



CLASS 9 · CHEMISTRY · CHAPTER 12

Empirical Data Collection and Analysis

Solved MCQs with Detailed Explanations

75

Solved MCQs

6

Topic Parts

100%

Explained

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75 solved MCQs · correct answers ticked ✓ · explanation below every question

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How to use: Try each question first, then check the green ✓ option and read the explanation to lock in the concept.

1

Introduction & Standardization

PART 1 · THE NEED FOR SI UNITS

Question 1

✓ Correct: B

What is science primarily defined as?

- A A random collection of facts
- B A systematic study of the world through observation and experimentation**
- C A belief system without evidence
- D The study of only chemical reactions

Explanation

Science is a methodical approach used to understand the universe. It relies on gathering empirical evidence through observation and testing hypotheses via experimentation, making it a systematic process rather than just a collection of facts.

Question 2

✓ Correct: B

Why did the scientific community agree to adopt standard units of measurement?

- A To make calculations harder
- B To avoid confusion and wastage of time during conversions**
- C To increase the cost of experiments
- D To favor one country over another

Explanation

Before standardization, different countries used different units (like metres vs. feet). Comparing data across borders required complex conversions, leading to confusion and errors. Standard units ensure that a measurement means the same thing worldwide.

Part 1 · Introduction & Standardization (continued)

Question 3

✓ Correct: B

What does the abbreviation 'SI' stand for?

- A Scientific Institution
- B System International**
- C Standard Imperial
- D System of Instruments

💡 Explanation

SI stands for "System International" (often referred to as the International System of Units). It is the modern, globally accepted metric system used for scientific measurements.

Question 4

✓ Correct: C

Which of the following is NOT a reason for using SI units in science?

- A They are based on the number 10
- B They allow scientists to share data easily
- C They increase the number of conversion factors**
- D They provide a universal standard for communication

💡 Explanation

SI units actually reduce the number of conversion factors needed because everything is based on powers of 10. This makes learning, converting, and communicating data much simpler.

Part 1 · Introduction & Standardization (continued)

Question 5

✓ Correct: B

Which system of units is based on the metre, kilogram, and second?

- ☐ A CGS System
- ☒ B MKS System
- ☐ C Imperial System
- ☐ D FPS System

 Explanation

MKS stands for Metre-Kilogram-Second. It forms the foundation of the SI system for mechanical units, providing a coherent base for larger scientific calculations.

Question 6

✓ Correct: B

In the CGS system, what is the standard unit of mass?

- ☐ A Kilogram
- ☒ B Gram
- ☐ C Pound
- ☐ D Mole

 Explanation

CGS stands for Centimetre-Gram-Second. It is an older metric system where the gram is the base unit of mass, unlike SI where the kilogram is the base unit.

Part 1 · Introduction & Standardization (continued)

Question 7

✓ Correct: D

Which of the following is true about the SI system?

- A It is based on the number 12
- B It uses undefined standards
- C It is derived from a single base unit

D It is based on the number 10

Explanation

The SI system is a metric system, meaning it is completely based on the decimal system (powers of 10). This makes conversions incredibly straightforward (e.g., moving the decimal point).

Question 8

✓ Correct: B

How do SI units bring harmony to the scientific community?

- A By forcing everyone to speak the same language
- B By allowing scientists to replicate experiments and verify results globally**
- C By making experiments more expensive
- D By standardizing the color of lab coats



Explanation

When units are standardized, a scientist in Japan can read a paper from a scientist in Brazil and understand the exact quantities used. This allows others to replicate the experiment and verify the findings, advancing collective knowledge safely.

Part 1 · Introduction & Standardization (continued)

Question 9

✓ Correct: C

What is a major risk of NOT using standard units?

- ☐ A Faster scientific progress
- ☐ B Better accuracy
- ☒ C **Inaccurate or inconsistent scientific models and results**
- ☐ D Increased funding for research

 Explanation

Without standard units, comparing data (like mass in grams vs. ounces) could lead to inaccurate calculations, miscommunication, and flawed scientific models that cannot be reliably reproduced.

