KAMSSA LOWER SECONDARY LEVEL EXAMINATIONS
SENIOR THREE
END OF YEAR ASSESSMENT 2024
CHEMISTRY
Paper 1
SCORING GUIDE

SCTION A

ITEM ONE **(10 scores)**

In a school inter house competitions organized by the games committee, many activities were organized including a washing competition. Two participants, one from zebra and the other from lion houses were each provided with a full jerry can of borehole water, basin, and a stained cloth. A participant from zebra house was provided with detergent A, while another from lion house was given detergent **B**. Zahara from zebra house, the usual winner of the competitions used detergent **A** to clean the cloth but it remained with some dirty marks even after rinsing it several times. Kamedde from lion house used detergent **B** and won the race as she cleaned the cloth with one rinse. Zahara was frustrated and could not understand what went wrong this time round.

Task;

a) As a chemistry learner,

i) Explain the categories of products, **A** and **B** used by the two participants.

The categories of products A and B used by the two participants are detergents. Detergents are substances used for cleaning purposes. They are able to remove dirt and stains from surfaces.

ii) Help Zahara to understand how the product she used works.

To help Zahara understand how the product she used works, she should know A is likely to be a traditional soap-based detergent. Soap-based detergents work by breaking down fats and oils through a process called saponification. This process involves the reaction of fats or oils with a strong alkali (usually sodium hydroxide) to produce soap and glycerol. The soap molecules have a hydrophilic (water-loving) head and a hydrophobic (water-fearing) tail. The hydrophobic tail is able to dissolve in the fats or oils, while the hydrophilic head remains dissolved in water. This allows the detergent to emulsify the fats or oils, making them easier to wash away with water.

iii) Advise the two participants on the challenges associated with the use of the products.

Detergent A (soap-based): Soap-based detergents may not be as effective in removing certain types of stains, especially those that are oily or greasy. They may also leave a residue on the fabric, which can make the fabric appear dull or stiff. Additionally, soap-based detergents may not be as effective in removing stains from synthetic fabrics.

Detergent B (soap less detergent): While the exact composition of detergent B is not specified, it is likely to be a synthetic detergent or a surfactant-based detergent. Synthetic detergents are made from petrochemicals and are able to dissolve a wider range of substances than soap-based detergents. They are also less likely to leave a residue on fabrics. However, they may not be as environmentally friendly as soap-based detergents, as they are derived from non-renewable resources.

ITEM TWO (10 scores)

Mary's house maid often prefers using wood charcoal to natural gas for cooking which results in some delays in the preparation of food compared to the days natural gas is used. Mary now wants to know the cause such that the maid can be advised accordingly.

Task
Using your knowledge of chemistry,

(a) Help Mary;
(i) Categorize the product Mary's maid preferred.
Carbon based fuels can be renewable or non-renewable energy.
Charcoal is a renewable fuel while natural gas is a non-renewable fuel

(ii) Understand how the product works.
Charcoal fuel is carbon which undergoes complete combustion in air to form carbon dioxide with release of a lot of energy that can be used to prepare food.

Equation for reaction; $C_{(S)} + O_{2(g)} \rightarrow CO_{2(g)} + Heat$

(b) Advise Mary on long term use of the desired product.
Side effects of the product (advice on the long-term use of the product)
Complete combustion of carbon-based fuels adds carbon dioxide to the atmosphere that can cause global warming
Incomplete combustion of carbon-based fuels adds carbon monoxide to air that is a respiratory poison.
Addition of carbon dioxide to air can also cause acidic rain that corrodes in roofs.

SECTION B

ITEM THREE (10 scores)
i. The categories of the materials:
There are various materials available in the market for making window and door frames. They can be broadly categorized into the following:

1. Wood: Wood is a natural material that is widely used for making window and door frames. It is available in different varieties, such as hardwood and softwood. Hardwood is more durable and resistant to weathering, while softwood is less expensive and easier to work with.

2. Metal: Metal is another popular material for making window and door frames. It is strong, durable, and resistant to weathering. However, it is more expensive than wood and may require special treatment to prevent rusting.
3. Plastic: Plastic is a lightweight and inexpensive material that is often used for making window and door frames. It is easy to work with and can be molded into various shapes. However, it is less durable than metal and may not be suitable for areas exposed to harsh weather conditions.

4. Fiber: Fiber is a material that is made from natural or synthetic fibers, such as bamboo or recycled plastic. It is eco-friendly and has a low carbon footprint. However, it may not be as strong or durable as wood or metal.

II. The suitability of the materials:
The suitability of a material for making window and door frames depends on various factors, such as durability, strength, weather resistance, and cost. Here are some considerations for each material:
1. Wood: Wood is a suitable material for making window and door frames because it is strong, durable, and resistant to weathering. It is also a natural material that is renewable and biodegradable. However, it may require regular maintenance to prevent rot and insect damage.

2. Metal: Metal is a suitable material for making window and door frames because it is strong, durable, and resistant to weathering. It is also easy to customize and can be made to fit any style or design. However, it is more expensive than wood and may require special treatment to prevent rusting.

