CHEMISTRY MCQ BOOKLET

# Grade 9 · Chapter 16 · Empirical Data Collection and Analysis

FBISE / National Book Foundation Model Textbook companion

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*Independent MCQs on SI units, prefixes, conversions, scientific notation, accuracy and precision, and laboratory measuring apparatus. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a teaching explanation.*

## A. Important / Main Topics

**1. Measurement is best described as a comparison of an unknown quantity with:**

(A) a known fixed quantity
(B) a changing personal opinion
(C) a colour name only
(D) a chemical formula only

**Correct Answer: A**

*Explanation: A measurement compares what is unknown with an agreed fixed standard so a number and a unit can be reported.*

**2. Units are standardized mainly so that scientists can:**

(A) keep every result secret
(B) communicate and collaborate with comparable results
(C) avoid using any instruments
(D) replace numbers with guesses

**Correct Answer: B**

*Explanation: Units are standardized mainly so that scientists can communicate and collaborate with comparable results.*

**3. Body-based units such as a cubit, a hand span, or a footstep are unreliable because they:**

(A) never change with the person
(B) are defined by the mole
(C) vary from person to person
(D) are SI base units

**Correct Answer: C**

*Explanation: Arm length and similar body measures differ between people, so they cannot be a universal standard.*

**4. Worldwide agreement on SI units as a single system is associated with about:**

(A) 1760 only
(B) 2010 as the first year of measurement
(C) 3000 BC as the SI start
(D) 1960

**Correct Answer: D**

*Explanation: Around 1960, scientists adopted the International System of Units so measurements could be compared globally.*

**5. A physical quantity is a property that:**

(A) can be measured
(B) cannot be measured at all
(C) is always a chemical name
(D) is only an opinion

**Correct Answer: A**

*Explanation: Mass, length, time, temperature, and amount of substance are examples of measurable physical quantities.*

**6. A unit of measurement is:**

(A) any changing body length
(B) an agreed fixed standard used for comparison
(C) the result without a number
(D) a laboratory accident

**Correct Answer: B**

*Explanation: The unit is the fixed quantity against which an unknown is compared during measurement.*

**7. The SI base unit of mass is the:**

(A) gram as the fundamental unit
(B) litre
(C) kilogram
(D) newton

**Correct Answer: C**

*Explanation: Mass is a fundamental quantity whose SI base unit is the kilogram, symbol kg.*

**8. The SI base unit of length is the:**

(A) centimetre as the base unit
(B) kilometre as the base unit
(C) inch
(D) metre

**Correct Answer: D**

*Explanation: Length is measured in the metre as the SI base unit; centimetres use a prefix.*

**9. The SI base unit of time is the:**

(A) second
(B) minute as the base unit
(C) hour as the base unit
(D) day as the base unit

**Correct Answer: A**

*Explanation: Time has the second as its SI base unit, although minutes and hours are convenient larger units.*

**10. The SI base unit of thermodynamic temperature is the:**

(A) degree Celsius as the base unit
(B) kelvin
(C) degree Fahrenheit
(D) joule

**Correct Answer: B**

*Explanation: Thermodynamic temperature uses kelvin, written with the symbol K and without a degree sign.*

**11. The SI base unit for amount of substance is the:**

(A) molecule as an SI unit
(B) gram as the amount unit
(C) mole
(D) litre as the amount unit

**Correct Answer: C**

*Explanation: Amount of substance is a fundamental quantity measured in moles, symbol mol.*

**12. The SI base unit of electric current is the:**

(A) volt as the current base unit
(B) watt as the current base unit
(C) coulomb as the current base unit
(D) ampere

**Correct Answer: D**

*Explanation: Electric current is a fundamental quantity whose SI base unit is the ampere, symbol A.*

**13. The SI base unit of luminous intensity is the:**

(A) candela
(B) lumen as the SI base unit
(C) lux as the SI base unit
(D) watt as the SI base unit

