

Chemistry (theory)

Date: 13/06/2025

Period: 08:30 AM – 11:30 AM



END OF TERM III EXAMINATION, 2024-2025

QUESTION PAPER

GRADE : SENIOR ONE (S1)

LEVEL : ORDINARY

DURATION : 3 HOURS

MARKS :

/ 100

CAMIS (Theory + Practical)

/ 40

INSTRUCTIONS:

- 1) Write your identification on this answer sheet.
- 2) This paper consists of **Two** sections: **A** and **B**.
Section A: Attempt **All** questions. **(70 marks)**
Section B: Attempt any **Three** questions. **(30 marks)**
- 3) **You do not need a periodic table.**
- 4) Silent-non programmable calculators may be used.
- 5) Use only a **blue** or **black** pen for answering and a **pencil** for drawing.
- 6) For Multiple Choice Questions, **circle** a letter corresponding to the correct answer.
- 7) The marks to be recorded into CAMIS will result from the sum of theory and practical exam marks, that will be converted out of **40 marks**.

SECTION A: ATTEMPT ALL QUESTIONS**(70 marks)**

1) Circle a letter of the correct answer on each of the following questions.

i) What is the first thing you should do in case of fire outbreak in the laboratory? **(1 mark)**

- A) To try to put out the fire yourself.
- B) To alert everyone in laboratory and activate the nearest fire alarm.
- C) To close all windows and doors and continue your experiment.
- D) To continue working, as the fire will likely go out by itself.

ii) Where should chemicals be stored in the laboratory? **(1 mark)**

- A) In a well-ventilated storage cabinet, away from heat sources
- B) On the laboratory bench
- C) Under the sink
- D) On the floor

iii) In laboratory a separating funnel is used for: **(1 mark)**

- A) measuring the volume of liquids
- B) separating the miscible liquids based on their solubilities
- C) separating the immiscible liquids based on their densities
- D) mixing two liquids thoroughly

iv) Which is best recommended to pick up a hot glassware in laboratory? **(1 mark)**

- A) First cool it with cold water.
- B) Use tongs to pick it up.
- C) Use a paper towel for insulation.
- D) Pick it up by the part that looks cool.

v) What does the following laboratory safety symbol mean? **(1 mark)**



- A) Poisonous when inhaled or ingested
- B) Corrosive that can easily burn when in contact with the skin
- C) Laser radiations which can cause cancer
- D) Electric shock which can lead to death

2) Fill in the blank spaces of each of the following sentences with the provide terms: heterogeneous mixture, decanting, magnetic separation, homogenous mixture, centrifugation.

i) A mixture of iron filings and sand can be separated by use of _____ **(1 mark)**

- ii) _____ is a mixture in which the components are not evenly distributed, and its different parts can be easily distinguished. **(1 mark)**
- iii) A technique used to separate cream from milk is _____. **(1 mark)**
- iv) A mixture in which the components are evenly distributed throughout and are not easily distinguishable is known as _____. **(1 mark)**
- v) A technique used to separate water from oil is called _____. **(1 mark)**

3) Match each term in the column **A** with its corresponding definition in the column **B** of the table below. **(5 marks)**

SN	Column A	SN	Column B
i)	Atom	A)	It defines the position of an element in the periodic table and is equal to the number of protons in the nucleus of an atom.
ii)	Atomic number	B)	The smallest unit of matter that retains the properties of an element.
iii)	Mass number	C)	A group of two or more atoms bonded together, either of the same or different elements.
iv)	Molecule	D)	The total number of protons and neutrons in an atom's nucleus.
v)	Compound	E)	A substance made up of two or more different elements that are chemically bonded together in a fixed ratio.

4) Answer with **true** (T) or **false** (F) each of the following statements about wastes and their management.

- i) The vegetable peels are in the category of non-biodegradable solid wastes. **(1 mark)**
- ii) The sulphur dioxide is an example of liquid industrial waste. **(1 mark)**
- iii) The used needles and syringes at hospital, are examples of medical wastes. **(1 mark)**
- iv) The 3Rs applied in wastes management are **recycle**, **reuse** and **refund**. **(1 mark)**
- v) Electronic devices like old phones, old computers, are examples of non-biodegradable wastes. **(1 mark)**

5) Circle a letter of the correct answer on each of the following questions.

- i) Which one of the following is NOT a property of oxygen? **(1 mark)**
- A) It is denser than air.
- B) It is an inert gas.
- C) It is a colorless, odorless and tasteless gas at room temperature.
- D) It supports combustion but does NOT burn itself.
- ii) Which of the following is the chemical formula of ozone, a form that occurs in the stratosphere? **(1 mark)**

- A) O
B) O₂
- C) O₃
D) O₄

iii) Which of the following equations is correct for one of the preparation methods of oxygen? **(1 mark)**

- A) $\text{Na}_2\text{O}_2(\text{s}) + 4\text{H}_2\text{O}(\text{l}) \longrightarrow 3\text{NaOH}(\text{aq}) + 1/3\text{O}_3(\text{g})$
 B) $\text{Na}_2\text{O}_2(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{NaOH}(\text{aq}) + 1/2\text{O}_2(\text{g})$
 C) $\text{Na}_2\text{O}_2(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{NaOH}(\text{aq}) + 2\text{O}(\text{g})$
 D) $\text{Na}_2\text{O}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{NaOH}(\text{aq}) + \text{O}(\text{g})$

iv) Which two (2) of the following are the correct uses of oxygen? **(2 marks)**

- A) It is used as solvent.
 B) It is used in oxy-acetylene torches for welding and cutting metals.
 C) It is used in animals and humans for cellular respiration.
 D) It is used as fuel in cooking.

6) Circle a letter of the correct answer on each of the following questions.

i) Which two (2) of the following are the true applications of Chemistry?

