "explain". Two clear points earn the marks; extra sentences only add the risk of a contradiction.

4 Calculation marks

- **The first mark is often for a step** ("conversion of T to 310 K seen", "use of F = ma"), the last for the value.
- **Range answers:** for graph readings, markschemes accept a range of values (e.g. 480–560 m). Show your gradient triangle or area so the examiner can follow it.
- **"Show that" values:** if you can't get the given value, use it in the next part; the follow-on marks are still available.

LINKING QUESTION

Put this into practice with Paper 2 answers, Paper 1B data skills and the data booklet guide.

Test yourself — cover the answers first

QUICK CHECK

1. What does "3 max" mean in a markscheme?
2. What do words in « » mean?
3. What does OWTTE mean?

4. What is ECF?
5. Define coherent sources.

Show answers

1. there are more marking points than marks; any three correct ones score full marks
2. they are not needed for the mark
3. or words to that effect: the meaning is what counts
4. error carried forward: a wrong earlier value used correctly still earns later marks
5. sources with a constant phase difference

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