**Correct Answer: A**

*Explanation: Luminous intensity is one of the seven fundamental quantities and its SI base unit is the candela.*

**14. Derived units are formed by:**

(A) replacing all measured quantities
(B) combining fundamental units mathematically
(C) using only body parts
(D) forbidding powers

**Correct Answer: B**

*Explanation: A derived unit is built by multiplying or dividing base units, as speed uses metres per second.*

**15. The prefix kilo means:**

(A) 10^-3
(B) 10^2
(C) 10^3, or one thousand times the base unit
(D) 10^-2

**Correct Answer: C**

*Explanation: Kilo is the SI prefix for one thousand, so one kilometre equals one thousand metres.*

**16. The prefix hecto means:**

(A) 10^3
(B) 10^-1
(C) 10^-2
(D) 10^2, or one hundred times the base unit

**Correct Answer: D**

*Explanation: Hecto multiplies a base unit by one hundred because its factor is 10 raised to 2.*

**17. The prefix deca means:**

(A) 10^1, or ten times the base unit
(B) 10^-1
(C) 10^2
(D) 10^-3

**Correct Answer: A**

*Explanation: Deca is a factor of ten, so a decametre contains ten metres.*

**18. The prefix deci means:**

(A) 10^1
(B) 10^-1, or one tenth of the base unit
(C) 10^-2
(D) 10^3

**Correct Answer: B**

*Explanation: Deci means one tenth because multiplying a base unit by 10^-1 divides it into ten equal parts.*

**19. The prefix centi means:**

(A) 10^2
(B) 10^-3
(C) 10^-2, or one hundredth of the base unit
(D) 10^1

**Correct Answer: C**

*Explanation: Centi is the prefix for one hundredth, which is why one metre contains one hundred centimetres.*

**20. The prefix milli means:**

(A) 10^3
(B) 10^-2
(C) 10^2
(D) 10^-3, or one thousandth of the base unit

**Correct Answer: D**

*Explanation: Milli means one thousandth of a base unit, so one thousand millimetres make one metre.*

**21. A distance of 1 kilometre is equal to:**

(A) 1000 m
(B) 100 m
(C) 1000 cm only as the only meaning
(D) 10 m

**Correct Answer: A**

*Explanation: The prefix kilo means one thousand, so one kilometre is one thousand metres.*

**22. How many centimetres are in 1 metre?**

(A) 10
(B) 100
(C) 1000
(D) 0.01

**Correct Answer: B**

*Explanation: Centi means one hundredth, so one metre contains one hundred centimetres.*

**23. 10 millimetres are equal to:**

(A) 1 metre
(B) 1 kilometre
(C) 1 centimetre
(D) 1 millilitre

**Correct Answer: C**

*Explanation: 10 millimetres are equal to 1 centimetre.*

**24. 3 minutes expressed in seconds equal:**

(A) 30 s
(B) 300 s
(C) 0.05 s
(D) 180 s

**Correct Answer: D**

*Explanation: Each minute contains 60 seconds, so three minutes are 3 multiplied by 60, or 180 s.*

**25. 2.5 hours expressed in minutes equal:**

(A) 150 min
(B) 25 min
(C) 120 min
(D) 250 min

**Correct Answer: A**

*Explanation: An hour is 60 minutes, so 2.5 hours are 2.5 multiplied by 60, which equals 150 minutes.*

**26. Converting 2.5 km into metres gives:**

(A) 250 m
(B) 2500 m
(C) 0.0025 m
(D) 25 000 m

**Correct Answer: B**

*Explanation: One kilometre is 1000 metres, so multiplying 2.5 by 1000 gives 2500 m.*

**27. Converting 350 cm into metres gives:**

(A) 35 m
(B) 0.35 m
(C) 3.5 m
(D) 3500 m

**Correct Answer: C**

*Explanation: One metre is 100 centimetres, so dividing 350 by 100 gives a length of 3.5 m.*

