0515 CHEMISTRY 1

GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

JUNE 2024 **ORDINARY LEVEL**

Centre Number	
Centre Name	
Candidate Identification Number	
Candidate Name	

Mobile phones are NOT allowed in the examination room.

MULTIPLE CHOICE QUESTION PAPER
Duration: One and a Half Hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the 9examination begins:

3. Check that this question booklet is headed **"ORDINARY LEVEL – 0515 CHEMISTRY 1"**
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil:
   Candidate Name, Exam Session, Subject Code and Candidate Identification Number.
   Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.

How to answer the questions in this examination

6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Non-programmable Calculators are allowed.
8. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide which answer is appropriate. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.
   For example, if **C** is your correct answer, mark **C** as shown below:
   [A] [B] ~~[C]~~ [D]
9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all your rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Useful Data: Molar volume of gas at rtp = $24000cm^2$
Avogadro number = 6.02×10^{23}
1 Faraday = 96000c

1. Identify the change of state from liquid to gas.
   A Sublimation
   B Melting
   C Evaporation
   D Condensation

2. Which of the following is true of a compound?
   A The constituents can be separated by physical means
   B The properties are a sum of the properties of the constituents
   C It cannot be broken down into simpler substances by any chemical means
   D The constituent elements can be separated by chemical reactions

3. Give an example of an oxide that turns damp blue litmus paper red.
   A CO
   B NO
   C SO_2
   D H_2O

4. For an element $^{82}_{27}P$, (where P is not the usual symbol of the element) deduce the number of neutrons.
   A 82
   B 27
   C 109
   D 55

5. Metals conduct electricity because they have
   A Free mobile electrons
   B Free moving ions
   C High melting and boiling point
   D Strong force of attraction

6. Atoms of the same element have the same atomic number and different mass numbers. This phenomenon is referred to as
   A Isotopic abundance
   B Isotopy
   C Allotropy
   D Allotropes

7. Identify a chemical change in the following processes.
   A Melting of candle
   B Boiling of water
   C Rusting of iron
   D Freezing of water

8 State one natural source of good drinking water.
   A Spring
   B Stream
   C River
   D Sea

9. Identify a process in which concentrated Sulphuric acid is used as a drying agent.
   A Adding conc. H_2SO_4 to sugar
   B Preparation of pure CO_2 gas
   C Adding conc. H_2SO_4 to NaOH
   D Preparation of NH_3 gas

10. What is the function of MnO_2 in the laboratory preparation of chlorine from potassium chlorate ($KClO_3$)?
   A Act as an oxidizing agent
   B Act as a catalyst
   C Act as a reducing agent
   D Act as a drying agent

11. Which of the following oxides is used in the extraction of metals?
   A CuO
   B Al_2O_3
   C Na_2O
   D MgO

12 On analysis, an organic compound with molecular mass $30gmol^{-1}$ is made up of 80% carbon and 20% hydrogen. Determine its empirical formula.
   A CH_3
   B CH_2
   C C_2H_6
   D C_2H_4

13. Which of the following is used as a suitable drying agent for ammonia?
   A Quicklime
   B Concentrated Sulphuric acid
   C Concentrated hydrochloric acid
   D Anhydrous calcium chloride

Questions 14-15 concern the following table on analysis

Salt	Effect of adding NaOH	Effects of adding $AgNO_{3(aq)}$ and $NH_{3(aq)}$	Flame test
A	A white precipitate is formed	No visible change	Brick red
B	A light blue gelatinous precipitate is formed	No visible change	Bluish green
C	No observable change	A white precipitate is formed	Golden yellow
D	No observable change	A pale yellow precipitate is formed	No observable change

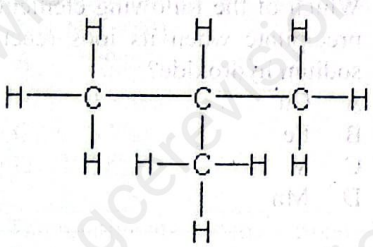
14. Which of the salts contains calcium ions?
    A A
    B B
    C C
    D D

15. Identify the salt which could be sodium chloride.
    A A
    B B
    C C
    D D

16. Why is phosphorus stored under water?
    A It is denser than water
    B It ignites at low temperatures
    C It is soft and transparent
    D It is insoluble in water

17. Identify the gas evolved when dilute hydrochloric acid is added to sodium sulphite in a test tube.
    A SO_2
    B CO_2
    C NO_2
    D CO

18. Name the following alkane



    A Methylpropane
    B Propane
    C 1-methylpropane
    D 2-methylpropane

19. Which of these carbonates is stable to heat?
    A Li_2CO_3
    B $CaCO_3$
    C K_2CO_3
    D $MgCO_3$

20. State what happens in the formation of the bond in sodium chloride.
    A Sodium atom accepts electrons from chlorine atom
    B Chlorine atom accepts an electron from sodium atom
    C Chlorine atom gives out electrons to sodium
    D Sodium and chlorine atoms share electrons

21. Which of these is a crystalline allotrope of sulphur?
    A Plastic sulphur
    B Colloidal sulphur
    C Rhombic sulphur
    D Flowers of sulphur

22. State a gas which is a respiratory poison.
    A Carbon monoxide
    B Nitrogen dioxide
    C Sulphur dioxide
    D Nitrogen monoxide

Questions 23-24: Transition metals form coloured compounds in solution and are used as catalysts in industrial processes.