(2 marks)

- A) Manufacture of biodegradable plastics
 B) Growing plants through photosynthesis
 C) Urban planning and development
 D) Synthesis of new drugs to fight diseases

ii) Which two (2) of the following are direct contributions of Chemistry to modern agricultural practices? **(2 marks)**

- A) Use of synthetic fertilizers and pesticides
 B) Testing the acidity and basicity of soil
 C) Prevention of soil erosion
 D) Practices of rotating crops

iii) Which one of the following is a direct contribution of Chemistry to transport? **(1 mark)**

- A) Developing of electric cars
 B) Construction of roads
 C) Synthesis of high-performance fuels
 D) Improvement of traffic signals

7) Answer with **true** (T) or **false** (F) each of the following statements about states of matter.

i) The process of transforming water vapor into water droplets refers to condensation. **(1 mark)**

ii) The direct transformation of solid carbon dioxide into gaseous carbon dioxide refers to freezing. **(1 mark)**

iii) The process of burning wood into ash is a chemical change. **(1 mark)**

iv) Dissolving sugar in hot tea is a physical change. **(1 mark)**

v) The particles of a gas have stronger forces of attraction between them and this is why they are very far apart of one another. **(1 mark)**

8) When balancing chemical equations, the law of conservation of matter is followed.

i) Which of the following describes correctly the law of conservation of matter?

(1 mark)

- A) The matter can be created and destroyed during chemical reactions.
- B) The total amount of matter decreases in a closed system during a reaction.
- C) Matter cannot be created nor destroyed, it only changes form.
- D) Energy is always lost when matter changes state.

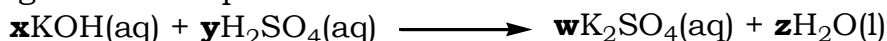
ii) What is the correct chemical formula of compound formed between Al^{3+} and SO_4^{2-} .

(1 mark)

- A) AlSO_4
- B) $\text{Al}_2(\text{SO}_4)_3$
- C) $\text{Al}_3(\text{SO}_4)_2$
- D) Al_2SO_4

iii) What is the correct set of stoichiometric coefficients required to balance the following chemical equation?

(1 mark)



- A) $x = 2, y = 1, w = 1$ and $z = 2$
- B) $x = 1, y = 1, w = 1$ and $z = 2$
- C) $x = 2, y = 1, w = 1$ and $z = 1$
- D) $x = 1, y = 2, w = 1$ and $z = 1$

iv) Identify the names for the substances **P** and **Q** in the following equations.

a) Sodium + Chlorine $\longrightarrow$ **P**

(1 mark)

b) Sulphur + **Q** $\longrightarrow$ Sulphur dioxide

(1 mark)

9) The following table gives the pH of some solutions. Use it to answer the questions that follow.

Solution	pH value
A	11.0
B	5.5
C	1.0
D	13
E	7.0

i) Which solution is more likely to be of $\text{HCl}(\text{aq})$?

(1 mark)

ii) Which solution is more likely to be of distilled water?

(1 mark)

iii) Which solution is more likely to be of $\text{NaOH}(\text{aq})$?

(1 mark)

iv) Which solution is more likely to be of rain water?

(1 mark)

v) Which solution is more likely to be of ammonia (NH_3)?

(1 mark)

10) An element **X** is represented by the following symbol:



i) What is the correct electron configuration for **X**?

(1 mark)

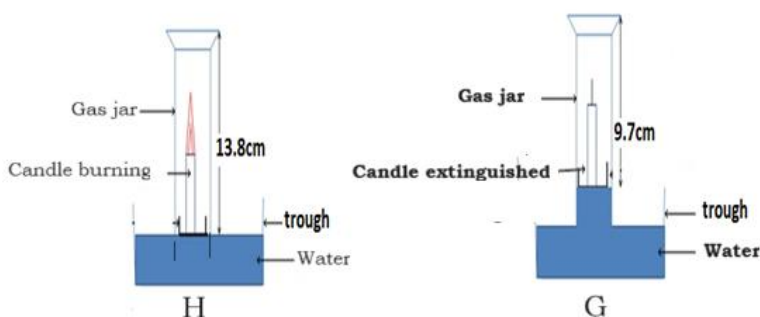
- A) 2:8:9
- B) 2:8:8:1
- C) 2:7
- D) 2:6:1

ii) Complete the following table for the atoms of elements **Y** and **Z**.

(4 marks)

SN	Atom	Electrons (e)	Protons (p)	Neutrons (n)	Mass number (A)
a)	Y	12			26
b)	Z		16	18	

- 11) An element **M** is defined by both chemical symbol, ${}^{31}_{15}\text{X}$, and electron configuration, 2:8:5.
- i) How many neutrons does **M** contain? **(2 marks)**
 A) 15 C) 31
 B) 16 D) 46
- ii) To which group (family) of the Periodic Table does **M** belong? **(2 marks)**
 A) Group 5 C) Group 31
 B) Group 2 D) Group 8
- iii) To which period of the Periodic table does **M** belong? **(2 marks)**
 A) Period 8 C) Period 3
 B) Period 5 D) Period 2
- 12) A senior one student carried out an experiment in **H** & **G**, to determine the percentage of oxygen using a beaker, water, a gas jar of 15 cm, a trough, a candle, and a match box as follows:



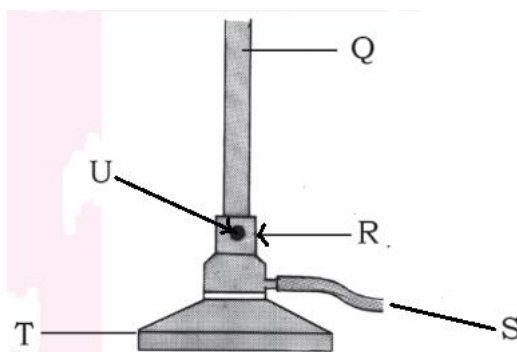
She observed that after a while the candle flame goes off and the water level in gas jar rises from 1.2 cm to 4.1 cm.

