



KAGADI PROGRESSIVE EXAMINATION BORD **CHEMISTRY**

ITEM ONE

Charcoal burning is one of the sources of income and the main source of fuel in Uganda but recently charcoal burning has attracted a national concern where the majority of people are against it. Explain the effects of this economic activity and how it can be prevented



item 2.

People have encroached wetlands in search of land for settlement and Setting up industries. This has caused major problems to the country and

promoted the government to campaign against wetland encroachment.



Task

As a learner of chemistry, write a speech explaining to your community

Why the government is against wetland encroachment.

Item 3

Below is an article extracted from the New Vision of 07th / May/2022.

The website to which it was downloaded has been provided at the end of the article. Read the article carefully and answer the questions that follow.

TOP STORY

‘Air pollution killing more than HIV’ -New vision official.

Gerald Tenywa. Journalist @New Vision.

Every home in Uganda has either been infected or affected by HIV and AIDS. They have either lost a relative or have suffered as a loss of a bread winner. Air pollution has gone steps ahead of HIV in affecting Ugandans as it has claimed more lives than HIV, Daniel Okello, the director in charge of environment at Kampala Capital City Authority (KCCA), has

said. “We lost 23,000 People in 2019 due to HIV in Uganda. In the same period, 26000 People died as a result of cardiovascular diseases linked to air pollution,” he said. Okello was speaking during the launch of the air quality awareness week at the Uganda Media Centre in Kampala on 4 May 2022. The event, **themed** “Be air aware, be prepared” ,attracted top officials from the National Environment Management Authority(NEMA), Makerere University and Ministry of Health, who called for increased awareness and actions to curb air pollution. Okello mentioned of two types of air pollution -outdoor pollution and household or indoor pollution which are all greatest environmental threat to human health around country pointing out Kampala, Mukono and Jinja with the poorest air quality which is five times way above the critical threshold of World Health Organisation. Okello said indoor air pollution resulting from cooking with biomass fuel particularly charcoal, firewood, coal ,burning of organic fuels such as kerosene, burning of grass and waste products. Partial combustion of these fuels lead to emission of carbon monoxide gas, which is poisonous if inhaled. Worse than indoor air pollution, he added, is outdoor air pollution include old cars spewing fumes. As the cars burn fuels, such as diesel and petrol to power engines, they release poisonous gases such as carbon monoxide and also lead from motor vehicle emissions, dust from

unpaved roads and construction sites, factories release fumes filled with sulphur dioxide gas which leads to acid rains and carbon monoxide gas which is poisonous .Burning of wastes including plastics , produces dioxins and furans, which cause cancer.

Dr Ivan kimuli from Makerere University’s lung institute said they have done studies that indicate that 11% of the population suffers from asthma and that was being aggravated by poor air quality and the same study indicated that children in rural settings had “ better and less damaged lungs" than those in urban settings, who were exposed to pollutants in the air. NEMA's director for environment monitoring and compliance, Waiswa Ayazika, said: “ the government is currently making a clear plan to improve air quality involving every body's responsibility to save the current and future generation.”

<http://www.newvision.co.ug/category/health/air-pollution-killing-morepeople-than-hiv-133316>.



(a).State what is meant by the term “air pollution” ? (02 scores)

(b)From the article; state the different types of air pollution and outline

how each type of air pollution is caused. (08 scores) (c) From the article, state the main air pollutants and show their effects to man. (08 scores)

(d) Suggest a reason why Kampala, Mukono and Jinja have the poorest air quality which is five times away above the critical threshold of World Health Organization? (02 scores)

(e) Suggest any 5 solutions that can be adopted into the government's strategic plan of how air pollution in the country can be greatly reduced (05 scores)

ITEM 4

A Senior two Learner from St. Catherine's college carried out an activity to obtain juice from a fruit.



- ✓ She Cleaned the fruits by washing using clean water.
- ✓ Peeled the fruits to remove the unwanted parts including seeds.
- ✓ Placed the fruits into the blender and blend them to a liquid solid mixture. Removed the mixture from the blender and filter off the solid parts of the fruits using a kitchen sieve.
- ✓ Add some water while filtering.
- ✓ Added some sugar to improve on the taste of the juice.
- ✓ Packaged the made juice into clean dry bottles.
- ✓ Gave the juice made a name.

