Unit 1-3 Chemistry Workbook Grade 9

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Unit 1: Chemistry and Its Importance Workbook

Multiple Choice Questions

1. Which of the following best describes the study of chemistry?

   (A) The study of living organisms.

   (B) The study of matter, its properties, composition, structure, and transformations.

   (C) The study of the Earth's physical structure.

   (D) The study of the universe.

   Answer: (B)

2. Which of the following is NOT part of the scope of chemistry?

   (A) Properties of substances.

   (B) Composition of substances.

   (C) Transformations of substances.

   (D) Political systems of countries.

   Answer: (D)

3. A material that has a uniform set of properties throughout is called a:

   (A) Element

   (B) Compound

   (C) Mixture

   (D) Substance

   Answer: (D)

4. The term that refers to the nature of a substance's ingredients is:

   (A) Property

   (B) Structure

   (C) Composition

   (D) Transformation

   Answer: (C)

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5. The term that refers to the attribute, quality, or characteristic of a substance is:

   (A) Property
   (B) Structure
   (C) Composition
   (D) Transformation

   Answer: (A)

6. The arrangement and relationships between parts of something complex is known as:

   (A) Property
   (B) Structure
   (C) Composition
   (D) Transformation

   Answer: (B)

7. A transformation of a substance is a:

   (A) Change in property.
   (B) Change in the constituent elements
   (C) Marked change in form.
   (D) Change in composition.

   Answer: (C)

8. Which field of chemistry focuses on the study of carbon-containing substances?

   (A) Physical chemistry
   (B) Inorganic chemistry
   (C) Organic chemistry
   (D) Biochemistry

   Answer: (C)

9. Which field of chemistry focuses on the study of the chemical processes that occur in living organisms?

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(A) Physical chemistry

(B) Inorganic chemistry

(C) Organic chemistry

(D) Biochemistry

Answer: (D)

10. The study of macroscopic properties, atomic properties, and phenomena in chemical systems is called:

(A) Organic chemistry

(B) Analytical chemistry

(C) Physical chemistry

(D) Biochemistry

Answer: (C)

11. The study that focuses on separating, identifying, and quantifying chemicals in samples of matter is called:

(A) Physical chemistry

(B) Analytical chemistry

(C) Inorganic chemistry

(D) Biochemistry

Answer: (B)

12. Which type of chemistry deals with substances not primarily based on carbon?

(A) Organic chemistry

(B) Inorganic chemistry

(C) Analytical chemistry

(D) Biochemistry

Answer: (B)

13. Which branch of science is concerned with the nature and properties of matter and energy?

(A) Chemistry

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(B) Biology

(C) Physics

(D) Geology

Answer: (C)

14. The study of rocks and the earth is called:

(A) Chemistry

(B) Biology

(C) Physics

(D) Geology

Answer: (D)

15. Which of the following describes a product of the chemistry of building construction?

(A) Cement

(B) Fertilizers

(C) Plastics

(D) Medicines

Answer: (A)

16. Which of the following materials is NOT commonly used as a household chemical?

(A) Soap

(B) Bleach

(C) Cement

(D) Detergent

Answer: (C)

17. Which of the following best describes the contribution of chemistry in food production?

(A) It provides pesticides that increases productivity

(B) It enables to preserve food for longer time

(C) It helps to identify adulterants

(D) All of the above

Answer: (D)

18. Which of the following is NOT a chemical substance related to health care?

(A) Analgesics

(B) Antibiotics

(C) Fertilizers

(D) Antiseptics

Answer: (C)

19. The main source of energy used for domestic purposes in Ethiopia are:

(A) Fossil fuels

(B) Biofuels

(C) Renewable energy sources

(D) Wood fuels

Answer: (D)

20. The most important ingredient in the manufacture of hand sanitizers is:

(A) Potash

(B) Alcohol

(C) Chlorine

(D) Mercury

Answer: (B)

