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Chemistry, 2012 EC, Grade 8 model exam

Grade 8 · Chemistry · 2012 E.C.

MARKING KEY: CONFIDENTIAL

Time allowed: 120 minutes | **Questions:** 58 | **Total marks:** 58

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1. The essence of chemistry concerned mainly with (1)

A. Searching for solution to problem making
B. Relying only an experimental proved facts
C. Production of new materials of desirable properties
D. ✓ **All**

Answer: D

2. In Ethiopia caustic soda is manufactured in (1)

A. Addis Ababa
B. ✓ **Zeway**
C. Wenji
D. Awash Melkasa

Answer: B
In Ethiopia, caustic soda (sodium hydroxide) is produced industrially by the Caustic Soda Share Company located in Zeway (Ziway).

3. Which properties of substance is measurable? (1)

A. color
B. odor
C. taste
D. ✓ **density**

Answer: D
Density is a quantitative (measurable) physical property, whereas color, odor, and taste are qualitative properties.

4. A chemical change is characterized by:- (1)

A. ✓ **energy change is involved**
B. no change in composition
C. no change in the mass of the substance is involved
D. the change is easy to reverse

Answer: A
A chemical change always involves an exchange of energy (either absorbed or released) and produces new substances with a change in composition.

5. What is the formula name of CU_2O? (1)

A. Copper (II) oxide
B. copper peroxide
C. ✓ **Copper (I) oxide**
D. copper (III) oxide

Answer: C
In Cu_2O, oxygen has an oxidation state of -2, meaning each copper atom has an oxidation state of +1, which is named Copper (I) oxide.

6. What does “X” represent in the following reaction? $Al_2O_3 + 2NaOH \rightarrow X + H_2O$ (1)

A. $Al(OH)_3$
B. AlH_3
C. $Al_2O_3 \cdot H_2O$
D. ✓ $NaAlO_2$

> **Answer:** D
> When amphoteric aluminum oxide reacts with sodium hydroxide, it forms sodium aluminate and water: $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$.

7. Substances that take part in a chemical reaction is called? (1)

A. subscript
B. products
C. ✓ **reactants**
D. None of the above

> **Answer:** C
> Reactants are the starting substances that enter into and take part in a chemical reaction to form products.

8. What is the chemical formula of Barium phosphate? (1)

A. $Ba\,(PO_4)_2$
B. $BaPO_4$
C. ✓ $Ba_3\,(PO_4)_2$
D. Ba_2PO_4

> **Answer:** C
> Barium forms a Ba^{2+} cation and phosphate is the PO_4^{3-} polyatomic anion; balancing charges gives $Ba_3(PO_4)_2$.

9. The liquid which passes through the filter paper is? (1)

A. Filter paper
B. funnel
C. residue
D. ✓ **filtrate**

> **Answer:** D
> In filtration, the liquid that passes through the filter medium is called the filtrate, while the trapped solid is called the residue.

10. Which one of the following technique is used to get a cup of clear coffee as it is poured from coffee Pot (jebena)? (1)

A. Filtration
B. ✓ **decantation**
C. distillation
D. evaporation

> **Answer:** B
> Pouring coffee from a jebena relies on decantation, where the liquid is gently poured off after the dense coffee grounds have settled to the bottom.

11. A block of ion metal occupies a volume of $20\,cm^3$ and has a density of $7.86\,g/cm^3$. What is the mass Of iron? (1)

A. 1572g
B. ✓ **157.2g**
C. 15.72g
D. 1.752g

> **Answer:** B
> Mass is calculated by multiplying density by volume: $\text{Mass} = 7.86\,g/cm^3 \times 20\,cm^3 = 157.2\,g$.

12. The coefficient “3” in the formula $3P_4$ represents:- (1)

A. 3 atoms phosphorous
B. 4 molecules of phosphorous
C. ✓ **3 molecules of phosphorous**
D. 12 molecules of phosphorous

> **Answer:** C
> In a chemical formula, the coefficient in front of the molecular formula denotes the number of discrete molecules, meaning $3P_4$ represents 3 molecules of tetratomic phosphorus.

