SEMINAR FORWARD

Dear Esteemed Participants Especially Students and Teachers, it is with great Pride and Excitement that I **J.J OKOTH**, Founder and CEO of ***Kampala Teachers' Education Consultancy*** (**KAMTEC**) warmly welcome you and present to you this Seminar compilation prepared by KAMTEC Education Consultancy for our ongoing Academic Enrichment series Across the Country.

Allow me to extend my deepest Appreciation to the Entire team of KAMTEC. Your Dedication, Commitment, Professionalism, and Relentless pursuit of Excellence continue to set us apart as a leading force in Education Consultancy. The Hours you have Invested in Research, to ensure quality have been reflected in every page of this Resource.

To the School Administrators who have patterned with us, Thank You Indeed! Your Decision to Prioritize Academic Growth and Embrace Innovative Approaches to Learning is Commendable. By Opening Wide Doors to this Seminar, you Demonstrate true leadership And Genuine Investment in the future of Your Learners.

To our Chemistry Teachers, I salute You. Indeed, you are the bridge between Content and Understanding. Your willingness to engage, refine your methods and walk this Journey with us affirms your dedication to shaping competent critical thinkers. This seminar is designed to sharpen those very skills.

To the Students, our reason for being here, thank you for showing up. Your presence speaks loud volume of Ambition, Curiosity, and Courage to Discover. These items are more than revision materials; they are the tools to stretch your thinking, deepen your mastery, and build the confidence you need to excel in Chemistry and Beyond.

The Seminar is not just another event on the calendar, but it is an opportunity to interrogate concepts, confront Competency -Based Learning, And Emerge Stronger. I urge each one of you to engage fully, ask bold relevant questions and take ownership of knowledge and skills that lie ahead.

Remember, the future belongs to those who prepare for it today. Therefore, let us embrace this moment with purpose, knowing that the work we do now, shapes the scientists, Innovators, And Leaders that Tomorrow Demands.

Thank you all, and I wish you a fruitful transformative Seminar of the Year.

Yours Faithfully,

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DISCUSSION QUESTIONS

DIVERSITY AND INTERACTION OF SUBSTANCES AND THEIR IMPORTANCE IN DAILY LIFE.

Item 1:

Environment club of a certain secondary school conducted a survey in which they found out the existence of packaging material in the environment which they proved to have existed there for a long period of time without rotting.





They concluded that the community needs to be provided with an alternative material made up cellulose fibers which has minimal environmental impacts and also guided on the environmental impacts of the material they use. You school has selected to be part of the team to create awareness and you have selected to lead them.

Task:

a. Help the community members understand:

i. The category of the substance making up the alternative material.

ii. An explanation of 4 properties of the substance making up the alternative material in relation to use.

b. Suggest two other uses of the substances making up the alternative material.

c. Explain two dangers to environment associated with the material used by community members.

Item 2.

In Uganda, rapid urbanization has led to increasing amounts of solid waste in form of plastics, organic waste among others some of which are from natural materials while others from synthetic ones. Many neighborhoods experience poor waste disposal with garbage dumped in open spaces and drainage channels posing negative impacts to the environment. Authorities encourage community members to properly dispose the wastes upon usage. Jimmy needs clear understanding of continued occurrence of the mentioned wastes and their disposal measures. Your friend knows Jimmy and he has directed him to you guidance.

Task:

a. Identify the waste in relation to scenario and categorize them independently.

b. Guide Jimmy on the properties of one of the materials that make up the wastes likely to impact the environment greatly.

c. Explain one importance of one of the material in each category making up the waste.

d. Suggest two dangers to environment of each of materials in the wastes to environment and mitigation.

Item 3. One of the major industries in Uganda; the textile industry uses cotton as a raw material producing goods that range from industrial fabrics to fashion apparel. Studies on cotton show it is made up of tiny threads whose properties attribute to its wide usage of the raw material in textile industries.



Over dependency on cotton prove to have a negative impact on environment. Jane is a causal worker from one textile industry and needs more clarification having heard the information. Your friend knows Jane she has directed her to you for guidance.

Task:

a. Explain the category of threads in the raw material.

b. Suggest four properties of the raw material.

c. State any other application of the raw material.

d. Explain one environmental impact associated with the raw material and mitigation.

Item 4.

Certain secondary school students had a tour in Kigezi region, Mike observed most locals wearing clothes that are very think. He was told that the clothes the natives put on are influenced by their weather which is very cold. Musa become interested in the nature of the material from the clothes are made and their environmental impacts. Your friend knows and has directed him to you for help.