**28. 12 kg expressed in milligrams is:**

(A) 12 000 mg
(B) 1 200 000 mg
(C) 0.000012 mg
(D) 12 000 000 mg

**Correct Answer: D**

*Explanation: A kilogram is one million milligrams, so 12 kg equals 12 000 000 mg.*

**29. A 50 mg tablet is needed to supply 0.2 g of medicine. How many tablets are required?**

(A) 4 tablets
(B) 1 tablet
(C) 2 tablets
(D) 40 tablets

**Correct Answer: A**

*Explanation: 0.2 g is 200 mg, and 200 divided by 50 gives four.*

**30. In school laboratories, chemists commonly prefer practical units such as:**

(A) km, tonnes, and years
(B) $cm^3$, g, and s
(C) feet, pounds, and days only
(D) no units at all

**Correct Answer: B**

*Explanation: Small laboratory samples are conveniently measured in cubic centimetres, grams, and seconds.*

**31. 1 litre is equal to how many millilitres?**

(A) 100 mL
(B) 10 mL
(C) 1000 mL
(D) 10 000 mL

**Correct Answer: C**

*Explanation: The prefix milli means one thousandth, so one litre contains one thousand millilitres.*

**32. 1 litre is equal to:**

(A) 1 $cm^3$
(B) 100 $dm^3$
(C) 0.001 $cm^3$
(D) 1 $dm^3$

**Correct Answer: D**

*Explanation: A litre is the same volume as one cubic decimetre.*

**33. 1 millilitre is equal to:**

(A) 1 $cm^3$
(B) 100 $cm^3$
(C) 0.01 $cm^3$
(D) 1 $dm^3$

**Correct Answer: A**

*Explanation: One millilitre and one cubic centimetre are equivalent practical units of volume.*

**34. The SI unit of volume is the:**

(A) litre as the SI base unit
(B) cubic metre
(C) gallon
(D) drop

**Correct Answer: B**

*Explanation: Volume is a derived quantity whose SI unit is the cubic metre, while litres and cm³ are convenient related units.*

**35. 1 dm³ is equal to how many cm³?**

(A) 100 cm³
(B) 10 cm³
(C) 1000 cm³
(D) 1 cm³

**Correct Answer: C**

*Explanation: A cubic decimetre contains one thousand cubic centimetres, which is also one litre.*

**36. Scientific notation is used mainly to write:**

(A) only integers between 2 and 3
(B) chemical names
(C) only colours
(D) very large or very small numbers compactly

**Correct Answer: D**

*Explanation: Scientific notation is used mainly to write very large or very small numbers compactly.*

**37. Standard scientific notation has the form A × 10^n where:**

(A) 1 ≤ |A| < 10 and n is an integer
(B) A must always exceed 10
(C) n must always be positive
(D) A must always be zero

**Correct Answer: A**

*Explanation: The coefficient's magnitude is at least one but less than ten, while the exponent is an integer.*

**38. 650 000 000 written in standard form is:**

(A) 65 × 10^7
(B) 6.5 × 10^8
(C) 0.65 × 10^9
(D) 6.5 × 10^-8

**Correct Answer: B**

*Explanation: Moving the decimal eight places left gives 6.5, so the compensating power is positive 8.*

**39. 0.006 written in standard form is:**

(A) 6 × 10^3
(B) 0.6 × 10^-2
(C) 6 × 10^-3
(D) 60 × 10^-4

**Correct Answer: C**

*Explanation: Moving the decimal three places right gives 6, so the original small number needs an exponent of −3.*

**40. Is 14 × 10^5 already in standard form?**

(A) Yes, because 14 is allowed
(B) Yes, because the exponent is 5
(C) Yes, because the base is 10
(D) No; the coefficient must be less than 10

**Correct Answer: D**

*Explanation: Fourteen is too large for the coefficient, so the number is not yet in standard form.*