3. Plastic: Plastic suitable material for making window and door frames because it is lightweight, inexpensive, and easy to work with. It is also available in various colors and shapes. However, it is less durable than wood and metal and may not be suitable for areas exposed to harsh weather conditions.

4. Fiber: Fiber is a suitable material for making window and door frames because it is eco-friendly, renewable, and has a low carbon footprint. It is also lightweight and easy to work with. However, it may not be as strong or durable as wood or metal and may require regular maintenance to prevent wear and tear.

III. Advise Peter on the choice of the materials:

Based on the considerations above, I would advise Peter to choose wood as the material for making window and door frames. Wood is a natural material that, durable, and resistant to weathering. It is also renewable and biodegradable, which makes it an environmentally friendly choice. Additionally, wood is relatively inexpensive and easy to work with, which makes it a cost-effective option for Peter.

However, if Peter is looking for a more sustainable option, he may consider using fiber, which is made from renewable resources and has a low carbon footprint. Fiber is also lightweight and easy to work with, which makes it a good choice for Peter's project.

In any case, Peter should ensure that the material he chooses is suitable for the climate and weather conditions of his area. He should also consider the maintenance requirements of the material and factor them into his budget and timeline.

ITEM FOUR (10 scores)

Thank you for the opportunity to present on the topic of ammonium nitrate fertilizers Mubende district. I will do my best to provide clear and accurate information to the locals.

First, I would like to explain what ammonium nitrate is and why it is important for agriculture. Ammonium nitrate is a type of fertilizer that contains nitrogen and ammonia. Nitrogen is an essential nutrient for plants, as it is a key component of proteins and DNA. Ammonium nitrate is commonly used to promote the growth of crops and improve yields.

Next, I would like to discuss the process of producing ammonium nitrate. The production of ammonium nitrate involves several steps, including the mining of raw materials, the conversion of those raw materials into ammonia, and the subsequent combination of ammonia and nitric acid to produce ammonium nitrate. The specific process used by Bloom Uganda limited will be one that minimizes environmental impact, as required by the government.

I would also like to address any concerns the locals may have about the potential risks associated with ammonium nitrate production. While it is true that ammonium nitrate is a hazardous material, proper safety measures and regulations will be in place to ensure that the production process is carried out safely and without harming the environment or the community.

Finally, I would like to emphasize the benefits that the ammonium nitrate production plant will bring to the local community. In addition to boosting local production and reducing reliance on imported fertilizers, the plant will create jobs and stimulate economic growth in the area. The plant will also help to ensure a steady supply of ammonium nitrate for local farmers, which will in turn help to increase agricultural productivity and food security.

Thank you for your attention, and I am happy to answer any questions you may have.

ITEM FIVE (10 scores)

Hello dear officials,

As a chemistry student, I would you like to emphasize the importance of maintaining a healthy balance between our needs and the preservation of our natural resources.

The swamps in our village play a crucial role in regulating the water cycle and providing a habitat for various aquatic organisms.

Clearing the swamps for settlement and dumping human waste not only disrupts this delicate balance but also poses a threat to the health and well-being of our community.

Similarly, the forest reserve on the hillside is a valuable resource that provides us with clean air and a diverse range of plant and animal species.

Cutting down trees for charcoal burning is not only unsustainable but also contributes to deforestation, which has severe consequences for our planet.

Therefore, I urge everyone to be mindful of their actions and make conscious efforts to conserve our environment. Let's work together to protect our swamps and forest reserve, and ensure a sustainable future for ourselves and future generations.

Thank you for the opportunity to supplement on your presentation, and I hope that we can all contribute to the conservation of our village environment.

ITEM SIX (10 scores)

Good morning everyone,

I am Uwimana, a student at Emma High School in Bushenyi, and today I am here to talk to you about the fascinating process of electroplating and its importance in our daily lives.

As many of you may know, electroplating is a process that involves the deposition of a layer of metal onto the surface of an object. This is done by passing an electric current through a solution containing the metal ions, which then deposit onto the object, forming a protective layer.

During my chemistry lesson, our teacher demonstrated this process using a five hundred shillings coin and a one hundred shillings coin. He connected the two coins to the terminals of a cell and left the circuit to settle for about 10 to 15 minutes. At the end of the experiment, the five hundred shillings coin had reduced in size and the one hundred shillings coin became tinted with a brown color.

This experiment demonstrated the power of electroplating and its ability to change the properties of an object. In this case, the five hundred shillings lost some of its mass due to the deposition of the metal onto the one hundred shillings coin. This is just one example of how electroplating can be used to improve the durability and longevity of an object.

Electroplating has many practical applications in our daily lives. For example, it is used to protect metal objects from rust and corrosion, to improve the appearance of jewelry decorative items, and to enhance the performance of electronic components.

In conclusion, electroplating is a fascinating process that has many practical applications in our daily lives. It is a process that can improve the durability and longevity of an object, protect it from rust and corrosion, and enhance its appearance. I hope this presentation has given you a better understanding of the importance of electroplating and its role in ours.

Thank you for your attention.