Task:

a. Identify the material from which the attires are made of and explain its category.

b. State four properties of the material that make it the best choice for attire manufacture.

c. Suggest two other uses of the material.

d. Explain the danger of the material to environment.

Item 5.

Takataka plastics is one of the leading companies in Uganda. The company managers show concerns relating poor management of plastics to environment where the waste is burnt and littered providing a possible solution of recycling the plastics, converting it recycled ceramics.

The company needs to fill vacancy for an individual who can educate the community on the suitability of the recycled ceramics, their different applications and if they have any impacts to the environment. Phillip wants to take up the opportunity but lacks enough knowledge. Your friend knows Phillip and has directed him for guidance.

Task:

a. What is the category of the material with a reason?

b. Suggest the properties of the material in relation to daily life applications

c. Explain the dangers the material could have to the environment.

Item 6.

Mr. Tamale wears clothes depending on the weather conditions. On hot days, he wears light clothes while on cold days he wears heavy clothes. The labels on the clothes show that some of the clothes are made from nylon while others are made from wool. Joel needs to evaluate the importance of the materials with their environmental impacts. Your friend knows Joel and has directed him for guidance.

Task:

a. Explain the categories of the materials from which the clothes are made.

b. Suggest four properties that make one of the materials suitable for the identified purpose.

c. State two other uses of each material.

d. Explain one impact of each material to environment.

Item 7.

During holiday, Vicent visited his friend who leaves in neighboring town. He was impressed on the set up of the friend's home especially the setting of the seating room. He was told that the attractive look of the room is because of the material from which the products in the room are made of. However, he got concerned of environmental impacts of over dependency of the material to make the products and if it has other uses. Your friend knows Vicent and has directed him to you for guidance.

Task:

a. Explain the category of material from which the goods are made.

b. State the properties of the material in relation to use.

c. Guide Vicent on environmental impacts associated with over dependence on material for production of goods.

Item 8.

A senior one student attempted to ignite a piece of wood inside vacuum chamber. Although the wood was dry enough and heated beyond its ignition temperature, it failed to produce a flame. However, the flame appeared when vacuum chamber was opened. Martin says the component of wood that burns is carbon in excess air. He says, iron develops a reddish brown layer when exposed in wet environment. He was told the same condition for wood to burn when vacuum is opened is the same for iron hoe to develop reddish brown layer.





Martin is unaware of the condition for the processes and the negative impacts of the processes. Your friend knows Martin and has contacted you for assistance.

Task:

ai. State the products of the processes and explain the types of structures they attain.

ii. Describe how one of the products of the process form ions giving their formulae.

b. Explain the properties of the gaseous product in relation to daily life applications.

c. Describe an environmental impact associated with each of the products of the process with mitigations.

Item 9.

A study was conducted to investigate the suspected contaminants in River Katonga. A water sample obtained from the river contained the substances shown in table below.

Substance.	Number of protons.	Number of electrons.
A	20	18
B	17	18
C	12	10
D	8	8

From the studies, substances found in the river combine forming useful compounds. The substances have positive impacts however their excessive presence in environment negative impacts. Kelvin's teacher asked them to assess the positive impacts of the substances against their environmental impacts. Your friend knows Kelvin and has directed him to you for assistance.

Task:

(a) i. Give the identity of substances A and B, explaining their categories.

(b) . Write the formula of

(i) The compound formed when B and C reacted

(ii) Ions formed by A and B.

b. Explain the properties of substances that belong to same category as C and show how they can be useful.

c. Suggest one negative impact of occurrence each of substances D and A in environment with mitigation?

Item 10.

Chlorides serve many purposes some of which include preservatives and industrial applications. A common chloride; M is made from reaction of sodium atoms and R molecules which exist as diatoms $^{35}_{17}A$ or $^{37}_{17}B$. Atoms A and B show properties of non-metals in the molecules they form. Musa's teacher requires them to evaluate the daily applications of R and environmental impacts of the chloride M. Your friend knows Musa and has directed him to you for assistance.

Task:

ai. Explain the category of atoms **A** and B.

ii. Describe how R is formed.

b. Write an equation showing how M is formed and explain its properties.

c. Suggest three daily life applications of R.

d. Explain two impacts of excessive existence of R in environment.

Item 11.