**41. Correcting 14 × 10^5 to standard form gives:**

(A) 1.4 × 10^6
(B) 1.4 × 10^4
(C) 14 × 10^5 unchanged
(D) 0.14 × 10^7

**Correct Answer: A**

*Explanation: Shifting the decimal in 14 one place left increases the exponent from 5 to 6.*

**42. 0.00000046 written in standard form is:**

(A) 4.6 × 10^7
(B) 4.6 × 10^-7
(C) 46 × 10^-8
(D) 0.46 × 10^-6

**Correct Answer: B**

*Explanation: The decimal moves seven places right to make 4.6, so the exponent is negative seven.*

**43. For a number greater than 10, the decimal is moved left and the power of ten is:**

(A) always negative
(B) always zero
(C) positive
(D) always a fraction

**Correct Answer: C**

*Explanation: Each left shift of the decimal is balanced by a positive power of ten.*

**44. For a number smaller than 1, the decimal is moved right and the power of ten is:**

(A) always positive
(B) always +8
(C) always a chemical formula
(D) negative

**Correct Answer: D**

*Explanation: Each right shift of the decimal is balanced by a negative exponent.*

**45. In 5.3687 × 10^4, the mantissa is the:**

(A) digits after the decimal point in the coefficient
(B) base 10 only
(C) exponent 4 only
(D) sign only

**Correct Answer: A**

*Explanation: In 5.3687 × 10^4, the mantissa is the digits after the decimal point in the coefficient.*

**46. 6000 written in standard form is:**

(A) 60 × 10^2
(B) 6 × 10^3
(C) 0.6 × 10^4
(D) 6 × 10^-3

**Correct Answer: B**

*Explanation: Moving the decimal three places left gives 6, so the exponent is positive 3.*

**47. The diameter of Earth given as 12 700 000 m is:**

(A) 1.27 × 10^5 m
(B) 12.7 × 10^7 m
(C) 1.27 × 10^7 m
(D) 1.27 × 10^-7 m

**Correct Answer: C**

*Explanation: Moving the decimal seven places left produces 1.27 with a positive exponent of 7.*

**48. Accuracy describes how close a measurement is to the:**

(A) other repeated readings only
(B) largest apparatus size
(C) number of trials
(D) accepted or true value

**Correct Answer: D**

*Explanation: Accuracy is high when a measured result is close to the true or accepted value.*

**49. Precision describes how closely repeated measurements:**

(A) agree with one another
(B) match the accepted value only
(C) are rounded every time
(D) use an uncalibrated scale

**Correct Answer: A**

*Explanation: Precision is repeatability, so tightly clustered repeats are precise even if they are inaccurate.*

**50. Shots forming a tight cluster away from the bullseye illustrate results that are:**

(A) accurate and precise
(B) precise but inaccurate
(C) accurate but imprecise
(D) random with no pattern

**Correct Answer: B**

*Explanation: Shots forming a tight cluster away from the bullseye illustrate results that are precise but inaccurate.*

**51. Shots spread around the bullseye overall, but not tightly grouped, illustrate results that are:**

(A) precise but inaccurate
(B) both perfectly precise and accurate
(C) accurate but imprecise
(D) not measurements

**Correct Answer: C**

*Explanation: A spread whose average is near the target can be accurate overall but lacks the close grouping of precision.*

**52. A balance that is not adjusted correctly can give readings that are:**

(A) always both accurate and precise
(B) never repeatable
(C) independent of calibration
(D) precise yet not representing the true mass

**Correct Answer: D**

*Explanation: A systematic instrument error can cluster results tightly while shifting them away from the true value.*

**53. Spilling part of a sample during repeated trials mainly reduces:**

(A) precision of the set of masses
(B) the need for units
(C) the existence of SI
(D) the meaning of a kelvin

**Correct Answer: A**

*Explanation: Careless losses make repeated readings disagree even if the balance itself is capable of accurate work.*

