DEPARMENT OF CHEMISTRY

Uganda Certificate of Education

CHEMISTRY S.2

Paper 2

2 hours 30 minutes

Name: .....Signature: .....

INSTRUCTIONS:

This paper consists of Sections A and B
Circle the right alternative in section A
Attempt ***ALL*** questions in both Sections
Use the answer space provided for the questions.

SECTION A

1. Which one of the following is a basic oxide?

   A. SO_2
   B. ZnO
   C. P_2O_5
   D. CaO

2. Beginning with the least reactive, the order of reactivity of the following metals with dilute hydrochloric acid is

   A. iron, aluminium lead, zinc
   B. zinc, lead, aluminium, iron
   C. lead, iron, zinc, aluminium
   D. aluminium, zinc, iron, lead

3. The atomic number of an element is
   A. the number of electrons and protons
   B. the number of protons and neutrons
   C. the number of neutrons
   D. the number of protons

4. The atomic numbers of elements X and Y are 7 and 9 respectively. The formula of the compound formed between X and Y is

A. XY_3
B. XY_2
C. X_3Y
D. X_2Y

5. Isotopes are different atoms of the same element with the

A.same number of protons, neutrons and electrons.
B. same number of electrons and neutrons but different number of protons.
C. same number of protons and neutrons but different number of protons.
D. same number of protons and electrons but different number of neutrons.

6. Which one of the following substances conducts electricity?

A. Zinc
B. Neon
C. Chlorine
D. Sulphur

7. How many electrons are there in oxygen (O^{2-}) ion?
(The atomic number of oxygen is 8)

A. 6
B. 8
C. 10
D. 16

8. Which one of the following gases will reduce copper (II) oxide to copper?

A. Hydrogen
B. Water vapour
C. Chlorine
D. Oxygen

9. An atom of an element X has 19 electrons. In the Periodic Table X belongs to

A. group I
B. group II
C. group III

D. group IV

10. An atom 41 M forms a chloride of the formula MCI_2. Which one of the following
20
atoms forms a chloride with a similar formula?

A. 25R
12
B. 25T
13
C. 21Y
10
D. 22Z
11

11. In the order of the reactivity of the elements K, Na, Mg, AI, C, Zn and Cu, potassium is the most reactive and lead is the least reactive. Which one of the following reactions is possible?

A. $2Na_2O_{(s)} + C_{(s)} \xrightarrow{\text{heat}} 4Na_{(s)} + CO_{2(s)}$

B. $2MgO(s) + C(s) \xrightarrow{\text{heat}} 2Mg(s) + CO2(g)$

C. $Mg_{(s)} + CuO_{(s)} \xrightarrow{\text{heat}} MgO_{(s)} + Cu_{(s)}$

D. $2AI_{(s)} + 3K_2O_{(s)} \longrightarrow AI_2O_{3(s)} + 6K_{(s)}$

12. A separating funnel can be used to separate a mixture of water and petrol because the two liquids.
A. are miscible
B. are immiscible.
C. have different densities.
D. have different boiling points.

13. When sodium nitrate is heated it gives
A. nitrogen dioxide
B. sodium oxide and nitric oxide.
C. oxygen
D. oxygen and nitrogen dioxide

14. Which one of the following properties is NOT shown by group VII elements? They

A. are all non-metals
B. are all gases at room temperature
C. all form ionic compounds with group I elements.
D. all form diatomic molecules.

15. The process by which water vapour is changed into dew is called
A. distillation
B. efflorescence
C. condensation
D. evaporation

16. Atoms of elements in the same group in the periodic table have the same number of

A. outer shell electrons
B. electrons outside the nucleus
C. protons in the nucleus
D. neutron in the nucleus

17. To which one of the following groups and periods in the periodic table does an element with atomic number 20 belong?

A. group II, period 4
B. group II, period 2
C. group IV, period 2
D. group IV, period 4

18. An atom of an element has the structure $^{20}_{10}X$. The element

A. forms covalent bonds readily with non-metals.
B. forms ionic bonds with non-metals
C. belongs to group II of the periodic table.
D. has full shells of electrons.

19. The ion formed by the element X of atomic number 13 is

A. X^{3+}
B. X^{2+}
C. X^{2-}
D. X^{3-}

20. Which of the following mixtures is best separated by chromatography?

A. Ink
B. Crude petroleum
C. Water and oil
D. Water and ethanol

21. Which one of the following is an electronic configuration of an atom of an inert gas?

A. 2:8:8
B. 2:8:7
C. 2:8:6
D. 2:8:8:1

22. The number of neutrons in the nucleus of an atom, $^{37}_{17}X$ is

A. 17
B. 20
C. 37
D. 54

23. An oxide of metal Z reacts with magnesium when heated but it does not react with copper. The order of reactivity of Z, magnesium and copper starting with the most reactive is

A. Cu, Z, Mg
B. Z, Mg, Cu
C. Mg, Cu, Z.
D. Mg, Z, Cu

24. Which one of the following substances sublimes when heated?

A. ZnO
B. $CaCI_2$
C. I_2
D. P

25. The atomic numbers of elements Q, R, S, and T are 8,9,13 and 17 respectively. Which one of the following pairs of elements belongs to the same group in the periodic table?