Gas Y makes up 0.03% of the components of air. Poor practices by community members for example excessive use of carbon-based fuels elevate the concentrate of the gas in atmosphere posing negative impacts to environment. In schools the properties and uses of the gas are studied after preparing it using limestone and suitable dilute acid. School environment awareness clubs plan to educate masses about the gas starting with schools.

Peter is a member in one environment awareness club and needs to prepare for the campaign however he lacks enough knowledge. Your friend knows Peter and has directed him to you for guidance.

Task:

ai. Explain the category of substances in gas Y.
ii. Describe how electrons in the atoms making up gas Y are arranged.
bi. Make an illustration and write chemical equation demonstrating how a sample of the gas Y can be prepared in a school laboratory.
ii. Explain the property exhibited when the gas is tested with a lighted splint.

c. Describe three uses of the gas in daily life.
d. Explain two environmental impacts associated with elevated concentrations of the gas in the atmosphere and suggest a common preventative measure.

Item 12.

Structures and properties of substances affect their applications in daily life. In secondary school science fair, senior two students of a certain secondary school presented two products shown in figure below.





Mukisa said that both products were obtain from same substance. One of the participants needed more information about the substance and raised concerns relating over dependence on substance for manufacture of the products on the environment. Through your chemistry teacher you have been contacted to give a written response.

Task:

a. Identify the term that describes the relationship between products and give a reason for your answer.

b. Describe the structure attained by the material that forms each product.

c. Explain two properties of material from which the product that make them useful in real life context.

d. Assess one environmental impact associated with over dependence on each of the material for manufacture of products and suggest two mitigative measures.

Item 13.

Rita's grandmother suffers from osteoporosis; a disease that weakens bones, making them porous, fragile and highly susceptible to sudden fractures. She was prescribed with a supplement to increase mineral ion level in her body. Analysis showed that the supplement contains a substance which on dissolving in water produces ions of opposite charges and it has a relative formula mass of 203.3g/mol made up of elements 12.0% Y, 34.9% Cl and the rest being water of crystallization. Rita needs more information about the supplement. Your friend knows Rita and directed her to you for help.

(Where necessary you may need Y=24, Cl=35.5, H=1, O=16)

Task:

a. Determine the molecular formula of substance in the supplement.

b. Explain the category of the substance in the supplement.

c. Write the formula of the ions of substance in the supplement.

d. Explain two uses of substances in the same category as that in the supplement.

e. Describe the two effects of excess supplement in environment and suggest mitigations.

Item 14.

More Haematite (iron-ore) was recently discovered in Kabale. Iron extraction plants convert haematite to iron; a useful substance following the equation;

The iron obtained after extraction is used in production of useful materials such as corrugated iron, cutlery among others.

Iron is produced of the ore following the reaction below.

$Fe_2O_{3(s)} + 3CO_{(g)} \longrightarrow 2Fe_{(s)} + 3CO_{2(g)}$.

Air pollution problems is one of the problems associated with extraction of iron which is due to excess carbon monoxide with in the production process.

In an experiment to determine the amount of the gas that may needed during production process, a sample experiment was performed using 1.6g of the ore.

The above information was presented to senior three students to make analysis. Molly lacks enough knowledge of what is required. Your friend knows Molly and has directed her to you for guidance.

(Where necessary you may use Fe=56, 0=16, C=12, 1mole of substance contains 6.02 X 10^{-22}particles).

Task:

a. Explain the category of the products obtained from the substance.

b. Determine number of particles of the gas needed for complete reaction with the ore.

c. Explain two uses of the gas produced along the reaction.

d. Explain two other environmental impacts of the excess gas to environment and give a common mitigation.

Item 15.

Recent survey shows that 90% of Uganda's population depend charcoal and firewood as the major source of fuel which threatens Uganda's bio-diversity. To curb the predicted impacts that will arise if the source of fuel is not changed, the government of Uganda distributed liquefied petroleum gas to less privileged families starting with Kisoro district.

Analysis shows that the substance in the gas cylinder is an organic covalent hydrocarbon with carbon and hydrogen atoms only; existing in a ratio of 3: 8. Community members are concerned if there are other uses of the substance and impacts the can arise due to of fuel source the government distribute.

Your school has been contacted to be part of sensitization problem and you been selected to lead team from school.

Task:

ai. Explain the category of the substance.
ii. Draw the structural formula of the substance.

b. Explain four characteristics of the substance that it suitable for the application.

c. Suggest one other use of the substance.
d. Explain two environmental impacts of dependence of the substance and one possible mitigation.

Item 16.

