

A-Level Physics

Name: _____ Score: _____

1. Every physical quantity has two parts: a number (its _____) and a unit.

2. Select **all** the SI **base** units.

- ☐ metre (m)
- ☐ kilogram (kg)
- ☐ kelvin (K)
- ☐ joule (J)
- ☐ newton (N)
- ☐ ampere (A)
- ☐ second (s)

Tick every correct option.

3. A careful enough measurement can be exactly correct, with zero uncertainty.

- ☐ True ☐ False

4. You walk 4 km east, then 4 km back west. What is your displacement, in km?

_____ km

5. Saying "the speed is 90" – with no unit – gives a complete physical quantity.

- ☐ True ☐ False

6. Which of these are SI base units? Select **all** that apply.

- ☐ the kelvin
- ☐ the newton
- ☐ the ampere
- ☐ the kilogram

Tick every correct option.

7. Which of these is a **systematic** error?

- ☐ Pressing the timer button slightly late, sometimes early
- ☐ Readings that scatter randomly above and below
- ☐ A scale that reads 0.2 mm when nothing is being measured

☐ A gust of wind that briefly changes a reading

8. Select **all** the quantities that are **vectors**.

☐ mass

☐ velocity

☐ speed

☐ force

☐ energy

☐ displacement

☐ momentum

Tick every correct option.

9. An answer of "5" to a question asking for a length is complete as long as the working is shown.

☐ True ☐ False

10. Is the equation $v = u + at$ homogeneous?

☐ True ☐ False

A-Level Physics

1. **magnitude**

The two parts are the **magnitude** (the number) and the **unit**.

2. **metre (m); kilogram (kg); kelvin (K); ampere (A); second (s)**

The five SI base units are the kilogram, metre, second, ampere and kelvin. The newton and joule are **derived** units, built from the base units.

3. **False**

No real measurement is exact – every reading has some **uncertainty**. The skill is estimating how big it is.

4. **0 km**

Displacement is a **vector** – start to finish. You end where you began, so it is 0. The distance travelled is 8 km.

5. **False**

Without a unit the number is ambiguous. "90 $\frac{\text{km}}{\text{h}}$ " is complete; "90" is not.

6. **the kelvin; the ampere; the kilogram**

The newton is derived: $1 \text{ N} = 1 \frac{\text{kg m}}{\text{s}^2}$, straight from $F = ma$. The five you need are the metre, kilogram, second, ampere and kelvin.

7. **A scale that reads 0.2 mm when nothing is being measured**

A **zero error** shifts every reading by the same amount in the same direction – that is systematic. The others vary randomly from reading to reading.

8. **velocity; force; displacement; momentum**

Vectors have a direction: displacement, velocity, force and momentum. Mass, energy and speed are scalars (speed is the size of velocity, with no direction).

9. **False**

A physical quantity is a magnitude AND a unit. 5 metres, 5 centimetres and 5 kilometres are three different lengths, and the mark scheme asks for the unit.

10. **True**

Yes – every term is a speed. v and u are $\frac{\text{m}}{\text{s}}$, and $at = \frac{\text{m}}{\text{s}^2} \times \text{s} = \frac{\text{m}}{\text{s}}$.