Tasks

a). Identify the ways how she can improve on the quality and safety measures of the juice in terms of color, taste and stability. (8 scores)

b). Identify the substances that can be added to make the juice suspension stable.

ITEM 5

In the last 30 to 40 years, plastics have taken over as replacement materials for metals, glass, paper and wood as well as for natural fibres such as cotton and wool. However, plastics such as polyethene bags have contributed significantly to household waste problem, up to 10% in some countries, and it is getting worse.



a) Outline any three advantages of using polyethene packaging (3 scores)

b) Explain any three ways how polyethene bags are dangerous to our environment

c) Explain any three ways of how to prevent the effects of polyethene bags on the environment

ITEM 6

8. In our day to day life at home most of us use carbon compounds such as petroleum products, wood, charcoal and biogas as source of fuel. Research shows that continued use of these fuels has greatly affected our resources from which they are obtained.



- Identify the class and write the general molecular formula of the organic family to which the components of oil belong (04 scores)
- Name and write the structural formula of the next two members of the organic family named after methane (04 scores)
- Giving a reason for your answer, state one method by which the components of crude oil. (2 scores)

a) Explain any six (6) ways how we can sustainably use the available resources

b) The main component of biogas is methane (CH_4). Methane is the simplest compound obtained from crude oil which contains a variety of compounds but with similar structures.

i) Identify the class and write the general molecular formula of the organic compound to which methane belongs. (02 scores)

ii) Name and write the structural formula of the next member of the organic family after methane (01 score)

ITEM 7

Large deposits of oil have been discovered in Lake Albert near Hoima city. Crude oil contains a variety of different compounds but with similar structure.

The simplest of these compounds is methane of molecular formula CH_4 and many others.



ITEM 8

Mukhama Garvin loves drinking rain water because he believes it is pure water as he gets directly from the sky. However, Owen Micheal has continuously advised him to stop taking it and instead drink water from the borehole which is hard water.



- Why do you think Owen Micheal advises Mukhama Garvin to drink hard water? (02 scores)
- Hard water is used to wash clothes more soap is required while less soap is required if rain water is used. Briefly explain this observation. (03 scores)

ITEM 9

Salts are very important in our everyday lives as some of them are used in medicines, add taste to our food. Many of these salts can be prepared in the laboratory.



- Suggest three ways in which salts can be prepared in the laboratory school.
- Ammonium chloride is an example of the salts prepared from the laboratory.
- When it was dissolved in water and the solution tested, it was found to be acidic.
- Explain why the solution was acidic. (02 scores)
- c) State three other applications of salts in your community. (03 scores)

item 10

Kyomuhendo Peter, a S.1 learner has studied Chemistry for two months now; his mother is a senior researcher. On visitation day Kirabo and his mother had a lengthy talk about science subjects offered in the school; their relevance in daily life and contributions to the economy. Chemistry being one of those subjects



Show how best Kirabo would show his father that chemistry has contributed to the economic growth of the country (10 scores)

Item 11

Kirabo Irene is a student in Kagadi Progressive S.S. in Kagadi district. When in the chemistry class, Master Sam taught her that melting of candle wax when a candle is burning is a physical change.

The teacher told them to go and research more from a particular book in the library about chemical and physical changes. On reading the book, she found that a burning candle has both physical and chemical changes. Agnes wondered which chemical change is in the burning candle since their teacher had only said that a burning candle has only physical change. When she went back home, she saw the uncle splitting firewood into small pieces. At the same time, her mother was using the splitted pieces of wood to cook food.



ITEM 12

Chemistry is one of the most prestigious science subjects studied at the secondary level of Education. When you study chemistry, you not only acquire knowledge about many chemical reactions and other substances, but you can also take up various careers after school.



- Identify any three careers that you can take up through studying chemistry.
- Briefly describe how the knowledge of chemistry has been applied in the following field in the Ugandan economy;
 - Agriculture.
 - Medicine.
 - Cosmetics industry.