A national science and innovation fair has been organized by the ministry of science, technology and innovation where Joel's school is to take part. Joel and his team want to design a prototype structural support bracket for a low-cost, miniature research satellite intended to study climate change patterns over East Africa. One participates from Joel's team said that the satellite should be made from material that can withstand high thermal radiations. Three substances are available from which the team can choose to use as raw material and some data about them is given in the table below.

Element.	X	Y	Z
Atomic number	11	12	13
Melting point (°c)	97.8	650.0	660.3

Other members suggest that they need to provide information about other applications of suggested raw material and its environmental impacts but lack sufficient knowledge. Your friend knows Joel and has directed them to you for help.

Task:

a. State and explain the trend in melting points of the substances from which Joel's team can choose the best raw material.

bi. Give the identity of the suitable of the substance that can be used as a raw material and explain its category.

ii. Describe the electron arrangement in the suitable raw material.

c. Explain three other uses of the substance suitable as the raw material.

d. Explain two environmental impacts of the wastes of the product in environment and one common mitigation.

Item 17.

The diversity of period table proves existence of many elements with different behavior towards the environmental conditions which influence their daily life applications. A study was conducted to investigate how sodium, aluminium and magnesium vary in their chemical behaviour towards the environment. Results from the study showed that products of the interaction of the substances can be useful in different aspects of life however the elements can pose environmental impacts. Kevin was instructed to make an evaluation of the information but she lacks enough knowledge. Your friend knows Kevin and has contacted you for help.

Task:

a. Explain the category of the substances used in the study and describe the structure they attain.

b. Describe the trend in chemical behaviour of the substances with water. (Illustrate your answer using equations).

c. Explain how the each of the interaction for each substance with water influence their daily life applications.

d. Suggest two impacts of the excess product in environment and their mitigations.

KAMTEC Mentoring Academic Success Through Research

APPLICATION OF CHEMISTRY IN DAILY LIFE.

(A) DETERGENTS.

Item 1.

Atim operates a retail shop selling many products including detergents. Her customers recognizes that of the detergents she sells; product A is removes all stains from clothes irrespective of the water source used compared to B whose performance depends on water source. This was confirmed when both products A and B were used in washing clothes using water containing mineral ions calcium ions and magnesium ions. Environmentalists say product A causes growth of algae lowering water quality. Many Atim's customers wish to understand how the more effective product can impact their health and evaluation between the two products.

Task:

a. State the types of products A and B.

b. Account for the performance of the product A.

c. Explain three dangers of over dependence on product A and give two common mitigations.

d. Give three similarities and three differences between products A and B.

Item 2.

Senior three students of a certain secondary school conducted a study on two common cleaning detergent products labelled X and Y. during their study, the laboratory attendant provided them with a water sample which contained magnesium ions and treating the products with it, the results were summarized using equations below.

X: $2NaSt_{(aq)} + Mg^{2+}_{(aq)} \rightarrow MgSt_{2(s)} + 2Na^{+}_{(aq)}$

Y: $2ROSO_3Na_{(aq)} + Mg^{2+}_{(aq)} \rightarrow (ROSO_3)_2Mg_{(aq)} + 2Na^{+}_{(aq)}$

The students noticed a difference in effective of the products on removing stains and also noticed that their hands had developed blisters and were irritating wish to know the identities of products X and Y, other health related impacts of their usage and basis of choosing a better product. You have been contacted to give guidance.

Task:

a. Give the categories of X and Y.

b. Explain mode of action of the products and give an accountability on the difference in their effectiveness.

c. Advise on two dangers associated with use of X and give three possible mitigations.

d. Guide on two differences and two similarities of the detergents and give recommendation.

Item 3:

Despite the regulatory bans on non-biodegradable branched alkyl benzene sulphonate (ABS) in Uganda due to its environmental related impacts, a peri-urban Kampala detergent manufacturer has secretly substituted its surfactant with a cheap unlabeled ABS-heavy alternative in their product to maintain profit margins. Locals have no problem with the product since it is very effective at removing stubborn stains from fabric making the authorities efforts to pull down the product are still hard since the community appreciates. Despite the environmental impacts, the product also has advance impacts on the user. Through school science clubs, a campaign has been organized to create awareness to community about the product and suggesting them a better alternative that is environmentally friendly.

Task:

a. Identify the category of the product peri-Uganda secretly manufactures and explain its mode of action.

b. Help the locals understand three dangers associated with the use of the product to human health and one common mitigation.
c. Suggest two similarities and three differences between the product and the alternative category community members can go for.