**54. In a glass measuring cylinder, a liquid surface often forms a U-shape called a:**

(A) solute
(B) meniscus
(C) filtrate
(D) mantissa

**Correct Answer: B**

*Explanation: The liquid sticks to the glass and curves, so the volume is read at the bottom of that curve at eye level.*

**55. The correct way to read a liquid volume is to view the meniscus:**

(A) only from above
(B) only from below
(C) at eye level
(D) with the vessel on its side

**Correct Answer: C**

*Explanation: Eye-level viewing aligns the bottom of the meniscus with the scale and avoids parallax error.*

**56. Looking down on a meniscus typically makes the apparent reading:**

(A) too high
(B) always exact
(C) disappear
(D) too low

**Correct Answer: D**

*Explanation: Looking down creates parallax that makes the meniscus appear lower on the graduated scale.*

**57. Looking up at a meniscus typically makes the apparent reading:**

(A) too high
(B) too low
(C) always zero
(D) change the real volume

**Correct Answer: A**

*Explanation: Looking upward creates parallax that makes the meniscus appear higher on the graduated scale.*

**58. A beaker is suitable for:**

(A) the most accurate titration volume
(B) an approximate liquid volume
(C) measuring mass directly
(D) delivering one exact fixed volume only

**Correct Answer: B**

*Explanation: Beaker graduations are coarse, so a beaker is used to estimate volume, hold samples, mix, or heat.*

**59. Compared with a beaker, a measuring cylinder is generally:**

(A) less accurate for volume
(B) unable to show any volume
(C) more accurate for volume
(D) used only for weighing solids

**Correct Answer: C**

*Explanation: A measuring cylinder has finer graduations than a beaker, so it gives a more reliable liquid volume.*

**60. Common measuring-cylinder capacities include:**

(A) only 1 $km^3$
(B) only tonnes
(C) only kelvin
(D) 10, 25, 50, or 100 $cm^3$

**Correct Answer: D**

*Explanation: School cylinders are typically sized in tens of cubic centimetres for laboratory volumes.*

**61. A volumetric pipette is typically designed to deliver:**

(A) one fixed volume, often 25 $cm^3$, very accurately
(B) any volume chosen by a tap
(C) only gases
(D) only masses in kilograms

**Correct Answer: A**

*Explanation: A volumetric pipette is calibrated for one fixed volume and is more accurate than a cylinder.*

**62. A volumetric pipette should be used with a:**

(A) mouth suction only
(B) pipette filler
(C) Bunsen flame inside the pipette
(D) magnet

**Correct Answer: B**

*Explanation: A filler is required for safety; liquid should never be drawn up by mouth.*

**63. Burettes are mainly used in:**

(A) flame tests only
(B) weighing solids only
(C) titrations
(D) timing races only

**Correct Answer: C**

*Explanation: A burette delivers a variable volume of liquid, which is why it is the usual titration apparatus.*

**64. The volume delivered by a burette is found by:**

(A) adding initial and final readings
(B) ignoring both readings
(C) using only the stopcock colour
(D) subtracting the initial reading from the final reading

**Correct Answer: D**

*Explanation: A burette is a graduated delivery tube, so the change in its readings gives the volume released.*

**65. Relative volume accuracy is generally best summarised as:**

(A) pipette more accurate than burette, which is more accurate than a cylinder
(B) beaker better than pipette
(C) cylinder better than pipette always
(D) all apparatus identical

**Correct Answer: A**

*Explanation: Fine burette graduations improve on a cylinder, while a fixed-volume pipette is designed for still greater accuracy.*

**66. A gas syringe is used to:**

(A) measure only solid mass
(B) collect and measure the volume of a gas
(C) measure luminous intensity
(D) replace a thermometer

**Correct Answer: B**

*Explanation: A gas syringe is used to collect and measure the volume of a gas.*

**67. A typical school laboratory thermometer spans about:**

(A) 0 K to 1 K
(B) only body temperature
(C) −10 °C to 110 °C
(D) mass in grams

**Correct Answer: C**

*Explanation: That Celsius range covers common experiments such as boiling-point and freezing-point checks.*

