Name …………………………………………………………Sign………………..

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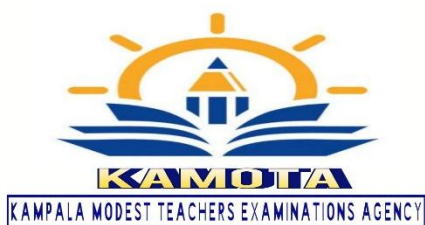*545/1*
Chemistry
Paper 1
1 ½ hours

KAMOTA MOCK EXAMINATIONS 2023

UGANDA CERTIFICATE OF EDUCATION

CHEMISTRY

PAPER 1

TIME: 1 ½ HOURS

Instructions

This paper consists of fifty (50) objective questions.

All questions are compulsory

Answer the questions by writing the correct alternative in the box on the right hand side of the question

For Examiner's use only	

1. Which one of the following processes produces oxygen?
   A: Combustion   B: Photosynthesis   C: Respiration   D: Rusting

2. The electronic configuration of an atom of element Z is 2:8:6.The compound formed between Z and hydrogen
   A: is a gas at room temperature
   B: is a solid at room temperature
   C: dissolves in water to form alkaline solution
   D: dissolves in water to form a neutral solution

3. A solid T, dissolved in dilute nitric acid to form a colourless solution which when reacted with dilute hydrochloric acid, formed a white precipitate. T is
   A: Zinc oxide   B: Lead (II) chloride
   C: Aluminium oxide   D: Lead (II) oxide

4. Which one of the following elements is heated with soft rubber to make it hard and strong?
   A: Phosphorus   B: Calcium   C: Sulphur   D: Iron

5. Hydrogen peroxide decomposes to give oxygen according to the following equation
   $2H_2O_{2(aq)} \longrightarrow 2H_2O_{(l)} + O_{2(g)}.$
   The volume of oxygen produced at s.t.p when 50cm^3 of 3M hydrogen peroxide solution decomposes completely is
   (1 mole of a gas occupies 22.4dm^{-3} at s.t.p)

   A: $\left(\frac{50 \times 2 \times 22.4}{1000 \times 3}\right) dm^3$ B: $\left(\frac{50 \times 3 \times 22.4}{1000 \times 2}\right) dm^3$

   C: $\left(\frac{1000 \times 3 \times 22.4}{50 \times 2}\right) dm^3$ D: $\left(\frac{50 \times 3 \times 2 \times 22.4}{1000}\right) dm^3$

6. The full symbols of atoms of elements W and X are $^{31}_{15}W$ and $^{37}_{17}X$ respectively. The formula of a compound formed between W and X is
   A: WX   B: W$_3$X   C: WX$_5$ D: W$_5$X

7. In which of the following test tubes would a drop of lead (II) nitrate solution form a yellow precipitate? The test tube containing water and
   A: sodium iodide   B: sodium sulphate
   C: sodium chloride   D: sodium hydroxide

8. When 2.78g of a hydrated salt was heated, 1.52g of anhydrous salt was formed. Which one of the following is the percentage of water of crystallization in the hydrated salt?
   A: $\frac{1.52 \times 100}{2.78}$ B: $\frac{1.26 \times 100}{2.78}$ C: $\frac{1.26}{1.52} \times 100$ D: $\frac{1.52}{4.3} \times 100$

9. When potassium mangante (VII) is heated, the gas produced,

A: burns with a pop sound   B: turns lime water milky

C: rekindles a glowing splint   D: bleaches moist litmus paper

10. Which one of the following gases cannot be collected over water?
  A: Hydrogen chloride   B: Oxygen
  C: Carbon dioxide   D: Hydrogen

11. Which one of the following nitrates when heated, will decompose to form an oxide as the solid residue?
  A: NH_4NO_3 B: KNO_3 C: $Zn(NO_3)_2$ D: $AgNO_3$

12. Which one of the following is not a property of aluminium?
  A: It forms an amphoteric oxide   B: It forms an oxide with high melting point
  C: It is trivalent   D: It forms ions by gaining electrons

