UMMUL QURA HIGH SHOOL

Arowona Bus-Stop Amuloko Akanran Road, Ibadan.

Third-Term Examination

CLASS: SSS 1 **SUBJECT**: Chemistry **DURATION**: $2\frac{1}{4}$ hours.

Instructions: Answer ***all*** questions in ***Section A*** and ***three*** in ***Section B.***

SECTION A: **OBJECTIVES**

1. A balanced equation is based on the law of
   A. chemical equilibrium
   B. conservative of mass
   C. definite proportions
   D. multiple proportions
2. An organic compound has the empirical formula CH_2. If its molar mass is 42 g/mol, what is its molecular formula? [H = 1.0, C = 12]
   A. C_2H_2
   B. C_3H_4
   C. C_3H_8
   D. C_4H_8
3. The electronic configuration of potassium is
   A. 8,8,1
   B. 2,8,8
   C. 2,8,8,1
   D. 2,8,8,2
4. When an atom of an active metal combines with an atom of an active non-metal, the bond formed is
   A. co-ordinate covalent
   B. polar covalent
   C. ionic
   D. covalent
5. Four elements P, Q, R and S have atomic numbers of 4, 10, 12 and 14 respectively. Which of these elements is a noble gas?
   A. P
   B. Q
   C. R
   D. S
6. Two elements P and Q with atomic number 11 and 8 respectively, combine chemically to form the compound P_xQ_y. The respective values of x and y are
   A. 1,1
   B. 1,2
   C. 2,1
   D. 3,1
7. Which of the following types of bonding does not involve the formation of new substances?
   A. Metallic
   B. Covalent
   C. Co-ordinate
   D. Electrovalent
8. In which of the following molecules will hydrogen bonds be strongest?
   A. H_2O
   B. H_2S
   C. HCl
   D. HF
9. How many valence electrons are contained in the element represented by P?
   A. 15
   B. 16
   C. 5
   D. 3
10. When ammonia and hydrogen ion bond together to form ammonium ion, the bond formed is called -----.
    A. ionic
    B. co-ordinate
    C. covalent
    D. hydrogen

11. Which of the following is correct?
    A. Covalent compounds would readily ionized in solutions
    B. Covalent compounds consist of
    C. ionic Compounds in solution will conduct electricity
    D. Hydrogen bonds is formed between metalsand non-metals
12. What is the percentage by mass of iron in Fe_3O_4? [O =16, Fe = 56]
    A. 28
    B. 72
    C. 24
    D. 38
13. How many valences electrons are contained in an atom of magnesium?
    A. 1
    B. 2
    C. 3
    D. 4
14. An atom that possesses an electric charge is called ------.
    A. protium
    B. charger
    C. ion
    D. iron
15. A mixture of chalk and water can be separated by
    A. filtration
    B. sublimation
    C. chromatography
    D. precipitation
16. Rare gases are stable because they
    A. are chemically active
    B. contain equal number of protons and neutrons
    C. contain more electrons than protons
    D. have octet structures
17. In any chemical reaction, the total mass of the products is always equal to that of reactants. This is a statement of the law of
    A. reciprocal proportions
    B. multiple proportions
    C. constant composition
    D. conservation of mass
18. In the reaction $2C_2H_6 + yO_2 \rightarrow 4CO_2 + 6H_2O$. The value of y is
    A. 4
    B. 7
    C. 6
    D. 14
19. A metal M forms two types of Chlorides – MCl_2 and MCl_3. Which of the following laws best explains the relationship between the chlorides?
    A. Reciprocal proportions
    B. Multiple proportions
    C. Constant composition
    D. Conservation of mass
20. The major reason why chemical reaction occurs among elements is that they have the tendency to
    A. attain the nearest noble gas structure
    B. become a metal
    C. become a non-metal
    D. become any noble element
21. What is the percentage by mass of water in sodium trixocarbonate (IV) decahydrate ($Na_2CO_3.\ 10H_2O$)? [Na = 23, C = 12, O = 16, H = 1]
    A. 82.48%
    B. 62.94%
    C. 48.82%
    D. 56.74%
22. The valency of oxygen in sodium oxide is 2, therefore the formula for sodium oxide is
    A. NaO_3
    B. NaO_2
    C. NaO
    D. Na_2O