**68. Analytical balances are used to determine:**

(A) only time intervals
(B) only flame colours
(C) only gas identity

(D) the mass of solids, liquids, powders, or granules

**Correct Answer: D**

*Explanation: They are precision mass instruments used in quantitative chemical work.*

**69. Most laboratory stopwatches display time with a precision of about:**

(A) 1 hour only
(B) 0.01 s
(C) 1 day only
(D) 1 kg

**Correct Answer: A**

*Explanation: A digital stopwatch commonly resolves hundredths of a second, which is useful for reaction timing.*

**70. To change SI units by factors of ten into larger or smaller units, chemists use:**

(A) only chemical formulas
(B) prefixes
(C) only opinions
(D) only colours

**Correct Answer: B**

*Explanation: Prefixes such as kilo and milli multiply or divide a base unit by powers of ten.*

**71. Normal human body temperature is commonly quoted as about:**

(A) 0 °C only
(B) 102 K only
(C) 98.6 °F
(D) 1 candela

**Correct Answer: C**

*Explanation: A reading such as 102 °F is then used as evidence of fever compared with that normal value.*

**72. 490 000 000 in standard form is:**

(A) 49 × 10^7
(B) 4.9 × 10^-8
(C) 0.49 × 10^9
(D) 4.9 × 10^8

**Correct Answer: D**

*Explanation: The decimal moves eight places left to leave 4.9, so the exponent is positive 8.*

**73. 0.000000097 in standard form is:**

(A) 9.7 × 10^-8
(B) 9.7 × 10^8
(C) 97 × 10^-7
(D) 0.97 × 10^-7

**Correct Answer: A**

*Explanation: The decimal moves eight places right to leave 9.7, so the exponent is negative 8.*

**74. In binary molecular names, the prefix tetra- means:**

(A) 1 atom
(B) 4 atoms
(C) 5 atoms
(D) 10 atoms

**Correct Answer: B**

*Explanation: Greek prefixes show atom counts, so tetra- indicates four atoms of that element.*

**75. CO is named:**

(A) carbon dioxide
(B) dicarbon monoxide
(C) carbon monoxide

(D) carbon tetrachloride

**Correct Answer: C**

*Explanation: CO is named carbon monoxide.*

**76. CO□ is named:**

(A) carbon monoxide
(B) dicarbon oxide
(C) carbon tetrachloride
(D) carbon dioxide

**Correct Answer: D**

*Explanation: CO□ is named carbon dioxide.*

**77. CCl□ is named:**

(A) carbon tetrachloride
(B) carbon monoxide
(C) carbon dioxide
(D) phosphorus pentachloride

**Correct Answer: A**

*Explanation: CCl□ is named carbon tetrachloride.*

**78. A sample of mass 0.003 kg is equal to how many milligrams?**

(A) 3 mg
(B) 3000 mg
(C) 0.3 mg
(D) 30 mg

**Correct Answer: B**

*Explanation: 0.003 kg is 3 g, and 3 g is 3000 mg because each gram contains one thousand milligrams.*

**79. A beam balance is useful because it can measure mass:**

(A) only if electricity is available
(B) only as a volume
(C) without requiring electricity
(D) only as a flame colour

**Correct Answer: C**

*Explanation: A beam balance is useful because it can measure mass without requiring electricity.*

**80. An electronic balance is especially useful because it:**

(A) cannot show digits
(B) measures only time
(C) measures only temperature
(D) gives a digital mass reading

**Correct Answer: D**

*Explanation: An electronic balance is especially useful because it gives a digital mass reading.*

## B. Less Important / Secondary Topics

**81. Experimental methods can give researchers a high level of:**

(A) control over conditions
(B) uncontrolled guessing only
(C) freedom from all error
(D) freedom from units

**Correct Answer: A**

*Explanation: Carefully designed experiments let chemists vary conditions and test ideas with evidence.*

