**Chemistry**

 **02/07/ 2021 08.30 AM - 11.30 AM**

 

S1 END OF YEAR EXAM, 2020/2021

SUBJECT: CHEMISTRY THEORY

DURATION: 3 HOURS

**Instructions:**

1. There are 2 sections in this paper:

 **Section A (70 marks**): Attempt all questions in this section

 **Section B (30 marks)**: Attempt 3 questions in this section.

1. Do not use periodic tables
2. Non-programmable calculators may be used
3. Answers should be written on blank papers provided
4. Use a blue or black pen only

**SECTION A: Attempt all questions in this section (70 marks)**

1. a) Define the term ‘chemistry’. (**2 marks)**

 b) List any four applications of chemistry by man in daily life. (**2 marks)**

1. Explain how you can apply the acquired content and skills of chemistry to:

a) Treat dirty water in order to obtain drinking water (potable water). (**2 marks)**

b) Prepare the soil in the field in order to grow seeds in it. (**2 marks)**

1. In traditional Rwanda, chemistry was applied.

Describe how any product used to be made using chemistry knowledge in traditional Rwanda. (**2 marks)**

1. Recently, Rwanda started developing modern industries. Indicate any four industrial activities related to chemistry. (**2 marks)**
2. List any 3 rules and regulations that a senior one student must follow during an experiment in the chemistry laboratory. **(3 marks)**
3. The following list contains the names of six pieces of apparatus with the letters of each name not in order (jumbled).

Rearrange the letters to produce the name of each piece of apparatus.

|  |  |
| --- | --- |
| NEUFNL | TEBEUTR |
| LAFSK | KERBEA |

 **(4 marks)**

1. Define the following terms: **(4 marks)**
2. Matter
3. Physical change
4. Study the triangular diagram shown below for the changes of states of matter and answer the questions that follow:

 

Name the changes of states labelled by letters **A, B** and **C. (3 marks)**

1. Name any two substances that can undergo the change of state labelled **C.**

 **(2 marks**

9. Study the following diagram and answer the questions that follow:

 

1. State the name of the method of separation of mixtures does the diagram show. **(1 mark)**
2. Give examples of two mixtures which can be separated by this separation technique. **(2 marks)**
3. State the easiest method one could use to obtain the substance shown from the following mixtures: **(3 marks)**
4. Diesel oil from crude oil.
5. Dyes from ink
6. Copper (II) sulphate crystals from copper (II) sulphate solution

11. a) Describe the term ‘element of a substance’ **(2 marks)**

 b) The following table provides you the necessary information on sub-atomic

 particles.

 Copy and fill it with the missing information. **(3 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Particle**  | **Symbol**  | **Charge**  | **Relative mass** | **Position in an atom** |
| Proton  | p |  |  |  |
| Neutron  | n |  |  | Nucleus  |
| Electron  | e |  | 1/1840 (negligible) |  |

12. The symbol of an element is represented by

 

 (a) Calculate the number of neutrons in atom X. **(1 mark)**

 (b) State the number of electrons in atom X. **(1 mark)**

 (c) Write the electronic configuration for atom X. **(1 mark)**

 (d) Determine the symbol for the ion which is formed by X. **(2 marks)**

13. The number of protons, neutrons and electrons in particles W, X, Y and Z are

 shown in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Particles  | Number of protons | Number of neutrons  | Number of electrons  |
| W | 6 | 6 | 6 |
| X | 9 | 10 | 10 |
| Y | 12 | 12 | 10 |
| Z | 19 | 20 | 19 |

1. Identify the particles which is:(**3marks)**
2. A cation.
3. An anion.
4. Neutral.
5. Write the electronic configuration of Z. (**1mark)**
6. State the valence of Z. (**1mark)**
7. Give the reason for your answer in (c) above.(**1mark)**

14. The figure below shows a part of the periodic table. The letter is not the correct

 symbol of the element

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I  | II  | III  | IV  | V  | VI  | VII | VIII  |
| J |  |  |  |  |  |  |
|   |   |   | G |   | E |   |   |
| A |   |   |   |   |   | R | D |
|   | X |  |  |  |  |  |  |

1. Give two elements that are metals. **(2 marks)**
2. State the element that is in group IV and period II and suggest its atomic number. **(2 marks)**
3. Write the formula of the compounds formed between: **(2 marks)**
4. X and R.
5. J and G.
6. X is in group II and in period IV of the periodic table. Give its electronic configuration. **(1mark)**

 15. (a) Explain the phenomena (steps) which are involved in water cycle.