13. Which of the following is the only liquid metallic element? (1)

A. Bromine
B. chlorine
C. ✓ **mercury**
D. hydrogen

> **Answer:** C
> Mercury (Hg) is the only metallic element that exists as a liquid at standard room temperature and pressure; bromine is also a liquid at room temperature, but it is a non-metal.

14. Which one of the following is TRUE about properties of acid? (1)

A. acids have bitter taste
B. ✓ **acids change the color of phenaophitaline into colorless**
C. acids has a PH value greater than seven(7)
D. acids changes red litmus in to blue

> **Answer:** B
> Phenolphthalein is colorless in acidic and neutral solutions (and turns pink in basic solutions), whereas acids have a sour taste, a pH less than 7, and turn blue litmus red.

15. Which one of the following is not a metalloid? (1)

A. silicon
B. arsenic
C. ✓ **bromine**
D. boron

> **Answer:** C
> Bromine is a non-metal in the halogen group, while silicon, arsenic, and boron are well-known metalloids.

16. Magnesium has a valence number of “2” and nitrogen has a valence number of “3” what is the Chemical formula for Magnesium nitride? (1)

A. Mg_2N_3
B. Mg_3N
C. ✓ Mg_3N_2
D. MgN

> **Answer:** C
> Using the criss-cross rule of valencies, magnesium (valency 2) and nitrogen (valency 3) combine in a 3:2 ratio to form magnesium nitride, Mg_3N_2.

17. Which one of the following is not homogeneous mixture? (1)

A. sea water
B. soft drink
C. brass
D. ✓ **dusty air**

> **Answer:** D
> Dusty air is a heterogeneous mixture (a suspension of solid dust particles in gas), whereas sea water, filtered soft drinks, and brass are homogeneous mixtures.

18. Which pair of liquids are immiscible liquid ? (1)

A. vinegar and water
B. ✓ **oil and water**
C. water and alcohol
D. none of the above

> **Answer:** B
> Oil is nonpolar and water is polar, so they do not mix and instead form two distinct immiscible layers.

19. A pure substance composed of two or more elements that are combined chemically in a definite Proportion by mass is called ..... (1)

A. element
B. mixture
C. ✓ **compound**
D. none

> **Answer:** C
> A compound is defined as a pure chemical substance composed of two or more different elements chemically bonded together in a fixed, definite proportion by mass.

20. The temperature at which gas (vapor) directly change into solid is called? (1)

A. sublimation
B. evaporation
C. ✓ **deposition**
D. condensation

> **Answer:** C
> Deposition is the phase transition in which a gas transforms directly into a solid without passing through the liquid phase (the reverse of sublimation).

21. Which of the following apparatus is used for the separation of salt from salt solution? (1)

A. ✓ **evaporating dish**
B. filter paper
C. condenser
D. thermometer

> **Answer:** A
> An evaporating dish is used to heat and evaporate the liquid solvent from a salt solution, leaving the solid salt behind.

22. What is the name of an element having the chemical symbol “Sn”? (1)

A. ✓ **tin**
B. sulphur
C. sodium
D. silver

> **Answer:** A
> The symbol 'Sn' comes from the Latin name 'stannum', which represents tin.

23. The combining power of an element is called? (1)

A. Valence electron
B. ✓ **valence number**
C. valence shell
D. coefficient

> **Answer:** B
> The combining capacity or combining power of an atom of an element is defined as its valency or valence number.

24. Which of the following is not poly atomic molecule? (1)

A. ✓ **chlorine**
B. ozone
C. phosphorous
D. sulphur

> **Answer:** A
> Chlorine exists as a diatomic molecule (Cl_2), whereas ozone (O_3), phosphorus (P_4), and sulfur (S_8) are polyatomic molecules composed of three or more atoms.