21. A chemical produced by the leather industries is:

(A) Sulfuric acid

(B) Sodium hydroxide

(C) Toluene

(D) Fat from hides

Answer: (D)



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Unit 2: Measurements and Scientific Methods Workbook

Multiple Choice Questions

22. Which of the following best describes a measurement in science?

    (A) A qualitative assessment of a quantity.
    (B) A comparison of a physical quantity with a standard unit.
    (C) An approximation of a quantity.
    (D) A guess about a quantity

    Answer: (B)

23. The international system of units (SI) is based on:

    (A) The English system of measurement
    (B) Decimal system
    (C) Traditional units of measurement
    (D) Arbitrary standards

    Answer: (B)

24. Which of the following is NOT a base SI unit?

    (A) Meter
    (B) Kilogram
    (C) Liter
    (D) Second

    Answer: (C)

25. Which of the following is the base SI unit for temperature?

    (A) Degree Celsius
    (B) Degree Fahrenheit
    (C) Kelvin
    (D) Joule

    Answer: (C)

26. Which of the following is the base SI unit for luminous intensity?

    (A) Candela
    (B) Ampere
    (C) Mole
    (D) Kelvin

    Answer: (A)

27. The prefix that corresponds to a factor of 10^{-3} is:

    (A) Kilo
    (B) Milli
    (C) Centi
    (D) Micro

    Answer: (B)

28. Which prefix multiplies a unit by one million?

    (A) Giga
    (B) Tera
    (C) Mega
    (D) Kilo

    Answer: (C)

29. Which prefix corresponds to one tenth of a unit?

    (A) Deci
    (B) Centi
    (C) Milli
    (D) Micro

    Answer: (A)

30. Which is the correct formula for temperature conversion from degree celsius to degree kelvin?

    (A) °C = K - 273.15
    (B) K = °C + 273.15

(C) K = 1.8°F+32

(D) °F = (1.8 °C) + 32

Answer:(B)

31. The SI unit of area is:

(A) m

(B) m3

(C) m/s

(D) m^2

Answer:(D)

32. The SI unit of speed is:

(A) m

(B) m^2

(C) m/s

(D) kg/m^3

Answer: (C)

33. The SI unit of density is:

(A) g/ml

(B) kg/m^3

(C) kg/L

(D) g/cm^3

Answer:(B)

34. The SI unit of force is:

(A) Joule

(B) Pascal

(C) Newton

(D) Ampere

Answer:(C)

35. The SI unit of energy is:

    (A) Pascal
    (B) Joule
    (C) Newton
    (D) Ampere

    Answer: (B)

36. A measured quantity should always consist of:

    (A) A number only
    (B) A unit only
    (C) A number and a unit
    (D) A name only

    Answer: (C)

37. Which of the following is NOT a type of uncertainty in measurement?

    (A) Systematic uncertainty
    (B) Random uncertainty
    (C) Instrumental uncertainty
    (D) Absolute uncertainty

    Answer:(D)

38. Which type of uncertainty is caused by a miscalibrated instrument?

    (A) Random uncertainty
    (B) Human error
    (C) Systematic uncertainty
    (D) Estimated part of measurement

    Answer:(C)

39. Which type of uncertainty varies without a predictable pattern?

    (A) Systematic uncertainty
    (B) Random uncertainty

(C) Instrumental uncertainty

(D) Absolute uncertainty

Answer:(B)

40. What is the term for the closeness of a single measurement to its true value?

(A) Precision

(B) Accuracy

(C) Uncertainty

(D) Error

Answer: (B)

41. What does the term precision refer to in measurement?

(A) The degree to which measurements deviate from a true value.

(B) The number of decimal places in a measurement.

(C) The range of values obtained in repeated measurements.

(D) The closeness of a set of measurements.