(B) FOOD ADDITIVES.

Item 4:

Moses bought a bottle of a drink to quench thirst. After taking, he checked on the table of ingredients in the drink which included water and sugar, mango puree, citric acid, stabilizer and a colorant obtain from natural sources. Moses became interested in why many different ingredients are added in the drink and their health implication. Your friend knows Moses and they have contacted you for advice.

Task:

a. Identify the category of the ingredients and state the purpose of each in the product.

b. Explain two health implications associated with over consumption of the product and mitigations.

c. Give the two differences between water and other ingredients and similarities of other ingredients.

Item 5:

Jenifer, a popular food vendor has been using new ingredients in her dishes to improve soup viscosity and food life span. The ingredients are said to be artificially manufactured. However, many of her customers complain about digestive disorders which is related to the ingredients she uses.

Jenifer is considering using alternative ingredients which serve the same purpose but needs guidance and you have been contacted.

Task:

ai. Give the category of the ingredients and hence identify each of them.

ii. Explain a reason why Jenifer adds each of the ingredients to meals she prepares.

b. Explain two other side effects of the ingredients and propose a possible common mitigation.

c. Evaluate each of the ingredient with its alternative and give advice.

Item 6:

Tinah's mother prepares the sweetest milk at home. All family members are always eager to taste her milk. She says in addition to sugar, she adds the following to the milk she prepares.





Tina picked interest in knowing the uses and side effects of the ingredients her mother uses while preparing milk and you have been contacted for advice.

Task:

a. State the category of the ingredients and explain the function of each ingredient.

b. Help Tina understand any side effect of each ingredient and advise her on possible mitigation of each.

c. Give:

i. Three similarities between the ingredients.

ii. Two differences between sugar and other ingredients.

Item 7:

Christella prepares juice which she sells to the neighborhood to earn a living. However, she faces a challenge that product separates out to from a layer as shown in figure below.



She was advised the problem can be solved if she uses specific ingredients which have different effectiveness level. Christella lacks enough knowledge about the ingredients and also wishes to know the health impacts associated with the ingredients before she choose which to take. You have been contacted for advice.

Task:

a. Categorize the ingredients Christella needs and give their function.

b. Explain three side effects of the ingredients and give mitigations.

c. Suggest two differences and two similarities between the ingredients and recommend one of them.

(C) MEDICINES.

Item 8:

Marvin is a casual work in a local stone quarrying company. He usually complains of body aches related to work load assigned to him at the quarry. His friends advised to bath a water mixture of plant parts showed in figure below.





Even after repeated usage, Marvin says the body aches continue severely yet he is not ready to quit the job. Marvin needs advice on alternative product he can use but lacks enough knowledge. You have been contacted to guide him.

Task:

a. Suggest the category of products Marvin can use as an alternative and identify their common name.

b. Explain how the product works.

c. Explain two side effects associated with the product Marvin used and a common mitigation.

d. Give two similarities and two differences between the product Marvin used and the alternative product.

Item 9:

Alice was sent back home from school because she was not feeling well. On taking her to hospital, after laboratory tests and she was recommended medicines shown in figure below.



Product A



product B

The doctor emphasized that she should orally take 2X3 of product A and 2X2 of product B daily for 7 days. Alice's friend told her to take more of the products than the doctor's recommendation. After some days, she developed un common symptoms and got worried. Alice needs an assessment of the products, why she developed uncommon symptoms and evaluation of the products.

Task:

a. Categorize the products Alice was given and explain the function of each.

b. Explain two side effects of each of the products if doctor's instructions are not followed and give a common mitigation.

c. Give two similarities and three differences between the products.

Item 10:

Mukasa is a medical practitioner working in a pharmacy around Kampala in central Uganda. In the pharmacy, they sell products that treat common diseases disturbing community members. Some of the products sold include aloe Vera extract which can have the same role as one the others below.



Mukasa's manager wants to create awareness on the products they sell emphasizing on their functions and health impacts due to their misuse and you have been contacted to be part of the team.

Task:

a. Categorize the products sold at the pharmacy Mukasa works and give function for each.

b. Explain one health impact associated with misuse of each product with a mitigation.

c. Give:

i. Three differences between aloe Vera extra and other products.

ii. Two similarities of the other products.

Item 11.

A business lady in one town employed a maid to look after her five year son as she went to work daily. She noticed that her son was always moody and seemed to be weak for abnormally long hours. She asked the maid to add some tree plant extract or use specific tablets to the son's food which she believed would work for the son.

