MARKER CODE

Student Personal Identification Number

Solomon Islands National Form Six School Certificate

2018

CHEMISTRY
QUESTION AND ANSWER BOOKLET

WEDNESDAY 14th NOVEMBER 2:00 PM TIME: 3 Hours Plus 10 Minutes Reading Time.

INSTRUCTION

1. This Exam Paper consists of TWO (2) sections. **ATTEMPT ALL QUESTIONS.**

		MARKS	TIME
SECTION A:	Multiple Choice Questions	40	36 minutes
SECTION B:	Q21: Atomic Structure and Bonding	24	21 minutes
	Q22: Quantitative Chemistry	32	23 minutes
	Q23: Organic Chemistry	27	23 minutes
	Q24: More Organic Chemistry	17	17 minutes
	Q25: Inorganic Chemistry	16	18 minutes
	Q26: Oxidation and Reduction	16	18 minutes
	Q27: Principle of Physical Chemistry	28	24 minutes
TOTAL:		**200**	**180 minutes**

2. Write your **Student Personal Identification Number (SPIN)** on the top right hand corner of this page and at the top of the **fold-Out flap** on the last page at the end of this booklet.

3. Write all answers to the Multiple Choice Questions on the answer sheet on the **FOLD-OUT FLAP** on the last page.

4. In SECTION B, write the answers to the questions in the spaces provided in this booklet.

NOTE: A copy of the **Periodic Table of the Elements – Sheet** should be provided.
The symbol M is used for molar mass.
For example, M (Mg) = 24 g/mol, M (CO_2) = 44 g/mol and M (NH_3) = 17 g/mol

5. Do NOT use correction fluid.

6. Mobile phones are NOT allowed in the Examination room.

7. Check that this booklet contains pages **2-38** in the correct order and none of these pages is blank. **Page 37** has been left blank deliberately.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

SECTION A: MULTIPLE CHOICE QUESTIONS (40 MARKS)

Answer all the questions in this section. Write your best choice answer in the boxes of the fold-out flap provided on the back of this booklet. Each question is worth 2 marks.

1. The atoms of isotope Boron denoted by $^{11}_{5}B$ has a composition denoted by which row of the table below?

	Protons	Neutrons	Electrons
A	5	5	5
B	5	6	6
C	5	6	5
D	6	5	5

2. Which of the following molecules is a Tetrahedral?

   A. Water (H_2O)
   B. Methane (CH_4)
   C. Carbon dioxide (CO_2)
   D. Ammonia (NH_3)

3. Which of the following is true about the relationship between the Atomic radii and the first ionization energy of the elements, across period 3 in the periodic table?

	Atomic Radii	First Ionization (IE)
A.	Decrease	Decrease
B.	Decrease	Increase
C.	Increase	Decrease
D.	Increase	Increase

4. How many atoms are there in 18g of H_2O?

   A. 6×10^{23}
   B. 9×10^{23}
   C. 12×10^{23}
   D. 18×10^{23}

5. Nitrogen dioxide has the molecular formula NO_2 and a molar mass of 46g/mol. How much NO_2 (in moles) is present in 0.92kg of NO_2?

   A. 0.2
   B. 42.3
   C. 2.0
   D. 20.0

6. The mass of 0.2 moles of Calcium Oxide is: M (Ca) = 40 g/mol M (O) = 16 g/ mol.

   A. 1.9 g
   B. 19.2 g
   C. 1.2 g
   D. 11.2 g

7. 24.5 g of anhydrous Magnesium hydroxide is dissolved to a volume of 350 ml solution. The Molarity of the solution is:

   M (Mg) = 24 g/mol M (O) = 16 g/mol M (H) = 1 g/mol

   A. 0.21 mol/l
   B. 2.09 mol/l
   C. 20.8 mol/l
   D. 208.9 mol/l

8. Which of the following is the condense structural isomer of methyl propene?

   A. $CH_3CH_2CH_3$
   B. CH_2CHCH_3
   C. $CH_3CH_2CH_2CH_3$
   D. $CH_3CHCHCH_3$

9. What is the name of the reaction used to produce ethane from ethene and the process occurring when polyvinyl chloride is made from vinyl chloride?

	Reaction	**Process**
A	Addition	Polymerization
B	Substitution	dehydration
C	Addition	Saturation
D	Substitution	Polymerization

10. Bromine water test is used as a positive test to determine _____ compound as the color _____.

	Compound	**Reaction**
A	hydrocarbon	change to colorless
B	saturated hydrocarbons	remains the same (brown)
C	unsaturated hydrocarbons	change to colorless
D	Aromatic	change colorless to brown

11. A propanol when undergoes reaction with acidified potassium dichromate solution forms an intermediate product called _____ and fully oxidized to _____.