Question 10

✓ Correct: B

Which of the following is considered a standard user-friendly system of units adopted globally?

- ☐ A Imperial System
- ☒ B **SI Units**
- ☐ C Local tribal units
- ☐ D Ancient Roman units

 Explanation

The Imperial System (feet, pounds) is used in a few countries but is not standard for global science. SI units are specifically designed to be user-friendly, decimal-based, and universally applicable.

2

SI Base Units & Their Definitions

PART 2 · METRE, KILOGRAM, SECOND, KELVIN, MOLE

Question 11

✓ Correct: B

How many base units are present in the SI system?

- A Five
- B Seven**
- C Twenty-two
- D Ten

Explanation

There are seven fundamental base units in SI (metre, kilogram, second, kelvin, mole, ampere, candela). All other units are derived from these seven.

Question 12

✓ Correct: B

How many of these SI base units are commonly used in Chemistry?

- A Seven
- B Five**
- C Three
- D Two

Explanation

Chemistry primarily relies on five base units: length (metre), mass (kilogram), time (second), temperature (kelvin), and amount of substance (mole).

Part 2 · SI Base Units & Their Definitions (continued)

Question 13

✓ Correct: C

What is the standard unit of length?

A Centimetre

B Kilometre

C Metre



D Foot

 Explanation

The metre (m) is the SI base unit of length, defined by the distance light travels in a vacuum in a specific fraction of a second.

Question 14

✓ Correct: B

How is the metre defined in modern science?

A The length of a standard metal rod kept in France

B The distance travelled by light in vacuum in about 300 millionth of a second



C One-tenth of a kilometre

D The length of a human arm

 Explanation

Originally defined by a physical rod, the metre is now defined using the speed of light in a vacuum, making it a highly precise and universal constant.

Part 2 · SI Base Units & Their Definitions (continued)

Question 15

✓ Correct: C

What is the SI unit of mass?

- A Gram
- B Pound
- C Kilogram**
- D Litre

 Explanation

The kilogram (kg) is the base unit of mass in the SI system, despite the gram being commonly used in practical chemistry lab work.

Question 16

✓ Correct: B

Historically, the standard kilogram was defined as the mass of 1000 cm³ of water. What physical object represents this standard?

- A A wooden block
- B A platinum-iridium block kept in France**
- C A glass flask
- D A steel ball

 Explanation

A standard block made of platinum-iridium alloy is kept in France as the international prototype for the kilogram, although it is now defined by fundamental physical constants.

Part 2 · SI Base Units & Their Definitions (continued)

Question 17

✓ Correct: C

What is the SI unit of time?

A Minute

B Hour

C Second



D Day

Explanation

The second (s) is the SI base unit of time. It is defined by the extremely precise vibration frequency of cesium-133 atoms.

Question 18

✓ Correct: B

The second is defined based on the radiation cycles of which atom?

A Carbon-12

B Cesium-133



C Oxygen-16

D Hydrogen-1

Explanation

The second is defined as the time it takes for 9,192,631,770 cycles of radiation from a cesium-133 atom. This atomic definition ensures extreme precision.

Part 2 · SI Base Units & Their Definitions (continued)

Question 19

✓ Correct: C

What is the SI unit of temperature?

A Celsius

B Fahrenheit

C Kelvin



D Joule

 Explanation

The kelvin (K) is the SI base unit for thermodynamic temperature. It is an absolute scale starting at absolute zero.

Question 20

✓ Correct: B

The Kelvin is defined as a fraction of the temperature of the triple point of what substance?

A Mercury

B Water



C Alcohol

D Nitrogen

 Explanation

The kelvin is precisely defined as $1/273.16$ of the thermodynamic temperature of the triple point of water (the point where ice, liquid water, and water vapor coexist).

Part 2 · SI Base Units & Their Definitions (continued)

Question 21

✓ Correct: B

What is the SI unit for the amount of a substance?

A Gram

B Mole



C Litre

D Kelvin

💡 Explanation

The mole (mol) is the SI base unit used to measure the amount of a chemical substance. It provides a bridge between the microscopic world of atoms and the macroscopic world of grams.