The Maid consulted Molly to know more about the medicines but lacked enough knowledge. You have been contacted for advice.

Task:

ai. Identify the categories of medicine the maid adds in son's food.

ii. Describe the mode of action of the medicine.

b. Explain three side effects of excessive use of the medicine.

c. Evaluate the medicines the maid adds to son's food.

(D) BEVERAGES.

Item 12:

Joan operates a retail shop that sells very many drinks. She is a supplier to many organizations including schools. However, some of the drinks are not suitable for some organizations like schools. Joan's sister wants more information about the drinks her sister supplies and you have been approached for help.

Task:

a. Categorize the drinks sold by Joan.

b. Explain three functions of the drinks.

c. Suggest how two side effects as a result of excessive consumption of each category of the drink may arise and give a common mitigation.

d. Evaluate the drinks sold by Joan through differences and similarities.

Item 13.

A teenage school girl who had gone to attend an introduction ceremony got so excited when she saw a new drink with a label; not suitable to persons below the age of 18 among the many drinks like soda and juice that were served. She got excited about the drink she was denied and wished to have more information about it. Your friend knows Joan and directed her to you for help.

Task:

a. Identify the category of the drink.

b. Describe three functions of the drink.

c. Explain two side effects of excessive use of the drink and three possible mitigations.

d. Give:

i. Three similarities of the drinks at the ceremony.

ii. Three differences between the new drink and others at the ceremony.

(E) NUCLEAR PROCESSES.

Item 14.

The need energy for clean and sustainable energy source is becoming a daily demand in Uganda as its population continuously grow. Environmentalist predict that energy from fossil fuels will become insufficient and therefore a need to supplement hydroelectricity. In a workshop about other alternative energy sources, facilitators emphasized that Uganda is to construct a power plant that can convert energy from the nuclear reaction below into electricity and solve energy projected inefficiency.

$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{236}_{92}U \rightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3\ {}^{1}_{0}n + energy.$

The facilitator also emphasized that there is another alternative nuclear reaction however it requires adverse conditions similar to those at the sun's core and therefore developments are not yet successful. Thomas participated in the workshop; he wishes to know if the energy from the reaction has other purposes and if it can be dangerous to human life. Your teacher has directed Thomas to you for help.

Task:

a. Identify the type of suggested nuclear reaction and suggest other purposes the energy from it can have to the community.

b. Explain the dangers associated with energy from the above reaction.

c. Compare and contrast the type of reaction above and the one that requires adverse conditions.

Similarities:

Differences:

Item 15:

Prostate cancer is a growing health concern in Uganda with limited access to advanced treatments; Uganda is investing more in the Mulago cancer Research institute to improve the health sector.

When a school toured the institute, they were told that doctors are utilizing energy released from certain substances to develop a new cancer treatment increasing the chances of survival of the patients. The energy used is produced from the following reactions.

$^{131}_{53}I \longrightarrow {}^{131}_{54}Xe + {}^{0}_{-1}e$

$^{223}_{88}Ra \longrightarrow {}^{219}_{86}Ra + {}^{4}_{2}He$

Doctors emphasized that the form of energy from the above series of reactions is a promising alternative mode of treatment for the disease.

Your friend from that school is concerned about the events in the facilitation and needs to assess the forms of energy from the reactions and has contacted you for guidance.

Task:

ai. What the type of substances are used in the research?

ii. State any other two applications of the type process the substances undergo.

b. Explain two challenges associated with prolonged exposure of the forms of energy.

c. Compare and contrast the forms of energy generated from the series of reactions.

i. Three similarities.

ii. Three differences.

Item 16.

While studying renewable energy, it is observed that the sun provides energy that drives many processes among which is photosynthesis. This is energy is produced at the sun's core under very high conditions of temperature and pressure. The reaction leading to production of the energy is represented by equation below.

$$^{2}_{1}H + ^{3}_{1}H \rightarrow ^{4}_{2}He + ^{1}_{0}n$$

Scientists say that the reaction at the sun's core can be induced on earth and the energy it could produce will supplement other clean sources such as that obtained from induced splitting of atomic nucleus. Kevin's teacher wants her elaborate the process under research and assess its impacts to human health if the scientists succeed. Kevin lacks enough knowledge and you have been contacted for guidance.

