GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

NOVEMBER 2020

GRADE 6

NATURAL SCIENCES AND TECHNOLOGY

TIME: 1½ hours

MARKS: 60

12 pages

DISTRICT				
NAME OF SCHOOL				
EMIS-NUMBER				
NAME AND SURNAME				
GENDER	BOY		GIRL	

SECTIONS	**A**					**B**	**C**	**TOTAL**
Questions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
Mark Allocation	**10**	**5**	**5**	**5**	**5**	**21**	**9**	**60**
Learner Marks								

INSTRUCTIONS

1. Answer **ALL** the questions on this paper.
2. Read the instructions of each question carefully before answering.
3. Write neatly and legibly.

STRANDS

NATURAL SCIENCES	**ENERGY AND CHANGE**
	MATTER AND MATERIALS
TECHNOLOGY	**SYSTEMS AND CONTROL**

The question paper consists of **SECTION A**, **SECTION B AND SECTION C**

SECTION A: LOW ORDER QUESTIONS/ COGNITIVE LEVEL 1	**SECTION B:** MIDDLE ORDER QUESTIONS/ COGNITIVE LEVEL 2, 3 & 4	**SECTION C:** HIGH ORDER QUESTIONS/COGNITIVE LEVEL 5 & 6
Q1: Solution as special mixtures, Dissolving, Mixtures and water resources, Processes to purify water, Electric circuits, Electric conductors and insulators, Systems to solve problems, Mains electricity	**Q6:** Dissolving, Electric circuits, Electric conductors and insulators, Systems to solve problems, Mains electricity	**Q7:** Solids, liquids and gases, Solution as special mixtures, Dissolving, Mixtures and water resources, Processes to purify water, Electric circuits, Electric conductors and insulators, Systems to solve problems, Mains electricity
Q2: Electric circuits, Electric conductors and insulators, Systems to solve problems, Mains electricity, Dissolving		
Q3: Dissolving		
Q4: Water resources, Processes to purify water, Mains electricity, Electric circuits		
Q5: Dissolving, Electric circuits, Electric conductors and insulators, Systems to solve problems, Mains electricity		
Total – 30	**Total – 21**	**Total – 9**

SECTION A

QUESTION 1

Make a **cross** over the letter that shows the correct answer.

1.1 In an electric circuit, copper wire is normally used as a … (1)

A	conductor.	B	polar device.
C	converter.	D	source of energy.

1.2 A mixture of sand and water can be separated using the … method. (1)

A	hand sorting	B	dissolving
C	machine sorting	D	settling/decanting

1.3 A wetland is important because … (1)

A	it removes pollution from water.	B	no life is sustained in it.
C	we can swim in it.	D	it does not retain water.

1.4 An electric circuit can still work without a … connected to it. (1)

A	battery	B	conductor
C	switch	D	bulb

1.5 Water can be polluted by insoluble substances such as … (1)

A	insecticides.	B	fertilisers.
C	soap.	D	oil.

1.6 A solution is saturated when … (1)

A	a solute can dissolve easily.	B	a solute is not able to dissolve any more, leaving the undissolved substances at the bottom.
C	a solute dissolves too slowly.	D	a solute does not dissolve at all.

1.7 If an electric cord is damaged, what do you do before using the appliance? (1)

A	Ignore the electric cord and use the appliance.	B	Throw it away.
C	Ask granny to look at it.	D	Make sure the cord is replaced by a qualified person/technician.

1.8 Which of these are non-renewable fossil fuels? (1)

A	Oil, natural gas, and coal	B	Wind, sun and coal
C	Coal, diesel and water	D	Natural gas, salt and sand

1.9 Eskom is not able to supply enough electricity because of … (1)

A	having no turbines to generate electricity.	B	a shortage of staff uniforms.
C	a shortage of insulation materials.	D	illegal connections overloading the system.

1.10 Every system requires the energy supply to work. Batteries/cells supply ... energy for a system to work. (1)

A	hydraulic	B	output
C	input	D	solar

[10]

QUESTION 2

Match the statements in **COLUMN A** with the correct word in **COLUMN B**. Write the correct **LETTER** in **COLUMN C** next to the number.

NB: 2.6 is an example that has already been completed for you.

COLUMN A		COLUMN B		COLUMN C
2.1	A process of straining a liquid to remove unwanted solids	**A**	Generator	**2.1 –**
2.2	Two or more cells joined together	**B**	Filtering	**2.2 –**
2.3	A machine that makes electricity when it is turned on	**C**	System	**2.3 –**
2.4	A disease that is carried and spread through water	**D**	Waterborne	**2.4 –**
2.5	When you can see through a solution and there are no solid pieces visible	**E**	Translucent	**2.5 –**
2.6	Substances that dissolve in a liquid	**F**	Battery	**2.6 – G**
		G	**Solute**	

(5)

QUESTION 3

Read the statements below about dissolving and answer the questions that follow.