Question 22

✓ Correct: B

What is the symbol for the SI unit of the amount of substance?

A M

B mol



C g

D K

💡 Explanation

The symbol for mole is 'mol'. It is always written in lowercase letters.

Part 2 · SI Base Units & Their Definitions (continued)

Question 23

✓ Correct: A

One mole of any substance contains exactly how many particles?

A 6.022×10^{23}



B 3.14×10^8

C 9.8×10^6

D 1.6×10^{-19}

 Explanation

This specific number (6.022×10^{23}) is known as Avogadro's number. It represents the number of atoms, ions, or molecules present in one mole of a substance.

Question 24

✓ Correct: C

Which of the following is NOT a base unit in the SI system?

A Metre

B Kilogram

C Cubic metre



D Mole

 Explanation

The cubic metre (m^3) is a derived unit because it is mathematically derived from the base unit of length ($\text{m} \times \text{m} \times \text{m}$). Base units stand alone.

Part 2 · SI Base Units & Their Definitions (continued)

Question 25

✓ Correct: B

Which base unit is represented by the symbol 'K'?

A Kilogram

B Kelvin



C Kilomole

D Knot

 Explanation

'K' is the symbol for kelvin, the base unit of temperature. Note that it is not written with a degree symbol (°).

3

Derived Units & Specific Quantities

PART 3 · VOLUME, DENSITY, FORCE, PRESSURE, ENERGY

Question 26

✓ Correct: B

What are derived units?

- ☐ A Units that are completely independent
- ☒ B Units mathematically derived from base units
- ☐ C Units used only in chemistry
- ☐ D Units based on the Imperial system

Explanation

Derived units are combinations of base units. For example, speed is derived from length (metre) divided by time (second), giving m/s.

Question 27

✓ Correct: C

What is the SI derived unit of volume?

- ☐ A Litre
- ☐ B Cubic centimetre
- ☒ C Cubic metre
- ☐ D Millilitre

Explanation

The standard SI derived unit for volume is the cubic metre (m^3), which comes from multiplying length by width by height ($\text{m} \times \text{m} \times \text{m}$).

Part 3 · Derived Units & Specific Quantities (continued)

Question 28

✓ Correct: B

What is the SI derived unit of density?

A g/cm^3

B kg/m^3

C kg/m^2

D g/L

💡 Explanation

Density is mass per unit volume. The SI base unit for mass is kg and for volume is m^3 , making the derived unit kg/m^3 (or kg m^{-3}).

Question 29

✓ Correct: B

What is the SI derived unit of area?

A Metre

B Square metre

C Cubic metre

D Centimetre

💡 Explanation

Area is derived from length multiplied by width, so the SI unit is the square metre (m^2).

Part 3 · Derived Units & Specific Quantities (continued)

Question 30

✓ Correct: C

The unit 'Newton' is used to measure which quantity?

A Energy

B Pressure

C Force



D Density

Explanation

Force is a derived quantity. It is calculated as mass times acceleration ($\text{kg}\cdot\text{m}/\text{s}^2$), which is given the specific name 'Newton' (N).

Question 31

✓ Correct: C

What is the SI unit of pressure?

A Newton

B Joule

C Pascal



D Kelvin

Explanation

Pressure is force per unit area (N/m^2). This derived unit is called the Pascal (Pa).

Part 3 · Derived Units & Specific Quantities (continued)

Question 32

✓ Correct: B

The unit 'Joule' is used to measure which of the following?

- A Force
- B Energy**
- C Pressure
- D Area

 Explanation

Energy is a derived quantity. The Joule (J) is the SI unit of energy, defined as the work done when a force of one Newton moves an object by one metre.

Question 33

✓ Correct: C

Which of the following is a specific quantity used in chemistry?

- A Mole
- B Area
- C Energy**
- D Mass

 Explanation

While mass and mole are base units, energy (along with force and pressure) is categorized as a specific derived quantity commonly utilized in chemical calculations.