ITEM 13

14. Read carefully below about how members of Sarah's family started their day. Nakato Swabulah woke up one day late than usual. She was hearing her mum's loud voice telling her to make tea. When she moved out of the bed, she met her younger brother who was so dirty after playing in mud earlier morning. She removed his dirty clothes and washed them using detergents. She also bathed her young brother using a bathing soap. As she was moving to the kitchen, her father called her and asked her to clean her shoes. She polished her father's shoes using a new shoe polish they bought from the market. She then went to the kitchen in order to make tea in the kettle. She observed bubbles of boiling water which produced steam in the kettle. She then added tea leaves which changes the entire colour of hot water. She tested the tea but it was so bitter. She then added sugar which made the tea sweet. She poured the tea in the flask and took it in the leaving room where she saw her mother putting fruits and soda in the refrigerator. She started feeling headache. When her mother knew about the headache, she gave her pain killer tablets which made her feel better after a few minutes. She moved out of the house and saw their neighbor painting his old metallic door which had developed a brown coat. (10 scores)



- a) Outline activities at Nakato's home showing chemistry. Give all
- Identify the occupation.
 - How is the knowledge of chemistry used in that occupation?
 - How is the activity above useful to the society

ITEM 14

Cement was first produced by Joseph Aspdin in England in 1824. He was a brick layer and inventor of modern Portland cement. However, research has confirmed that Lime and Cement production has undergone tremendous development since its beginning, some 2000

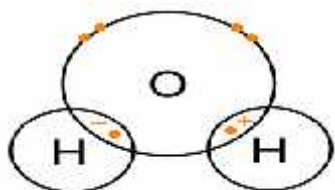
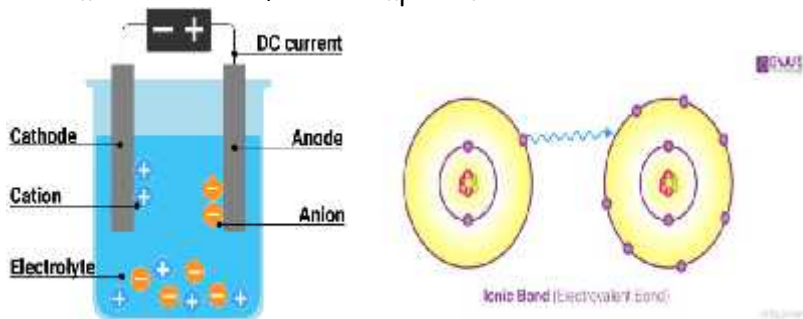
Years ago and now so many different types of cement are being produced to market. Thus this has enabled progressive urbanization from the local soil built houses to cemented brick houses. And so cement is an important chemical in most societies.



- Construct a flow chart to indicate the process involved in the manufacture of cement.
- Identify the social benefits of manufacturing lime and cement.
- Explain some of the dangers to the community, arising from the manufacture of lime and cement.
- Ngambo, a villager from magogo village has been identified as one of the victims of the above dangers in (C), as a Chemistry learner, advise Ngambo on the steps he may take to minimize the dangers arising from the manufacture of cement.

ITEM 15

Sugar and sodium chloride are common compounds used by MR. Bakaki to serve different functions at home. Bakaki's son accidentally poured a solution of sodium chloride into a laptop which immediately blew up. The boy also became surprised when he heated sugar and it ended up melting so fast with gentle heating. The boy got puzzled about the properties that determine the uses of each compound.



- As a chemist, explain what happened causing the laptop to blow.
- Suggest any two other properties of the type of compounds to which the compound that melted easily belongs?
- Using the outermost shell electrons only, show how the compound that caused the laptop to blow up is formed.

ITEM 16

In one of the towns in Uganda, residents are facing an unexpected challenge of water wasting soap. The

locals are frustrated; do not understand the cause and what to do. However, they have heard of other detergents on market that work better but they need more advice on this.



A resident has sought your assistance and confidence that you can use your Knowledge of chemistry to provide help
TASK: Write down the advice you would give the resident.

ITEM 17

Many people in villages make a living by manufacturing local waragi (ethanol). However, the government is against the business due to associated challenges. The district's LC5 chairperson wants to sensitize the community about the large-scale production process and its impact to enable them understand the government position.



The district's LC5 chairperson has contacted you as a student with the knowledge of chemistry in your village to provide the

relevant information.

TASK. Make a write up to use upon meeting the community.

ITEM 18

A farmer in a rural area cleared his land to grow maize for sale. The rainfall was very favorable but the yields were very poor because the soil was not fertile and he made losses.

He was advised to buy and apply one of the ammonium fertilizers. Make a presentation of about 400 words to guide him. (C=12, O=16, S=32, P=31, N=14, H=1)

ITEM 19

. A new knitting firm in Entebbe Uganda makes sweaters from cotton. However, clients are complaining that these are easily decomposed by moths and carpet beetles. The operations manager has heard of nylon as an alternative material. She is uncertain of its nature, composition and effect on the natural well- being of the community. She has contacted you as someone with knowledge of chemistry to guide her in making a better choice.



