

0515 CHEMISTRY 1

JUNE 2020

ORDINARY LEVEL

Centre Number	GCE REVISION
Centre Name	
Candidate Identification No.	<a href="http://www.gcerevision.com">http://www.gcerevision.com</a>
Candidate Name	

Mobile phones are NOT allowed in the examination room.  
**MULTIPLE CHOICE QUESTION PAPER**

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.

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

Before the examination begins:

- Check that this question booklet is headed "Ordinary Level -0515 Chemistry 1"
- Fill in the information required in the spaces above.
- 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

- Answer ALL the 50 questions in this Examination.
- Calculators are allowed.
- 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]
- 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.
- 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.
- Do all rough work in this booklet using the blank spaces in the question booklet.
- 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**

Relative Atomic Masses	1 Faraday = 96000 Coulombs.
Hydrogen (H) = 1.0	Molar volume of any gas at r.t.p = 24000cm <sup>3</sup> ,
Sodium (Na) = 23.0	Molar volume of any gas at s.t.p = 22400 cm <sup>3</sup> ,
Carbon (C) = 12.0	Avogadro number = 6.02x10 <sup>23</sup>
Oxygen (O) = 16.0	Specific heat capacity of water = 4.2 J g <sup>-1</sup> °C <sup>-1</sup>
Copper (Cu) = 64.0	
Potassium (K) = 39.0	
Sulphur (S) = 32.0	

Turn Over

1. A uniform mixture of a solute and solvent is called  
 A Aqueous solution  
 B Standard Solution  
 C Solution  
 D Saturated solution
- 
2. Which of the following elements is stored under paraffin oil?  
 A Phosphorus  
 B Potassium  
 C Aluminium  
 D Zinc
- 
3. What name is given to the reaction that occurs when hydrochloric acid and potassium hydroxide react?  
 A Neutralization reaction  
 B Addition reaction  
 C Displacement reaction  
 D Decomposition reaction
- 
4. Which of the following pairs constitutes a major cause of acid rain?  
 A  $\text{CO}_2$  and  $\text{NO}_2$   
 B  $\text{CO}$  and  $\text{SO}_2$   
 C  $\text{SO}_2$  and  $\text{CO}_2$   
 D  $\text{NO}_2$  and  $\text{SO}_2$
- 
5. Identify the hydrocarbon which will rapidly decolourize bromine water when it is bubbled through it.  
 A Ethane  
 B Propene  
 C Butane  
 D Propane
- 
6. Which of the following reactions will NOT occur?  
 A  $\text{Cl}_{2(g)} + 2\text{KI}_{(aq)} \longrightarrow 2\text{KCl}_{(aq)} + \text{I}_{2(aq)}$   
 B  $\text{Br}_{2(g)} + 2\text{KI}_{(aq)} \longrightarrow 2\text{KBr}_{(aq)} + \text{I}_{2(aq)}$   
 C  $\text{I}_{2(aq)} + 2\text{KBr}_{(aq)} \longrightarrow 2\text{KI}_{(aq)} + \text{Br}_{2(aq)}$   
 D  $\text{Cl}_{2(aq)} + 2\text{KBr}_{(aq)} \longrightarrow 2\text{KCl}_{(aq)} + \text{Br}_{2(aq)}$
- 
7. Identify an enzyme that catalyzes the conversion of glucose to ethanol  
 A Zymase  
 B Diastase  
 C Maltase  
 D Invertase
- 
8. Calculate the percentage by mass of water of crystallization in hydrated copper(II) sulphate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ . (RMM=250)  
 A 50.6%  
 B 7.2%  
 C 10.1%  
 D 36.0%

9. Equilibrium is said to be attained when:  
 A products are being formed rapidly  
 B the forward and backward reactions are taking place at the same time  
 C the rate of forward and backward reactions is the same.  
 D reactants are being used up at the same time

10. Determine the oxidation state of iron in  $\text{Fe}_2\text{O}_3$   
 A +2  
 B +3  
 C -3  
 D 3

11. Select the appropriate reagents and reaction conditions for the preparation of  $\text{Cl}_2$  in the laboratory.  
 A  $\text{KMnO}_4$ ,  $\text{H}_2\text{SO}_4$  and heat  
 B  $\text{H}_2\text{SO}_4$ ,  $\text{NaCl}$ ,  $\text{MnO}_2$  and heat  
 C  $\text{H}_2\text{SO}_4$ ,  $\text{NaCl}$  at Room temperature  
 D Conc  $\text{HCl}$ ,  $\text{H}_2\text{SO}_4$  at Room temperature

12.  $\text{NH}_3$  is collected in the laboratory  
 A by upward delivery  
 B by downward delivery  
 C by upward displacement  
 D over water

Questions 13 – 15 concern the following gases:

- A  $\text{CO}$   
 B  $\text{HCl}$   
 C  $\text{CO}_2$   
 D  $\text{Cl}_2$

Each gas could be selected once, more than once or Not at all.