- i) Why does the candle flame go off after a while? **(2 marks)**
- ii) Why does the volume of water in the gas jar increase? **(2 marks)**
- iii) Calculate the percentage of oxygen in air in this gas jar. **(3 marks)**
- 13) This question concerns the inorganic salts.
- i) Explain what is meant by “monobasic salt”? **(1 mark)**
- ii) Suggest any one (1) example of acidic salt. **(1 mark)**
- iii) Complete the following table with the missing information. **(5 marks)**

Salt name	Salt formula	Source	
		Acid formula	Base formula
(a)	$\text{Mg}(\text{NO}_3)_2$	(b)	(c)
Potassium sulphate	(d)	(e)	KOH

SECTION B: ATTEMPT ANY THREE (3) QUESTIONS (30 marks)

14) A Bunsen burner is the most preferred source of heat in the laboratory due.



i) Match each part **Q, R, S, T** and **U**, in column A, with its corresponding name in the column B of the table below. **(5 marks)**

SN	Column A	SN	Column B
A)	Q	(1)	Rubber tubing
B)	R	(2)	Base
C)	S	(3)	Chimney (Barrel)
D)	T	(4)	Collar (Sleeve)
E)	U	(5)	Air hole

ii) Refer to the figure in (i) above and match each part **Q, R, S**, and **T**, with its corresponding function in the right column of the table below. **(4 marks)**

SN	Part	SN	Function
A)	Q	(1)	It regulates the amount of air entering the burner by opening and closing.
B)	R	(2)	It supports the Bunsen burner so that it does not fall.
C)	S	(3)	It raises the flame to a suitable height for heating.
D)	T	(4)	It connects the Bunsen burner to an external source of gas.

iii) Why is the Bunsen burner commonly preferred as a source of heat in laboratory experiments? **(1 mark)**

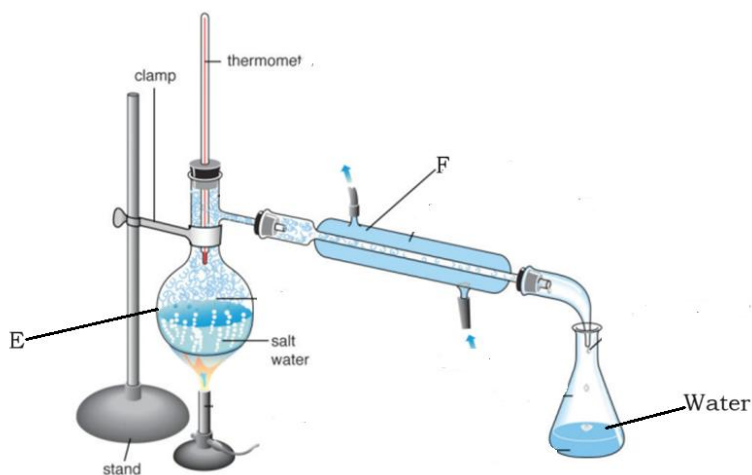
- A) It produces large visible yellow flame that is easy to observe.
- B) It operates without the need for the gas supply.
- C) It allows easy control of flame temperature and allows to ensure that the apparatus holding the reagents are not damaged.
- D) It emits harmful fumes which help in certain reactions.

15) Write the balanced word and symbolic equations for the following reactions.

State symbols on substances should be involved.

- i) Lithium metal burns in oxygen to form lithium oxide. **(2 marks)**
- ii) Carbon burns in excess oxygen to form carbon dioxide. **(2 marks)**
- iii) Nitric acid solution reacts with potassium hydroxide solution to form potassium nitrate solution and water. **(2 marks)**
- iv) $\text{Ca(s)} + 2\text{HCl(aq)} \longrightarrow \text{CaCl}_2\text{(aq)} + \text{H}_2\text{(g)}$ **(2 marks)**
- v) $\text{Na}_2\text{O(s)} + \text{H}_2\text{SO}_4\text{(aq)} \longrightarrow \text{Na}_2\text{SO}_4\text{(aq)} + \text{H}_2\text{O(l)}$ **(2 marks)**

16) A group of senior one students made a mixture in laboratory by dissolving 20 g of NaCl in 300 g of water. Another group of the same class wanted to recuperate the salt and water by using the simple distillation process below.



- i) What is the name for the apparatus **E**? **(1 mark)**
- A) Conical flask
B) Beaker
C) Round-bottomed flask
D) Flat-bottomed flask
- ii) What is the correct name for the apparatus **F**? **(1 mark)**
- A) Condenser
B) Separator
C) Burette
D) Electrolyzer
- iii) What is the most important safety precaution to take when setting up a simple distillation process? **(1 mark)**
- A) Wearing gloves to protect against chemicals
B) Ensuring the apparatus is set up in a fume hood to avoid inhaling vapors
C) Using a Bunsen burner for heating the mixture
D) Ensuring that the distillation flask is completely full
- iv) On which property of substances is the above process based? **(2 marks)**
- A) Have the same melting points
B) Difference in densities
C) Difference in boiling points
D) Have the same masses

v) Calculate the percentage composition of NaCl by mass in water, for the above mixture. **(2 marks)**