	Intermediate product	**Main product**
A.	Propanoic acid	Propanone
B.	Propanoic acid	Propanal
C.	Propene	Propanol
D.	Propanal	Propanoic acid

12. The general formula for an Ketone compound is:

A. R—CO—OH
B. R—O—R’
C. R—CO—OR’
D. R—CO—H

13. The process used to produce ethyl propanoate ester is an example of _____ reaction.

    A. Redox
    B. Neutralization
    C. Saponification
    D. Condensation

14. Which Oxide compound has the highest melting point?

    A. Na_2O
    B. Al_2O_3
    C. P_4O_{10}
    D. SO_3

15. According to your study on solubility rules, what is the precipitation formed when solution Barium chloride and Sodium carbonate react?

    A. $BaCl_2$
    B. Na_2CO_3
    C. $BaCO_3$
    D. NaCl

16. What is the oxidation number of chromium in dichromate ion ($Cr_2O_7^{2-}$)?

    A. $^{+}6$
    B. $^{+}7$
    C. 6^{+}
    D. 7^{+}

17. Which one of the following is a Reduction reaction? (The equations are not balanced).

    A. $2I^- \longrightarrow I_2$
    B. $MnO^{4-} \longrightarrow Mn^{2+}$
    C. $C \longrightarrow CO_2$
    D. $Zn \longrightarrow Zn^{2+}$

18. Which of the following is TRUE about Exothermic process?

A. Reactants and products have the same energy.
B. The products contain more energy than the reactant.
C. The reactants contain more energy than the product.
D. The surrounding of the reactant vessel decrease in temperature as the reaction proceeds.

19. The reaction for the combustion of carbon monoxide is:

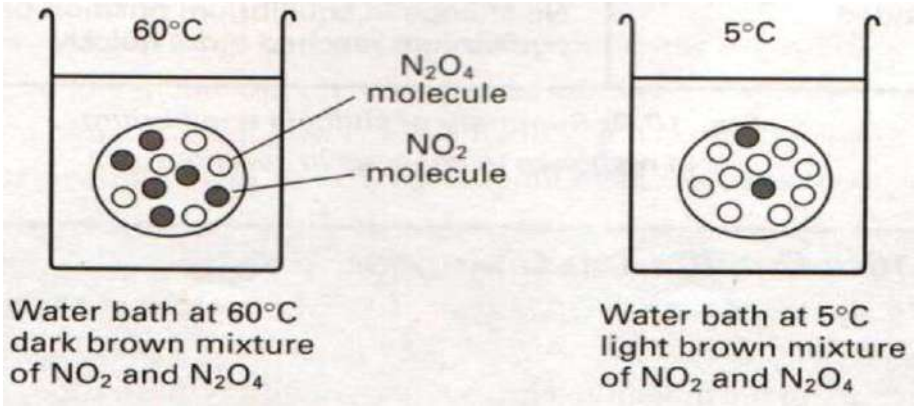
$2CO_{(g)} + O_{2(g)} \longrightarrow 2CO_{2(g)}$; $\Delta H = -566kJ$

The heat energy released when one mole of carbon monoxide burn is;

A. 566 kJ
B. 283 kJ
C. 620 kJ
D. 1560 kJ

20. The equation represent the equilibrium system due to change of temperature:

$N_2O_{4(g)} \rightleftharpoons 2\,NO_{2(g)} \quad \Delta H = {}^{+}54kJ$



The above equation represents which situation?

A. Decrease temperature and endothermic direction.
B. Increase temperature and exothermic direction.
C. Decrease temperature and exothermic direction.
D. Increase temperature and endothermic direction.

SECTION B: SHORT ANSWER QUESTIONS (160 MARKS)

Answer questions (21 - 27) in the space provided. All calculations must be showed as required by each question.

QUESTION 21: ATOMIC STRUCTURES AND BONDING [24 MARKS]

A. Periodic Table

1. Write the electron configuration for the atom and ion below using s, p, d, f notation.

   i. F _____

   ii. Mg^{2+} _____

   (2 marks)

2. From question 1, identify and explain which of them is more stable.

   Name and give the reason for your answer.

   (i) Name: _____

   (1 mark)

   (ii) Reason: _____

   _____

   (1 mark)

3. Identify and circle the phrase below that best describes the **relationship** between the size of the fluoride ion and magnesium ion**.**

   i. F^- is larger than Mg^{2+} F^- is the same as Mg^{2+} F^- is smaller than Mg^{2+}

   (1 mark)

ii. Explain the reason for your answer.

