10.11.2020 Meester Soja

Laerskool Van Dyk Primary

D16

Ekurhuleni South

EMIS NO: 160994

Moderated 2/11/2020

Natural Science

End-of-year Examination

Properties of Materials; Separating Mixtures; Acids, Bases and Neutrals; Periodic Table of Elements; Potential and Kinetic Energy; Heat Transfer; Insulation and Energy Saving

Examiner: Ms K Barnard

Moderator: Ms G Botes

Total Marks: 80

Time: 90 Minutes

Learner:_____ **Grade 7.** ____

Aim 1, Aim 2, Aim 3

LEARNER MARK ANALYSIS					
SECTIONS		**LEVEL:**		**LEARNER'S MARK**	
Section A					
Question 1	/6	0-29%	1	_____ / 80	____ %
Question 2	/5	30-39%	2		
Question 3	/6	40-49%	3		
Section B		50-59%	4		
Question 4	/23	60-69%	5		
Question 5	/18	70-79%	6		
Question 6	/22	80-100%	7		

Instructions:

- This paper consists of 6 questions.
- Answer **all** the questions in the spaces provided on the answer sheet.
- Write neatly and legibly and answer your questions in blue pen ONLY.
- Good luck!

SECTION A

QUESTION 1:

Multiple choice questions

Choose the correct answer from the following questions and only write the correct letter next to the question number on your answer sheet.

1.1 Materials that allow electricity to move through them. (1)

a. Flexibility
b. Electrical conductors
c. Materials
d. Electrical insulators

1.2 When you use a magnet to separate a mixture. (1)

a. Magnetism
b. Evaporation
c. Sieving
d. Distillation

1.3 This word is used to describe a substance that eats through clothing, stonework and metals, and can burn the skin. (1)

a. Bases
b. Acids
c. Sour
d. Corrosive

1.4 The temperature at which a liquid turns into a gas. (1)

a. Electrical Conductor
b. Tensile Strength
c. Boiling Point
d. Melting Point

1.5 This substance is neither acid nor base and is not dangerous. (1)

a. Neutral
b. Base
c. Acid
d. Caustic

1.6 Two or more substances with different properties that are mixed together. (1)

a. Mixture
b. Semi-metal
c. Pure Substance
d. Acid

Question 1: /6

QUESTION 2:

Column A and B

Fit the correct term in column A to the definition in column B.
Only write the correct letter on your answer sheet.

Column A		Column B	
2.1	Kinetic Energy	**A**	The transfer of heat between solid objects.
2.2	Conduction	**B**	Energy that an object has because it is moving.
2.3	Convection	**C**	Materials that reduce heat loss.
2.4	Potential Energy	**D**	The way that heat energy flows through liquids and gases.
2.5	Insulating materials	**E**	Energy stored in an object or system.

Question 2: /5

QUESTION 3:

Terminology

3.1 Give the word for the following definitions:

3.1.1 Substances that transfer heat easily (1)
3.1.2 Factors that can change within an experiment (1)
3.1.3 Substances that do not transfer heat easily (1)

3.2 Give the definition of the following words:

3.2.1 Vacuum (1)
3.2.2 Warm-blooded (1)
3.2.3 Solar power (1)

Question 3: /6

SECTION A: [17]