Part 3 · Derived Units & Specific Quantities (continued)

Question 34

✓ Correct: C

The unit kg m^{-3} is equivalent to:

A Newton

B Pascal

C Density



D Volume

 Explanation

kg m^{-3} represents kilograms per cubic metre. This is the standard SI unit for density (mass/volume).

Question 35

✓ Correct: C

Which of these is a derived unit?

A Second

B Kelvin

C Joule



D Mole

 Explanation

Joule is derived from base units of mass, length, and time. Second, Kelvin, and Mole are fundamental base units.

4

SI Prefixes & Conversions

PART 4 · FROM PICO TO MEGA

Question 36

✓ Correct: B

What does the prefix 'Mega' represent?

A 10^3

B 10^6

C 10^9

D 10^{-6}

💡 Explanation

Mega (symbol M) is a metric prefix representing a factor of one million (10^6). For example, a megagram is one million grams.

Question 37

✓ Correct: B

What is the symbol for the prefix 'Kilo'?

A K

B k

C M

D da

💡 Explanation

The symbol for Kilo is a lowercase 'k' (representing 10^3). It is important to distinguish it from the uppercase 'K' used for Kelvin.

Part 4 · SI Prefixes & Conversions (continued)

Question 38

✓ Correct: C

Which prefix represents the factor 10^{-2} ?

A Milli

B Micro

C Centi



D Deci

 Explanation

Centi (symbol c) represents one-hundredth (10^{-2}) of a base unit. For example, a centimetre is 1/100th of a metre.

Question 39

✓ Correct: C

What is the factor represented by the prefix 'Milli'?

A 10^{-1}

B 10^{-2}

C 10^{-3}



D 10^{-6}

 Explanation

Milli (symbol m) represents one-thousandth (10^{-3}). For example, a milligram is 1/1000th of a gram.

Part 4 · SI Prefixes & Conversions (continued)

Question 40

✓ Correct: B

What is the symbol for the prefix 'Micro'?

A m

B u



C n

D p

 Explanation

The symbol for Micro is 'u' (or sometimes the Greek letter μ). It represents 10^{-6} (one-millionth).

Question 41

✓ Correct: B

Which prefix represents 10^{-9} ?

A Pico

B Nano



C Micro

D Milli

 Explanation

Nano (symbol n) represents one-billionth (10^{-9}). Nanotechnology deals with structures on this scale.

Part 4 · SI Prefixes & Conversions (continued)

Question 42

✓ Correct: C

Which prefix represents the smallest factor listed in standard SI tables?

A Nano

B Micro

C Pico



D Milli

Explanation

Pico (symbol p) represents 10^{-12} (one-trillionth), which is the smallest prefix commonly listed in standard chemistry reference tables.

Question 43

✓ Correct: A

What does the prefix 'Deca' represent?

A 10^1

B 10^2

C 10^{-1}

D 10^{-2}

Explanation

Deca (symbol da) represents a factor of ten (10^1). For example, a decametre is 10 metres.

Part 4 · SI Prefixes & Conversions (continued)

Question 44

✓ Correct: B

What is the symbol for 'Hecto'?

A H

B h



C da

D D

Explanation

The symbol for Hecto is a lowercase 'h', representing 10^2 (one hundred). A hectare is a common unit of area.

Question 45

✓ Correct: B

If you measure 100 millimetres, how should it be written according to SI conventions?

A 100 mms

B 100 mm



C 100 MM

D 100 milli m

Explanation

SI symbols are never pluralized. Therefore, it is always 'mm' regardless of the quantity. Adding an 's' is incorrect.

Part 4 · SI Prefixes & Conversions (continued)

Question 46

✓ Correct: C

Which prefix is commonly used to express large quantities like distances between cities?

- ☐ A Milli
- ☐ B Micro
- ☒ C Kilo
- ☐ D Nano

 Explanation

Kilo (10^3) is used for larger quantities. For instance, kilometres (km) are standard for measuring road distances.

Question 47

✓ Correct: B

Which of the following represents 10^6 ?