A) 6.25 %

C) 8.22 %

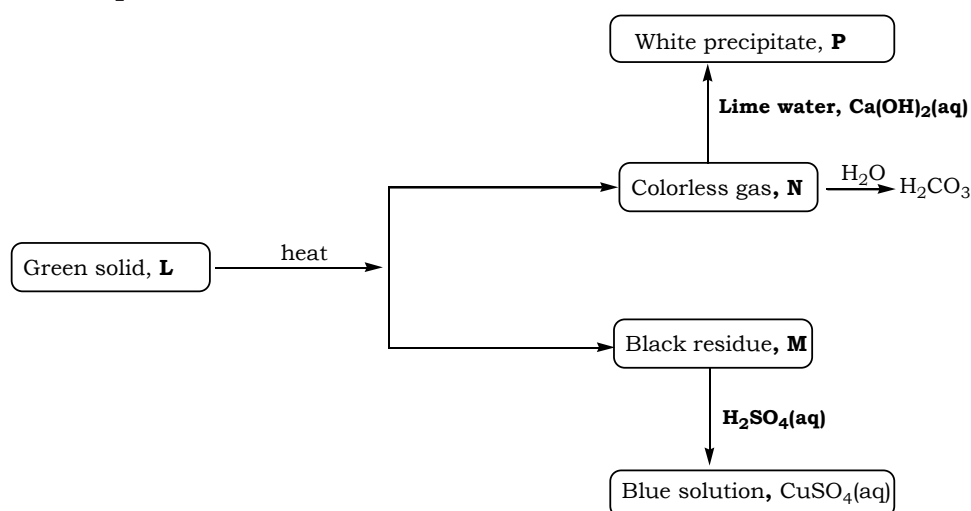
B) 6.66 %

D) 0.0625 %

vi) The simple distillation process is NOT suitable for separating the mixture of ethanol and water. **True/False.** Justify your answer. **(2 marks)**

(Boiling points: ethanol = 78.5°C, water = 100°C)

17) Some salts are decomposed when heated. The following flow chart illustrates such an example.



i) Identify two correct (2) physical properties of inorganic salts among the following. **(2 marks)**

A) Color

B) High volatility

C) Good solubility in organic solvents

D) Good electrical conductivity in aqueous solutions

ii) Give the chemical formula for the:

a) black residue **M**. **(2 marks)**

b) colorless gas **N**. **(2 marks)**

c) white precipitate **P**. **(2 marks)**

d) green solid **L**. **(2 marks)**

18) There are various essential steps involved in purification of water.

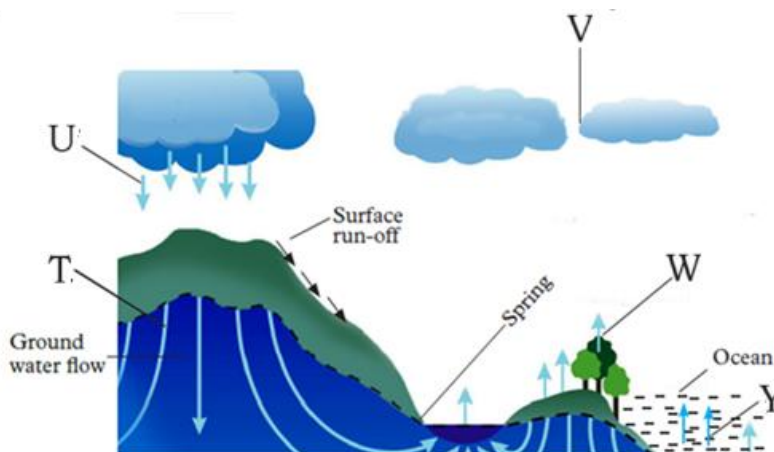
i) Match each water treatment step in the column **A** with its corresponding description in the column **B** of the table below. **(4 marks)**

SN	Column A		SN	Column B
A)	Coagulation		(1)	Water is passed through fine sand, gravel and charcoal that help to remove even smaller particles.
B)	Sedimentation		(2)	A small amount of chlorine is added to kill any disease-causing microorganisms.
C)	Filtration		(3)	It removes dirt and other particles suspended in water. Alum and other chemicals are added to water to form sticky particles called 'floc'.
D)	Disinfection		(4)	Water is put in a large container and left undisturbed. The large and heavy impurities settle at the bottom of the container.

ii) Which one is a characteristic of pure water among the following? **(1 mark)**

- A) It is a blue liquid with a salty taste.
- B) It contains various minerals.
- C) It shows effervescence of gases.
- D) It has a poor ability to conduct electricity.

iii) Given the figure showing the main steps involved in the water cycle. Name each of the steps **T, U, V, W** and **Y**. **(5 marks)**



END

Chemistry_Alternative to Practical exam

Date: 13/06/2025

Period: 2:00 PM – 3:30 PM



END OF TERM III EXAMINATION, 2024-2025

MARKING GUIDE

GRADE	: SENIOR ONE (S1)
LEVEL	: ORDINARY
DURATION	: 1 HOUR 30 MINUTES
MARKS :	/20

INSTRUCTIONS:

- 1) Write your identification on this answer sheet.
- 2) Use only a **blue** or **black** pen for answering and a **pencil** for drawing.

Answers

1)i) acidic: _Solution H_ /2 marks

-Because it turns the blue litmus paper into red (5) /1 mark while it leaves unchanged the red litmus paper (6). /1 mark

ii) basic: __Solution G__ /2 marks

-Because it turns the red litmus paper into blue (6) /1 mark while it leaves unchanged the blue litmus paper (5). /1 mark

iii) neither acidic nor basic: __Substance F__ /2 marks

Because it has no effect on neither the blue litmus paper nor the red litmus paper (5). /2 marks

2) more likely to be distilled water: _Substance F__ /2 marks

Because it the one which;

-leaves the blue litmus paper unchanged. /1 mark

-leaves the red litmus paper unchanged. /1 mark

-turns into blue the white anhydrous copper (II) sulphate. /1 mark

3) Fill in with the terms: less than (<), equal to (=), and greater than (>):

i) The pH of substance **F** is more likely to be __=__7. /1 mark

ii) The pH of solution **G** is more likely to be __>_7. /1 mark

iii) The pH of solution **H** is more likely to be _<_7. /1 mark

END

Chemistry_Alternative to Practical exam

Date: 13/06/2025

Period: 2:00 PM – 3:30 PM



END OF TERM III EXAMINATION, 2024-2025 QUESTION PAPER

GRADE : SENIOR ONE (S1)

LEVEL : ORDINARY

DURATION : 1 HOUR 30 MINUTES

MARKS :

/20

INSTRUCTIONS:

- 1) Write correctly your identification on this answer sheet.
- 2) This paper consists of **One** section only.
- 3) Use only a **blue** or **black** pen for answering and a **pencil** for drawing.
- 4) All answers should be written in the spaces provided in this question paper.