13. Sulphur dioxide was bubbled through water. The resultant solution
  A: is an oxidizing agent
  B: is a bleaching agent
  C: liberates oxygen when exposed to sunlight
  D: turns red litmus blue

14. When concentrated sulphuric acid is added to sugar in a beaker, a black substance is produced. This is because sulphuric acid is
  A: a strong acid corrosive acid   B: a strong dehydrating agent
  C: a strong reducing agent   D: a strong oxidizing agent

15. Which one of the following substances is produced in large amounts at the anode when copper (ii) chloride is electrolysed using graphite electrodes?
  A: Copper   B: Copper (II) ions   C: Hydrogen   D: Oxygen

16. When 0.6g of an element M was burnt, the heat produced raised the temperature of 500cm^3 of water from 23°C to 32$^{\circ C}$. Which one of the following expressions gives the atomic mass of M? (The molar heat of combustion of M is 380KJmol^{-1}. Specific heat capacity of water = 4.2J/g/$^\circ$C; density of water = 1.0gcm^{-3})

  A: $\left(\dfrac{380 \times 0.6}{500 \times 4.2 \times 9}\right)$ B: $\dfrac{1380 \times 0.6 \times 1000}{500 \times 4.2 \times 9}$

  C: $\left(\dfrac{500 \times 4.2 \times 9 \times 1000}{380 \times 0.6}\right)$ D: $\left(\dfrac{500 \times 4.2 \times 9}{380 \times 0.6 \times 1000}\right)$

17. Which one of the following substances is the product formed when steam is passed over heated coke?
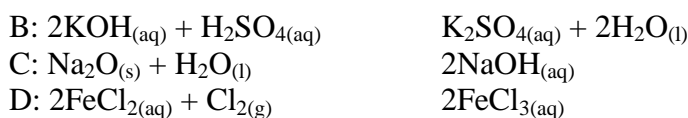 A: Carbon dioxide and hydrogen   B: Carbon monoxide and hydrogen
  C: Carbon dioxide only   D: Hydrogen only

18. Which one of the following equations shows a redox reaction?
  A: $CaCO_{3(s)} + 2HCl_{(aq)} \longrightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$

B: $2KOH_{(aq)} + H_2SO_{4(aq)}$ $K_2SO_{4(aq)} + 2H_2O_{(l)}$
C: $Na_2O_{(s)} + H_2O_{(l)}$ $2NaOH_{(aq)}$
D: $2FeCl_{2(aq)} + Cl_{2(g)}$ $2FeCl_{3(aq)}$

19. Which one of the following is a neutral oxide?
    A: Carbon monoxide   B: Carbon dioxide
    C: Sulphur dioxide   D: Nitrogen dioxide

20. The form of carbon that is used dynamo as a lubricant is
    A: Wood charcoal   `   B: Lamp black
    C: Animal charcoal   D: Graphite

21. In the extraction of sodium from sodium chloride, the melting point of sodium chloride is lowered by addition of
    A: Calcium sulphate   B: Calcium fluoride
    C: Calcium chloride   D: Calcium bromide

22. The reaction between glucose and yeast is called
    A: Oxidation   B: Fermentation
    C: Decomposition   D: Esterification

23. During the preparation of chlorine, by adding concentrated hydrochloric acid onto hot manganese (IV) oxide, the gas is first bubbled through water before it is dried. The purpose of passing the gas through water is to;
    A: remove solid impurities that dissolve in water
    B: to obtain a saturated solution of the gas
    C: remove acid spray from chlorine
   D: obtain hypochlorous acid that will decompose to give a pure gas

24. What is the percentage of oxygen in iron (III) sulphate; $Fe_2(SO_4)_3$
    (S = 32, Fe = 56, O = 16)
    A: 48.0   B: 30.8   C: 16.0   D: 15.4

25. $20.0cm^3$ of a 0.1M acid H_nX required $21.5cm^3$ of a 0.2M sodiuim hydroxide solution for complete neutralization. The acid reacts with sodium hydroxide according to the following equation
    $H_nX_{(aq)} + nNaOH_{(aq)} \longrightarrow Na_nX_{(aq)} + nH_2O_{(l)}$
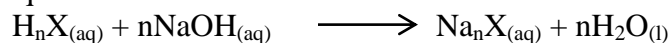
    Which one of the following expressions gives the value of n?

