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545/1
CHEMISTRY
Paper 1
August, 2022
1½ hrs

UNNASE MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY

PAPER 1

1hour 30minutes

INSTRUCTIONS TO CANDIDATES

- *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 EXAMINERS USE ONLY

1. The following are industrial methods of preventing rusting except;
   A) Tin plating
   B) Enameling
   C) Alloying
   D) Oiling

2. Which one of the following carbonates undergoes a physical change when heated?
   A) $FeCO_3$
   B) $PbCO_3$
   C) Na_2CO_3
   D) $CaCO_3$

3. Fused calcium chloride when exposed to air, changes from solid to liquid. Which one of the following is the process that occurs?
   A) Deliquescence
   B) Hygroscopy
   C) Efflorescence
   D) Hydration

4. Which of the following substances is **not** a compound?
   A) Polythene
   B) Charcoal
   C) Sugar
   D) Sand

5. Ammonium nitrate was dissolved in water and the resultant solution tested with litmus. The correct observation is;
   A) There was no effect on litmus
   B) Blue litmus turned red
   C) Red litmus turned blue
   D) Litmus was bleached

6. The atomic number of an element R is 19. The formula of the sulphate of R is;
   A) RSO_4
   B) R_2SO_4
   C) $R_2(SO_4)_3$
   D) $R_3(SO_4)_2$

7. Which one of the following nitrates does **not** give off oxygen when heated?
   A) $Pb(NO_3)_2$
   B) NH_4NO_3
   C) $NaNO_3$
   D) $Zn(NO_3)_2$

8. When temporary hard water is boiled,
   A) It changes to permanent hard water
   B) A white precipitate of calcium oxide is formed
   C) A white precipitate of calcium hydrogen carbonate is formed
   D) A white precipitate of calcium carbonate is formed.

9. During extraction of sodium from molten sodium chloride, calcium chloride is added in order to;
A) Catalyse the reaction
B) Prevent oxidation of the metal
C) Remove the impurities
D) Lower the melting point of the ore

10. Zinc reacts with silver nitrate solution according to the following equation;
$Zn(s) + 2AgNO_3(aq) \longrightarrow Zn(NO_3)_2(aq) + 2Ag(s)$
The mass of silver metal deposited when 6.5g of zinc metal reacts with silver nitrate is;
(Zn=65; Ag=108; N=14; O=16)
A) 2.16g
B) 1.08g
C) 21.6g
D) 10.8g

11. The process that is used to separate crude oil into its various components is called;
A) Simple distillation
B) Fractional crystallization
C) Decantation
D) Fractional distillation

12. Which one of the following reactions is **NOT** a redox reaction?
A) $Pb^{2+}(aq) + SO_4^{2-}(aq) \longrightarrow PbSO_4(s)$
B) $CuO(s) + H_2(g) \longrightarrow Cu(s) + H_2O(l)$
C) $2Fe^{2+}(aq) + Cl_2(g) \longrightarrow 2Fe^{3+}(aq) + 2Cl^-(aq)$
D) $Zn(s) + 2H^+(aq) \longrightarrow Zn^{2+}(aq) + H_2(g)$

13. Metal P displaces hydrogen from a dilute acid but metal Q does not. Metal R displaces P from its chloride. The order of reactivity of the metals beginning with the most reactive is;
A) P, Q, R
B) Q, P, R
C) R, Q, P
D) R, P, Q

14. During the determination of the amount of oxygen in air by passing it over heated copper, the gas collected in the evacuated flask is mainly;
A) Nitrogen
B) Oxygen
C) Carbon dioxide
D) Water vapour

15. 25cm³ of 0.2M sodium hydroxide solution required 24.6cm³ of 0.1M solution of an acid H_nX for complete reaction. The value of n is;

A) 1 B) 2

C) 3 D) 4

16. An element burns readily in oxygen to form a solid. The solid dissolves in water producing an alkaline solution and a clourless gas that re-lights a glowing splint. The element is;

A) Sulphur B) Sodium

C) Magnesium D) Phosphorpus

17. When lead(II) nitrate solution was added to a solution X, a bright yellow precipitate was formed. The anion responsible for the yellow precipitate was;