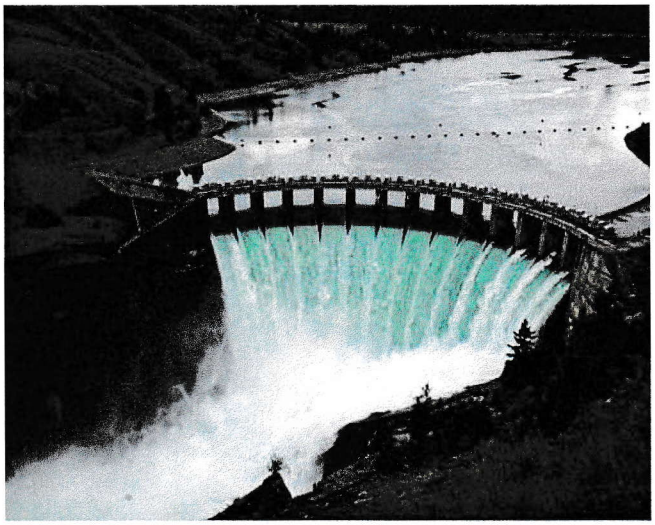
SECTION B

QUESTION 4:
Case Studies

4.1 Read the following case study and then answer the questions that follow:

Water Reservoirs

Water reservoirs are built to provide water for towns. They are built uphill from the houses in a town. In this way, the stored water has enough potential energy to flow when a tap in the town is opened. The height of the reservoir determines how strongly the water will flow from the taps. When the water reservoir is not much higher than the houses, the water only trickles out of the taps. Water in reservoirs that are positioned lower than the houses, or water from boreholes and wells, have to be pumped up to the houses. This is because the water below the level of the houses does not have enough energy to reach the houses.



4.1.1 Give the definition of potential energy. (1)
4.1.2 What are the three types of potential energy? (3)
4.1.3 What type of potential energy is in a water reservoir? (1)
4.1.4 Rainwater naturally flows downhill because of gravity. However, dams are built in valleys downstream. Explain how the water gets from the dam (downstream) to the town (upstream). (1)
4.1.5 Answer TRUE or FALSE to the following questions:
- a. Kinetic energy is energy that an object has because it is moving. (1)
- b. A group of parts that work together to do a specific task is called potential energy. (1)
- c. Energy is transferred when different parts of a system react and cause change. (1)

4.1.6 Describe the law of conservation of energy. (4)

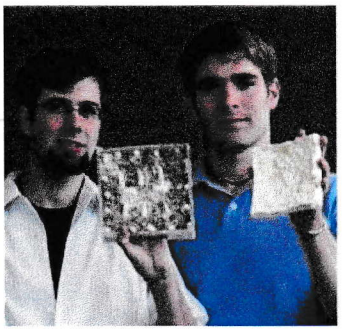
[13]

4.2 Read the following case study and then answer the questions that follow:

Mushroom Insulation

In 2009, two mechanical engineering students- Gavin McIntyre and Eben Bayer, became the fathers of Greensulate, an insulator used in sustainable housing. They started out by growing mushrooms under their beds!

After many experiments, they patented their unique biomaterial- material made from living organisms`. Starch is obtained from by-products collected from farms, such as rice hulls and buckwheat husks. These are mixed with water and hydrogen peroxide, and poured into a mould. Cells from the oyster mushroom grow into a network that looks like fibres.



Growth takes place in the dark at room temperature. The only disadvantage of this process is that it takes about two weeks to grow, thereafter, the mesh is dried and ready for use.

Greensulate traps more heat than newspaper or fibreglass and is fire-resistant. It is biodegradable and much cheaper to produce than insulators such as Styrofoam and plastic. This makes it an environmentally friendly alternative for insulation.

4.2.1 What organism did the two men use to make the insulation. (1)
4.2.2 What is the difference between a heat conductor and an insulator? (2)
4.2.3 The word 'biomaterial' has been used in the text. What does this word mean? (1)
4.2.4 Which environment do the oyster mushrooms need to be able to grow? (2)
4.2.5 List three other insulators that have been mentioned in this article. (3)
4.2.6 List one disadvantage in the production of Greensulate. (1)

[10]

Question 4: /23

QUESTION 5:
Translations

5.1 Heat conduction

Make use of the following information to answer the questions that follow.

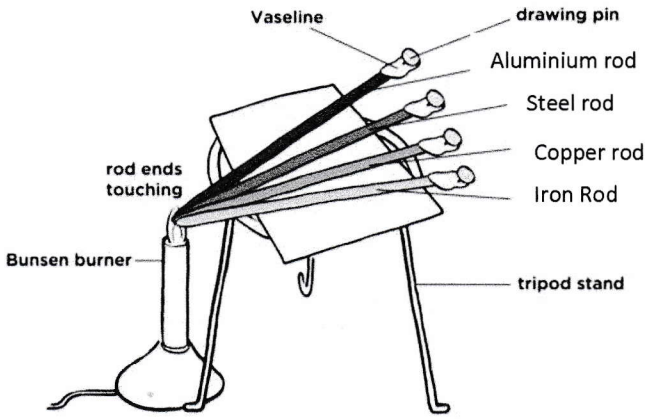
Conductivity of metals:

In order to find out which metal has the highest conduction of heat, a group of grade 7 learners conducted the following experiment:

They collected rods of the same length of four types of metals. One end of the rod was placed nearest to the Bunsen burner and the other side of the metal rods were placed on a tripod stand. Vaseline was placed at the end of each rod.