Student's names: _____ **Nº** _____

School: _____

Class: _____

I) You are provided with the following materials:

SN	Apparatus/Student	Quantity	Chemicals/Student	Quantity
1	Test tube	6	Substance F	50 cm ³
2	Test tube holder	1	Solution G	5 cm ³
3	Spatula	2	Solution H	5 cm ³
4			Substance J (CuSO ₄)	1 gram
5			Blue litmus	3 strips
6			Red litmus	3 strips

II) Procedure:

- 1) Six (6) test tubes were collected and divided into 2 groups.
- 2) The six test tubes were labeled as **F**, **G** and **H**.
- 3) The two groups of test tubes were formed as follows: Group **1** (F, G and H) and Group **2** (F, G and H).
- 4) Substance or solutions were put in test tubes as follows:
 - 5 cm³ of substance F in test tube **F**,
 - 5 cm³ of solution G in test tube **G**, and
 - 5 cm³ of solution H in test tube **H**.
- 5) In Group **1** of test tubes (F, G and H): a blue litmus paper was dipped in each substance/solution and the observations were recorded as follows:
 - Substance **F**: the blue litmus paper remains unchanged.
 - Solution **G**: the blue litmus paper remains unchanged.
 - Solution **H**: the blue litmus paper turns into red.
- 6) In Group **1** of test tubes (F, G and H): a red litmus paper was dipped in each substance/solution and the observations were recorded as follows:
 - Substance **F**: the red litmus paper remains unchanged.
 - Solution **G**: the red litmus paper turns into blue.
 - Solution **H**: the red litmus paper remains unchanged.
- 7) In Group **2** of test tubes (F, G and H): a half spatula end-full of anhydrous CuSO₄ was added on each substance/solution in **F**, **G**, and **H**; and the observations were recorded as follows:
 - Substance **F**: formation of a deep blue solution, that is, the white anhydrous CuSO₄ turns blue.
 - Solution **G**: formation of a blue precipitate of Cu(OH)₂(s) at the bottom of the test tube with a colorless solution at the top.
 - Solution **H**: the colorless solution slowly turns yellow-green.

III) Questions to be responded

1) Which of the substance/solutions **F**, **G** or **H** is:

i) acidic? _____ (2 marks)

Explain why. (2 marks)

ii) basic? _____ (2 marks)

Explain why. (2 marks)

iii) neither acidic nor basic? _____ (2 marks)

Explain why. (2 marks)

2) Which of the substances **F**, **G** or **H** is more likely to be distilled water?

(2 marks)

Explain your answer. (3 marks)

3) Refer to the above recorded experimental observations and fill in the blank spaces with the terms: less than (<), equal to (=), and greater than (>).

i) The pH of the substance **F** is more likely to be _____ 7. (1 mark)

ii) The pH of the solution **G** is more likely to be _____ 7. (1 mark)

iii) The pH of the solution **H** is more likely to be _____ 7. (1 mark)

END

Chemistry (theory)

Date: 13/06/2025

Period: 08:30 AM – 11:30 AM



END OF TERM III EXAMINATION, 2024-2025

MARKING GUIDE

GRADE : SENIOR TWO (S2)

LEVEL : ORDINARY

DURATION : 3 HOURS

MARKS :

/100

CAMIS (Theory + Practical)

/40

INSTRUCTIONS:

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Section A: Attempt **All** questions. **(70 marks)**
Section B: Attempt any **Three** questions. **(30 marks)**
- 3) For Multiple Choice Questions, **circle** a letter corresponding to the correct answer.
- 4) The marks to be recorded into CAMIS will result from the sum of theory and practical exam marks, that will be converted out of **40 marks**.

ANSWERS

SECTION A: ATTEMPT ALL QUESTIONS

(70 marks)

Question N°	Answers	Marks allocation
1)i)	D) An atom or molecule that has gained or lost one or more electrons.	/1 mark
ii)	A) Transfer electrons from one atom to another	/1 mark
iii)	C) Sodium	/1 mark
iv)	B) delocalized and free to move throughout the structure	/2 marks
2)i)	A) $\text{HCl} + \text{NaOH}$	/1 mark
ii)	C) Carbon dioxide	/1 mark
iii)	D) Barium sulphate	/1 mark
iv)	B) Precipitation reaction between two soluble salts	/2 marks
3)i)	Avogadro's number	/1 mark
ii)	molar mass	/1 mark
iii)	6.022×10^{23}	/1 mark
iv)	22.4	/1 mark
v)	2	/1 mark
4)i)	True	/1 mark
ii)	True	/1 mark
iii)	False	/1 mark
iv)	True	/1 mark

v)	False	/1 mark
5)i)	D) Carbon	/1 mark
ii)	A) High solubility in water	/1 mark
iii)	C) C_nH_{2n+2}	/1 mark
iv)	B) Liquefied Petroleum Gas, mainly composed of propane and butane	/2 marks
6)i)	B) Prevention	/1 mark
ii)	C) Electronic devices and components	/1 mark
iii)	D) Organic waste	/1 mark
iv)	A) Reduce, Reuse, Recycle	/2 marks
7)i)	A) Decomposition reaction	/1 mark
ii)	C) $2H_2 + O_2 \longrightarrow 2H_2O(l)$	/1 mark
iii)	B) Combustion	/1 mark
iv)	D) $Ba^{2+}(aq) + SO_4^{2-}(aq) \longrightarrow BaSO_4(s)$	/2 marks
8)i)	<u>carbon dioxide</u>	/1 mark
ii)	<u>sulfate</u>	/1 mark
iii)	<u>iron ions</u>	/1 mark
iv)	<u>salt and water</u>	/2 marks
9)i)	False	/1 mark

ii)	True	/1 mark
iii)	True	/1 mark
iv)	False	/2 marks
10)	Matching	

SN	Element	SN	Use
i)	Oxygen (O ₂)	A)	is used in the disinfection of drinking water
ii)	Phosphorus (P)	B)	is used for making ornaments
iii)	Aluminium (Al)	C)	is used in match industry and fertilizers
iv)	Gold (Au)	D)	is extensively used for making airplanes and spacecraft
v)	Chlorine (Cl ₂)	E)	is absolutely essential for the respiration of all kinds of plants and animals