A) SO_4^{2-} B) I^-

C) Cl^- D) Br^-

18. Soap consists mainly of;

A) Esters B) Polymers

C) Higher alcohols D) Salts of organic acids

19. An example of a non – biodegradable substance is;

A) Silk B) Wool

C) Polythene D) Paper

20. 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 150cm³ of sulphur dioxide is mixed with 50cm³ of oxygen in a reaction vessel at a constant temperature is;

A) 150cm³ B) 100cm³

C) 200cm³ D) 50cm³

21. The electrical conductivity of a metal is due to the movement of certain particles through the metal. These particles are called;

A) Atoms B) Protons

C) Ions D) Electrons

22. Which one of the following gases is used in the manufacture of margarine?

A) Hydrogen chloride
B) Ammonia
C) Hydrogen
D) Chlorine

23. Which one of the following metal oxides is yellow in colour when at room temperature?

A) ZnO
B) PbO
C) CuO
D) Fe_2O_3

24. The role of Manganese(IV) oxide in the preparation of chlorine using concentrated hydrochloric acid is to;

A) Catalyse the reaction
B) Oxidise the acid
C) Neutralise the acid
D) Dry the gas

25. The most suitable method of preparing anhydrous iron(II) chloride is by the reaction of;

A) Iron with dry chlorine
B) Iron(II) carbonate with hydrochloric acid
C) Iron with dry hydrogen chloride
D) Iron (II) hydroxide with hydrochloric acid

26. On heating 8.0g of hydrated copper(II) sulphate, $CuSO_4.XH_2O$, 5.1g of anhydrous salt remained. The formula of the hydrated salt is; (Cu=64, S=32, O=16, H=1)

A) $CuSO_4 . 2H_2O$
B) $CuSO_4 . 3H_2O$
C) $CuSO_4 . 4H_2O$
D) $CuSO_4 . 5H_2O$

27. Burning magnesium was lowered into a jar containing carbon dioxide gas for sometime. The resultant mixture was dissolved in warm dilute Sulphuric acid and filtered. To the filtrate sodium hydrogen carbonate solution was added to form substance X. X is a;

A) Colourless gas
B) Colourless solution
C) White solid
D) Sublimate

28. Which one of the following hydroxides when exposed to air turns brown?

A) $Pb(OH)_2$
B) $Fe(OH)_2$
C) $Zn(OH)_2$
D) $Fe(OH)_3$

29. The brown ring test can be performed on a nitrate solution by adding to the nitrate;
A) Iron(III) sulphate solution, then slowly adding concentrated sulphuric acid
B) Iron (II) sulphate solution, then slowly adding concentrated hydrochloric acid
C) Iron (III) sulphate solution, then slowly adding concentrated hydrochloric acid
D) Iron (II) sulphate solution, then slowly adding concentrated sulphuric acid

30. Fertilizer R was treated with calcium hydroxide and a gas which turned red litmus blue was evolved. R contained;
A) Sodium nitrate
B) Potassium sulphate
C) Ammonium nitrate
D) Potassium phosphate

31. Which one of the following pairs of compounds are in the same homologous series?
A) C_2H_6 and C_2H_2
B) C_2H_4 and C_2H_2
C) C_2H_2 and CH_4
D) C_2H_6 and CH_4

32. Concentrated Sulphuric acid is **NOT** suitable for drying ammonia because;
A) Sulphuric acid is a dehydrating agent
B) Ammonia forms a complex with the acid
C) Sulphuric acid oxidises ammonia
D) Ammonia is an alkaline gas

33. 1.22g of Z combined with 0.95g of oxygen. The simplest formula of the product formed was (Z=31, O=16);
A) Z_2O_3
B) Z_3O_2
C) Z_4O_{10}
D) Z_5O_{10}

34. A mixture of sodium chloride crystals and concentrated Sulphuric acid was gently heated in a test tube. The gas evolved;
A) Had no effect on litmus paper
B) Bleached moist blue litmus paper
C) Formed dense white fumes in the presence of ammonia gas
D) Produced a pop sound when a burning splint was lowered into it.