 **(2 marks)**

(b) Every morning, we see water droplets on plant leaves and materials left outdoors. But in the course of the day, the droplets disappear. Discuss this phenomenon. **(2 marks)**

 (c) When it rains, surface run-off water goes in the seas, oceans and lakes.

 Explain the contribution of this water to the amount of rainfall in surrounding areas. **(3 marks)**

16. (a) Discuss any two effects of acidic rain. **(3 marks)**

 (b) Discuss any two ways that can be used to prevent water pollution. **(3 marks)**

**SECTION B: Attempt three questions in this section (30 marks)**

17. a) What is meant by “waste materials”? **(2 marks)**

 b) Differentiate between biodegradable wastes and non-biodegradable wastes

 using 2 examples in each case. **(2 marks)**

 c) Briefly explain any 2 different sources of wastes in your school. **(2 marks)**

 d) Many activities generate wastes in your home.

 (i) List any 2 sources of the wastes in your home. **(2 marks)**

 (ii) Explain briefly how you manage those wastes at home. **(2 marks)**

18.a) (i) Discuss by means of 3 examples the harmful effects of waste materials

 which are not well managed depending on their various sources. **(3 marks)**

 (ii) Explain what you could do to minimize the dangers associated with the

 wastes listed above. **(3 marks)**

 b) Complete and balance the following chemical reactions. **(4 marks)**

 (i) 

 (ii) 

19. a) Classify the following among soluble salts and insoluble salts: NaNO3 ,

 CaSO4, Cu(NO3)2, AgCl. **(2 marks)**

b) Draw a well labeled diagram to demonstrate the electrical conductivity of a salt solution. **(4 marks)**

c) Describe the nature of particles in salt solutions that enable them to be electrical conductors. **(2 marks)**

 d) Describe the term ‘laboratory’. **(2 marks)**

20. Study the diagram below for the preparation of oxygen gas in the laboratory using potassium chlorate and manganese(IV) oxide and answer the questions that follow:



 a) State the role of manganese (IV) oxide in this process. **(1 mark)**

 b) Write the chemical equation for the reaction that takes place in the boiling tube. **(2 marks)**

 c) Explain the chemical test to identify the presence of oxygen. **(2 marks)**

 d) State the method used to collect oxygen. **(1 mark)**

 e) Discuss the dangers associated with ozone layer depletion in the atmoshere.

 **(2 marks)**

 f) State 2 uses of oxygen on a large scale. **(2 marks)**

……………………………………………………………………………………….

**MARKING SCHEME: CHEMISTRY (S1)**

**End of Year Examination: (100 marks)**

**End of Year Examination: 2021**

**SECTION A: (70 marks)**

1.a) Chemistry is the study of the composition of matter, its properties and its transformations. (**2 marks)**

**(Accept other correct definitions)**

b) Four applications of chemistry by man in daily life: (**2 marks)**

-Production of pharmaceutical drugs.

-Water treatment.

-Production of soap.

-Food and beverages industries.

**(Give 0.5 mark for each answer)**

**(Accept other correct answers)**

2. a) Treat dirty water in order to obtain drinking water (potable water).

-I can add Al2(SO4)3 to remove solid particles in water, I then add CaO in the clear water to neutralise the acid medium. I add Ca(OCl)2 in the resultant water to kill any bacteria present in water. (**2 marks)**

b) Prepare the soil in the field in order to grow seeds in it.

-I can add CaO in the soil to neutralize the acid present. I then add fertilisers in the soil to have the required mineral salts for plant growth. (**2 marks)**

3. Use of chemistry in traditional Rwanda:

-People used to keep milk and later churn it to separate butter from milk. (**2 marks)**

4. Four industrial activities related to chemistry in Rwanda: (**2 marks)**

-Water treatment.

-Production of soft drinks such as Fanta.

-Production of cement.

-Production of soap.

 **(Give 0.5 mark for each answer)**

**(Accept other correct answers)**

5. Rules and regulations that a senior one student must follow: **(3 marks)**

-Do not play in the laboratory.

-Do not eat or taste any chemical substance in the laboratory.

-Do not point the opening of the test tube at your colleague while heating substances.