23. Which of the following elements forms a blue precipitate when its ions react with aqueous sodium hydroxide?
A Cu
B Fe
C V
D Mn

24. An element that is used as a catalyst in the industrial manufacture of ammonia
A V
B Mn
C Fe
D Zn

25. Ethanol (Rmm = 46g/mol) burns in oxygen according to the following equation
$C_2H_5OH_{(g)} + 3O_{2(g)} \longrightarrow 2CO_{2(g)} + 3H_2O_{(l)}$
Calculate the volume of carbon dioxide formed when 1.7g of ethanol is completely burnt at RTP.
A $887cm^3$
B $66941cm^3$
C $8869cm^3$
D $1774cm^3$

26. An organic compound which decolorizes bromine water is
A Ethane
B Ethene
C Ethanol
D Ethanoic acid

27. Consider the following equation:
$N_{2(g)} + 3H_{2(g)} \leftrightarrow 2NH_{3(g)}$
Which of the following changes produces more NH_3?
A A decrease in the concentration of hydrogen
B An increase in temperature of reactants
C An increase in the pressure
D A decrease in the surface area of reactants

28. Ethanol reacts with concentrated Sulphuric acid at 170°C. Give the major product.
A Ethanoic acid
B Ethylethanoate
C Ethanal
D Ethene

29. Identify the elements that will react with Nitrogen of the air.
A Na
B Mg
C K
D Ca

QUESTIONS 30-32

INSTRUCTIONS: For each of the questions, one or more of the response(s) given is (are) correct.
Decide which of the response(s) is (are) correct. Then choose
A. If 1,2 and 3 are correct
B. If 1 and 3 are correct
C. If 2 and 4 are correct
D. If only 4 is correct

INSTRUCTIONS SUMMARISED

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

30. Oxidation is defined as
1- Addition of oxygen
2- Removal of hydrogen
3- Loss of electrons
4- Addition of hydrogen

31 From the equation
$2SO_{2(g)} + O_{2(g)} \leftrightarrow 2SO_{3(g)}$ $\Delta H = -196KJ$
Which of the factor(s) when introduced will shift the equilibrium to the right?
1. Low pressure
2. High pressure
3. High temperature
4. Low temperature

32. A mole of oxygen atoms contain
1- 6.02×10^{23} atoms
2- 32g
3- 16g
4-RMM of 48

QUESTIONS 33-34

INSTRUCTIONS: Each of the following questions consists of a statement in the left-hand column followed by a second statement in the right-hand column. Decide whether each of the statements is **True or False.**

Then on your answer sheet, choose

A. If both statements are **True** and the second statement is a correct explanation of the first statement

B. If both statements are **True** but the second statement is not the correct explanation of the first

C. If the first statement is **True** but the second statement is **False**

D. If the first statement is **False** but the second statement is **True**

Instructions summarised		
	First statement	**Second statement**
A	True	True and the second statement is the correct explanation of the first
B	True	True and the second statement is **not** the correct explanation of the first
C	True	False
D	False	True

No.	First Statement	Second Statement
33	Dilute hydrochloric acid completely ionizes in solution	Hydrochloric acid is a strong acid
34	The mass of an element liberated at the electrodes during electrolysis is directly proportional to the quantity of electricity passed	Oxygen is liberated at the anode during the electrolysis of acidified water

35. The sodium ion, Na^+, has electronic configuration
A 2,8,1
B 2,8
C 2,8,2
D 2,8,3

36. Which element is extracted by thermal reduction?
A Titanium
B Calcium
C Iron
D Copper

37. Calculate the percentage by mass of nitrogen in ammonium nitrate, NH_4NO_3(RMM of NH_4NO_3=80)
A 29%
B 17.5%
C 35%
D 58%

38. The relative atomic mass of an element can be defined as
A The mass of one atom of an element relative to the mass of 12g of a carbon-12 isotope
B The amount of substance in one mole of atoms
C The mass of one atom of an element relative to 1/12 the mass of carbon-12
D The mass of 6.02×10^{23} atoms of carbon

39. How many isomers does pentane have?
A 2
B 3
C 1
D 4

40. Select the most appropriate method for preparing sodium sulphate
A Precipitation
B Action of dilute acids on insoluble oxides
C Neutralization
D Action of dilute acids on metals

41. One of the factors that accounts for the preferential discharge of ions during electrolysis is
A Nature of electrolyte
B Types of ions present
C Nature of electrodes
D Charge of the ions

42. Which of the following serves as the cathode in the manufacture of NaOH?
A Mercury
B Graphite
C Copper
D Platinum

43. Which of the following is a disadvantage of using soap?
A It is an excellent cleaner in soft water
B It forms scum with hard water
C It is non-toxic to aquatic life
D It is biodegradable

44. The polymer made from hexane -1, 6-diamine and hexane-1, 6-dioic acid is
A Nylon
B Terylene
C Polyethene
D Perspex

45. What is the concentration of the solution formed by dissolving 16g of NaOH in 250cm^3 solution (MM of NaOH=40g/mol)
A 16M
B 1.6M
C 0.16M
D 40M

46. The electronic configuration of an element, M, is 2, 8, 2. Identify the group to which M belongs.
A Group II
B Group VII
C Group VIII
D Group III

47. How does a catalyst increase the rate of a reaction?
A By decreasing the kinetic energy
B By increasing the activation energy
C By making the product more stable
D By lowering the activation energy

48. Identify the homologous series with the general Molecular formula C_nH_{2n+2}
A Alkenes
B Alkanes
C Alkynes
D Alkanols

49. The volume of a fixed mass of a gas is inversely proportional to pressure at constant temperature. Which laws explains this behavior?
A Charles' law
B Dalton's law
C Boyle's law
D Avogadro's law

50. Identify the raw materials for the contact process.
A Sulphur and water
B Sulphur trioxide and water
C Sulphur and oxygen
D Sulphur dioxide and water

STOP

GO BACK AND CHECK YOUR WORK