Tasks;

- (a) Guide the manager on
 - (i) The category of the selected alternative material
 - (ii) The characteristics of the material
- (b) He is inquisitive about its use. Advise her
- (c) „Will the selected alternative have an effect on natural well-

being of the community?"" If YES, What can be done?

ITEM 20

A resident of Bufunjo zone fetches water daily from two sources of water: borehole and nearby spring. When she uses this water from these two sources, she realized that she uses a lot of soap while washing her clothes. One day she boiled the water from the borehole for bathing but remembered that she had not washed one of her shirts and washed it with the boiled water instead and used little soap than it used to be. This has forced her to try boiling the spring water as well and used it for washing her clothes but still used a lot of soap as it used to be. This has confused her more.

Task. Prepare an article to clear away her dilemma.

ITEM 21

James, living in an area where they use bore hole water, slid, fell and his white shirt became dirty. He decided to use a detergent to clean his shirt. The shirt remained with some brown spots yet he had rinsed it several times.

Task: As a chemistry learner;

- (a) Point out the problem James made when choosing a product.
- (b) Help James understand how the product works.
- (c) Advice James on the challenges associated with the long term use of the product.

ITEM 22

Ngambo is in the process of constructing his house without affecting the environment. He wants to build a good strong house; there are various building materials of different quality and properties on the market. However, he does not know the quality of materials to use. Ngambo knows that

choosing quality materials depends on the nature of the material and has come to you for advice.



Task: Use your chemistry knowledge to;

- (a) Explain (i) Categories of materials.
- (ii) The suitability of the materials.
- (b) Advise Ngambo on the choice of materials.

ITEM 23

Air which is a mixture of different components contains 21% oxygen. Due to a wide spread of respiratory illnesses caused by COVID-19, there was an increased demand for oxygen by patients in hospitals. The government supply of oxygen is not enough and is planning to set up an oxygen production plant with minimal environmental impact. However, the science club members in your school would like to know how the process of production will be carried out.



Task: As chemistry student, make a write up you will use during the presentation.

ITEM 24

Bakaita Godfrey always washes his clothes at any time and they can get dried at any time whether on a hot day, inside the house or even on a windy day.

- (a) Explain why clothes dry,
 - (i) On a dry day

(ii) Inside the house.

(iii) On a windy day.

(b) i) From the knowledge of different states of matter, explain the process of rain formation.

(ii) State any three importance of water to man.

ITEM 25

- a) In your village you have challenge of water, where the wells have muddy water and the boreholes provide salt water that hardly quench their thirst but rather increase it. Describe any scientific procedures that you as chemistry student can perform to make the village water clean and safe for human consumption
- b) Polythene bags, car tyres, buckets, iron sheets and petrol are some of the materials used in our day to day life.

(i) Describe any five ways how polythene bags are dangerous to our environment.

(ii) Explain any five ways of how to prevent the effects of polythene bags on the