**(Give 1 mark for each answer)**

**(Accept other correct answers)**

6. Rearrangement of the letters to produce the name of each piece of apparatus: **(4 marks)**

|  |  |
| --- | --- |
| NEUFNL: FUNNEL | TEBEUTR: BURRETTE |
| LAFSK: FLASK  | KERBEA: BEAKER |

 **(Give 1 mark for each answer)**

7. a) Matter: Is a substance of which any physical object consists. **(2 marks)**

b) Physical change: In a physical change, the appearance or form changes, but the substances remain the same. **(2 marks)**

8. a) Names of the changes of states: **(3 marks)**

A: Freezing or solidification

B: Melting

C: Sublimation.

**(Give 1 mark for each answer)**

b) Two substances that can undergo the change of state labelled **C: (2 marks**

-Iodine

-Ammonium chloride.

**(Give 1 mark for each answer)**

9. a) The name of the method of separation of mixtures:

-Decantation. **(1 mark)**

b) Examples of two mixtures which can be separated by this separation technique: **(2 marks)**

-Paraffin and water

-Cooking oil and water.

 **(Give 1 mark for each answer)**

10. State the easiest method one could use to obtain the substance shown from the following mixtures: **(3 marks)**

a) Diesel oil from crude oil: Fractional distillation

b) Dyes from ink: Chromatography

c) Copper (II) sulphate crystals from copper (II) sulphate solution: Filtration

**(Give 1 mark for each answer)**

11. a) An element is a pure substance that cannot be broken down into other types of substances.

 An atom is the smallest part of an element that has the properties of the element. **(2 marks)**

 b) Information on sub-atomic particles: **(3 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Particle**  | **Symbol**  | **Charge**  | **Relative mass** | **Position in an atom** |
| Proton  | P | +1 | 1 | Nucleus |
| Neutron  | N | 0 | 1 | Nucleus  |
| Electron  | E | -1 | 1/1840 (negligible) | Shell |

 **(Give 0.5 mark for each answer)**

12. (a) The number of neutrons in atom X: 27-13

The number of neutrons in atom X = **14** **(1 mark)**

(b) The number of electrons in atom X: **13** **(1 mark)**

(c) The electronic configuration for atom X: **2, 8, 3** **(1 mark)**

(d) Determine the symbol for the ion which is formed by X: **X3+**  **(2 marks)**

13. a)The particles which is:(**3marks)**

1. A cation: Y
2. An anion: X
3. Neutral: W

**(Give 1 mark for each answer)**

b)The electronic configuration of Z: 2, 8, 8, 1 (**1mark)**

c) The valence of Z: 1 (**1mark)**

d) The reason for your answer in (c) above: It is because the element has one electron in the outermost shell,(**1mark)**

14. a)Two elements that are metals: A and X **(2 marks)**

b)The element that is in group IV and period II: G **(1 mark)**

Its atomic number: 6 **(1 mark)**

c)The formula of the compounds formed between: **(2 marks)**

i)X and R: XR2

ii)J and G: GJ4

d)The electronic configuration of X: 2, 8, 8, 2 **(1mark)**

15. (a) -Liquid water in lakes and seas evaporate to form water vapour in the sky.

-Water vapour in the sky condenses to form liquid water which falls on the ground as rain. **(2 marks)**

 (b) -The water droplets absorb energy of the solar radiations then they evaporate into the sky in form of water vapour. **(2 marks)**

 (c) -The water in the seas and lakes evaporate and the water vapour formed is blown away by wind until it reaches above the ground where it condenses and falls on the ground in form of rainfall. **(3 marks)**

16. (a) Two effects of acidic rain: **(3 marks)**

-Acid rain falls on monuments mainly constituted of CaCO3 substance. The acid reacts with CaCO3 and destroys the monuments.

-Acid rain kills some insects in the area where it falls.

**(Give 1.5 marks for each answer)**

**(Accept other correct answers)**

 (b) Two ways that can be used to prevent water pollution:  **(3 marks)**

-We should avoid pouring fat from cooking or any other type of fat, oil or grease down the sink.

-Avoid using the toilet as a waste basket.

**(Give 1.5 marks for each answer)**

**(Accept other correct answers)**

**SECTION B: Each question is marked out of (10 marks)**

17. a) Waste materials: **(2 marks)**

-Waste material is anything that is worthless or defective after primary use.