Give **1 mark** for each correct matching (**Total 5 marks**)

Or

i) → E

ii) → C

iii) → D

iv) → B

v) → A

11)i)	A) The maximum amount of solute that can dissolve in a given solvent at a given temperature	/2 marks
ii)	a) solute = sugar /1 mark b) solvent = water /1 mark	
iii)	B) 15.38 grams Working: Solubility of copper sulphate at 20°C = 31 -Let the mass of solute (copper sulphate) be x grams -The mass of solvent = (65 – x) grams Solubility of copper sulphate = 31	/2 marks

	-Formula: $\text{Solubility} = \frac{\text{Mass of solute (in grams)}}{\text{Mass of solvent (in grams)}} \times 100 \text{ (at a particular temperature)}$ or, $31 = \frac{x}{(65-x)} 100$ or, $31(65 - x) = 100x$ or, $2015 - 31x = 100x$ or, $1050 = 131x$ or, $x = \frac{2015}{131} = \mathbf{15.38 \text{ grams}}$	
12)i)	Under similar conditions of temperature and pressure, the rates of diffusion of gases are inversely proportional to the square root of their molecular masses or densities.	/1 mark
ii)	Increasing order: $\text{CO}_2 (44) < \text{HCl} (36.5) < \text{NH}_3 (17)$	/2 marks
iii)	Molecular masses: HCl = 36.5 g/mol (given) NH₃ = 17 g/mol (given) $\frac{r_{\text{NH}_3}}{r_{\text{HCl}}} = \sqrt{\frac{M_{\text{HCl}}}{M_{\text{NH}_3}}} = \sqrt{\frac{36.5}{17}} \quad \mathbf{/1 \text{ mark}}$ $= 1.465 \quad \mathbf{/1 \text{ mark}}$ This means that the rate of NH₃ is 1.465 times faster than that of HCl. From the above; $\frac{10 \text{ cm}}{x} = 1.465 \quad \mathbf{/1 \text{ mark}}$ Therefore, $x = \frac{10 \text{ cm}}{1.465} = \mathbf{6.82 \text{ cm}} \quad \mathbf{/1 \text{ mark}}$	
13)i)	E = CO₂ or E = Carbon dioxide /1 mark	

	F = ZnO or F = Zinc oxide /1 mark	
ii)	E = CO₂ = acidic oxide /1 mark F = ZnO = amphoteric oxide /1 mark	
iii)	$\begin{array}{ccc} \text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) & \longrightarrow & \text{E} + 2\text{H}_2\text{O}(\text{l}) \\ 16 \text{ g} & & 36 \text{ g} \\ 4 \text{ g} & & \text{x g} \end{array}$ /2 marks x = $\frac{36}{16} \times 4 = 9$ g of water /1 mark Accept any other correct working	

SECTION A: ATTEMPT ANY THREE (3) QUESTIONS

(30 marks)

14)i)

SN	Water pollutant		SN	Description
A)	Oil spill		(1)	Disease-causing organisms from untreated sewage
B)	Plastic waste		(2)	Often the result of leaked or dumped petroleum products
C)	Mercury		(3)	Long-lasting pollutant that harms marine animals
D)	Pathogens		(4)	Toxic heavy metal often found in industrial wastes

Give **1 mark** for each correct matching (**Total 4 marks**)

Or

A) → (2)

B) → (3)

C) → (4)

D) → (1)

ii)	a) eutrophication /1 mark b) power plants /1 mark c) more acidic /1 mark d) sewage /1 mark										
iii)	A) Polluter pays principle	/2 marks									
15)i)	G = Mg /1 mark = magnesium /1 mark H = K ₂ SO ₄ (aq) /1 mark = potassium sulphate /1 mark J = NaOH(aq) /1 mark = sodium hydroxide /1 mark										
ii)	a) P is an exothermic reaction /1 mark Q is an endothermic reaction /1 mark b) <table border="1" data-bbox="327 1400 1264 1590"> <tr> <td>(P)= Exothermic</td> <td></td> <td>(1)</td> </tr> <tr> <td>(Q)= Endothermic</td> <td></td> <td>(2)</td> </tr> <tr> <td colspan="3">Give 1 mark for each correct matching (Total 2 marks)</td> </tr> </table>	(P)= Exothermic		(1)	(Q)= Endothermic		(2)	Give 1 mark for each correct matching (Total 2 marks)			
(P)= Exothermic		(1)									
(Q)= Endothermic		(2)									
Give 1 mark for each correct matching (Total 2 marks)											
16)i)	B) Disposal	/1 mark									
ii)	A) Energy recovery	/1 mark									
iii)	C) Agriculture	/1 mark									
iv)	a) -iron metals /1 mark										