The question they wanted to answer was, "Which metal has the highest conduction of heat?"

After setting up the experiment, they turned on the burner and started their stopwatches in order to time how long it took for the Vaseline to melt on each of the metal rods. They carefully recorded their results as follows:



Type of metal	Aluminium	Steel	Copper	Iron
Time taken	12 seconds	20 seconds	10 seconds	15 seconds

5.1.1 Draw a bar graph to show the results of the experiment. (8)

5.1.2 What conclusion can be drawn after the results have been obtained? (Which metal has the highest conductivity of heat and which material has the lowest conductivity of heat?) (2)

5.1.3 Identify the variables in the experiment:

a. The independent variable: (1)

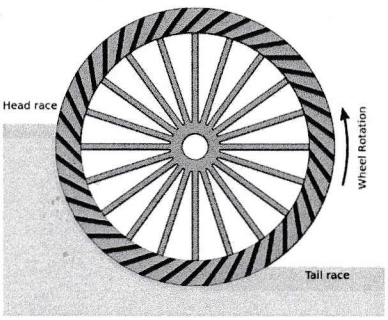
b. The dependent variable: (1)

[12]

5.2 Energy flow diagrams

Make use of the following information on the system of a water wheel to formulate an energy flow diagram. An energy flow diagram is a visual way to show energy transfer in different parts of an energy system. It shows energy transfer in three stages:

- *The input stage*
- *The process stage*
- *The output stage*



The system of a water wheel:

A water wheel is a machine for converting the energy of flowing or falling water (gravitational potential energy) into useful forms of power. The gravitational potential energy is turned into kinetic energy
by the downwards force of the falling water which makes it turn. This turning motion produces energy.

5.2.1 Draw an energy flow diagram that describes the workings of a water wheel. (6)

INPUT:	PROCESS:	OUTPUT:
Question:	Question:	Question:
Process:	Process:	Process:

[6]

Question 5: /18

QUESTION 6:

Investigations

6.1 Investigate the most efficient way to separate mixtures.

Make use of the following table to work out the best way to separate the mixtures that follow. Write down the separation technique as well as a reason for using the separation technique.

Method	Hand-sorting	Sieving	Filtration	Magnetism	Evaporation
Type of substance	Solids of different sizes, colours, textures	Solids of different sizes wherein one solid is quite small	Insoluble solids from liquids	Magnetic substances from non-magnetic substances	Soluble solid and liquid

What would the best separation techniques be to separate the following mixtures (Give a reason for your answer):

6.1.1 Iron fillings and sand (2)

6.1.2 Salt and water (2)

6.1.3 Building sand and stones (2)

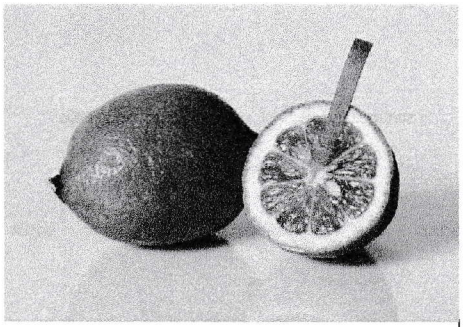
6.1.4 Buttons and coins (2)

[8]

6.2 Investigate the workings of litmus paper as an acid-base indicator.

The acid-base indicator investigation

A group of grade 7 learners conducted an experiment with litmus paper to test which colour changes happen on specific substances. Four household objects were tested using litmus paper.