**(Accept other correct answers)**

 b) -Biodegradable wastes can be broken down into simpler substances by microorganisms. Example: Potatoe or banana peels. **(1 mark)**

 - Non-biodegradable wastes cannot be broken down into simpler substances by microorganisms. Example: plastic materials. **(1 mark)**

 c) -At school the blooms used to sweep the classroom floors. When they become dry, they are thrown in the compost because any attempt to use them any further is not possible. **(1 mark)**

-The leaves from trees around the compound fall in the playground and are considered to be wastes. **(1 mark)**

**(Accept other correct answers)**

 d) (i) 2 sources of the wastes in your home. **(2 marks)**

 -Banana peels,

-Food left-overs.

**(Accept other correct answers)**

(ii) To you manage those wastes at home:

-We collect the peels and throw them in the compost so that they decay after a certain period of time. **(2 marks)**

18.a)i) Examples the harmful effects of waste materials: **(3 marks)**

-Broken pieces of bottles can injure someone when he steps on them.

-Left-over food can decay in the kitchen and cause mosquitoes to come thus bringing harmful germs on utensils such as plates.

-Banana peels can smell bad in the kitchen if they are not thrown away.

**(Accept other correct answers)**

**(Give 1 mark for each answer)**

ii) -I can throw away the biodegradable wastes in the compost. **(1.5 marks)**

-I can put non-biodegradable wastes in separate containers to be taken away by people who clean the city. **(1.5 marks)**

b) Balanced chemical reaction equations: **(4 marks)**

i) Mg(s) + 2HNO3(aq) → Mg(NO3)2(aq) + H2(g)

ii) 2K(s) + Cl2(g) → 2KCl(s)

**(Give 2 marks for each balanced equation)**

19. a) -Soluble salts: NaNO3, CaSO4 and Cu(NO3)2 **(1.5 marks)**

-Insoluble salt: AgCl **(0.5 mark)**

b) A well labeled diagram to demonstrate the electrical conductivity of a salt solution:

 

**(4 marks)**

**(Give 2 marks for the drawing and 2 marks for labeling)**

c) The particles carry positive or negative charges. **(2 marks)**

d) A laboratory is a room or building equipped with apparatuses and other materials for scientific experiments. **(2 marks)**

20. a) Manganese(IV) oxide acts as a catalyst to speed up the reaction at a low temperature. **(1 mark)**

b) The chemical equation for the reaction that takes place in the boiling tube.

 2KClO3(s) → 2KCl(s) + 3O2(g) **(2 marks)**

 **(Give 1 mark for unbalanced equation)**

c) -Insert a glowing splint at the opening of the tube where the gas passes while moving out. **(1 mark)**

-The O2 gas relights the glowing splint. **(1 mark)**

d) The method used to collect oxygen:

-Downward displacement of water. **(1 mark)**

e) -Depletion of the ozone layer results in inability of that layer to capture ultraviolet radiations of the sun.

The layer would prevent these ultraviolet radiations from reaching people on the earth. **(1 mark)**

-So people will suffer from cancer as a result of being exposed to ultraviolet light. **(1 mark)**

f) Uses of oxygen on a large scale:

- Oxygen is used during the respiration of animals and plants. **(1 mark)**

-Oxygen is used with fuel gases in welding of metals. **(1 mark)**

**(Accept other correct answers)**

……………………………………………………………………………………….

 

**Chemistry**

 **02/07/ 2021 08.30 AM - 11.30 AM**

S1 END OF YEAR EXAM, 2020/2021

SUBJECT: CHEMISTRY THEORY(Blind)

DURATION: 3 HOURS

**Instructions:**

1. There are 2 sections in this paper:

 **Section A (70 marks**): Attempt all questions in this section

 **Section B (30 marks)**: Attempt 3 questions in this section.

1. Do not use periodic tables
2. Non-programmable calculators may be used
3. Answers should be written on blank papers provided
4. Use a blue or black pen only

**SECTION A: Attempt all questions in this section (70 marks)**

1) a) Define the term ‘chemistry’. (**2 marks)**

 b) List any four applications of chemistry by man in daily life. (**2 marks)**

2) Explain how you can apply the acquired content and skills of chemistry to:

a) Treat dirty water in order to obtain drinking water (potable water).

 (**2 marks)**

b) Prepare the soil in the field in order to grow seeds in it. (**2 marks)**

3) In traditional Rwanda, chemistry was applied.

