1. What is a physical quantity?

Answer: A physical quantity is a measurable characteristic of an object or phenomenon, such as length, mass, time, or temperature, expressed with a numerical value and a unit.

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2. Name two situations from daily life where physical quantities are measured.

Answer: Measuring the depth of a pit (length) and weighing vegetables (mass).

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3. What is the difference between fundamental and derived quantities?

Answer: Fundamental quantities (e.g., length, mass, time) exist independently and cannot be expressed in terms of other quantities. Derived quantities (e.g., area, volume, density) are calculated using fundamental quantities.

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4. List the seven fundamental quantities in the SI system.

Answer: Length, mass, time, electric current, temperature, amount of substance, and luminous intensity.

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5. What is the SI unit of length, and what is its symbol?

Answer: The SI unit of length is the metre, and its symbol is **m**.

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6. Convert 2.5 km into metres.

Answer: 2.5 km = 2.5 × 1000 m = **2500 m**.

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7. What is the relationship between a centimetre and a millimetre?

Answer: 1 centimetre = **10 millimetres**.

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8. Why are traditional units like cubit and hand span less accurate?

Answer: Traditional units vary between individuals and regions, leading to inconsistent measurements, unlike standardized SI units.

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9. What is the SI unit of mass, and what is its symbol?

Answer: The SI unit of mass is the kilogram, and its symbol is **kg**.

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10. Arrange the following units of mass in ascending order: kilogram, milligram, gram, quintal.

Answer: Milligram, gram, kilogram, quintal.

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11. Convert 5000 g into kilograms.

Answer: 5000 g = 5000 ÷ 1000 kg = **5 kg**.

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12. What is the SI unit of time, and how is it related to a minute?

Answer: The SI unit of time is the second (s). 1 minute = **60 seconds**.

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13. What is the SI unit of volume, and what is its symbol?

Answer: The SI unit of volume is the cubic metre, and its symbol is m^3.

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14. How is the volume of a stone measured using a measuring jar?

Answer: Pour water into a measuring jar and note the initial level. Submerge the stone and note the new water level. The volume of the stone is the difference between the final and initial water levels (in mL or cm³).

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15. Define density and write its formula.

Answer: Density is the mass of a substance per unit volume. **Formula**: Density = Mass ÷ Volume.

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16. If a box has a volume of 2 m³ and a mass of 4000 kg, calculate its density.

Answer: Density = Mass ÷ Volume = 4000 kg ÷ 2 m³ = **2000 kg/m³**.

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17. What is the least count of a commonly used metre scale?

Answer: The least count of a commonly used metre scale is **0.1 cm** (1 mm).

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18. Why are SI units universally accepted?

Answer: SI units are standardized, internationally accepted, and allow consistent measurements worldwide, enabling seamless assembly of parts and accurate scientific communication.

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19. Write one rule for writing SI unit symbols correctly.

Answer: Use lowercase letters for unit symbols (e.g., kg, m), except for units named after people (e.g., N for Newton).

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20. Why should a full stop not be used after a unit symbol like cm?

Answer: A full stop or comma after a unit symbol (e.g., 60 cm.) is incorrect unless it is at the end of a sentence, as it may cause confusion in international notation.

Application-Level Questions

21. A tailor measures a cloth piece as 1.5 m. Convert this to centimetres.

Answer: 1.5 m = 1.5 × 100 cm = **150 cm**.

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22. A stopwatch records 10 oscillations of a pendulum in 20 seconds. What is the time for one oscillation?

Answer: Time for one oscillation = Total time ÷ Number of oscillations = 20 s ÷ 10 = **2 s**.

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23. A plastic bag has a thickness of 50 micrometres. Express this in metres.

Answer: 50 micrometres = 50 ÷ 1,000,000 m = **0.00005 m** or 5×10^{-5} **m**.

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24. A shop sells 2 quintals of rice. How many kilograms is this?

Answer: 2 quintals = 2 × 100 kg = **200 kg**.

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25. A measuring jar shows an initial water level of 100 mL and a final level of 150 mL after dipping a stone. What is the volume of the stone?

Answer: Volume of the stone = Final level - Initial level = 150 mL - 100 mL = **50 mL** (or 50 cm³).

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26. If the density of a substance is 800 kg/m³ and its volume is 0.5 m³, calculate its mass.

Answer: Mass = Density × Volume = 800 kg/m³ × 0.5 m³ = **400 kg**.

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27. A stack of 50 papers has a thickness of 5 mm. What is the thickness of one paper?

Answer: Thickness of one paper = Total thickness ÷ Number of papers = 5 mm ÷ 50 = **0.1 mm**.

28. Why is the density of sand higher than sawdust in a box of the same volume?

Answer: For the same volume, sand has a higher mass than sawdust, so its density (Mass ÷ Volume) is higher.

29. A vehicle's speed is given as 72 km/h. Convert this to SI units (m/s).

Answer: 72 km/h = (72 × 1000 m) ÷ (3600 s) = 72,000 m ÷ 3600 s = **20 m/s**.

30. A recipe requires 500 mL of water. Express this in cubic metres.

Answer: 500 mL = 500 cm³ = 500 ÷ 1,000,000 m³ = **0.0005 m³**.