25. In balancing a chemical equation using the least common multiple (LCM) method the following steps Are followed. I. Find the LCM of the total valence number and write it on the arrow. II. Write the word equation. III. Write the total valence number of each of the elements above their symbol. Iv. Change the word equation to formula equation. v. divide the LCM by each total valence number and use dividend as the coefficient for each species in the equation. Which of the following is the correct step for balancing a chemical equation using the LCM methods? (1)

A. I, III, II, IV, V
B. II,I,III,IV,V
C. ✓ **II,IV,III,I,V**
D. III,II,IV,I,V

> **Answer:** C
> The LCM method begins with writing the word equation (II), converting it to a skeleton formula equation (IV), determining total valences (III), finding the LCM (I), and dividing by total valences to find the coefficients (V).

26. The atomic masses of the two stable isotopes ofboron, ^{10}B(20%) and ^{11}B(80%) are 10 and 11 Respectively. What is the average atomic mass of boron? (1)

A. 108 amu
B. 1.08amu
C. ✓ **10.8amu**
D. 0.108amu

> **Answer:** C
> The average atomic mass is calculated as (10 amu × 0.20) + (11 amu × 0.80) = 2.0 amu + 8.8 amu = 10.8 amu.

27. The correct balanced chemical equation for the reaction between lead and oxygen to form lead(II)oxide is (1)

A. $Pb + O_2 \rightarrow PbO$
B. ✓ $2Pb + O_2 \rightarrow 2PbO$
C. $4Pb + O_2 \rightarrow 2Pb_2O$
D. $Pb + O_2 \rightarrow PbO_2$

> **Answer:** B
> Lead(II) oxide has the chemical formula PbO; balancing the reaction with diatomic oxygen gives 2Pb + O_2 → 2PbO.

28. Which of the following atomic energy level is nearest to the nucleus of an atom? (1)

A. L-shell
B. ✓ **K-Shell**
C. M-shell
D. N-shell

> **Answer:** B
> The K-shell corresponds to the principal quantum number n = 1, which is the innermost shell closest to the nucleus.

29. Which of the following is not molecules of compound? (1)

A. O_3
B. H_2O
C. P_4
D. ✓ **except “B”**

> **Answer:** D
> A molecule of a compound must contain atoms of different elements (like H_2O), whereas O_3 and P_4 are molecules of elements; thus, all options except 'B' are not molecules of a compound.

30. Which of the following statements describes the shortcoming of Dalton atomic theories? (1)

A. Atoms combine in a fixed small whole number ratio to form compounds.
B. Atoms of different elements are different
C. ✓ **Atoms of the elements have the mass**
D. Matter consists of very small particles called atoms.

> **Answer:** C
> A major shortcoming of Dalton's atomic theory was the claim that all atoms of a given element have identical mass; this was disproved by the discovery of isotopes.

31. The horizontal rows of elements in the periodic table are called:- (1)

A. Group
B. Coefficient
C. ✓ **period**
D. Subscript

> **Answer:** C
> The horizontal rows of elements in the periodic table are called periods, while the vertical columns are called groups or families.

32. Which one of the following subatomic particles has the smallest mass? (1)

A. Proton
B. Neutron
C. ✓ **Electron**
D. Nucleus

> **Answer:** C
> An electron has a rest mass of approximately 9.11×10^{-31} kg (about 1/1836 of an atomic mass unit), which is far smaller than that of a proton, neutron, or nucleus.

33. How many electrons does O^{-2} have? (1)

A. ✓ **10**
B. 8
C. 6
D. 2

> **Answer:** A
> A neutral oxygen atom has an atomic number of 8 (8 electrons); the oxide ion (O^{2-}) has gained 2 additional electrons, giving a total of 10 electrons.

34. What are the number of proton, electron and neutron in $^{24}_{12}Mg^{+2}$ respectively? (1)

A. ✓ **12.10,12**
B. 12, 14, 12
C. 12,12,12
D. 14,12,12

> **Answer:** A
> For $^{24}_{12}Mg^{2+}$, the atomic number gives 12 protons, the +2 charge means 12 - 2 = 10 electrons, and the mass number minus atomic number gives 24 - 12 = 12 neutrons.