35. The main bi-product of the fermentation of sugar to alcohol is;

A) Ethanoic acid
B) Carbon dioxide
C) Ethanol
D) Water

36. Solid Q melts at a very high temperature, conducts electricity in both molten and aqueous state but **NOT** in the solid state. The structure in Q is;

A) Giant metallic
B) Giant Ionic
C) Giant molecular
D) Giant atomic

37. Which one of the following substances would affect the rate of reaction during manufacture of nitric acid;

A) Platinum
B) Iron
C) Asbestos
D) Manganese (IV) oxide

38. The gas, which is a health hazard because its reaction with blood is irreversible is?

A) Chlorine
B) Ammonia
C) Carbon monoxide
D) Hydrogen sulphide

39. When an excess of calcium carbonate reacts with dilute hydrochloric acid, the reaction gradually becomes slower and finally stops. Which one of the following statements best explains why this happens?

A) The calcium carbonate is used up
B) Carbon dioxide exerts a pressure on the solution
C) An insoluble salt is formed.
D) The acid is gradually used up.

40. When 1.0g of carbon was burnt in excess oxygen the heat produced raised the temperature of 400g of water by 19^{0}C. The heat of combustion of carbon is; (C=12, Specific heat capacity of water = 4.2Jg^{-1}0C^{-1}

A) 0.4 x 4.2 x 19 x 12 kJmol^{-1}
B) 400 x 4.2 x 19 x 12 kJmol^{-1}
C) 400 x 4.2 x 19 kJmol^{-1}
D) 0.4 x 4.2 x 19 kJmol^{-1}

Each of the questions 41 to 45 consists 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 SUMMARIZED

	Assertion	**Reason**
A)	True	True (Reason is a correct explanation)
B)	True	True (Reason is not a correct explanation)
C)	True	Incorrect
D)	Incorrect	Correct

41. When ethene is bubbled through bromine liquid, the red liquid rapidly turns colourless. ***Because*** Ethene is a saturated hydrocarbon. ☐

42. Carbon -12 and Carbon-14 are isotopes of carbon ***Because*** Both Carbon-12 and Carbon-14 have the same number of protons but different numbers of electrons. ☐

43. When sodium hydroxide solution was added to a solution of rust in dilute nitric acid, a brown precipitate formed. ***Because*** Iron (III) hydroxide was formed. ☐

44. Carbon monoxide diffuses faster than Carbon dioxide ***Because*** The molecular mass of Carbon oxide is less than that of Carbon dioxide. ☐

45. A solution of hydrogen chloride in methyl benzene is a non-electrolyte **Because** It is covalent in nature.

In each of the questions 46 to 50 one or more of the answers given may be correct. Read each question carefully and then indicate the correct answer according to the following;

A: If 1, 2 and 3 only are correct
B: If 1 and 3 only are correct
C: If 2 and 4 are correct
D: If 4 only is correct

SUMMARY OF INSTRUCTIONS

A	B	C	D
1, 2 and 3 only Correct	1 and 3 only Correct	2 and 4 only Correct	4 only Correct

46. Which one of the following is/are observed when a mixture of copper(II) oxide ad charcoal is strongly heated?
1. Gas evolved turns lime water milky
2. Gas evolved has no effect on lime water
3. Black residue
4. Reddish – brown residue

47. The following substance(s) is/are used in the laboratory preparation of a sample of solid soap.
1. Sodium chloride
2. Potassium hydroxide
3. Fats
4. Sulphuric acid

48. Which of the following can be dehydrated by concentrated Sulphuric acid?
1. Sucrose
2. Soda ash
3. Pork
4. Lime

49. Which one of the following, when electrolyzed between platinum electrodes will produce oxygen and hydrogen gas?

1. Acidified water
2. Copper(II) chloride solution
3. Dilute sodium chloride solution
4. Copper(II) sulphate solution

50. Which of the following metal(s) react(s) with excess air to form a white residue

1. Copper
2. Sodium
3. Potassium
4. Magnesium

END