- ☐ A Kilo
- ☒ B Mega
- ☐ C Hecto
- ☐ D Giga

 Explanation

Mega (M) is the prefix for 10^6 (one million). Kilo is 10^3 , Hecto is 10^2 , and Giga is 10^9 .

5

Practical Units in Chemistry

PART 5 · TEMPERATURE CONVERSIONS & LAB UNITS

Question 48

✓ Correct: B

Why do chemists prefer using grams over kilograms for measuring mass in the lab?

- A Grams are heavier
- B Reactants are usually in small quantities, making numbers manageable**
- C Kilograms are not an SI unit
- D Grams are more accurate

Explanation

In a typical lab, you might use 0.5 grams of a reactant. If you used kilograms, you would be dealing with 0.0005 kg, which is cumbersome. Using grams keeps the numbers easy to read and calculate.

Question 49

✓ Correct: B

Why is the cubic centimetre (cm^3) preferred over the cubic metre (m^3) in chemistry labs?

- A It is the standard SI unit
- B Lab volumes are small, making cm^3 practical and precise**
- C m^3 is too small
- D cm^3 is heavier

Explanation

A cubic metre is a massive volume (1000 litres). Laboratory experiments involve small volumes like 25 cm^3 or 50 cm^3 . Using cm^3 provides manageable numbers and greater practical precision.

Part 5 · Practical Units in Chemistry (continued)

Question 50

✓ Correct: C

Which temperature scale is most often used in chemistry laboratories?

- A Kelvin
- B Fahrenheit
- C Celsius**
- D Rankine

 Explanation

While Kelvin is the SI base unit, Celsius is more commonly used for everyday lab measurements because its scale (0–100) is more convenient and familiar for routine experiments.

Question 51

✓ Correct: B

Why is the Celsius scale preferred for practical lab measurements over Kelvin?

- A It starts at absolute zero
- B It has 100 divisions, making it compatible with the base-10 format**
- C It uses larger numbers
- D It doesn't require conversions

 Explanation

The Celsius scale has 100 divisions between the freezing and boiling points of water. This decimal-based structure aligns well with the SI system, making it more intuitive for lab work.

Part 5 · Practical Units in Chemistry (continued)

Question 52

✓ Correct: B

What is the correct formula to convert temperature from Celsius to Kelvin?

A $K = ^\circ\text{C} - 273$

B $K = ^\circ\text{C} + 273$ ✓

C $K = ^\circ\text{C} \times 273$

D $K = ^\circ\text{C} \div 273$

 Explanation

The Kelvin scale starts at absolute zero ($-273.15\text{ }^\circ\text{C}$). To convert Celsius to Kelvin, you simply add 273 to the Celsius value.

Question 53

✓ Correct: C

If the temperature of a solution is $25\text{ }^\circ\text{C}$, what is its temperature in Kelvin?

A 248 K

B 273 K

C 298 K ✓

D 300 K

 Explanation

Using the formula $K = ^\circ\text{C} + 273$, we get $K = 25 + 273 = 298\text{ K}$.

Part 5 · Practical Units in Chemistry (continued)

Question 54

✓ Correct: B

What is the practical unit for measuring the amount of a substance in a lab?

- A Gram
- B Mole**
- C Litre
- D Kilogram

 Explanation

The mole is used to quantify the number of particles. When weighing out chemicals, chemists calculate the mass in grams based on the required number of moles (using molar mass).

Question 55

✓ Correct: B

Which unit is commonly used to express the concentration of a solution in practical chemistry?

- A kg/m^3
- B mol/dm^3**
- C g/m^3
- D kg/L

 Explanation

While kg/m^3 is the SI derived unit for density, concentration in chemistry is practically expressed as moles per cubic decimetre (mol/dm^3), which is equivalent to moles per litre (mol/L).

6

Errors, Accuracy & Precision

PART 6 · SYSTEMATIC VS RANDOM ERRORS

Question 56

✓ Correct: B

How is 'error' defined in scientific measurement?