35. An element with atomic number 23 is found in ..... (1)

A. group IIIA and period 4
B. ✓ **group VA and period 4**
C. group IVA and period 4.
D. group 4 and period V

> **Answer:** B
> Vanadium (Z = 23) has the electron configuration [Ar] $4s^2$ $3d^3$ and lies in Period 4. In the traditional periodic table group notation (and the European convention where d-block elements were designated 'A'), it belongs to Group 5 (VA/VB).

36. The atomic number of chromium is 24.How many electrons are contained in its third energy level? (1)

A. 18
B. ✓ **8**
C. 32
D. 2

> **Answer:** B

37. The sum of protons and neutrons in an atom is called; (1)

A. Atomic number
B. ✓ **Mass number**
C. Atomic mass
D. None of the above

> **Answer:** B
> The mass number (A) of an atom is defined as the total number of protons and neutrons in its nucleus.

38. The common name of group VIIIA element is..... (1)

A. ✓ **Noble gas**
B. Chalcogen
C. Halogens
D. Alkaline earth metals

Answer: A
Group VIIIA (Group 18) elements have completely filled valence shells and are known as the noble (or inert) gases.

39. Across a period atomic size of the elements..... (1)

A. Increase
B. remains the same
C. ✓ **Decrease**
D. Increase and decrease

Answer: C
Across a period from left to right, the effective nuclear charge increases while the number of energy levels remains constant, causing the atomic radius (size) to decrease.

40. Which one of the following is inorganic compound? (1)

A. animal fat
B. sugar
C. vinegar
D. ✓ **carbon dioxide**

Answer: D
Carbon dioxide (CO2), along with carbonates and cyanides, is traditionally classified as an inorganic compound despite containing carbon, whereas fats, sugars, and vinegar (acetic acid) are organic.

41. Which of the following hydrocarbon used to produce oxyacetylene flam? (1)

A. Octane
B. Decane
C. Ethene
D. ✓ **Ethyne**

Answer: D
Ethyne (commonly known as acetylene) burns in pure oxygen to produce an oxyacetylene flame, which reaches temperatures high enough for cutting and welding metals.

42. The mixture of carbon monoxide and hydrogen gas is produce ..... (1)

A. ✓ **water gas**
B. producer gas
C. biogas
D. methane

Answer: A
A gaseous mixture consisting primarily of carbon monoxide (CO) and hydrogen (H2) is called water gas (or synthesis gas), whereas producer gas is a mixture of CO and N2.

43. Which one is the correct general formula for Alkyne? (1)

A. C_nH_{2n}
B. ✓ C_nH_{2n-2}
C. C_nH_{2n+2}
D. C_nH_{2n-1}

Answer: B
Alkynes are acyclic hydrocarbons containing at least one carbon-carbon triple bond and have the general molecular formula CnH2n-2.

44. Which of the following oxide is binary compound? (1)

A. CO_2
B. MgO
C. CrO_3
D. ✓ **All of them**

Answer: D
A binary compound is composed of exactly two different elements; CO2, MgO, and CrO3 each consist of only two elements (one element plus oxygen), making all of them binary oxides.

45. The characteristics property of base is due to the presence of :- (1)

A. Hydrogen ion
B. ✓ **Hydroxide ion**
C. Oxide ion
D. Hydride ion

Answer: B
According to the Arrhenius definition, bases produce hydroxide ions (OH-) in aqueous solution, which are responsible for their characteristic properties such as bitter taste, slippery feel, and effect on indicators.

46. Which of the following salts is used as a baking powder? (1)

A. $CaCO_3$
B. ✓ $NaHCO_3$
C. $(NH_4)_2HPO_4$
D. KNO_3

Answer: B
Sodium hydrogen carbonate (NaHCO3, or sodium bicarbonate) is the active leavening agent used in baking powder, which releases CO2 gas to make dough rise.