_____

_____

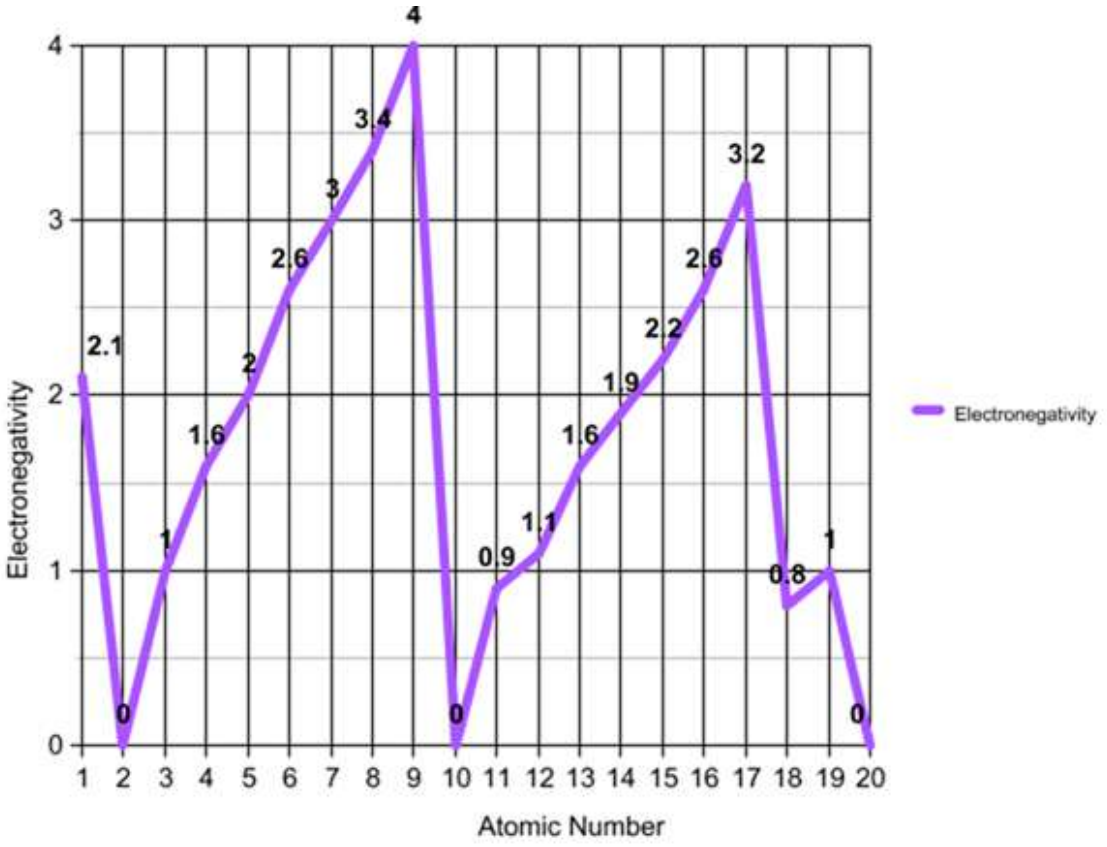
_____

_____

(2 marks)

4. Electronegativity is a measure of the tendency of an atom to attract a bonding pair of electrons.

Study the first 20 element's electronegativity below and answer the follow up questions (i – iii).



i. Explain the trend across the Periodic Table.

_____

_____

_____

(2 marks)

ii. Explain the trend down the Group.

_____

_____

_____

(2 marks)

iii. Explain why the stable elements according to the electronegativity graph above are given the same value.

_____

_____

_____

(2 marks)

B. Structure and Bonding

1. **Study the information in the table and write the answers in the spaces provided below**.

Column A	**Column B**	**Column C**	**Column D**
Compound	**Interaction**	**Melting point**	**Type of solid**
Sodium chloride	Ionic	High	Ionic
Discrete Carbon dioxide	London dispersion	**i**	Molecular
Magnesium	Metallic Bonding	High	Metallic
Silicon dioxide	Covalent Bonding	High	**ii**

Missing words/ properties

(i) _____

(ii) _____ (2 marks)

2. Differentiate the following **terms** with relevant examples.

(i) Intra molecular and inter molecular forces

_____

_____

_____

(2 marks)

(ii) Van der waal forces and Hydrogen forces

_____

_____

_____

(2 marks)

(iii) Polar and Non-polar covalent bonds

_____

_____

_____

(2 marks)

C. Shapes of Molecules

1. Determine the geometry shape of Tetrachloroethane (CCl_4) molecule.

(i) Shape _____

(1 mark)

(ii) Give reasons for your answer in C.1 (i) above.

_____

_____

_____

(2 marks)

QUESTION 22: QUANTITATIVE CHEMISTRY [32 MARKS]

A. Moles and Molar Mass

1. Every ion, atom, molecule and compounds contain 6.02×10^{23}, which is the Avogadro's number (N_A).

   i. Using the N_A to find the amount of potassium ions in 1.8×10^{24} of potassium nitrate.

