Vector and Scalar Questions for GCSE Physics (ANSWERS)

1. What is the difference between a scalar quantity and a vector quantity?

*A **scalar quantity** has only **magnitude** (size), whereas a **vector quantity** has both **magnitude** and **direction**.*

2. Why is mass considered a scalar quantity?

*Mass has only **magnitude** (how much matter an object contains) and does not have a direction, so it is a **scalar**.*

3. Why do we use the term **magnitude** when describing scalars and vectors?

*Magnitude refers to the **size or numerical value** of a quantity.*

Scalars only have magnitude, while vectors have both magnitude and direction.

4. Give two examples of scalar quantities and two examples of vector quantities.

***Scalar quantities**: Mass, energy, temperature, speed, time, power, distance, volume, area, resistance….*

***Vector quantities**: Force, velocity, displacement, acceleration, current, voltage, weight, momentum ….*

5. What is the key difference between **speed** and **velocity**?

*Speed is a **scalar** (it only tells you how fast something is moving),*

*whereas velocity is a **vector** (it tells you both how fast and in which direction something is moving).*

6. Why is **displacement** a vector while **distance** is a scalar?

Distance *is a* ***scalar*** *because it only measures how far an object has traveled, regardless of direction.*

Displacement *is a* ***vector*** *because it measures the shortest path from the starting point to the ending point, including* ***direction****.*

7. Which of these quantities are vectors? (a) Force, (b) Energy, (c) Time, (d) Acceleration?

Vectors*: Force (a) and Acceleration (d)*

Scalars*: Energy (b) and Time (c)*

8. If an object is moving at a constant speed but changing direction, is its velocity also constant? Explain your answer.

Velocity is a ***vector quantity****, meaning it depends on both* ***magnitude (speed)*** *and* ***direction****.*

If the object is changing direction, then the ***direction component of velocity is changing****,*

even if the speed remains the same.

9. Why is **temperature** NOT considered a vector quantity, even though it can be negative?

Although temperature can be ***positive or negative****, it does* ***not*** *have a* ***direction*** *in space.*

Temperature only has ***magnitude****, so it is a* ***scalar****.*

10. A student argues that "time is a vector because we can go back in time in movies." Explain why this is incorrect.

In physics, ***time only moves forward*** *and has no spatial direction.*

(It's actually a measurement between two events)

Although movies may show time travel, in reality, time has ***only magnitude*** *and no direction, making it a* ***scalar****.*