Task:

ai. Explain the type of reaction that occurs.

ii. Suggest three ways in which energy from the reaction can be of use.

b. Explain three dangers that are associated with the form of energy and suggest three mitigations.

c. Compare and contrast the reaction above with its alternative.

i. Two similarities.

ii. Three differences.

CONTRIBUTION OF CHEMISTRY TO UGANDA'S ECONOMY.

Item 1:

Sulphuric acid is one of common raw-materials that serve many local industries in Uganda such as the detergent manufacturing industries, metal extraction companies among others. To make the acid readily available, a sulphuric acid manufacturing plant is yet to be established in Kabaale. The government plans to create awareness in the community on the upcoming event on how the acid will be produced, preventive measures that will be taken to safe-guard the community against impacts that rise from industrial wastes and benefits of the manufacturing plant to people of the community. Your head teacher has been appointed to lead the workshops.

Task: Make a presentation that can be followed.

Item 2:

Maku-maku detergents is local supplier of a detergent product well known for removing stubborn stains regardless of the water source used. The marketing director announced a give-away to the community as an appreciation for their endless support. He asked customers to always fill the questionnaire found in the product and submit it to specified places in order to enter the draw. Tenda obtained the draw which required him to express the processes involved in manufacture of the product with three likely environmental impacts of the manufacturing plants on community and mitigation and two merits of the plant other than taxes and job opportunities. Tenda lacks enough knowledge to attempt the draw and you have been contacted for help.

Task: Write a message Tenda can use.

Item 3:

Uganda's prospective on crude oil extraction focus on potential for economic growth through taxation and foreign exchange. The extraction is a joint venture between total energies and the Uganda national oil company.

The private investors aim at sensitizing the masses on processes involved in refinery of the resource, different ways on how the company will manage industrial wastes due to refinery processes and the benefits of the refinery plant. Your head teacher as recommended you as a knowledgeable person to be part of the sensitization team.

Task: Make a write you would use during sensitizing masses.

Item 4:

Air which is a mixture of different components contains oxygen and nitrogen as the main components. Nitrogen is used as preservative for fruits, in manufacture of nitrate fertilizers among others. A local investor has been approved to set up an industry that deals with production of the gas. The school community showed interest in the processes involved in manufacture of the gas while the rest of the community is interested in how the plant will be important apart from job opportunities and tax and different ways of managing industrial wastes.

Your school has been appointed to create and awareness.

Task: Make a write up your school would use.

Item 5:

Ethanol has other numerous uses beyond alcoholic beverages including solvent, fuel additive and hand sanitizers among others hence calling for its adequate supply. In response to this, a private investor has been cleared to set up another ethanol producing plant in Gulu to serve other purposes of ethanol other than a beverage. Community members are aware that the plant will avail more job opportunities to them and increase government taxes.

They also know how cassava is converted to crude ethanol. They are interested in processes involved in converting crude ethanol to 95.4% ethanol, how the manufacturing plant mitigates impacts due to industrial processes and other benefits of the plant.

For quick sensitization of the community to enable quick set-up of the industry, the Government through the Ministry of Education and Sports intends to use secondary schools. Your school has appointed you as chairperson to lead the group to sensitize the community.

Task: Make a write up that would be used during sensitization.

Item 6:

Aluminium is a highly important metal due to numerous beneficial properties and wide spread applications across industries in manufacture of construction materials, electronics among others.

To serve the market for industries that use aluminium as a raw material, a private investor has been cleared to set up an aluminium extraction plant in Ntungamo district according to the Uganda Investment Authority. The manufacturing process was recently published in a popular area news-paper how community members still raise issues on converting purified ore into finished good such as construction materials, how the industry will mitigate impacts due to industrial wastes during process of production and ways through which plant will boost Uganda's economy. Your head teacher has recommended to be part of the team creating awareness.

Task: Make a write you would use during sensitization.

Item 7:

Increased population has called for increased construction of residential and one of the major construction materials people think about as they set up buildings is iron sheets. A factory that supplies iron sheets plans to reward the population through a fair draw where customers will be required to answer some questions concerning iron production. The marketing director says the areas of focus in the draw include the processes involved in purification of the ore after it being converted to iron, its conversion to iron sheets, how the industry mitigates impacts that arise due to industrial wastes and contributions of the plant towards the growth of the country.

Your friend wants to participate in the draw but he lacks sufficient knowledge and has come to you for help.

Task: Make a write up your friend would use.

EXISTENCE OF NATURAL RESOURCES IN THE ENVIRONMENT AND THEIR IMPORTANCE IN EVERYDAY LIFE.