Select from A to D:

13. An irritating gas which bleaches damp litmus paper

A B C D

14. A colourless, tasteless, poisonous gas

A B C D

15. A gas used in fire extinguishers

A B C D

16. What mass of solid  $\text{Na}_2\text{CO}_3$  is needed to prepare  $250\text{cm}^3$  of  $0.1\text{M}$   $\text{Na}_2\text{CO}_3(\text{aq.})$  (RMM  $\text{Na}_2\text{CO}_3=106$ )
- A 2.65g  
B 42.2g  
C 0.025g  
D 26.5g

**Questions 17 – 20**

**Instructions:** Each question consists of a statement in the left-hand column followed by another 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 the **CORRECT EXPLANATION** of the first,  
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 Summarized		
	First statement	Second statement
A	True	True, second statement is the correct explanation of the first
B	True	True, second statement is NOT a correct explanation of the first
C	True	False
D	False	True

	First Statement	Second Statement
17.	Sodium chloride solution is a strong electrolyte	Sodium chloride ionises completely in solution
18.	Concentrated sulphuric acid increases in volume when exposed to air	Concentrated sulphuric acid is dehydrating
19.	Vanadium is in Group V of the periodic table	Vanadium (V) oxide is used in the conversion of $\text{SO}_2$ to $\text{SO}_3$ in the Contact Process
20.	Petrol is a hydrocarbon which contains between 5-10 carbon atoms	Fractional distillation is used to isolate petrol from crude oil.

21. Which one of the following is an amphoteric oxide?
- A  $\text{Na}_2\text{O}$   
B  $\text{Al}_2\text{O}_3$   
C  $\text{NO}_2$   
D  $\text{CO}$

22. Select a property of a covalent compound from the following:
- A An electrolyte in solution  
B A conductor in the solid state  
C Made up of molecules  
D Contains ions

23. Choose a pair of electronic configurations that represents two metal atoms in the same period of the periodic table
- |   | Atom 1  | Atom 2  |
|---|---------|---------|
| A | 2,3     | 2,4     |
| B | 2,8,1   | 2,8,5   |
| C | 2,8,8   | 2,8,7   |
| D | 2,8,8,1 | 2,8,8,2 |

24. Condensation is a change of state from:
- A gas to liquid  
B gas to solid  
C liquid to gas  
D solid to gas

25. Charles' law can be represented mathematically as:
- A  $P \propto \frac{1}{V}$   
B  $P \propto V$   
C  $V \propto T$   
D  $T \propto \frac{1}{V}$

26. In which of these substances can Hydrogen bonding occur?
- A Water  
B Oxygen  
C Hydrogen  
D Helium

27. Calculate the quantity of electricity in coulombs used when a current of  $1.5\text{A}$  is passed through an electrolyte for 1 hour 20mins.
- A 120C  
B 7200C  
C 180C  
D 720C

28. The following substances are deliquescent **EXCEPT**
- A  $\text{NaOH}$   
B  $\text{KCl}$   
C  $\text{MgCl}_2$   
D  $\text{CaCl}_2$

29. What happens when a few drops of water are added to anhydrous copper(II) Sulphate?
- The blue crystals dissolve in water
  - The white powder does not dissolve in water
  - The blue crystals crumble to form a white paste
  - The white powder turns into blue crystals

30. If the first and second burette readings during a titration are  $5\text{cm}^3$  and  $17.3\text{cm}^3$  respectively. Determine the volume of liquid used to reach the end point.
- $17.3\text{cm}^3$
  - $22.3\text{cm}^3$
  - $12.3\text{cm}^3$
  - $5.0\text{cm}^3$

**Questions 31 – 32**

Study the table below which concerns some chemical tests performed on solutions of salt X and salt Y, and then answer the questions that follow:

Salt	Colour of solution	Flame test	Adding dilute HCl	Adding $\text{BaCl}_2(\text{aq})$
X	Colourless	Golden yellow flame	Effervescence, Turns lime water milky	White ppt
Y	Colourless	Brick red	No effect	White ppt

31. Identify the cation and the gas given off for salt X
- $\text{Na}^+$  and  $\text{CO}_2$
  - $\text{Ca}^{2+}$  and  $\text{CO}_2$
  - $\text{Na}^+$  and HCl
  - $\text{Ca}^{2+}$  and HCl