	-glass bottles/ 1 mark b) -wood ash / 1 mark -peels of fruits / 1 mark c) True / 1 mark -Because recycling is more labor-intensive than landfilling. / 1 mark -This means that building the recycling industry is a way to create more jobs. / 1 mark -More people will be engaged while you recycle. -It is estimated that for 1 job created when burying and burning garbage, about 20 jobs are created through recycling. (Accept any other relevant answer)	
17)i)	-S allow the bulb to glow because it dissociates into ions in solution. / 1 mark -R does not allow the bulb to glow because it does NOT dissociate into ions in solution. / 1 mark	
ii)	a) R: Non electrolyte / 1 mark b) S: Electrolyte / 1 mark	
iii)	a) Urea / 1 mark Sugar / 1 mark b) Sodium chloride (NaCl) / 1 mark Sulphuric acid (H₂SO₄) / 1 mark	
iv)	False / 1 mark Pure water is a neutral substance and does NOT contain any ion to allow the conductivity. / 1 mark	
18)i)	P = Mg(NO₃)₂(aq) / 1 mark Q = MgCl₂(aq) / 1 mark R = MgCO₃(s) / 1 mark S = MgO(s) / 1 mark Gas X = H₂(g) / 1 mark (State symbols are not compulsory)	
ii)	$2\text{Mg}(\text{NO}_3)_2(\text{s}) \xrightarrow{\text{heat}} 2\text{MgO}(\text{s}) + 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$	/2 marks

iii)	-Release of brown gas (NO_2), toxic and irritating. /1 mark -Release of colourless gas (O_2) which relights a glowing splint. /1 mark	
iv)	Carbon dioxide /1 mark	
	END	

Chemistry (theory)

Date: 13/06/2025

Period: 08:30 AM – 11:30 AM



END OF TERM III EXAMINATION, 2024-2025

MARKING GUIDE

GRADE : SENIOR ONE (S1)

LEVEL : ORDINARY

DURATION : 3 HOURS

MARKS :

/100

CAMIS (Theory + Practical)

/40

INSTRUCTIONS:

- 1) Write your identification on this answer sheet.
- 2) This paper consists of **Two** sections: **A** and **B**.
Section A: Attempt **All** questions. **(70 marks)**
Section B: Attempt any **Three** questions. **(30 marks)**
- 3) For Multiple Choice Questions, **circle** a letter corresponding to the correct answer.
- 4) The marks to be recorded into CAMIS will result from the sum of theory and practical exam marks, that will be converted out of **40 marks**.

ANSWERS

SECTION A: ATTEMPT ALL QUESTIONS

(70 marks)

Question N°	Answers	Marks allocation
1)i)	B) To alert everyone in laboratory and activate the nearest fire alarm.	/1 mark
ii)	A) In a well-ventilated storage cabinet, away from heat sources	/1 mark
iii)	C) separating the immiscible liquids based on their densities	/1 mark
iv)	B) Use tongs to pick it up.	/1 mark
v)	D) Electric shock which can lead to death	/1 mark
2)i)	magnetic separation	/1 mark
ii)	heterogeneous mixture	/1 mark
iii)	centrifugation	/1 mark
iv)	homogeneous mixture	/1 mark
v)	decanting	/1 mark
3)i)		/1 mark

SN	Term		SN	Definition
i)	Atom		A)	It defines the position of an element in the periodic table and equal to the number of protons in the nucleus of an atom.
ii)	Atomic number		B)	The smallest unit of matter that retains the properties of an element.
iii)	Mass number		C)	A group of two or more atoms bonded together, either of the same or different elements.
iv)	Molecule		D)	The total number of protons and neutrons in an atom's nucleus.
v)	Compound		E)	A substance made up of two or more different elements that are chemically bonded together in a fixed ratio.

Give 1 mark for each correct matching (total: 5 marks) Or i) → B ii) → A iii) → D vi) → C v) → E		
4i)	False (F)	/1 mark
ii)	False (F)	/1 mark
iii)	True (T)	/1 mark
iv)	False (F)	/1 mark
v)	True (T)	/1 mark
5)i)	B) It is an inert gas.	/1 mark
ii)	C) O ₃	/1 mark
iii)	B) $\text{Na}_2\text{O}_2(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{NaOH}(\text{aq}) + 1/2\text{O}_2(\text{g})$	/1 mark
iv)	B) It is used in oxy-acetylene torches for welding and cutting metals. /1 mark	
	C) It is used in animals and humans for cellular respiration. /1 mark	
6)i)	A) Manufacture of biodegradable plastics /1 mark	
	D) Synthesis of new drugs to fight diseases /1 mark	
ii)	A) Use of synthetic fertilizers and pesticides /1 mark	
	B) Testing the acidity and basicity of soil /1 mark	
iii)	C) Synthesis of high-performance fuels	/1 mark
7)i)	True	/1 mark
ii)	False	/1 mark

iii)	True	/1 mark
iv)	True	/1 mark
v)	False	/1 mark
8)i)	C) Matter cannot be created nor destroyed, it only changes form.	/1 mark
ii)	B) $\text{Al}_2(\text{SO}_4)_3$	/1 mark
iii)	A) $x = 2$, $y = 1$, $w = 1$ and $z = 2$	/1 mark
iv)	P = Sodium chloride /1 mark Q = Oxygen /1 mark	
9)i)	Solution C	/1 mark
ii)	Solution E	/1 mark
iii)	Solution D	/1 mark
iv)	Solution B	/1 mark
v)	Solution A	/1 mark
10)i)	C) 2:7	/1 mark
ii)	a) $p = 12$ /1 mark $n = 14$ /1 mark b) $e = 16$ /1 mark $A = 34$ /1 mark	
11)i)	B) 16	/2 marks
ii)	A) Group 5	/2 marks
iii)	C) Period 3	/2 marks