The following results were obtained:

Vinegar: BLUE litmus paper turned RED
Toothpaste: RED litmus paper turned BLUE
Lemon: BLUE litmus paper turned RED
Bicarb of soda: RED litmus turned BLUE

6.2.1 Fill in the correct words:

Acids taste a._____ and feel b._____, while bases taste c._____ and feel d._____. (2)

6.2.2 By looking at the results of this investigation we can see whether the household objects are acidic or basic. Indicate whether the following household objects are acidic or basic based off the colour change of the litmus paper:

a. Vinegar (1)

b. Lemon (1)

c. Toothpaste (1)

d. Bicarb of soda (1)

[6]

6.3. *The Periodic Table of Elements*

6.3.1 Categorise the following properties of metals and non-metals into the correct column. The first answer has been done as an example.

Good conductors	Low melting point
Shiny, ductile, malleable	Poor conductors
High melting point	Dull, non-ductile and brittle

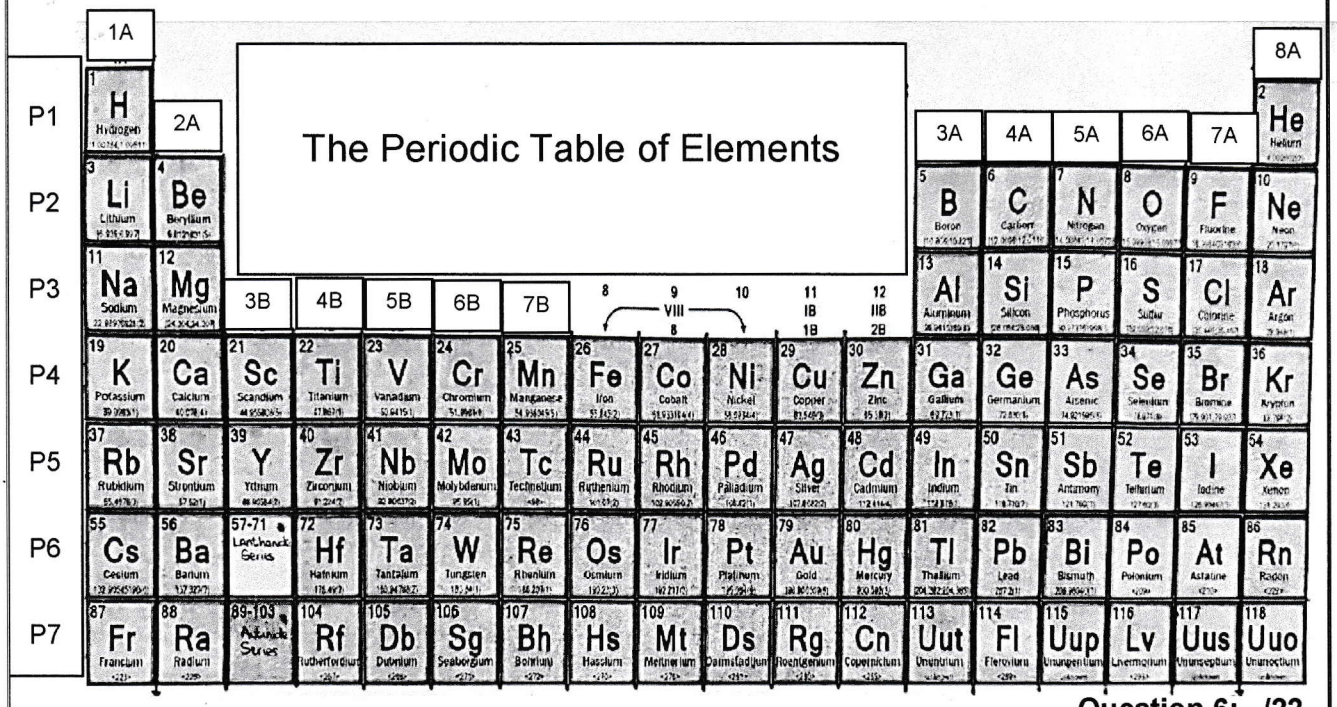
METALS	NON-METALS
E.g. High Melting Point	E.g. Low Melting Point

(4)

6.3.2 Look at the following elements and use the periodic table provided to indicate where on the periodic table they are located.

9 **F** 18.99	12 **Mg** 24.30	1 **H** 1.00	20 **Ca** 40.08
(a)	(b)	(c)	(d)

(4)



Question 6: /22

SECTION B: {52]