    A: $\left(\frac{0.2 \times 21.5}{0.1 \times 20}\right)$ B: $\left(\frac{0.1 \times 21.5}{0.2 \times 20}\right)$ C $\left(\frac{0.1 \times 20}{0.2 \times 21.5}\right)$ D: $\left(\frac{20 \times 21.5}{0.1 \times 0.2}\right)$

26. Which one of the following chlorides is soluble in hot water only?
    A: $FeCl_2$ B: $CuCl_2$ C: $ZnCl_2$ D: $PbCl_2$
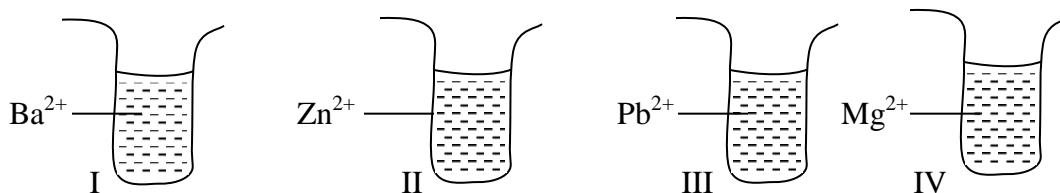
27. Which one of the following metals will produce hydrogen when heated with steam?
    A: Calcium   B: Potassium   C: Zinc   D: Sodium

28. 1cm^3 of dilute sulphuric acid was added to four test tubes containing solutions of different cations as shown below

Ba^{2+} — I Zn^{2+} — II Pb^{2+} — III Mg^{2+} — IV

The white precipitate was obtained in test tube numbers,

A: I,II,IV   B: I, III, IV   C: I, III   D: III, IV

29. Pure sulphuric acid does not conduct electricity because
    A: it has a great affinity for water   B: it is an electrovalent compound
    C: it is an oxidizing agent   D: it is a covalent compound

30. When carbondioxide is bubbled through lime water, the latter turned milky and finally colourless because
    A: The reaction between carbondioxide and water is reversible
    B: Lime water is a good solvent for the milky substance formed
    C:The milk substance reacts to form a soluble colourless compound
    D: Carbondioxide eventually dissolves in lime water to form carbonic acid

31. Which one of the following reactions that occur during the manufacture of sulphuric acid by the contact process requires a catalyst
    A: $H_2SO_{4(l)} + SO_{3(g)} \longrightarrow H_2S_2O_{7(l)}$
    B: $H_2S_2O_{7(l)} + H_2O_{(l)} \longrightarrow 2H_2SO_{4(aq)}$
    C: $2SO_{2(g)} + O_{2(g)} \longrightarrow 2SO_{3(g)}$
    D: $S_{(s)} + O_{2(g)} \longrightarrow SO_{2(g)}$

32. Which one of the following reactions does not take place in the blast furnace during the extraction of iron?
    A: Limestone reduces iron (III) oxide to iron
    B: Coke burns in air forming carbon dioxide
    C: Limestone decomposes to form calcium oxide
    D: Coke reduces carbondioxide to carbonmonoxide

33. Sulphur dioxide reacts with oxygen according to the following equation

$$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$$

The volume of sulphur trioxide formed when 120cm^3 of sulphur dioxide is mixed with 30cm^3 of oxygen in a reaction vessel at a certain temperature is

A: 120cm^3 B: 90cm^3 C: 60cm^3 D: 30cm^3

34. In which one of the following test tubes would a burning splint produce a pop sound? The test tube containing
A: manganese (IV) oxide and hydrogen peroxide
B: dilute sulphuric acid and zinc
C: dilute hydrochloric acid and calcium carbonate
D: calcium oxide and water

35. Which one of the following allotropes of sulphur is crystalline and stable below 96°C?
A: Rhombic   B: Amorphous   C: Plastic   D: Monoclinic