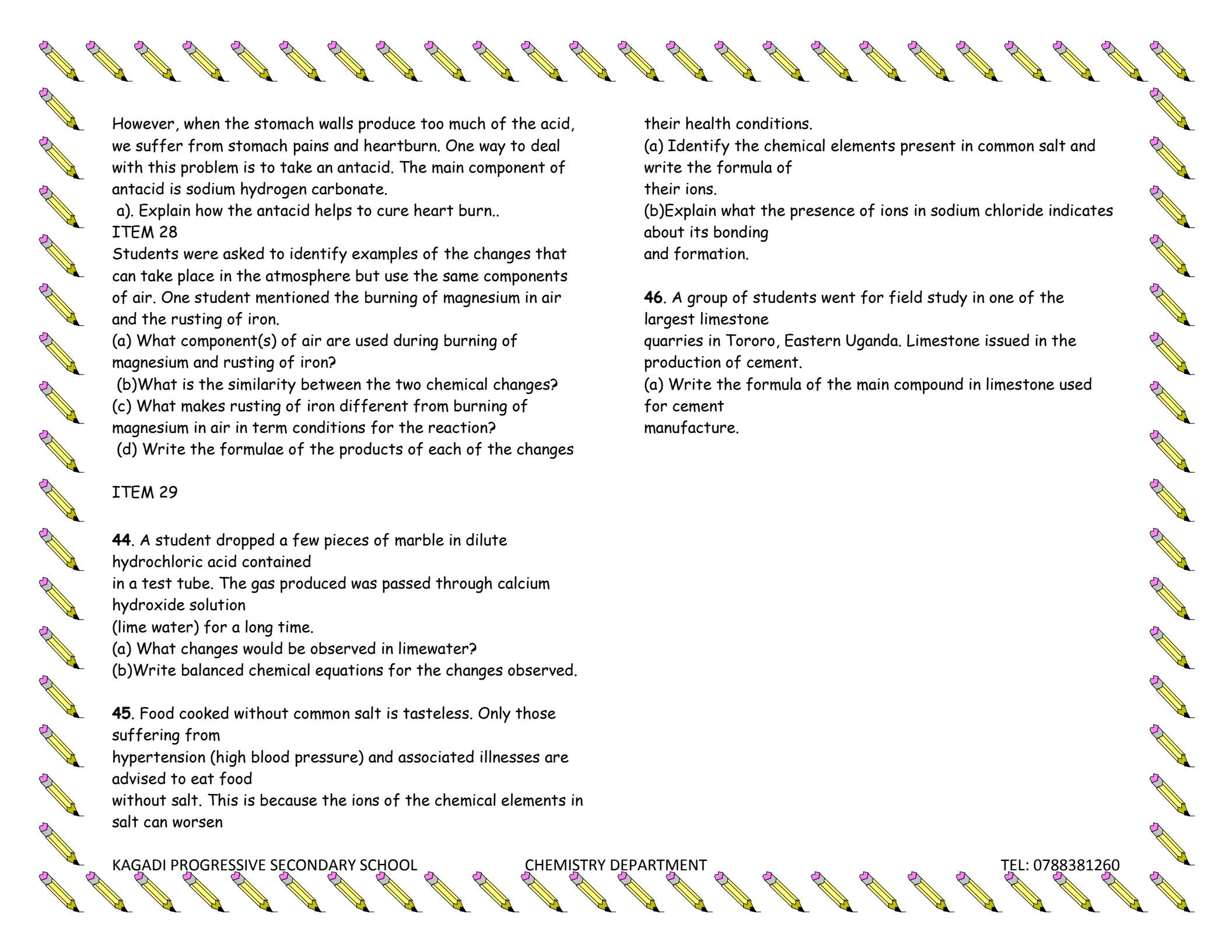
ITEM 26

Cook Musa left knife outside the compound for a winter night, it was found that the knife turned dark brown on the surface the following day.

- a) What is the chemical name for the dark brown coating?
- b) What conditions led to the formation of the dark brown coating?
- c) State any two advantages of the above process to the economy

ITEM 27

The human stomach contains hydrochloric acid with a pH of about 2. The acid helps to kill any germs in our stomach.



However, when the stomach walls produce too much of the acid, we suffer from stomach pains and heartburn. One way to deal with this problem is to take an antacid. The main component of antacid is sodium hydrogen carbonate.

a). Explain how the antacid helps to cure heart burn..

ITEM 28

Students were asked to identify examples of the changes that can take place in the atmosphere but use the same components of air. One student mentioned the burning of magnesium in air and the rusting of iron.

(a) What component(s) of air are used during burning of magnesium and rusting of iron?

(b)What is the similarity between the two chemical changes?

(c) What makes rusting of iron different from burning of magnesium in air in term conditions for the reaction?

(d) Write the formulae of the products of each of the changes

ITEM 29

44. A student dropped a few pieces of marble in dilute hydrochloric acid contained in a test tube. The gas produced was passed through calcium hydroxide solution (lime water) for a long time.

(a) What changes would be observed in limewater?

(b)Write balanced chemical equations for the changes observed.

45. Food cooked without common salt is tasteless. Only those suffering from hypertension (high blood pressure) and associated illnesses are advised to eat food without salt. This is because the ions of the chemical elements in salt can worsen

their health conditions.

(a) Identify the chemical elements present in common salt and write the formula of their ions.

(b)Explain what the presence of ions in sodium chloride indicates about its bonding and formation.

46. A group of students went for field study in one of the largest limestone quarries in Tororo, Eastern Uganda. Limestone issued in the production of cement.

(a) Write the formula of the main compound in limestone used for cement manufacture.