- A A mistake made by the student
- B The difference between the measured value and the actual value**
- C The failure of an experiment
- D A random guess

Explanation

In science, "error" does not mean a mistake. It refers to the inevitable discrepancy between a measured value and the true, known value.

Question 57

✓ Correct: B

What are systematic errors?

- A Errors that happen randomly
- B Errors that can be removed by applying a constant adjustment**
- C Errors caused by bad weather
- D Errors that cannot be fixed

Explanation

Systematic errors are consistent and predictable. For example, if a weighing scale is zeroed incorrectly, it will consistently add 0.1 g to every measurement. This can be fixed by subtracting 0.1 g.

Part 6 · Errors, Accuracy & Precision (continued)

Question 58

✓ Correct: B

Which type of error primarily affects the accuracy of a measurement?

A Random error

B Systematic error



C Human error

D Parallax error

Explanation

Systematic errors cause measurements to consistently deviate from the true value in one direction (either too high or too low), thus directly impacting accuracy.

Question 59

✓ Correct: B

What causes random errors?

A A miscalibrated instrument

B Unpredictable changes during an experiment or environmental factors



C Using the wrong formula

D Reading the textbook incorrectly

Explanation

Random errors arise from unpredictable fluctuations, such as slight temperature changes, air currents affecting a balance, or a student reading a meniscus from slightly different angles each time.

Part 6 · Errors, Accuracy & Precision (continued)

Question 60

✓ Correct: B

What does random error primarily determine in an experiment?

- ☐ A Accuracy
- ☒ B Precision
- ☐ C Systematic error
- ☐ D The true value

 Explanation

Random errors cause measurements to scatter around an average value. The spread of these measurements determines the precision of the experiment.

Question 61

✓ Correct: B

What does the term 'accuracy' measure?

- ☐ A How close multiple measurements are to each other
- ☒ B How close a measurement is to the true or known value
- ☐ C How fast an experiment is completed
- ☐ D How expensive the equipment is

 Explanation

Accuracy is about correctness. A measurement is accurate if it hits the bullseye (the true value).

Part 6 · Errors, Accuracy & Precision (continued)

Question 62

✓ Correct: B

What does the term 'precision' measure?

- A How close a measurement is to the true value
- B The closeness of two or more measurements to each other**
- C The size of the measuring instrument
- D The color of the chemical

 Explanation

Precision is about consistency. If you repeat a measurement multiple times and get very similar results, your measurements are precise, even if they are all wrong.

Question 63

✓ Correct: B

A true volume of a liquid is 26 cm^3 . A student measures it three times and gets 27 cm^3 each time. How would you describe the student's results?

- A Accurate and precise
- B Precise but not accurate**
- C Accurate but not precise
- D Neither accurate nor precise

 Explanation

The measurements are consistent with each other (precise) because they all read 27 cm^3 . However, they are not accurate because 27 cm^3 does not match the true value of 26 cm^3 .

Part 6 · Errors, Accuracy & Precision (continued)

Question 64

✓ Correct: C

A student weighs an object and gets readings of 19.8, 20.5, and 19.6 grams. The true mass is 20.0 grams. How would you describe these results?

- ☐ A Accurate and precise
- ☐ B Precise but not accurate
- ☒ C **Accurate but not precise**
- ☐ D Neither accurate nor precise

 Explanation

The average of the readings is close to 20.0 g (accurate), but the individual readings vary widely from 19.6 to 20.5 (not precise). The random errors are high.

Question 65

✓ Correct: B

If a student weighs a substance three times and gets a reading of 5.2 g every time, but the true weight is 5.0 g, what is the result?

- ☐ A Accurate and precise
- ☒ B **Precise but not accurate**
- ☐ C Accurate but not precise
- ☐ D Neither accurate nor precise

 Explanation

The readings are identical, showing high precision. However, they are consistently off by 0.2 g from the true value, indicating a systematic error that makes them inaccurate.

Part 6 · Errors, Accuracy & Precision (continued)

Question 66

✓ Correct: A

Which of the following is an example of a systematic error?