23. The equation for the decomposition of $KClO_3$ on heating is:
    A. $KClO_3 \rightarrow KCl + O_2$
    B. $2KClO_3 \rightarrow KCl + O_2$
    C. $2KClO_3 \rightarrow 2KCl + 3O_2$
    D. $2KClO_3 \rightarrow 2KCl + 2O_2$
24. A solid substance with high melting and boiling point is likely to be a/an;
    A. covalent compound
    B. dative-covalent compound
    C. electrovalent compound
    D. non-metal
25. Hydrogen bonds are formed between molecules containing a hydrogen atom bonded to a
    A. strongly electronegative atom
    B. diatomic element
    C. strongly electronegative element
    D. non-polar species
26. What is the common name for the compound $KClO_3$?
    A. Potassium oxocarbonate (I)
    B. Potassium trioxochloride (V)
    C. Potassium tetraoxocarbonate (VII)
    D. Potassium trioxochlorate (III)
27. Water molecules are held together by
    A. ionic bond
    B. hydrogen bond
    C. coordinate bond
    D. van der waals forces
28. Which of the following factors is very important in covalent bond formation?
    A. Electronegativity
    B. Electro positivity
    C. Metallic character
    D. Presence of hydrogen
29. When Y combines with element Z,
    A. A Covalent compound, ZY is formed
    B. A Covalent compound, YZ is formed
    C. A ionic compound, ZY is formed
    D. A ionic compound, YZ is formed
30. The strength of metallic bonds depends on the
    A. charge density of the atoms
    B. ductility of metal
    C. number of valence electrons
    D. total number of electrons in the atom
31. Consider the reaction represented by the following equation: $MnO_{2(s)} + xHCl_{(aq)} \rightarrow MnCl_2 + yCl_{2(g)} + zH_2O$. The values of x, y, z are respectively.
    A. 1,2,3
    B. 4,2,2
    C. 4,1,2
    D. 2,4,5
32. The presence of an impurity in a substance will cause the melting point to be
    A. zero
    B. increased
    C. reduced
    D. stable
33. The purity of a solid sample can be determined by its
    A. boiling point
    B. melting point
    C. solubility
    D. conductivity
34. Which of the following methods can be used to separate blood cells from plasma?
    A. Centrifugation
    B. Filtration
    C. Chromatography
    D. Distillation
35. In electrovalency, valence electrons are transferred and the atomic number is
    A. also reduced
    B. stabilized
    C. unaffected
    D. destabilized
36. The correct equation for reaction: $CuO_{(s)} + H_2SO_{4(aq)}$ is
    A. $CuO_{(s)} + H_2SO_4 \rightarrow CuSO_4 + H_2O_{(l)}$

B. $H_2SO_4 + CuO \rightarrow CuSO_4 + H_2O$
C. $CuO_{(s)} + H_2SO_4 \rightarrow CuSO_4 + H_2O_{(l)}$
D. $2CuO_{(s)} + H_2SO_4 \rightarrow CuSO_4 + H_2O_{(l)}$

37. Calculate the percentage by mass of lead in 1 mole of $Pb(NO_3)_2$. [Pb = 207, N = 14, O = 16].
A. 76.9
B. 62.5
C. 77.5
D. 87.3

38. The members of group O or VIII in the periodic table are unractive because
A. they are gases at room temperature
B. they have strong intermolecular forces
C. they have incomplete electronic configuration
D. they have stable electronic configuration

39. The atomic number of an element is the number of
A. neutron in the atom
B. protons added to the number of neutrons in the atom
C. protons in the nucleus of the atom
D. electrons added to the number of protons in the atom

40. The following atoms of carbon $^{12}_{6}C$, $^{13}_{6}C$ and $^{14}_{6}C$ can be described as
A. allotropes
B. isotopes
C. isomers
D. polymer

41. An organic compound contains 18.8889% carbon and 11.11% hydrogen. Determine the empirical formula of the compound. [H = 1.0, C = 12.0].
A. CH
B. CH_2
C. C_2H_3
D. C_2H_5

