Chemistry

1. The nucleus of an atom:
    a) is neutral
    b) contains electrons
    c) has positive electric charge
    d) does not contain neutrons

2. The total sum of protons and neutrons in the nucleus of a chemical element determines:
    a) the number of electrons in the last layers electron layer
    b) the number of electron layers in the electron shell of an atom
    c) the isotope of the element
    d) there is not correct answer

3. In which compound there is covalent polar bond:
    a) NaCl
    b) $MgBr_2$
    c) N_2O_3
    d) K_2S

4. What are the possible oxidation states of aluminium:
    a) -1, 0, +1
    b) -2, -1, 0
    c) -2, -1, +2
    d) -2, -1, +1, +2, +3

5. The heat effect of a reaction depends on:
    a) the initial reactant conditions only
    b) the final reactant conditions only
    c) the intermediate stages of a reaction only
    d) there is no correct answer

6. Consider the following hypothetical reactions:
    A → B $\Delta H = 30$ kJ /mol
    B → C $\Delta H = 60$ kJ/mol

    a) Two moles A→ C have $\Delta H = 90$ KJ/mol
    b) Tree moles A→ C have $\Delta H = 180$ KJ/mol
    c) Molar enthalpy of A→ C is 180 KJ/mol
    d) there is not correct answer

7. Which of the following is true of all catalysts?
    a) they are used up in chemical reactions
    b) they are always transition metals
    c) they do not take part in chemical reactions.
    d) they are present at the beginning of a reaction and are unchanged at the end

8. The equilibrium constant:

a) can be changed at constant temperature
b) depends on changes in reactant concentrations
c) depends on changes in product concentrations
d) there is no correct answer

9. Equilibrium can be established during:
a) hydrolysis of saccharose
b) interaction between HCl and NaOH
c) interaction between CH_3COOH and NaOH
d) hydrolysis of proteins

10. Which one of the statements below is *false*?
a) H_2O has lower boiling point than NaCl solution.
b) 1 M CH_3OH solution has higher osmotic pressure than 1 M NaCl.
c) The vapor pressure of H_2O is higher compared to the vapor pressure of KCl solution.
d) The freezing point of KCl is lower compared to the freezing point of H_2O.

11. Which one of the statements below is *true*?
a) Sugar solution has the same osmotic pressure compared to $MgCl_2$ solution.
b) The colligative properties of solutions depend on the concentration.
c) A solution of electrolyte has the same boiling point compared to the boiling point of a solution of nonelectrolyte.
d) Osmotic pressure does not depend on the temperature.

12. Which salt is not produced from a strong acid and a strong base?
a) NaCl
b) B) NaF
c) C) NaBr
d) NaI

13. What is the oxidation number of sulfur in S_2Cl_2?
a) +1
b) B) -1
c) C) +2
d) D) -2

14. How many chain isomers does pentane have?
a) 5
b) 3
c) 4
d) 2

15. Which one of the substituents is orto-, para- director:
a) $–NH_2$
b) $–NO_2$
c) $–NR_3$
d) –CN

16. Addition plus tautomerism is possible for:

a) butane
b) 1-butene
c) 1-butyne
d) benzene

17. In which one of the following compounds does nitrogen have the lowest oxidation number?

a) NH_3
b) N_2H_4
c) NO
d) NH_2OH

18. Which compound is an electrolyte?

a) CH_3OH
b) CH_3COOH
c) $C_3H_5(OH)_3$
d) $C_{12}H_{22}O_{11}$

19. Which organic compound is classified as an acid?

a) CH_3CH_2COOH
b) $OHCH_2CH_3$
c) $C_{12}H_{22}O_{11}$
d) $C_6H_{12}O_6$

20. The products of the fermentation of a sugar are ethanol and

a) Water
b) Oxygen
c) Carbon dioxide
d) Sulfur dioxide

21. The reaction $CH_2=CH_2 + H_2 \rightarrow CH_3CH_3$ is an example of

a) Substitution
b) Addition
c) Esterification
d) Fermentation

22. In which pair of hydrocarbons does each compound contain only one double bond per molecule?

a) C_2H_2 and C_2H_6
b) C_2H_2 and C_3H_6
c) C_4H_8 and C_2H_4
d) C_6H_6 and C_7H_8

23. What type of compound is this? $N(CH_3)_3$

a) Primary amine
b) Amide
c) Tertiary amine
d) Aniline

24. What is the total number of hydrogen atoms required to form 1 molecule of $C_3H_5(OH)_3$?

a) 1
b) 5
c) 3
d) 8

25. What type of compound is this? CH_3SO_3H

a) Sulfonate
b) Mercaptane
c) Sulfonic aside
d) Sulphuric aside