(2 marks)

2. A 2.3 moles of Aluminum oxide (Al_2O_3) is used in a class experiment.
   M (Al) = 27.0 g/mol, M (O) = 16.0 g/mol

   i. Calculate the mass of the oxide.

(2 marks)

B. Empirical and Molecular Formulae

1. The percent composition of a compound is a relative measure of the mass of each different element present in the compound.

   i. Calculate the percentage of sodium in caustic soda (NaOH).
   M (Na) = 23.0 g/mol, M (O) =16 g/mol, M (H) =1.0 g/mol

(2 marks)

2. A compound contains 19.3% Na, 26.9% S and 53.8% O. Its molar mass is 238.0 g/mol.
   M (Na) = 23.0 g/mol, M (S) = 32.1 g/mol, M (O) = 16.0 g/mol

   i. Calculate the moles of each element.

(2 marks)

   ii. Calculate the Empirical formula of the Compound.

(2 marks)

iii. Determine the Molecular formula of the Compound.

(2 marks)

C. Stoichiometry Reactions

1. **Use the equation below to answer questions (i and ii).**

$Mg_{(s)} + HCl_{(aq)} \longrightarrow MgCl_{2\,(aq)} + H_{2\,(g)}$

i. How many grams of magnesium chloride will form if 3.6g of Magnesium is reacted with hydrochloric acid? Assuming, magnesium is the limiting reactant.

M (Mg) = 24.0 g/mol, M (Cl) = 35.5 g/mol, M (O) = 16.0 g/mol

(2 marks)

ii. Calculate the theoretical mole of hydrochloric acid that have being used?

(2 marks)

2. Calcium burns in air to form Calcium oxide. The equation for the reaction is:

$Ca_{(s)} + O_{2(g)} \longrightarrow CaO_{(s)}$

M (Ca) = 40.0 g/mol, M (O) = 16.0 g/mol

A student weighed out 4.8g of calcium and burned it.

i. Rewrite and balance the above equation.

(1 mark)

ii. Find the amount of calcium used.

(1 mark)

iii. Calculate the mass of calcium oxide produced in the reaction.

(2 marks)

D. Acids and Bases

1. Preparation of primary standard solutions.

   i. Write the correct steps of how to prepare a standard solution in the science laboratory.

      a. _____

      b. _____

      c. _____

      d. _____

(4 marks)

2. A student was asked to prepare a standard solution of 0.2 mol/L sodium carbonate (Na_2CO_3) using 100 ml volumetric flask.

   M (Na) = 23.0 g/mol M (C) = 12.0 g/mol M (O) = 16.0 g/mol

   i. Calculated the mass of sodium carbonate the student should weigh;

(2 marks)

3. The prepared 0.2 mol/L of sodium carbonate is used to standardize the 20.0 ml of diluted citric acid (lemon juice). The table below provides the volumes of sodium citrate used in the titration. Citric acid has a molar mass of 192.1 g/mol.

$$Na_2CO_{3\,(aq)} + C_6H_8O_{7\,(aq)} \longrightarrow Na_3C_6H_5O_{7\,(aq)} + H_2O_{\,(l)} + CO_{2\,(g)}$$

Titration	**Burette reading in ml**		**Titre volume (ml)**
	Initial	**final**	
1(Pilot)	0.0	23.3	23.3
2	23.3	46.2	22.9
3	0.0	22.8	22.8
4	22.8	45.6	22.8

i. Find the average volume.

(1 mark)

ii. Calculate the diluted concentration of Citric acid (mol/L).

(3 marks)

iii. Calculate the Original concentration (mol/L) if 20.0 ml of original lemon juice is diluted into 100.0 ml of the solution.

(2 marks)

QUESTION 23: ORGANIC CHEMISTRY [27 MARKS]

A. Nomenclature

1. **Write the names and structural formulas of the following organic compounds.**

Compound	Name	Structural Formula
$CH_3CH_2CH_3$		
$CH_3CH_2CH_2CHBrCH_2Br$		
$CH_3CH_2CH_2CH_2CO_2H$		

(6 marks)

2. Define the following **terms:**

   i. Structural isomer

   _____

   (1 mark)

   ii. Functional group

   _____

   (1 mark)

   iii. Saturated hydrocarbon

   _____

   (1 mark)

B. Chemical Reactions

1. The unsaturated hydrocarbons can undergo substitution reactions.

   i. Name the products form.

      a. Hydrogenation (H_2) of Ethene.

         Product: _____

         (1 mark)

      b. Fluorination (F_2) of propene.