42. Neutral atoms of Neon with atomic number of 10 has the same number of electrons as
A. O^{2-}
B. Ca^{2+}
C. K^{+}
D. Mg^{2+}

43. A compound contains 36.4% sodium, 38.2% oxygen and 25.4% sulphur. What is the empirical formula of the compound? [Na = 23, S = 32, O = 16]
A. $NaSO_4$
B. Na_2SO_3
C. Na_2SO_4
D. $Na_2S_2O_3$

44. Compounds that conduct electricity in liquid state are called.
A. Metallic compounds
B. Electrolyte
C. Conductors
D. Semi-conductors

45. Van der waals forces are
A. Strong forces
B. Intermediate forces
C. Weak forces
D. Attractive forces

46. The numerical coefficients in a balanced equation give
A. the number of moles of reactions and products
B. the molar mass of the reactants and products
C. the number of moles of reactants only
D. the number of molecules and atoms of the products only

47. In electrovalency most metallic atoms with few valence electrons tend to give out these electrons to non-metals because
A. they are unstable

B. they require less energy to give away these electrons
C. they require more energy to give away these electrons
D. they need non-metals to operate

48. Bond between a highly electronegative atom and a hydrogen from another is called
A. hydrogen bond
B. covalent bond
C. intermolecular forces
D. ligand

49. An element belongs to a period in the periodic table because of
A. the number of electrons in its outermost shell
B. the shell number
C. the size of the atom
D. the electronic configuration in the azimuthal quantum numbers

50. The major differences between I-SO_3 and II-SO_3^{2-} is that
A. I is a molecule while II is an atom
B. I is a radical while II is a molecule
C. I is molecule while II is a radical
D. I is a radical while II is an atom

SECTION A: **THEORY**

1. (a) Define the following terms;
   i. valency
   ii. oxidation number

   (b) Write the chemical formula of the following compounds;
   i. magnesium oxide
   ii. sodium triixocarbonate (V)
   iii. tetraoxosulphate (VI) acid

   (c) Give the *IUPAC* names of the following compounds;
   i. MnO_2
   ii. $Al_2(SO_4)_3$
   iii. $ZnCl_2$
2. (a) State **<u>three</u>** information provided by a balanced chemical equation.

   (b) Give any **<u>two</u>** information that are ***not*** obtainable from a balanced chemical equation.

   (c) Balanced the following chemicals equations;
   i. $H_2SO_4 + NaOH \rightarrow Na_2SO_4 + H_2O$
   ii. $Cu + H_2SO_4 \rightarrow CuSO_4 + SO_2 + H_2O$
   iii. $Al(OH)_3 + HNO_3 \rightarrow AL(NO_3)_3 + H_2O$
   iv. $NH_3 + O_2 \rightarrow H_2O + N_2$
   v. $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$
3. (a) State the following laws of chemical combination;
   i. law of definite proportions
   ii. law of multiple proportions

   (b) What is a chemical bond?

   (c) The following are the electronic configuration of *five* elements. Use it to answer the questions below

A	B	C	D	E
2, 8, 2	2, 8, 6	2, 8, 8	2, 8, 7	2, 8, 5

   i. which element is unlikely to react with the others?
   ii. which ***two*** elements will react to form covalent compounds?
   iii. which elements will react to form ionic solids?
   iv. which of the elements is a metal?
4. (a) Write briefly on the following types of chemical bonds
   i. electrovalent combination

ii. hydrogen bonds

(b) Give ***three*** properties of covalent compounds.

(c) An element X, with electronic configuration 2,8,2 ionizes to a configuration 2, 8 when it combines with another element Y of configuration 2,8,7.

i. state the types of bonding firmed between the two elements.

ii. what will be the physical state of the compound at room temperature?

iii. write the molecular formula, in terms of X and Y, of the compound $KClO_3$ formed when the two elements really together.

5. (a) Explain the terms;

i. fine chemicals

ii. heavy chemicals

(b) Give ***two*** examples of each of fine and heavy chemicals.

(c-i) Define the term ***Isotopy***

(c-ii) Calculate the relative atomic mass of an element R given that the relative abundance of $^{65}_{29}R$ and $^{63}_{29}R$ are 68% and 32% respectively.