**82. A listed disadvantage of experimental methods is that they can:**

(A) never produce results

(B) take a lot of time and money and be affected by errors
(C) remove the need for apparatus
(D) ban all collaboration

**Correct Answer: B**

*Explanation: Experiments are valuable, but cost, time, safety, and error can limit what is feasible.*

**83. Scientists linked with empirical chemical work in this chapter include Boyle, Lavoisier, Curie, Rutherford, and:**

(A) only poets
(B) only athletes
(C) Pauling
(D) only painters

**Correct Answer: C**

*Explanation: Measured evidence underpins key chemical ideas associated with those experimental scientists.*

**84. SO□ is named:**

(A) sulfur monoxide
(B) disulfur oxide
(C) carbon monoxide
(D) sulfur dioxide

**Correct Answer: D**

*Explanation: Two oxygen atoms take the prefix di-, so SO□ is sulfur dioxide.*

**85. NO is named:**

(A) nitrogen monoxide
(B) nitrogen dioxide
(C) dinitrogen monoxide
(D) nitrogen tetrachloride

**Correct Answer: A**

*Explanation: NO is named nitrogen monoxide.*

**86. N□O is named:**

(A) nitrogen monoxide
(B) dinitrogen monoxide
(C) nitrogen dioxide
(D) carbon dioxide

**Correct Answer: B**

*Explanation: N□O is named dinitrogen monoxide.*

**87. PCl□ is named:**

(A) phosphorus trichloride
(B) carbon pentachloride
(C) phosphorus pentachloride
(D) disulfur dichloride

**Correct Answer: C**

*Explanation: PCl□ is named phosphorus pentachloride.*

**88. S□Cl□ is named:**

(A) sulfur dichloride only
(B) sulfur monoxide
(C) carbon tetrachloride
(D) disulfur dichloride

**Correct Answer: D**

*Explanation: S□Cl□ is named disulfur dichloride.*

**89. The prefix penta- means:**

(A) 5 atoms
(B) 3 atoms
(C) 8 atoms
(D) 9 atoms

**Correct Answer: A**

*Explanation: Penta- is the Greek prefix for five, as in phosphorus pentachloride.*

**90. 60 seconds equal:**

(A) 1 hour
(B) 1 minute
(C) 1 day
(D) 1 week

**Correct Answer: B**

*Explanation: 60 seconds equal 1 minute.*

**91. 24 hours equal:**

(A) 1 minute
(B) 1 week
(C) 1 day
(D) 1 year

**Correct Answer: C**

*Explanation: 24 hours equal 1 day.*

**92. 1000 grams equal:**

(A) 1 milligram
(B) 1 centimetre
(C) 1 second
(D) 1 kilogram

**Correct Answer: D**

*Explanation: 1000 grams equal 1 kilogram.*

**93. A length of 1.7 m written as 1.7 × 10^0 m shows that:**

(A) a coefficient already between 1 and 10 can use a zero exponent
(B) the number is not allowed in scientific notation
(C) the length must be in kilometres
(D) the exponent must be negative

**Correct Answer: A**

*Explanation: When the ordinary number already has one non-zero digit before the decimal, the power of ten can be zero.*

**94. A mosquito length of 0.01 m in standard form is:**

(A) 1 × 10^2 m
(B) 1 × 10^-2 m
(C) 0.01 × 10^-2 m
(D) 1 × 10^0 m

**Correct Answer: B**

*Explanation: Moving the decimal two places right gives 1, so the exponent is −2.*

**95. A red-blood-cell length of 0.0000075 m in standard form is:**

(A) 7.5 × 10^-4 m
(B) 7.5 × 10^6 m
(C) 7.5 × 10^-6 m
(D) 0.75 × 10^-5 m

**Correct Answer: C**

*Explanation: The decimal moves six places right to leave 7.5, so the exponent is −6.*