12)i)	Because the oxygen in the gas jar is consumed and there is no longer enough oxygen to sustain the flame.	/2 marks															
ii)	Because the process of burning the candle consumes oxygen, creating a vacuum that causes the water level to rise	/2 marks															
iii)	Data: -Length of gas jar = 15 cm -Initial water level = 1.2 cm -Final water level= 4.1cm Calculation: -Length occupied by oxygen = (4.1-1.2) cm = 2.9 cm /1mark -Length occupied by air = (15-1.2) cm = 13.8 cm /1mark -Percentage of oxygen in air = $\frac{2.9}{13.8} \times 100=$ 21.0% /1mark																
13)i)	Monobasic salt: is a salt that is derived from an acid with only one replaceable hydrogen ion , meaning that it can donate only one H⁺ ion per molecule during neutralization. (Accept any other correct definition)	/1 marks															
ii)	Acidic salt: NaHCO ₃ /1 mark KHSO ₄ , NaH ₂ PO ₄																
iii)	<table><tr><th rowspan="2">Name of the salt</th><th rowspan="2">Salt formula</th><th colspan="2">Source</th></tr><tr><th>Acid formula</th><th>Base formula</th></tr><tr><td>(a)=Magnesium nitrate /1 mark</td><td>Mg(NO₃)₂ /1 mark</td><td>(b)=HNO₃ /1 mark</td><td>(c)=Mg(OH)₂ /1 mark</td></tr><tr><td>Potassium sulphate</td><td>(d)= K₂SO₄ /1 mark</td><td>(e)=H₂SO₄ /1 mark</td><td>KOH</td></tr></table>			Name of the salt	Salt formula	Source		Acid formula	Base formula	(a)=Magnesium nitrate /1 mark	Mg(NO ₃) ₂ /1 mark	(b)=HNO₃ /1 mark	(c)=Mg(OH)₂ /1 mark	Potassium sulphate	(d)= K₂SO₄ /1 mark	(e)=H₂SO₄ /1 mark	KOH
Name of the salt	Salt formula	Source															
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Potassium sulphate	(d)= K₂SO₄ /1 mark	(e)=H₂SO₄ /1 mark	KOH														
SECTION B: ATTEMPT ANY THREE QUESTIONS (30 marks)																	

14)i)	Matching				
SN	Part of Bunsen burner		SN	Name of part	
A)	Q		(1)	Rubber tubing	
B)	R		(2)	Base	
C)	S		(3)	Chimney (Barrel)	
D)	T		(4)	Collar (Sleeve)	
E)	U		(5)	Air hole	

Give **1 mark** for each correct matching (**total: 5 marks**)

Or:

A) Q → (3) Chimney (Barrel)
 B) R → (4) Collar (Sleeve)
 C) S → (1) Rubber tubing
 D) T → (2) Base
 E) U → (5) Air hole

ii) Matching

SN	Part of Bunsen burner		SN	Name of part	
A)	Q		(1)	It regulates the amount of air entering the burner by opening and closing.	
B)	R		(2)	It supports the Bunsen burner so that it does not fall.	
C)	S		(3)	It raises the flame to a suitable height for heating.	
D)	T		(4)	It connects the Bunsen burner to an external source of gas.	

Give **1 mark** for each correct matching (**total: 4 marks**)

Or:

A) Q → (3)
 B) R → (1)
 C) S → (4)
 D) T → (2)

iii)	C) It allows easy control of flame temperature and to ensure that the apparatus holding the reagents are not damaged.	/1 mark
15)i)	$2\text{Li(s)} + 1/2\text{O}_2\text{(g)} \longrightarrow \text{Li}_2\text{O(s)}$ Or $4\text{Li(s)} + \text{O}_2\text{(g)} \longrightarrow 2\text{Li}_2\text{O(s)}$	/2 marks
ii)	$\text{C(s)} + \text{O}_2\text{(g)} \longrightarrow \text{CO}_2\text{(g)}$	/2 marks
iii)	$\text{HNO}_3\text{(aq)} + \text{KOH(aq)} \longrightarrow \text{KNO}_3\text{(aq)} + \text{H}_2\text{O(l)}$	/2 marks

iv)	Calcium reacts with dilute hydrochloric acid to form calcium chloride and hydrogen gas.	/2 marks
v)	Sodium oxide reacts with dilute sulphuric acid to form sodium sulphate solution and water.	/2 marks
16)i)	C) Round-bottomed flask	/1 mark
ii)	A) Condenser	/1 mark
iii)	B) Ensuring the apparatus is set up in a fume hood to avoid inhaling vapours.	/2 marks
iv)	C) Difference in boiling points	/2 marks
v)	A) 6.25 % /2 marks Working: Mass of NaCl (solute) = 20 g Mass of water (solvent) = 300 g Mass of mixture, NaCl + water = 20 + 300 (g) = 320 g $\% \text{NaCl} = \frac{20}{320} \times 100$ = 6.25 %	
vi)	-True /1 mark -Because the difference in boiling points between ethanol and water is small (21.5°C). When the mixture is heated, both ethanol and water tend to vaporize together. /1 mark	
17)i)	A) Color /1 mark D) Good electrical conductivity in aqueous solutions /1 mark	
ii)	a) Black residue, M = CuO /2 marks b) Colourless gas, N = CO₂ /2 marks c) White precipitate, P = CaCO₃ /2 marks d) Green solid, L = CuCO₃ /2 marks	
18)i)	Matching	

SN	Column A		SN	Column B
A)	Coagulation		(1)	Water is passed through fine sand, gravel and charcoal that help to remove even smaller particles.
B)	Sedimentation		(2)	A small amount of chlorine is added to kill any disease-causing microorganisms.
C)	Filtration		(3)	It removes dirt and other particles suspended in water. Alum and other chemicals are added to water to form sticky particles called 'floc'.
D)	Disinfection		(4)	Water is put in a large container and left undisturbed. The large and heavy impurities settle at the bottom of the container.

Give **1 mark** for each correct matching (**total: 4 marks**)

Or: A) → (3)
 B) → (4)
 C) → (1)
 D) → (2)

ii)	D) It has a poor ability to conduct electricity.	
iii)	T = Infiltration / 1 mark U = Precipitation / 1 mark V = Condensation / 1 mark W = Transpiration (Evapo-transpiration) / 1 mark Y = Evaporation / 1 mark	
	END	