

**KYOTERA PARENTS SECONDARY SCHOOL
END OF YEAR 2023 EXAMINATIONS**

545/1

S 3 CHEMISTRY

(Theory)

Time 1 ½ hours

Name

Instructions to candidates

- *Attempt all questions.*
- *Answers to the questions must be written in the space provided under each question.*
- *Neat work will earn you a credit.*

1. Assuming you are doing research in your school laboratory and you come across a colourless solution **X**, which turns blue litmus paper red;

a) Sodium chloride, sodium hydroxide, dilute hydrochloric acid, are some of the colourless solutions in the laboratory. Which one of these is likely to be **X**?

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.....(1 score)

b) Write the chemical formula of **X**.

.....
.....(1 score)

c) **X** can react with other substances in a process called neutralisation.

i) Name any substance which can react with **X** in the above reaction

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.....(1score).

ii) Write a chemical equation for the above reaction.

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.....
.....(1score)

2. Iron(II) sulphate (FeSO_4) is a salt found in tablets given to pregnant women who appear pale due to having a certain element in insufficient amounts in their bodies. This salt can be prepared in the laboratory by reacting a certain metal in excess amounts with a dilute acid.

a) Name the

i) Acid used.

.....(1score)

.....

ii) Metal used.

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.....(1score)

b) Explain why the metal used should be in excess.

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.....(1score)

c) State the deficiency disease that requires administration of the above tablets.

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.....(1score)

3. The atomic numbers of atoms of elements **M**, **R** and **W** are 7, 13, and 17 respectively. **M**, **R**, and **W** are not the usual symbols of the elements in the Periodic Table.

a) Umar, a local electrician in Kasambya wants to select an element to be used for his job.

i) Which of the above elements can he use?

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.....(1score)

ii) Suggest **two** reasons to support the choice of your answer in (i) above.

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.....(1score)

b) **Two** of the above elements belong to the same period in the periodic table.

i) Write the symbols of these **two** elements.

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.....(1score)

ii) Suggest a reason for your answer in (i) above.

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.....(1score)

4. Charcoal (C) and ethane (C₂H₆) are some of the substances that are good sources of fuel in homes and factories.

a) What is a fuel?

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.....(1score)

b) Write a chemical equation for the complete combustion of ethane.

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.....(1score)

c) Suggest the **disadvantage** of excessive use of the above fuels to the world.

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.....(1score)

d) A Village Health Team (VHT) in Kasambya, Kyotera is always advising his people to avoid cooking using charcoal stoves while inside rooms with closed doors and windows. Suggest a reason for the VHT's advice.

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.....(1score)

5. The observations made when some metals were allowed to react with water are shown in the table below

Metal	Observation
A	No observation with water nor steam
E	Vigorously react with cold water
T	Fairly react vigorously with cold water
X	Very slow reaction in water but fast when heated in steam

- a) Identify the metal which is
- i) Most reactive
-(1score)
- ii) Least reactive
-(1score)
- b) Arrange the above metals in order of decreasing reactivity.
-(1score)
- c) Giving reason(s), suggest which of the above metal(s) can be used to make a tank for storing water in your school. (1score)
- i) Metal(s)
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-
- ii) Reason(s)
-
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6. Ethanol is an organic compound that belongs to a homologous series of compounds called alcohols, having the general formula $C_nH_{2n+1}OH$, where $n \geq 1$.

- a) Write the molecular formula and the name of any other **two** members in this homologous series. (2scores)

Molecular formula	Name

b) Ethanol may be used as a fuel. Write a chemical equation for the complete combustion of ethanol.

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.....(1score)

c) Describe how each of the chemical products of the reaction in (b) can be tested in the laboratory.

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.....(1score)

7. (a). Mukwano bar soap is one of the soaps that can be prepared by boiling palm oil and a substance Y and after which sodium chloride is added to the boiled mixture.

i) What is the role of sodium chloride?

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.....(1score)

ii) What name is given to the process leading to the formation of soap?

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.....(1score)

b) Water collected from the borehole (**T**) and also that freshly harvested in tanks from rain (**Q**) can be used to wash clothes with the help of soap. One of these two (**T** or **Q**) requires more soap to form lather.

i) Which one of the above requires more soap to lather?

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.....(1score)

- ii) Suggest what can be done to the water in (i) above such that it can also requires less soap to lather.

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.....(1score)

8. The full symbols of atoms of elements **J**, **L**, **V**, and **Z** are $^{16}_8\text{J}$, $^{20}_{10}\text{L}$, $^{27}_{13}\text{V}$, and $^{32}_{16}\text{Z}$ respectively.

- a) Which one of the above elements is a noble gas?

.....
.....(1score)

- b) (i). State **two** elements that can react together to form a compound which is a solid at room temperature, soluble in water and can conduct electricity when it is only in molten form or aqueous state and not when in solid state.

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.....(1score)

- (ii). State the reason why the compound formed by the elements in (i) can only conduct electricity in molten form or aqueous state but not in solid state.

.....
.....(1score)

- c) State **two** elements which can react together to form a substance which is a gas at room temperature

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.....(1score)

End