36. Copper can be separated from a mixture of zinc powder and copper powder by adding to the mixture.
A: Concentrated sulphuric acid   B: Dilute sulphuric acid
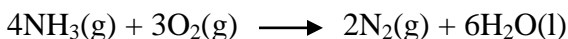C: Zinc sulphate solution   D: Concentrated nitric acid

37. Which one of the following hydrocarbons is formed when a mixture of ethanol and concentrated sulphuric acid is heated?
A: C$_2$H$_6$ B: C$_4$H$_{10}$ C: C$_3$H$_8$ D: C$_2$H$_4$

38. Ammonia gas reacts with oxygen according to the following equation

4NH$_3$(g) + 3O$_2$(g) $\longrightarrow$ 2N$_2$(g) + 6H$_2$O(l)

 The volume of nitrogen gas formed when 60cm^3 of ammonia gas reacts completely with excess oxygen is
A: 20cm^3 B: 30cm^3 C: 120cm^3 D: 240cm^3

39. An atom of element Y has two energy levels, if Y forms an ion with formula Y^{2-} , what is the atomic number of Y.
A: 2   B: 4   C: 6   D: 8

40. Which of the following is/are observed when hydrogen is passed overheated copper (II) oxide?
A: a colour liquid   B: black solid turns yellow
C: black solid turns brown   D: yellow solid turns grey.

Each of the questions 41 to 45 consist of an assertion (statement) on the left hand side and a reason on the right hand side. Select
A: if both the assertion and the reason are true statements and the reason is a correct explanation of the assertion
B: if both the assertion and the reason are true statements but the reason is not a correct explanation of the assertion

C: if the assertion is true but the reason is not a correct statement

D: if the assertion is not correct but the reason is a correct statement.

INSTRUCTIONS SUMMARISED

A: True	True and is a correct explanation
B: True	True but is not a correct explanation
C: True	Incorrect
D: Incorrect	Correct

41. Polyethene is a thermo softening plastic	because	Polyethene can be remolded on heating	
42. Dry ammonia gas turns dry red litmus paper blue	because	Ammonia is an alkaline gas	
43. When sodium hydroxide solution was added to a solution of rust in dilute nitric acid, a brown precipitate formed	because	Iron (II) hydroxide was formed	
44. Aqueous sulphur dioxide conducts electricity	because	It contains free mobile ions	
45. Ammonia can be dried using concentrated sulphuric acid	because	Concentrated sulphuric acid is a dehydrating agent	

For each of questions 46 – 50 one or more of the statements is/are correct .

Choose

A: if statements 1,2,3 only are correct

B: if statements 1,3, only are correct

C: if statements 2,4 only are correct

D: if statement 4 only is correct

Summarized instructions

A	B	C	D
1,2,3 only are correct	1,3 only Correct	2,4 only Correct	4 only Correct

46. Which of the following substances is/are formed when concentrated nitric acid reacts with

    sulphur?

    1. Sulphuric acid
    2. Nitrogen monoxide
    3. Nitrogen dioxide
    4. Sulphur dioxide

47. Which of the following substances would react with copper (II) oxide to produce a colourless

    liquid which would turn anhydrous copper (II) sulphate blue?

    1. Carbon
    2. Hydrogen
    3. Carbon monoxide

4. Ammonia

48. Which one of the following compounds would be formed when magnesium burns?

1. Magnesium hydroxide
2. Magnesium nitride
3. Magnesium carbide
4. Magnesium oxide

49. Which of the following acid solution when reacted separately with the same mass of copper (II)

carbonate would give the highest volume of carbon dioxide within the shortest time?

1. 50cm^3 of a 2M HCl
2. 50cm^3 of a 1M H$_2$SO$_4$
3. 1000cm^3 of a 1M HNO$_3$
4. 200cm^3 of a 0.5M H$_2$SO$_4$

50. Which of the following is/are true about the extraction of sodium by electrolysis?
1. The anode is made of iron
2. The electrolyte is concentrated sodium chloride solution
3. The cathode is made of carbon
4. The sodium is deposited at the cathode

END