Item 1:

Uganda is facing changes in climate patterns and increased respiratory diseases. Environmentalists attribute these issues to the over dependence on charcoal for cooking. Citizens are un-aware of how charcoal usage impacts the environment.




Students have been identified by environmentalists as key players in educating the citizens on category of the fuel, different ways in which its usage impacts environment and benefits of the resource used to obtain the fuel. You have been identified by your school as one of the students to be involved.

TASK: Write the message you will use to help the citizens understand.

Item 2:

In the campaign to create more job opportunities to Ugandans, many private investors were cleared to set up industries in different parts of the country. Some of these industries poorly dispose the industrial wastes which environmentalists say have greatly impacted the water and air.




A workshop under the theme ***"environmental conversation amidst industrialization"*** has been organized to create awareness about sustainable practices in industries to save the environment.

The community needs to know about the category of the resources with their composition, how industrial practices impact the environment and two benefits of each resource in community. Your school has been invited to be part of the team creating awareness and your head teacher has selected you to represent your school.

Task: Make a write you would use during the workshop.

Item 3:

Recently, crude oil deposits were discovered in Western Uganda. A Chinese investor has been contracted by the government to extract the oil. Many Ugandans are excited about the resource.




The government plans to create awareness to community about the resource through informing community about its category with composition, preventive measures of impacts associated with extraction process and different ways in which resource will be beneficial.

Task: Make a write up that can be published in news-paper to create awareness.

Item 4:

A cement company is quarrying limestone to produce ordinary Portland cement. A certain secondary school visited the quarry and Joan realized that the air of the area is not visible through and also water in their water bodies is salty.

She says her observations are related to the activity of the company.




She is therefore interested in understanding the category of the resource exploited, how the activity brings about her observations in environment and different uses of the resource. Joan lacks enough knowledge and you have been contacted for advice.

Task: Make a write-up you can use.

Item 5:

Forests are important natural resources because they serve many purposes including cleaning up the air through photosynthesis by absorbing harmful greenhouse gases like carbon dioxide and releasing fresh oxygen among others. Many forests are being cut-down for timber which risk different tree species to extinction. A campaign has been organized under theme ***"biodiversity conservation"*** to educate community members on why they should conserve trees.





A non-government organization says community members need to be aware of the category of the resource, other three demerits of cutting down trees and a common mitigation and four ways in which trees are important in environment and therefore need to be conserved. Your school has been contacted to be part of the campaign.

Task: Make a write-up that can be used.

DEAR CANDIDATES OF 2026,

As the CEO of **KAMTEC** Education Consultancy, I speak on behalf of a team that has walked with you through your academic Journey since you joined secondary level. We have seen your potentials in the questions you ask, the efforts you put, but most importantly, the fire in your eyes. Because of that I chose to write to you today with full conviction that; **WE HAVE HOPE IN YOU.**

2026 is not just another year of examinations, it is a year to prove to yourself what you are capable of. The journey to the final paper is never easy. There will be long nights, difficult concepts, moments of doubt, and perhaps days when the syllabus seems unfinished; But remember this: ***Every Great Result Begins with a Decision to Keep Going When It Gets Tough!***

You are not walking alone. Your teachers are investing most of their times in you. Your parents and Guardians are sacrificing for you, just to hold your future torch. At KAMTEC we have designed these series questions because we believe in your future. We have exposed you to many challenging questions, ***Not to Break You, But to Build You!*** We have Pushed you not because we doubt you, ***but we Know You Can Rise Higher!*** So, as you prepare, draw attention on three things:

1. ***Believe You Can & You Will****: Trust the work you on daily. Small & Consistent efforts beat last-minute panic!*
2. ***Embrace the Struggle****: The concept you find hardest today will be your testimony tomorrow. Therefore, attack it, don't avoid it.*
3. ***Guard your Focus****: Distractions will come, but your dream is worth more than a few minutes of comfort.*

Beloved Candidates of 2026, you carry the hopes you families, your schools, and this great nation. But more importantly, ***you carry your own dreams do not let them die.*** Our Motherland needs your ***skills, innovations, and your leadership.*** We are counting on you to take your place. At **KAMTEC**, we see Doctors, Engineers, Teachers, Entrepreneurs and leaders in you. We see generation that will not just pass exams but will change communities

Stay Disciplined and when examinations day comes, walk with confidence into that room with a slogan '**I am Ready'. I WISH YOU ALL THE BEST!**

J. J OKOTH, For

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