The Gr. 6 class at Amandla Primary School conducted an experiment to determine how the grain size of various sugars (10 grams each) affects the rate of dissolving three types of sugar in 440 ml warm water (temperature – 60°C). Their results were recorded in the table below:

Beaker label	Substance	Size of grain	Rate of dissolving (Time in Seconds)
A	Icing sugar	Small	12
B	Castor sugar	Medium-sized	18
C	Granulated sugar	Large	30

3.1 Name the solvent used? _____ (1)

3.2 Which variable was changed? _____ (1)

3.3 Give one variable that was kept the same. _____ (1)

3.4 Which type of sugar dissolved the fastest? _____ (1)

3.5 Name one other substance that you could use in the place of sugar?

_____ (1)
[5]

QUESTION 4

Choose a word from the box below to complete each sentence.

settling	sludge	turbine	input	process	output

4.1 _____ occurs when you leave a mixture of dirty water to stand for a while so that the heavier substances sink to the bottom.

4.2 The muddy substance found in water during the purification process is called _____ .

4.3 Steam from boiling water turns a _____ and generator to make electricity.

4.4 A system is made up of two or more parts that work together to do a specific job. When a component goes into a circuit and provides energy to the circuit, we say it is providing _____ energy. As this energy is moved, transferred or changed to another form, it is called the _____ energy. **[5]**

QUESTION 5

Case Study: The Slime Dams of Ekurhuleni

In the townships of Thema in Ekurhuleni, some people live near the old Vlakfontein mines. The people are grateful for the houses and have worked hard to buy them and take care of them. But, in Thema, many slime dams take in the wastewater from the mines. The acid in the water turns the pool orange, green and blue. Many of the neighbourhood children like to play on the banks of the dam. Some even swim in the dams.

Vusi Thembekwayo is concerned. He visits the residents to warn them of the dangers of the dams. The acid water that drains out of the mines and into the dams can cause health problems and fatal diseases.

5.1 What is a slime dam?

_____ (1)

5.2 Name TWO problems that can be caused by acids from the mines.

_____

_____

(1 x 2) (2)

5.3 Why does the water in the pools turn orange, green and blue?

_____

(1)

5.4 Is the water from slime dams healthy to use? Give a reason to support your answer.

_____

_____

(1)
[5]

TOTAL SECTION A: [30]

SECTION B

QUESTION 6

6.1 Explain the importance of **a design brief** when designing a system to solve a problem?

_____

_____ (2)

6.2 Give the difference between a **complete circuit** and an **incomplete circuit** in a circuit.

6.2.1 **Complete circuit:** _____

_____ (1)

6.2.2 **Incomplete circuit:** _____

_____ (1)

6.3 What is the function of a **switch** in the circuit?

_____ (1)

6.4 What is the **difference** between **suspension** and **solution** waste?

6.4.1 Suspension: _____

_____ (1)

6.4.2 Solution: _____

_____ (1)

6.5 Explain how the **temperature of a solvent** affects the rate of dissolving.

_____

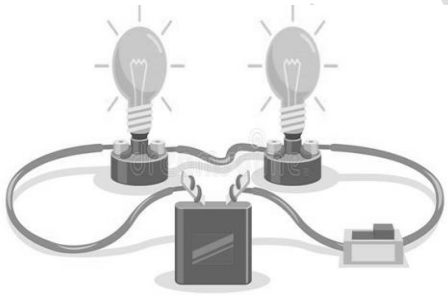
_____ (2)

6.6 **Arrange** the steps of how electricity is generated into the correct order.

	Steps not in the right order	Steps in the correct order (Use letters only)
A	Electric current is transported by a system of electrical transmission lines and substations to our homes.	Step 1:
B	The boiling water produces steam that turns a turbine.	Step 2:
C	At the power station, coal is ground into a fine powder.	Step 3:
D	The heat generated from burning coal is used to boil water in a huge boiler.	Step 4:
E	The turbine is linked to a generator which uses a coil to produce energy.	Step 5:
F	The ground coal then goes into a container where it is burned.	Step 6:
G	Coal is transported from a coal mine to a power station.	Step 7:

(7)

6.7 **Draw** a circuit diagram of a **closed circuit** using the picture below. Include all the components in the picture.



Rubric for circuit diagram	
Criteria	**Marks**
Battery	1
Two bulbs	1
Closed switch	2
Copper wire	1
Total	5

Draw your circuit diagram here.

(5)

TOTAL SECTION B: [21]

SECTION C

QUESTION 7

The Gr. 6 class at Amandla Primary School conducted an experiment to determine how the grain size of various sugars (10 grams each) affects the rate of dissolving three types of sugar in 440 ml of warm water (temperature – 60°C). Their results were recorded in the table below:

Beaker label	Substance	Size of grain	Rate of Dissolving (Time in seconds)
A	Icing sugar	Small	12
B	Castor sugar	Medium-sized	18
C	Granulated sugar	Large	30

7.1 Draw a bar graph to indicate the results of the investigation above.

TITLE:_____

_____

(6)

RUBRIC FOR GRAPH	
Criteria	**Marks**
x and y axis correctly labelled	2
Bars correctly plotted	3
Title of the graph	1
Total	6

7.2 Give TWO reasons why electrical wires in electric circuits are covered in plastic.

_____

_____ (2)

7.3 Would you say it is important to know which materials are conductors and which materials are insulators? Give a reason to support your answer.

_____

_____ (1)

TOTAL SECTION C: [9]

TOTAL: 60

END