         Product: _____

         (1 mark)

      c. Hydration (H_2O) of Butene

         Product: _____

         (1 mark)

2. How do primary, secondary and tertiary alcohols differ in their reactions with acidified potassium dichromate solution ($Cr_2O_7^{2-}/H^+$)?

   i. Primary alcohol: _____

   (1 mark)

   ii. Secondary alcohol: _____

   (1 mark)

   iii. Tertiary alcohol: _____

   (1 mark)

3. The Benedict Test is used to differentiate the aldehyde from the ketones. Little amount of a benedict solution is heated with glucose solution in a water bath**.**

i. Explain the changes in the observation.

_____

_____

_____

(2 marks)

ii. Identify the TWO (2) substances that cause the color change.

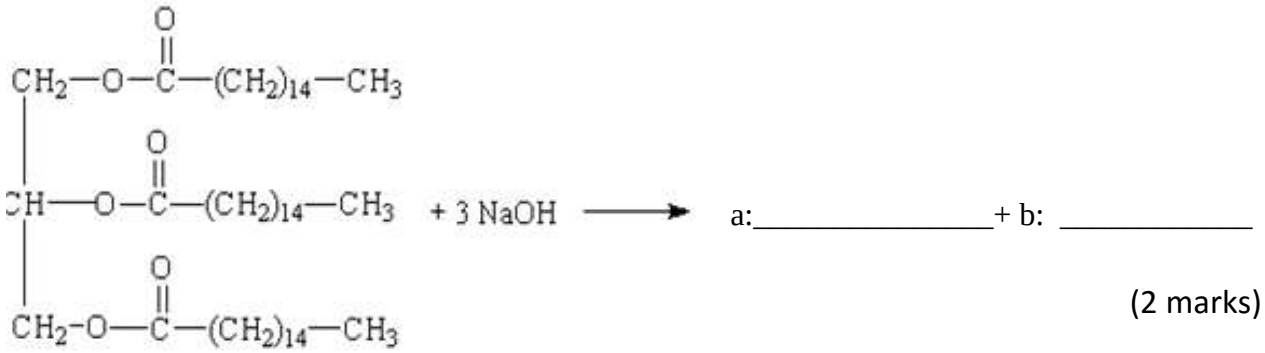
_____

_____

(2 marks)

C. Carbonyl Compounds

1. Soap making involves the alkaline hydrolysis of triesters of glycerol.



(2 marks)

Triglyceride

i. Complete the above hydrolysis by writing the balanced condense structural formula of the palmitate soap and glycerol in the space provided.

ii. Describe how soap as a cleaning agent.

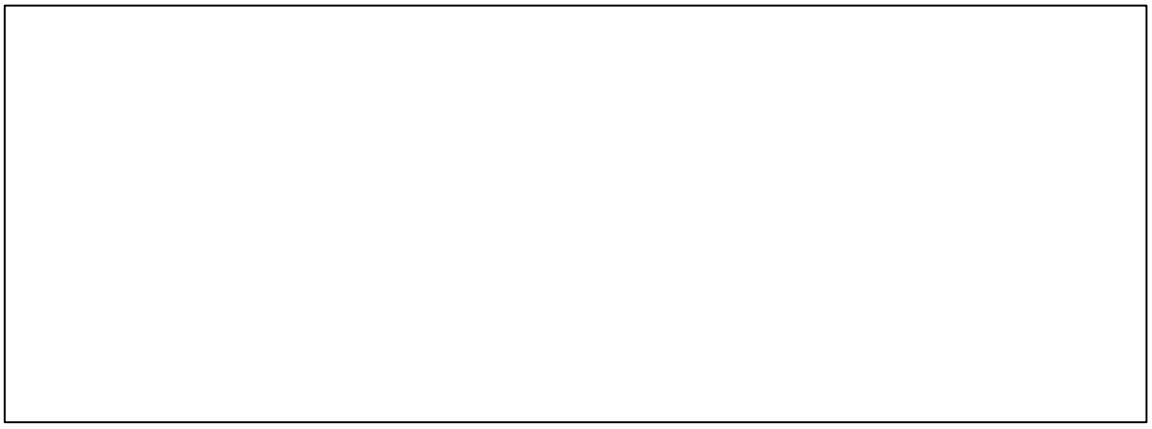
_____

_____

_____

(2 marks)

iii. Draw the general structure of the soap and label as the hydrophilic and hydrophobic.



(2 marks)

iv. Describe how the soap behaves in hard and soft water.