**96. The Great Wall length 6 400 000 m in standard form is:**

(A) 6.4 × 10^5 m
(B) 64 × 10^6 m
(C) 6.4 × 10^-6 m
(D) 6.4 × 10^6 m

**Correct Answer: D**

*Explanation: Moving the decimal six places left leaves 6.4 with a positive exponent of 6.*

**97. A volumetric pipette is emptied under gravity and actually holds:**

(A) a slightly greater volume than it delivers, because some liquid remains in the tip
(B) exactly less liquid than it delivers
(C) no liquid at all
(D) only solids

**Correct Answer: A**

*Explanation: A small film remains in the tip, so the pipette is calibrated to deliver its marked volume, not to empty completely dry.*

**98. A burette is designed to deliver any volume up to about:**

(A) 50 km
(B) 50 cm³
(C) 50 kg
(D) 50 hours

**Correct Answer: B**

*Explanation: A burette is designed to deliver any volume up to about 50 cm³.*

**99. The accuracy of a gas syringe is described as similar to that of a:**

(A) analytical balance
(B) platinum wire
(C) measuring cylinder
(D) stopwatch

**Correct Answer: C**

*Explanation: Gas syringes collect gas volume with roughly cylinder-like accuracy, not pipette-level accuracy.*

**100. Laboratory thermometers are used for temperatures other than human body temperature, such as:**

(A) only luminous intensity
(B) only electric current
(C) only mass of powders
(D) boiling points and freezing points of substances

**Correct Answer: D**

*Explanation: A school thermometer is a tool for experimental temperatures, not a clinical body thermometer.*

**101. A stopwatch measures a time interval, meaning the elapsed time:**

(A) between two events
(B) of a kelvin scale only
(C) of a chemical formula
(D) of a prefix only

**Correct Answer: A**

*Explanation: Start and stop marks define the interval displayed, often to 0.01 s.*

**102. One listed advantage of experimental methods is that they can be used:**

(A) in only one field forever
(B) in different fields
(C) without any tools
(D) only in dreams

**Correct Answer: B**

*Explanation: One listed advantage of experimental methods is that they can be used in different fields.*

**103. Creating an artificial laboratory situation is listed as a possible:**

(A) advantage of SI prefixes
(B) SI base unit
(C) disadvantage of experimental methods
(D) binary molecular prefix

**Correct Answer: C**

*Explanation: High control can also make a setup unlike the real world, which limits how far results can be generalised.*

**104. Chemists use cm³ rather than litres in many school experiments because:**

(A) litres cannot exist
(B) cm³ is the SI base unit of mass
(C) volume cannot be measured
(D) laboratory samples are small, so cm³ matches the scale of the glassware

**Correct Answer: D**

*Explanation: Small volumes are easier to measure and report in cubic centimetres than in full litres.*

**105. Grams are preferred over kilograms for many laboratory masses because:**

(A) small sample masses are reported more conveniently and precisely in grams
(B) the kilogram is not an SI unit
(C) grams measure time
(D) grams measure temperature

**Correct Answer: A**

*Explanation: Typical reagent portions are far below a kilogram, so the gram matches laboratory practice.*

**106. Seconds are preferred for many reaction timings because:**

(A) hours cannot be converted
(B) short time-sensitive changes need a small time unit
(C) seconds measure mass
(D) seconds measure volume

**Correct Answer: B**

*Explanation: Reaction rates and short events are recorded more usefully in seconds than in hours.*

**107. The coefficient in scientific notation may be:**

(A) only the integer 14
(B) always greater than 10
(C) positive or negative, including decimals, provided its magnitude is at least 1 and less than 10
(D) always a chemical symbol

**Correct Answer: C**

*Explanation: The coefficient in scientific notation may be positive or negative, including decimals, provided its magnitude is at least 1 and less than 10.*

**108. The base in scientific notation should always be:**

(A) 2
(B) 12
(C) 60
(D) 10

**Correct Answer: D**

*Explanation: Standard form uses powers of ten so place-value shifts match the decimal system.*