Describe how any product used to be made using chemistry knowledge in traditional Rwanda. (**2 marks)**

4) Recently, Rwanda started developing modern industries. Indicate any four

 industrial activities related to chemistry. (**2 marks)**

5) List any 3 rules and regulations that a senior one student must follow

 During an experiment in the chemistry laboratory. **(3 marks)**

6) The following list contains the names of six pieces of apparatus with the

 letters of each name not in order (jumbled).

Rearrange the letters to produce the name of each piece of apparatus.

|  |  |
| --- | --- |
| NEUFNL | TEBEUTR |
| LAFSK | KERBEA |

 **(2 marks)**

7) Define the following terms:

1. Matter
2. Physical change

 **(4 marks)**

8) Read the following passage and fill in the missing words:

When some solids are heated, they change into liquids. This process is called……………….. When the liquids are cooled, they change back into the solid state. This process is known as…………`The process through which water changes state from liquid to gas is called…………….. When the vapour is cooled, it changes back into liquid form. This process is called condensation. A solid can change directly into a gas. This is called…………………

 (**5 marks**)

9 a) What is decantation **(2 marks)**

1. Give an example of a mixture which can be separated by decantation.

 **(1 mark)**

10) State the easiest method one could use to obtain the substance shown from

 the following mixtures: **(3 marks)**

1. Diesel oil from crude oil.
2. Dyes from ink
3. Copper (II) sulphate crystals from copper (II) sulphate solution

11 a) Describe the term ‘element of a substance’ **(2 marks)**

 b) The following table provides you the necessary information on sub-atomic

 particles.

 Copy and fill it with the missing information. **(3 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Particle**  | **Symbol**  | **Charge**  | **Relative mass** | **Position in an atom** |
| Proton  | p |  |  |  |
| Neutron  | n |  |  | Nucleus  |
| Electron  | e |  | 1/1840 (negligible) |  |

12) The symbol of an element is represented by

 

 (a) Calculate the number of neutrons in atom X. **(1 mark)**

 (b) State the number of electrons in atom X. **(1 mark)**

 (c) Write the electronic configuration for atom X. **(1 mark)**

 (d) Determine the symbol for the ion which is formed by X. **(2 marks)**

13) The number of protons, neutrons and electrons in particles W, X, Y and Z

 are shown in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Particles  | Number of protons | Number of neutrons  | Number of electrons  |
| W | 6 | 6 | 6 |
| X | 9 | 10 | 10 |
| Y | 12 | 12 | 10 |
| Z | 19 | 20 | 19 |

1. Identify the particles which is:
2. A cation.
3. An anion.
4. Neutral.

 **(3marks)**

1. Write the electronic configuration of Z. (**1mark)**
2. State the valence of Z. (**1mark)**
3. Give the reason for your answer in (c) above.(**1mark)**

14) The figure below shows a part of the periodic table. The letter is not the

 correct symbol of the element

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| I  | II  | III  | IV  | V  | VI  | VII | VIII  |
| J |  |  |  |  |  |  |
|   |   |   | G |   | E |   |   |
| A |   |   |   |   |   | R | D |
|   | X |  |  |  |  |  |  |

 a) Give two elements that are metals. **(2 marks)**

1. State the element that is in group IV and period II and suggest its atomic number. **(2 marks)**
2. Write the formula of the compounds formed between: **(2 marks)**
3. X and R.
4. J and G.
5. X is in group II and in period IV of the periodic table. Give its electronic configuration. **(1mark)**

 15 (a) Explain the phenomena (steps) which are involved in water cycle.

 **(2 marks)**

(b) Every morning, we see water droplets on plant leaves and materials

 left outdoors. But in the course of the day, the droplets disappear.

 Discuss this phenomenon. **(2 marks)**

 (c) When it rains, surface run-off water goes in the seas, oceans and

 lakes. Explain the contribution of this water to the amount of rainfall

 in surrounding areas. **(3 marks)**

16 (a) Discuss any two effects of acidic rain. **(3 marks)**

 (b) Discuss any two ways that can be used to prevent water pollution.

 **(3 marks)**

**SECTION B: Attempt three questions in this section (30 marks)**

17 a) What is meant by “waste materials”? **(2 marks)**

 b) Differentiate between biodegradable wastes and non-biodegradable

 wastes using 2 examples in each case. **(2 marks)**

 c) Briefly explain any 2 different sources of wastes in your school.