_____

_____

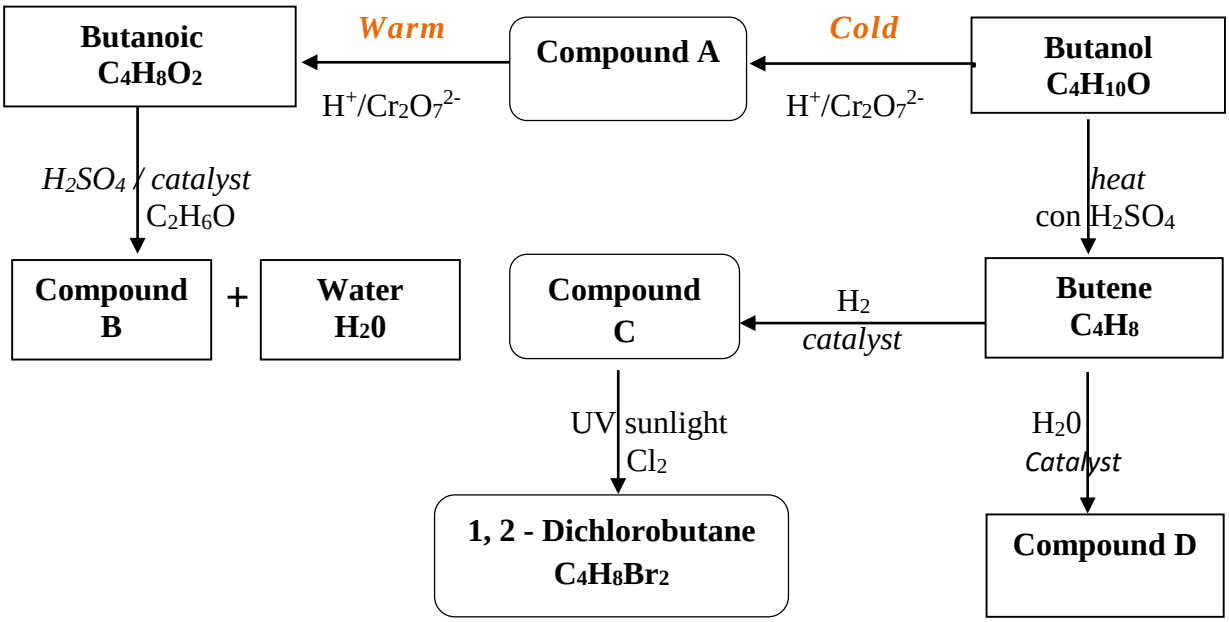
_____

(2 marks)

QUESTION 24: MORE ORGANIC CHEMISTRY [17 MARKS]

A. Organic compound synthesis reactions

1. **Study the diagram and answer the associated questions (1 and 2) below.**



i. Give the **correct** name for the following Organic compounds.

a. Compound A _____

b. Compound B _____

c. Compound C _____

d. Compound D _____

(4 marks)

2. **Compound A** has a carbonyl carbon. In fact, to conduct a test for this compound, Tollen's test is normally used. Give the positive tests for compound A when using;

   i. Tollen test.

      a. Color and positive test

      _____

      (1 mark)

      b. Brief explain what happens to compound A during the reaction / test.

      _____

      _____

      _____

      (2 marks)

   ii. Draw the structural formula (SF) of compound A in the space provided below.

SF:

(2 marks)

3. **Compound B** is produced as a result of a carboxylic acid reacting with an alcohol in the presence of few drops of concentrated sulfuric acid.

i. Write the balanced equation for the formation of compound B.

Equation:

(2 marks)

ii. In the esterification reaction the refluxing process is used. Explain how efficient this process for the production of esters.

_____

_____

_____

(2 marks)

iii. Explain the role of the concentrated sulfuric acid (H_2SO_4) in the above reaction.

_____

_____

_____

(2 marks)

4. Give the observation for the reaction occurring when **Compound D** is warmed with;

i. Potassium permanganate.

_____

_____

(1 mark)

ii. Potassium dichromate.

_____

_____

(1 mark)

QUESTION 25: INORGANIC CHEMISTRY [16 MARKS]

A. Properties of Period 3 Compounds

1. The table showing the elements of Period 3 Oxides. Use the table to answer questions (i and ii).

Element	**Na**	**Mg**	**Al**	**Si**	**P**	**S**
Chloride	NaCl	$MgCl_2$	$AlCl_3$	**a**	PCl_3	SCl_2
Acid-Base behavior	neutral	neutral	**b**	← acidic →		
Melting point (°C)	801	712	Sublimes At 180	-70	-91	-80
Conductivity	**c**	In aqueous & molten		←non conductors →		

i. Complete the table by writing the answers on the spaces provided below.

a. _____

b. _____

c. _____

(3 marks)

ii. Explain the huge difference between the melting points of NaCl and PCl_3**.**

_____

_____

_____

(2 marks)

2. Chlorine is found mainly as part of ionic compounds. For example, sodium chloride is found as large deposits called rock salt or dissolved in seawater from which it can be extracted by evaporation.

   i. State at least TWO (2) physical properties of Chlorine.

      a. _____

      b. _____

      (2 marks)

   ii. Chlorine reacting with water to produce acidic solution known as Hydrochloric and hypochlorous acids. Write the chemical equation of the reaction.