Answer: (D)

42. Which of the following measurements has the most number of significant figures?

(A) 200m

(B) 2.0m

(C) 200.0m

(D) 0.02 m

Answer: (C)

43. How many significant figures are in the number 0.003050?

(A) 3

(B) 4

(C) 5

(D) 7

Answer: (C)

44. How many significant figures are in 2.70 x 10^5?

    (A) 2

    (B) 3

    (C) 4

    (D) 5

    Answer: (B)

45. When adding or subtracting measured quantities, what determines the number of decimal places in the result?

    (A) The number with the most decimal places.

    (B) The number with the fewest decimal places.

    (C) The number with the most significant figures.

    (D) The number with the fewest significant figures.

    Answer: (B)

46. When multiplying or dividing measured quantities, what determines the number of significant figures in the result?

    (A) The number with the most decimal places.

    (B) The number with the fewest decimal places.

    (C) The number with the most significant figures.

    (D) The number with the fewest significant figures.

    Answer: (D)

47. In a result which is expressed using a scientific notation, the significant figures are from:

    (A) power of ten

    (B) the decimal places

    (C) The number before the ten power

    (D) the number before the decimal places

    Answer: (C)

48. Which of the following is NOT a step in the scientific method?

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(A) Making observations
(B) Formulating hypothesis
(C) Formulating scientific laws
(D) Analyzing results

Answer:(C)

49. Which of the following does not require a direct measurement of mass?

(A) Using a balance
(B) Using a burette
(C) Using a graduated cylinder
(D) Using a pipette

Answer: (B)

50. Which of the following is a suitable tool to use to measure a specific volume?

(A) Beaker
(B) Pipette
(C) Graduated cylinder
(D) All of the above

Answer: (B)

51. Which of the following is used to measure the area of irregular shapes?

(A) Ruler
(B) Plaimeter
(C) Divider
(D) Caliper

Answer: (B)



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Unit 3: Structure of the Atom Workbook

Multiple Choice Questions

52. The concept of atom originated from the:

    (A) British

    (B) Greek

    (C) Roman

    (D) Egyptian

    Answer: (B)

53. Which of the following scientists first used the term 'atom' to describe indivisible particles?

    (A) Dalton

    (B) Leucippus

    (C) Aristotle

    (D) Empedocles

    Answer: (B)

54. Who proposed that matter is composed of earth, air, fire and water?

    (A) Democritus

    (B) Leucippus

    (C) Aristotle

    (D) Empedocles

    Answer: (D)

55. Which statement best describes the early Greek concept of the atom?

    (A) Atoms were composed of smaller particles.

    (B) Atoms were the fundamental units of life.

    (C) Atoms were the basic building blocks of matter.

    (D) Atoms are divisible and destructible.

    Answer: (C)

56. Which of the following laws was NOT a basis for Dalton's atomic theory?

    (A) Law of Conservation of Mass
    (B) Law of Definite Proportions
    (C) Law of Multiple Proportions
    (D) Law of Thermodynamics

    Answer: (D)

57. Which of the following is NOT a postulate of Dalton's atomic theory?

    (A) All matter is composed of atoms.
    (B) Atoms can be created or destroyed.
    (C) Atoms of the same element are identical.
    (D) Atoms combine in whole number ratios.

    Answer: (B)

58. The scientist who discovered the first subatomic particle (electron) was:

    (A) James Chadwick
    (B) Eugene Goldstein
    (C) Ernest Rutherford
    (D) J.J. Thomson

    Answer:(D)

59. What experiment was Thomson famous for?

    (A) Gold foil experiment
    (B) Oil drop experiment
    (C) Cathode ray experiment
    (D) Anode ray experiment

    Answer:(C)

60. Which model of the atom shows electrons embedded in a uniform sphere of positive charge?

    (A) Rutherford's model
    (B) Bohr's model

(C) Dalton's model

(D) Thomson's model

Answer:(D)

61. Which scientist discovered the presence of protons by using a discharge tube with a perforated cathode?

(A) J.J. Thomson

(B) Robert Millikan

(C) Eugene Goldstein

(D) James Chadwick

Answer: (C)

62. What did Rutherford's gold foil experiment conclude?

(A) Electrons exist in fixed energy levels

(B) Most of the mass and positive charge are concentrated in the nucleus

(C) Electrons are embedded in a positive charge.