 **(2 marks)**

 d) Many activities generate wastes in your home.

 (i) List any 2 sources of the wastes in your home. **(2 marks)**

 (ii) Explain briefly how you manage those wastes at home. **(2 marks)**

18 a) (i) Discuss by means of 3 examples the harmful effects of waste materials

 which are not well managed depending on their various sources.

 **(3 marks)**

 (ii) Explain what you could do to minimize the dangers associated with

 the wastes listed above. **(3 marks)**

 b) Complete and balance the following chemical reactions. **(4 marks)**

 (i) 

 (ii) 

19 a) Classify the following among soluble salts and insoluble salts: NaNO3 ,

 CaSO4, Cu(NO3)2, AgCl. **2 marks)**

 b) Draw a well labeled diagram to demonstrate the electrical conductivity

 of a salt solution. **(4 marks)**

 c) Describe the nature of particles in salt solutions that enable them to be

 electrical conductors. **(2 marks)**

 d) Describe the term ‘laboratory’. **(2 marks)**

20 a) State 2 uses of inorganic salts. **(2 marks)**

 b) Give 2 physical properties of inorganic salts. **(2 marks)**

 c) Copper sulphate CuSO4 decomposes when it is heated strongly.

 (i) Write the chemical equation for the thermal decomposition of copper

 sulphate. **(2 marks)**

 (ii) State the colour of the solid product formed after the decomposition.

 **(1mark)**

 d) State 2 chemical substances that can be used to prepare oxygen gas in

 the laboratory. **(2 marks)**

 e) Give one physical propertie of oxygen gas. **(1 mark)**

**MARKING SCHEME: CHEMISTRY (S1)**

**End of Year Examination: (100 marks)**

**End of Year Examination: 2020**

**SECTION A: (70 marks)**

1.a) Chemistry is the study of the composition of matter, its properties and its transformations. (**2 marks)**

**(Accept other correct definitions)**

b) Four applications of chemistry by man in daily life: (**2 marks)**

-Production of pharmaceutical drugs.

-Water treatment.

-Production of soap.

-Food and beverages industries.

**(Give 0.5 mark for each answer)**

**(Accept other correct answers)**

2. a) Treat dirty water in order to obtain drinking water (potable water).

-I can add Al2(SO4)3 to remove solid particles in water, I then add CaO in the clear water to neutralise the acid medium. I add Ca(OCl)2 in the resultant water to kill any bacteria present in water. (**2 marks)**

b) Prepare the soil in the field in order to grow seeds in it.

-I can add CaO in the soil to neutralize the acid present. I then add fertilisers in the soil to have the required mineral salts for plant growth. (**2 marks)**

3. Use of chemistry in traditional Rwanda:

-People used to keep milk and later churn it to separate butter from milk. (**2 marks)**

4. Four industrial activities related to chemistry in Rwanda: (**2 marks)**

-Water treatment.

-Production of soft drinks such as Fanta.

-Production of cement.

-Production of soap.

 **(Give 0.5 mark for each answer)**

**(Accept other correct answers)**

5. Rules and regulations that a senior one student must follow: **(3 marks)**

-Do not play in the laboratory.

-Do not eat or taste any chemical substance in the laboratory.

-Do not point the opening of the test tube at your colleague while heating substances.

**(Give 1 mark for each answer)**

**(Accept other correct answers)**

6. Rearrangement of the letters to produce the name of each piece of apparatus: **(4 marks)**

|  |  |
| --- | --- |
| NEUFNL: FUNNEL | TEBEUTR: BURRETTE |
| LAFSK: FLASK  | KERBEA: BEAKER |

 **(Give 1 mark for each answer)**

7. a) Matter: Is a substance of which any physical object consists. **(2 marks)**

b) Physical change: In a physical change, the appearance or form changes, but the substances remain the same. **(2 marks)**

8. Melting (1), freezing (2), evaporation(3), condensation (4), sublimation (5)

9. a) Decantation. is a method of separating mixtures. It is used to separate liquids

 from insoluble solids and or to separate liquids from immiscible liquids

 **(2 marks)**

b) Examples of a mixture which can be separated by decantation:

 -Cooking oil and water. **(1 mark)**

10. State the easiest method one could use to obtain the substance shown from the following mixtures: **(3 marks)**

a) Diesel oil from crude oil: Fractional distillation

b) Dyes from ink: Chromatography

c) Copper (II) sulphate crystals from copper (II) sulphate solution: Filtration

**(Give 1 mark for each answer)**

11. a) An element is a pure substance that cannot be broken down into other types of substances.