A A pipette that is miscalibrated and delivers slightly less volume than indicated



B A sudden draft of air changing the reading on a balance

C Reading a meniscus from different angles each time

D A student accidentally spilling a drop of liquid

Explanation

A miscalibrated instrument consistently provides the same incorrect reading every time. This is a classic systematic error that affects accuracy.

Question 67

✓ Correct: B

Which of the following is an example of a random error?

A A balance that is not zeroed correctly

B Reading the volume from a measuring cylinder at different eye levels each time



C Using a ruler that is slightly stretched

D A thermometer that reads 2 degrees too high

Explanation

Reading a meniscus from different angles introduces unpredictable variations into the measurement, which is the hallmark of a random error.

Part 6 · Errors, Accuracy & Precision (continued)

Question 68

✓ Correct: B

How can systematic errors be minimized or eliminated?

- ☐ A By taking more readings and averaging them
- ☒ B By applying a constant adjustment to the measurement
- ☐ C By ignoring them
- ☐ D By using a different student

 Explanation

Since systematic errors are consistent, you can calibrate the instrument or mathematically add/subtract a constant value to correct all measurements.

Question 69

✓ Correct: B

What is the primary goal of any scientific experiment regarding results?

- ☐ A To get fast results
- ☒ B To obtain accurate and precise results
- ☐ C To use the most expensive equipment
- ☐ D To prove a hypothesis wrong

 Explanation

The ultimate objective is to minimize both systematic and random errors to achieve measurements that are both correct (accurate) and consistent (precise).

Part 6 · Errors, Accuracy & Precision (continued)

Question 70

✓ Correct: A

Can a measurement be precise but not accurate?

A Yes, if there is a systematic error



B No, precision always means accuracy

C Yes, if there is a random error

D No, they are the same thing

Explanation

Yes. As seen in earlier examples, a miscalibrated instrument can give you the exact same reading every time (precise) but the reading is wrong (not accurate).

Question 71

✓ Correct: B

If a measurement is close to the true value, it is said to be:

A Precise

B Accurate



C Systematic

D Random

Explanation

By definition, accuracy refers to how close a measured value is to the true or accepted value.

Part 6 · Errors, Accuracy & Precision (continued)

Question 72

✓ Correct: B

If multiple measurements are close to each other, they are said to be:

- ☐ A Accurate
- ☒ B Precise
- ☐ C Systematic
- ☐ D Erroneous

 Explanation

Precision refers to the reproducibility or closeness of repeated measurements to each other, regardless of whether they are close to the true value.

Question 73

✓ Correct: C

Which of the following statements is true?

- ☐ A Accuracy and precision are exactly the same
- ☐ B A measurement can be accurate without being precise
- ☒ C A measurement can be precise without being accurate
- ☐ D A measurement cannot be both accurate and precise

 Explanation

It is possible to be precise but not accurate (consistent but wrong). It is possible to be accurate but not precise (average is right, but individual readings are scattered). The ideal is to be both.

Part 6 · Errors, Accuracy & Precision (continued)

Question 74

✓ Correct: B

What is the main reason for random errors in measurements?

- A Faulty equipment
- B Limitations of instruments and environmental factors**
- C Using the wrong formula
- D Reading the textbook incorrectly

Explanation

Random errors stem from uncontrollable and unpredictable variations in the environment (like air currents or temperature) and the inherent limitations of the measuring instrument.

Question 75

✓ Correct: B

How do you avoid systematic errors in an experiment?

- A By taking multiple readings and averaging them
- B By properly calibrating instruments and applying corrections**
- C By rushing through the experiment
- D By changing the procedure every time

Explanation

Since systematic errors are caused by faulty equipment or consistent procedural flaws, they are avoided by calibrating instruments, zeroing balances, and applying mathematical corrections to the readings.



Keep Learning!

You have completed all 75 MCQs of Chapter 12. Revise SI units, prefixes, and the difference between accuracy and precision — and walk into your exam with confidence. Best of luck!

SI Units

7 base units, powers of 10

Prefixes

pico → mega

Errors

Accuracy vs precision

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