Equation:

(2 marks)

B. Solubility and Precipitation

1. The table below shows different ions, their tests and results.

Ion	Test reagent	Test Results
Iron (III) Fe^{3+}	**i**_____	Orange-brown precipitate
ii_____	Few drops of HCl and $BaCl_2$	White precipitate
Silver (Ag^+)	Dilute Sodium hydroxide (NaOH)	**iii**_____
iv_____	Dilute nitric acid and $AgNO_3$ solution	Pale yellow precipitate

(4 marks)

2. A lab technician forgets to put labels on $[Cu(NH_3)_4]^{2+}$ and $[Al(OH)_4]^-$ ions samples. The content of the test tube 1 looks colorless and test tube 2 looks blue.

   i. Give the name given to the $[Cu(NH_3)_4]^{2+}$ and $[Al(OH)_4]^-$ ions

   _____

   (1 mark)

   ii. Which test tube and color contains:

      a. $[Cu(NH_3)_4]^{2+}$ ions? _____

      (1 mark)

      b. $[Al(OH)_4]^-$ ions? _____

      (1 mark)

QUETION 26: OXIDATION AND REDUCTION [16 MARKS]

A. Oxidation State

1. Redox reaction is a chemical reaction in which the oxidation states of atoms are changed. Such reaction involves both a reduction process and oxidation process. The nature of this reaction also demands using of appropriate terms.

   i. Define the following **terms:**

      a. Oxidation number

      _____

      _____

      (1 mark)

      b. Reduction reaction

      _____

      _____

      (1 mark)

   ii. Determine the trend of oxidation number of Mn in the equation,
   $MnO_4^- \longrightarrow Mn^{2+}$.

      (2 marks)

B. Oxidant and Reductant

1. Clear understanding of the nature of redox reaction will pave way to distinguish the oxidation and reduction half equations.

   i. Define these **terms:**

      a. Oxidizing agent

      _____

      (1 mark)

      b. Reducing agent

      _____

      (1 mark)

2. Oxidation-reduction reactions have a number of similarities to acid-base reactions. Fundamentally, redox reactions are a family of reactions that are concerned with the transfer of electrons between species.

   Study the oxidation-reduction reaction below and do the follow up questions.

   $Cu^{2+}_{(aq)} + SO_{2\,(aq)} \longrightarrow Cu_{(s)} + SO_4^{2-}{}_{(aq)}$

   i. Write and balance the;

      a. Reduction half equation

      _____

      _____

      _____

      (2 marks)

      b. Oxidation half equation.

      _____

      _____

      _____

      (2 marks)

c. Overall equation from (a) and (b)

_____

_____

_____

(2 marks)

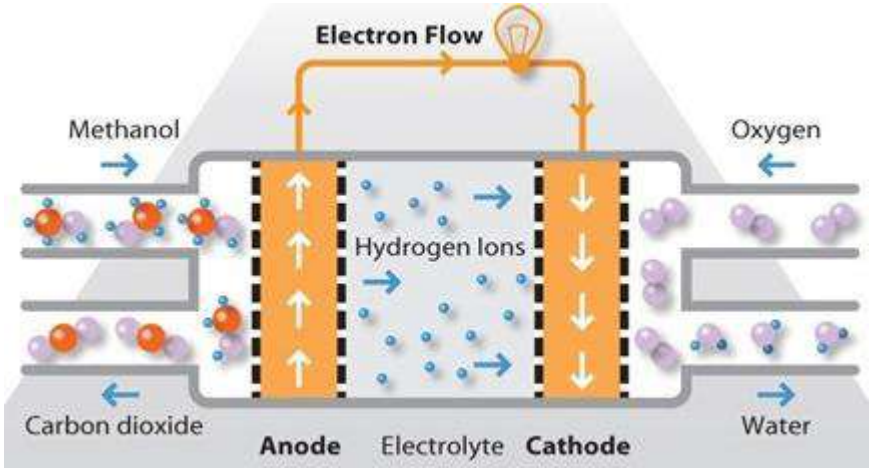
C. Fuel Cell

1. The Direct-methanol fuel cell (DMFCs) is subcategory of proton-exchange fuel cells in which methanol is used as the fuel. The DMFC relies upon the oxidation of methanol on a catalyst layer to form carbon dioxide. Water is consumed at the anode and is produced at the cathode. The hybrid DMFC/ battery can used to power cell phones and 2-way radios

The equation below represents the reaction occurring in the methanol fuel cell;

$CH_3OH + O_2 \longrightarrow CO_2 + H_2O$

Study the diagram below and answer questions (i and ii).



Describe what happens at the respective electrodes and support it with the right half redox equation.

i. Cathode.