 An atom is the smallest part of an element that has the properties of the element. **(2 marks)**

 b) Information on sub-atomic particles: **(3 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Particle**  | **Symbol**  | **Charge**  | **Relative mass** | **Position in an atom** |
| Proton  | P | +1 | 1 | Nucleus |
| Neutron  | N | 0 | 1 | Nucleus  |
| Electron  | E | -1 | 1/1840 (negligible) | Shell |

 **(Give 0.5 mark for each answer)**

12. (a) The number of neutrons in atom X: 27-13

The number of neutrons in atom X = **14** **(1 mark)**

(b) The number of electrons in atom X: **13** **(1 mark)**

(c) The electronic configuration for atom X: **2, 8, 3** **(1 mark)**

(d) Determine the symbol for the ion which is formed by X: **X3+**  **(2 marks)**

13. a)The particles which is:(**3marks)**

1. A cation: Y
2. An anion: X
3. Neutral: W

**(Give 1 mark for each answer)**

b)The electronic configuration of Z: 2, 8, 8, 1 (**1mark)**

c) The valence of Z: 1 (**1mark)**

d) The reason for your answer in (c) above: It is because the element has one electron in the outermost shell,(**1mark)**

14. a)Two elements that are metals: A and X **(2 marks)**

b)The element that is in group IV and period II: G **(1 mark)**

Its atomic number: 6 **(1 mark)**

c)The formula of the compounds formed between: **(2 marks)**

i)X and R: XR2

ii)J and G: GJ4

d)The electronic configuration of X: 2, 8, 8, 2 **(1mark)**

15. (a) -Liquid water in lakes and seas evaporate to form water vapour in the sky.

-Water vapour in the sky condenses to form liquid water which falls on the ground as rain. **(2 marks)**

 (b) -The water droplets absorb energy of the solar radiations then they evaporate into the sky in form of water vapour. **(2 marks)**

 (c) -The water in the seas and lakes evaporate and the water vapour formed is blown away by wind until it reaches above the ground where it condenses and falls on the ground in form of rainfall. **(3 marks)**

16. (a) Two effects of acidic rain: **(3 marks)**

-Acid rain falls on monuments mainly constituted of CaCO3 substance. The acid reacts with CaCO3 and destroys the monuments.

-Acid rain kills some insects in the area where it falls.

**(Give 1.5 marks for each answer)**

**(Accept other correct answers)**

 (b) Two ways that can be used to prevent water pollution:  **(3 marks)**

-We should avoid pouring fat from cooking or any other type of fat, oil or grease down the sink.

-Avoid using the toilet as a waste basket.

**(Give 1.5 marks for each answer)**

**(Accept other correct answers)**

**SECTION B: Each question is marked out of (10 marks)**

17. a) Waste materials: **(2 marks)**

-Waste material is anything that is worthless or defective after primary use.

**(Accept other correct answers)**

 b) -Biodegradable wastes can be broken down into simpler substances by microorganisms. Example: Potatoe or banana peels. **(1 mark)**

 - Non-biodegradable wastes cannot be broken down into simpler substances by microorganisms. Example: plastic materials. **(1 mark)**

 c) -At school the blooms used to sweep the classroom floors. When they become dry, they are thrown in the compost because any attempt to use them any further is not possible. **(1 mark)**

-The leaves from trees around the compound fall in the playground and are considered to be wastes. **(1 mark)**

**(Accept other correct answers)**

 d) (i) 2 sources of the wastes in your home. **(2 marks)**

 -Banana peels,

-Food left-overs.

**(Accept other correct answers)**

(ii) To you manage those wastes at home:

-We collect the peels and throw them in the compost so that they decay after a certain period of time. **(2 marks)**

18.a)i) Examples the harmful effects of waste materials: **(3 marks)**

-Broken pieces of bottles can injure someone when he steps on them.

-Left-over food can decay in the kitchen and cause mosquitoes to come thus bringing harmful germs on utensils such as plates.

-Banana peels can smell bad in the kitchen if they are not thrown away.