A. Q and R
B. Q and S

C. R and T
D. S and T

26. The red brown coating formed when iron nail is left in moist air for a long time is

A. hydrated iron (II) oxide
B. hydrated iron (III) oxide
C. anhydrous iron (II) oxide
D. anhydrous iron (III) oxide

27. Which one of the following methods is normally used to prepare hydrogen in the laboratory?

A. Electrolysis of water.
B. Action of water on magnesium
C. Action of dilute hydrochloric acid on zinc.
D. Action of steam on zinc.

28. A carbonate of an element Y has the formula $Y_2 (CO_3)_3$.
To which group in the Periodic Table does Y belong?

A. 1
B. 2
C. 3
D. 4

29. The alloy solder consists of
A. zinc and lead
B. copper and lead
C. copper and aluminium
D. tin and lead.

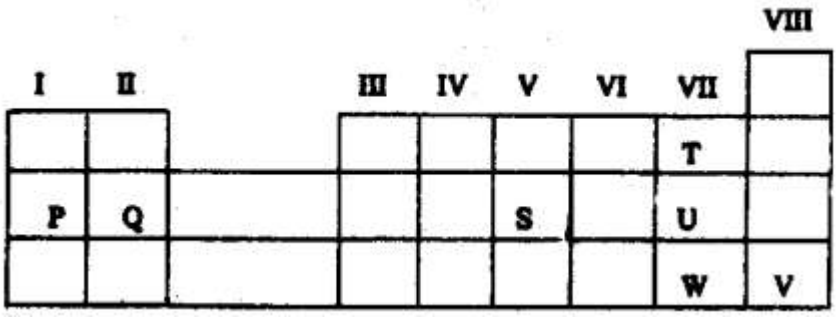
30. Which one of the following metals will not displace lead from its salt in solution?
A. Aluminium
B. Calcium
C. Silver
D. Zinc

SECTION B

31. Define the following terms. **(5 marks)**

(a) An atom……
……..
(b) Oxidation……
……
(c) Isotopes…….
……..
(d)An alloy……
…….
(e) Mixture
……
……..
(f) Reduction
……
……..

32. Part of the Periodic Table is shown below. The letters are not the usual symbols for elements.



(a) Which is the least reactive element? **(1 mark)**

……

(b) Which one of the elements, T, U and W reacts most vigorously with Q? **(1 mark)**

……

(c) Write the formula of the compound formed between Q and S. **(1 mark)**

……

(d) The compound formed between P and W was dissolved in water. State whether resultant solution was acidic, basic or neutral. **(1 mark)**

……

(e) Which two elements represented in the table can react as reducing agents?**(1 mark)**

……

33.(a) Define the term oxide **(1 marks)**

……

……

(b) State whether the following oxides are acidic, basic, neutral or amphoteric.

(a) ZnO……
(b) SO_2……
(c) K_2O……
(d) N_2O……

34. (a) When water was added to solid **X**, a colourless, odourless gas was evolved that relights a glowing splint.

(i) Name solid **X.** *(01 mark)*

…….....

(ii) Write an equation for the reaction that took place. *(1½ marks)*

…….....

…….....

(b) State what would be observed if litmus paper was added to the resultant solution in (a) above. *(01 mark)*

…….....

(c) Name any other substance that evolves a colourless gas in (a) above. *(01 mark)*

…….....

SECTION C

35. (a) Write the reactivity series in their order.

(b) With equations also, explain how the following metals react with water.

(i) Patassium

(ii) Sodium

(iii) Calcium

(iv) Magnesium

(c) How can water be prepared in the laboratory.

(d) How is water important?

36. (a) Write the formula for the following compounds

(i) Magnesium sulphate

(ii) Iron(II) sulphate

(iii) Hydrogen chloride

(iv) Phosphorus penta oxide

(b) Write well balanced chemical equations for the following chemical reactions.

(i) Sodium + Oxygen $\longrightarrow$ Sodium oxide

(ii) Carbon dioxide + Sodium hydroxide $\longrightarrow$ Sodium carbonate + Water

(iii) Copper + Sulphuric Acid $\longrightarrow$ Copper(II) Sulphate + Sulphur dioxide + Water

(iv) Zinc + Sulphuric Acid $\longrightarrow$ Zinc sulphate + Hydrogen

(c) Complete the following equations:

(a) $H_2O_2(aq) \xrightarrow{MnO_2}$

(b) $Zn(s) + HCl(aq) \longrightarrow$

END