_____

_____

_____

_____

(2 marks)

ii. Anode

_____

_____

_____

_____

(2 marks)

QUESTION 27: PRINCIPLES OF PHYSICAL CHEMISTRY [28 MARKS]

A. Energy Changes

1. The reaction of zinc metal with dilute hydrochloric acid gives out heat.

   i. Write a **balanced equation** for the reaction.

   _____

   _____

   _____

   (2 marks)

   ii. Which contains the most energy, reactant or product?

   _____

   (1 mark)

   iii. What is the sign of the enthalpy change (ΔH)?

   _____

   (1 mark)

   iv. What type of reaction is it?

   _____

   (1 mark)

v. Sketch an **energy diagram** for the reaction. Label products and reactant on the diagram.

(2 marks)

2. Hess's law states that the change of enthalpy in a chemical reaction is independent of the pathway between the initial and final states. In other words, the overall enthalpy change is the same regardless of the route by which the chemical change occurs.

i. Describe what will happen according to rule if a reaction is reversed according to Hess law's calculation of energy is concern.

_____

_____

(1 mark)

ii. What is the valve for ΔH for the following reactions?

$CS_{2\,(l)} + 3O_{2\,(g)} \longrightarrow CO_{2\,(g)} + 2\,SO_{2\,(g)}$

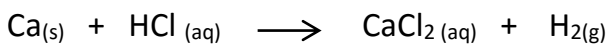
Given:

1) $C_{(s)} + O_{2\,(g)} \longrightarrow CO_{2\,(g)}$ $\Delta H = -393.5kJ$
2) $S_{2(s)} + O_{2\,(g)} \longrightarrow SO_{2\,(g)}$ $\Delta H = -296.8kJ$
3) $C_{(s)} + 2S_{\,(s)} \longrightarrow CS_{2\,(1)}$ $\Delta H = 87.9kJ$

(4 marks)

B. Rate of reaction

1. A student had investigated the rate of reaction between the calcium lump and hydro-chloric acid.



The experiments were carried out at a constant temperature.

Experiments	Mass of Ca lump (grams)	Volume of HCL (ml)	Concentration of HCl (mol/L)
1	6.0	25.0	0.5
2	6.0	25.0	1.0
3	6.0	25.0	2.0

i. Which reaction would be the fastest?

_____

(1 mark)

Give a reason for your answer.

_____

_____

(1 mark)

ii. State TWO (2) other factors that could be used to increase the rate of this reaction.

a. _____

_____

b. _____

_____

(2 marks)

C. Equilibrium system

1. In chemical reaction, chemical equilibrium is the state where both reactants and products are present in concentrations which have no further tendency to change with time. This is where the forward proceeds at the same rate as the reverse reaction.

   i. Explain what is the **Le Chatelier's** principle and its limitation.

   _____

   _____

   _____

   _____

   (2 marks)

   ii. For the equilibrium reaction, $PCl_{3\,(g)} + Cl_{2\,(g)} \rightleftharpoons PCl_{5\,(g)}$.

   Briefly explain the effect or shift of the equilibrium.

   a. Decreasing the pressure

   _____

   _____

   _____

   (2 marks)

   b. Adding of chlorine gas

   _____

   _____

   _____

   (2 marks)

   c. Adding a catalyst

   _____

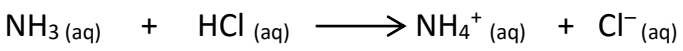
   _____

   _____

   (2 marks)

D. Acids and Bases

1. Identify the acid-base conjugates when ammonia (NH_3) reacting with hydrochloric acid (HCl). **Write the formula of**:



$NH_{3\,(aq)} + HCl_{\,(aq)} \longrightarrow NH_4^{+}{}_{(aq)} + Cl^{-}{}_{(aq)}$

i. Conjugate acid: _____

_____

ii. Conjugated base: _____

_____

(2 marks)

2. Complete the table below to show the hydronium in concentration [$\mathbf{H_3O^+}$**],** hydroxide ion concentration **[$\mathbf{OH^-}$]** and **pH** for the solutions.

Solution	[H_3O^+] mol/L	[OH^-] mol/L	pH
A	**i**._____	1.2×10^{-8}	6.1
B	1.2×10^{-11}	8.1×10^{-4}	**ii**. _____

(2 marks)

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SINF6 - CHEMISTRY 2018

Student Personal Identification Number

SECTION A:
Multiple Choice

1.		11.	
2.		12.	
3.		13.	
4.		14.	
5.		15.	
6.		16.	
7.		17.	
8.		18.	
9.		19.	
10.		20.	

SECTION	EXAM MARK	MARKER	SCRIPT CHECKER
A	40		
B.21	24		
B.22	32		
B.23.	27		
B.24	17		
B.25	16		
B.26	16		
B.27	28		
TOTAL MARK	200		
Marker/Checker Initials			