**(Accept other correct answers)**

**(Give 1 mark for each answer)**

ii) -I can throw away the biodegradable wastes in the compost. **(1.5 marks)**

-I can put non-biodegradable wastes in separate containers to be taken away by people who clean the city. **(1.5 marks)**

b) Balanced chemical reaction equations: **(4 marks)**

i) Mg(s) + 2HNO3(aq) → Mg(NO3)2(aq) + H2(g)

ii) 2K(s) + Cl2(g) → 2KCl(s)

**(Give 2 marks for each balanced equation)**

19. a) -Soluble salts: NaNO3, CaSO4 and Cu(NO3)2 **(1.5 marks)**

-Insoluble salt: AgCl **(0.5 mark)**

b) A well labeled diagram to demonstrate the electrical conductivity of a salt solution:

 

**(4 marks)**

**(Give 2 marks for the drawing and 2 marks for labeling)**

c) The particles carry positive or negative charges. **(2 marks)**

d) A laboratory is a room or building equipped with apparatuses and other materials for scientific experiments. **(2 marks)**

20 a) 2 uses of inorganic salts. **(2 marks)**

-To make chalk

-To make dry cells.

**(Give 1 mark for each answer)**

**(Accept other correct answers)**

b) 2 physical properties of inorganic salts. **(2 marks)**

**-** Inorganic salts conduct electricity

- Inorganic salts are brittle.

**(Give 1 mark for each answer)**

**(Accept other correct answers)**

c) Copper sulphate CuSO4 decomposes when it is heated strongly.

i) The chemical equation for the thermal decomposition of copper sulphate. **(2 marks)**

**2CuSO4(S) heat 2CuO(s) + 2SO2(g) +O2(g)**

**(Give 1 mark for unbalanced equation)**

ii) The colour of the solid product formed: Black **(1mark)**

**(Give 1 mark for each answer)**

**(Accept other correct answers)**

d) 2 chemical substances that can be used to prepare oxygen gas in the laboratory. **(2 marks)**

**-**Hydrogen peroxide

-Manganese dioxide.

**(Give 1 mark for each answer)**

e) One physical properties of oxygen gas.

-Oxygen dissolves slightly in water.

**(Give 1 mark for each answer)**

**(Accept other correct answers)**

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**Chemistry**

 **24/06/ 2021 08.30 AM - 11.30 AM**

 **S1 END OF YEAR EXAM, 2020/2021**

**SUBJECT: ALTERNATIVE TO CHEMISTRY PRACTICAL EXAM**

**DURATION: 1 HOUR 30 MINUTES**

**INSTRUCTIONS:**

1. Please read carefully before you start.
2. This paper has one question.
3. Answer the questions appropriately.

**Experiment to separate heterogeneous and homogeneous mixtures (15 marks)**

a) State 4 methods of separation of homogeneous mixtures. **(4 marks)**

b) You are given a mixture of sand, iron nails and salt.

 Describe the steps you can use to separate that mixture so that you obtain the

 pure salt crystals at the end. **(7 marks)**

c) Describe how particles (constituents) in a mixture such as human blood are

 separated by centrifugation. **(4 marks)**

**MARKING SCHEME CHEMISTRY III (ALTERNATIVE)**

 **S1: ADVANCED LEVEL EXAMINATION 2020**

**SUBJECT: CHEMISTRY**

**PAPER III: PRACTICAL**

**DURATION: 1 HOUR 30 MINUTES**

**INSTRUCTIONS:**

1. Please read carefully before you start.
2. This paper has one question.
3. Answer the questions appropriately.

**Experiment to separate heterogeneous and homogeneous mixtures (15 marks)**

a) 4 methods of separation of homogeneous mixtures. **(4 marks)**

 -Chromatography

-Distillation

-Solvent extraction

-Precipitation.

b) The steps you can use to separate that mixture so that you obtain the pure salt crystals at the end. **(7 marks)**

-Remove the iron nails using a magnet.

-Add water to the sand and salt mixture

-Mix the mixture well until all the salt dissolves

-Carry out filtration to remain with sand alone on the filter paper

-Heat the salt water mixture gently in a beaker until all the water evaporates to remain with pure salt.

c) Describe how particles (constituents) in a mixture such as human blood are separated by centrifugation. **(4 marks)**

 - The centrifuge machine exerts a force such that the heavier particles move faster than lighter particles to the bottom of the test tube in the centrifuge machine.

-The lighter particles in the upper layer can thus be poured off to remain with heavier particles in the tube.