32. Identify salt Y
- $\text{Na}_2\text{SO}_4$
  - NaCl
  - $\text{CaCl}_2$
  - $\text{CaSO}_4$

33. A compound contains 85.5% C and 14.3% H only. Determine its empirical formula.
- $\text{C}_2\text{H}_4$
  - $\text{CH}_2$
  - $\text{C}_2\text{H}$
  - $\text{C}_2\text{H}_2$

34. A mole of  $\text{CO}_2$
- 1g  $\text{CO}_2$
  - $24000\text{cm}^3$  of  $\text{CO}_2$  at r. t. p.
  - $24\text{dm}^3$  of  $\text{CO}_2$  at s.t.p.
  - $6.02 \times 10^{22}$  molecules of  $\text{CO}_2$

**Questions 35 – 37**

Instructions: Each question is followed by four responses numbered 1-4. One or more of these responses is (are) correct. Decide which response(s) is(are) correct then choose

- If only 1, 2 and 3 are correct
- If only 1 and 3 are correct
- If only 2 and 4 are correct
- If only 4 is correct

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

35. Calcium carbonate is a raw material used for
- the extraction of iron
  - making glass
  - the production of cement
  - the extraction of aluminium

36. A gas or gases that is (are) responsible for global warming is(are):

- Sulphur dioxide
- Methane
- Ozone
- Carbon dioxide

37. Consider the reaction:
- $$\text{Zn}(\text{s}) + 2\text{HCl}(\text{aq}) \longrightarrow \text{ZnCl}_2(\text{aq}) + \text{H}_2(\text{g})$$

The rate of the reaction will be affected by a change in:

- temperature
- surface area
- concentration
- light intensity

38. Select the electronic configuration of  ${}_{19}^{39}\text{K}^+$  ion.
- 2,8,81
  - 2,8,8,2
  - 2,8,18,8,3
  - 2,8,8

39. Determine the number of each type of atom present in  $(\text{NH}_4)_3\text{PO}_4$

	No. of atoms of N	No. of atoms of H	No. of atoms of P	No. of atoms of O
A	1	4	3	4
B	3	12	1	4
C	1	4	1	4
D	3	12	3	4

40. The most abundant component of air is
- $\text{O}_2$
  - $\text{H}_2\text{O}$
  - $\text{N}_2$
  - He

41. The following equilibrium reaction represents the industrial production of ammonia.  

$$\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)} \quad \Delta H = -92 \text{ kJ mol}^{-1}$$
 If the temperature is increased, the equilibrium position will  
 A Shift to the right  
 B Shift to right then to the left  
 C Not change  
 D Shift to left
- 
42. Which of the following is an oxidizing agent used in the treatment of water?  
 A  $\text{Cl}_2$   
 B  $\text{H}_2\text{O}_2$   
 C  $\text{MnO}_2$   
 D  $\text{Ca(OH)}_2$
- 
43. Choose a characteristic of alkaline earth metals.  
 A They do form nitrites on combination with nitrogen.  
 B Their hydroxides are stable to heat  
 C Their carbonates decompose on heating  
 D Their nitrates decompose to nitrites and oxygen
- 
44. In an exothermic reaction,  
 A the energy content of the reactants is more than that of the products  
 B heat is absorbed from the environment.  
 C the temperature of the environment drops after the reaction  
 D the energy required to break bonds in reactants is greater than the energy released when new bonds are formed in products.
- 
45. Members of a homologous series have the following characteristics EXCEPT  
 A Have a general molecular formula  
 B Show similar chemical properties  
 C Can be obtained by a general method of preparation  
 D Have the same physical properties
- 
46. Which of the following is not true of detergents?  
 A are natural polymers  
 B have cleansing properties  
 C are made from petroleum products  
 D are not affected by hard water
- 
47. Which of the following pH values best describes the pH of an aqueous solution of NaOH?  
 A 2  
 B 7  
 C 12  
 D 8
- 
48. Which of these will burn with the most luminous and sooty flame?  
 A  $\text{C}_3\text{H}_8$   
 B  $\text{C}_3\text{H}_4$   
 C  $\text{C}_4\text{H}_{10}$   
 D  $\text{C}_3\text{H}_7\text{OH}$
- 
49. Why is it recommended to use a polythene cup in determining the heat of neutralization?  
 A It reduces heat loss by convection  
 B It eases observation because it is transparent.  
 C It will not break if it falls.  
 D It reduces heat loss by conduction
- 
50. Which of the following fuels is most environmentally friendly?  
 A Hydrogen  
 B Butane  
 C Coal  
 D Fire wood
- 

**STOP**  
**GO BACK AND CHECK YOUR WORK**