(D) Electrons are neutral particles.

Answer:(B)

63. Who proposed that electrons are arranged in concentric circular orbits around the nucleus?

(A) Ernest Rutherford

(B) J.J. Thomson

(C) Niels Bohr

(D) Robert Millikan

Answer: (C)

64. The subatomic particle that is electrically neutral is the:

(A) Proton

(B) Neutron

(C) Electron

(D) Nucleus

Answer: (B)

65. Which subatomic particle is located outside the nucleus?

    (A) Proton
    (B) Neutron
    (C) Electron
    (D) Nucleon

    Answer: (C)

66. Which subatomic particle has the same mass as a proton?

    (A) Electron
    (B) Neutron
    (C) Nucleus
    (D) Meson

    Answer: (B)

67. Which subatomic particle has a positive charge of one (+1) and a mass of 1.0073 amu?

    (A) Electron
    (B) Proton
    (C) Neutron
    (D) Meson

    Answer: (B)

68. What subatomic particle contributes very little to the mass of an atom?

    (A) Electron
    (B) Proton
    (C) Neutron
    (D) Nucleus

    Answer:(A)

69. Which of the following are equal in an electrically neutral atom?

(A) Number of protons and neutrons

(B) Number of protons and electrons

(C) Number of electrons and neutrons

(D) Number of nucleons and electrons

Answer:(B)

70. Which particle is located in the nucleus and has no charge?

(A) Proton

(B) Electron

(C) Neutron

(D) Nucleus

Answer: (C)

71. What is the term for the total number of protons and neutrons in an atom?

(A) Atomic number

(B) Mass number

(C) Atomic mass

(D) Isotope

Answer: (B)

72. What is atomic number?

(A) Total number of protons and neutrons

(B) The number of protons in nucleus

(C) Number of electrons in outer shell

(D) Number of sub-atomic particle

Answer: (B)

73. What is the term for atoms of the same element that have different numbers of neutrons?

(A) lons

(B) Isotopes

(C) Nucleons

(D) Protons

Answer: (B)

74. Which of the following refers to the weighted average mass of all isotopes of an element?

(A) Mass number

(B) Atomic number

(C) Atomic mass

(D) Mass number

Answer: (C)

75. A neutral atom has an atomic number of 20 and a mass number of 40. How many neutrons does it have?

(A) 10

(B) 20

(C) 30

(D) 60

Answer: (B)

76. How many electrons does the following species have, $^{23}Na^{+}$?

(A) 10

(B) 11

(C) 12

(D) 23

Answer: (A)

77. What does the notation 1s22s22p6 represent?

(A) The number of neutrons in an atom

(B) The position of an element in the periodic table

(C) The number of electrons in a nucleus

(D) The electron configuration of an atom

Answer:(D)

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78. Which term describes the outermost shell in which the electrons revolve?

    (A) Inner shell
    (B) Penultimate shell
    (C) Antipenultimate shell
    (D) Valence shell

    Answer: (D)

79. What are the electrons in the outermost shell called?

    (A) Core electrons
    (B) Valence electrons
    (C) Orbitals
    (D) Subshells

    Answer:(B)

80. What does the term "amu" stand for?

    (A) Actual mass unit
    (B) Atomic metal unit
    (C) Atomic mass unit
    (D) Absolute mass unit

    Answer: (C)

81. The force that keeps electrons from spiraling into the nucleus was explained in the model of:

    (A) Thomson
    (B) Rutherford
    (C) Bohr
    (D) Dalton

    Answer: (C)