47. Carbonates are salts of:- (1)

A. ✓ **Carbonic acid**
B. Sulphuric acid
C. Phosphoric acid
D. Hydrochloric acid

Answer: A
Carbonate salts contain the carbonate ion (CO3^2-), which is formed by the complete neutralization of carbonic acid (H2CO3).

48. Which of the following pairs of compounds produces sodium chloride? (1)

A. Sodium Oxide and water
B. Sodium oxide and sulphuric acid
C. ✓ **Sodium Hydroxide and hydrochloric acid**
D. Sodium Hydroxide and Nitric acid

Answer: C
The neutralization reaction between sodium hydroxide (a base) and hydrochloric acid yields sodium chloride (NaCl) and water.

49. What measure we talk, if you drink corrosive acid? You are advisable to drink:- (1)

A. KOH
B. $NaOH$
C. ✓ $Mg(OH)_2$
D. $Ca(OH)_2$

Answer: C
Strong bases like NaOH and KOH are caustic and cause severe chemical burns; therefore, a mild, non-toxic base such as magnesium hydroxide, $Mg(OH)_2$ (milk of magnesia), is used to neutralize ingested acid safely.

50. Which gas is given offby the reaction between acid and carbonates? (1)

A. ✓ CO_2
B. O_2
C. H_2
D. SO_2

> **Answer:** A
> The reaction between an acid and a metal carbonate produces a salt, water, and carbon dioxide gas (CO_2).

51. Which one of the following is not the properties of metal? (1)

A. Luster
B. Malleable
C. sonorous
D. ✓ **Metals have slightly less melting and boiling point**

> **Answer:** D
> Metals generally possess high melting and boiling points due to strong metallic bonding, so having low melting and boiling points is not a typical metallic property.

52. Which one is the seventh most abundant element and the fifth most abundant metal in the EarthCrust? (1)

A. ✓ **Potassium**
B. Sodium
C. Magnesium
D. Aluminum

> **Answer:** A
> In Earth's crust, the order of abundance is O, Si, Al, Fe, Ca, Na, K, and Mg, making potassium (K) the seventh most abundant element and the fifth most abundant metal.

53. Which of the following are does not contain copper? (1)

A. Malachite
B. chalcocite's
C. ✓ **Magnetite**
D. Coveline

> **Answer:** C
> Magnetite is an ore of iron with the formula Fe_3O_4, whereas malachite, chalcocite, and covellite (coveline) are all copper-containing minerals.

54. Which of the following statements does not describe gold? (1)

A. it is an excellent conductor
B. ✓ **it does not exists as free element in nature**
C. It does not react with oxygen in the presence of moist air
D. it has a yellow color

> **Answer:** B
> Gold is very unreactive and typically occurs as a free native element in nature, making the statement that it does not exist as a free element false.

55. Which of the following alloys does not contain copper? (1)

A. brass
B. bronze
C. Cupronickel
D. ✓ **steenless steel**

> **Answer:** D
> Stainless steel is primarily an alloy of iron, chromium, nickel, and carbon, containing no copper, whereas brass, bronze, and cupronickel are all copper-based alloys.

56. Which of the following elements does not have an allotropic forms? (1)

A. sulphur
B. phosphorus
C. carbon
D. ✓ **Nitrogen**

> **Answer:** D
> Nitrogen exists almost exclusively as diatomic N_2 molecules and lacks allotropes under ordinary conditions, whereas sulfur, phosphorus, and carbon have well-known allotropic forms.

57. Which one is not the important ore of Aluminum? (1)

A. corundum
B. Bauxite
C. ✓ **Sylvite**
D. Cryoline

> **Answer:** C
> Sylvite is potassium chloride (KCl), an important ore of potassium rather than aluminum.

58. Which of the following Nonmetallic element are solid at room temperature? (1)

A. Fluorine
B. Bromine
C. ✓ **Iodine**
D. Chlorine

> **Answer:** C
> Among the halogens, fluorine and chlorine are gases, bromine is a liquid, and iodine is a dark purple-black solid at room temperature.

END OF THE MARKING KEY

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