CLEMENT HOWELL HIGH SCHOOL

Scholar's Way, Blue Hills, Providenciales

Turks and Caicos Islands, BWI

GENERAL SCIENCE PROFICIENCY

1 1/2 hours

DIAGNOSTIC EXAMINATION

SEPTEMBER 2024

FORM 4

NAME: _____ SCORE: _____

CLASS: _____ DATE: _____

READ THE FOLLOWING INSTRUCTIONS CARFULLY.

1. Answer ALL questions. This paper consist of FOUR sections:
   - Section 1 - General Knowledge
   - Section 2 - Recall and reasoning
   - Section 3 - Experimental/Investigative skill
   - Section 4 - Data collection and analysis
2. Write your answers in the spaces provided.
3. Where appropriate, ALL WORKING MUST BE SHOWN.
4. You may use a silent, non-programmable calculator to answer questions.

TOTAL 65 MARKS

SECTION 1 - Multiple Choice

1. Food production in plant cells takes place in the

   A) nucleus

   B) vacuole

   C) chloroplast

   D) mitochondria

2. During the process of respiration in mammals, the products does NOT include

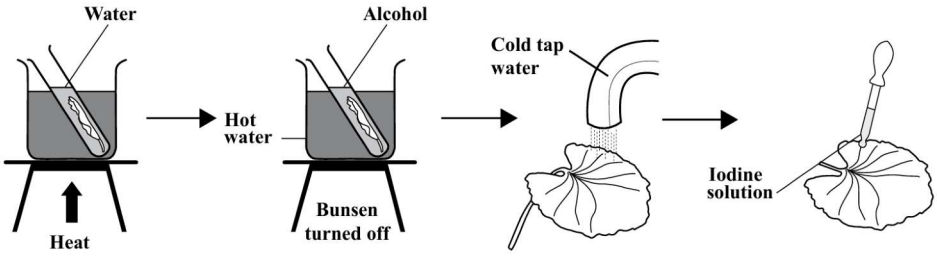
   A) energy

   B) oxygen

   C) carbon dioxide

   D) water

Item **3** refers to the following laboratory experiment.



3. The purpose of the experiment is to test the leaf for

   A) starch

   B) oxygen

   C) chlorophyll

   D) carbon dioxide

4. Which of the following is an organ system?

   A) Pancreas

   B) Kidney

   C) Excretory

   D) Intestine

5. In which of the following is nicotine found?

A) Coffee

B) Tobacco

C) Marijuana

D) Alcoholic drinks

6. Removing salt from sea water for the purpose of accessing potable water is defined using which of the following terms?

A) Recycling

B) Desalination

C) Osmosis

D) Hydroponics

7. Clothes are hung on a line to dry using heat from the sun. The process by which heat is transferred from the sun to the clothes is

A) radiation

B) conduction

C) convection

D) evaporation

8. The chemical formula of water uses which elements from the periodic table?

I. Chlorine

II. Oxygen

III. Hydrogen

IV. Carbon

A) I and II

B) II and III

C) II and IV

D) III and IV

9. Paper chromatography is used to separate _____.

A) powders

B) milk and water

C) components of dyes

D) kerosine and petrol

10. Which of the following chemical elements has an atomic number of 16?

A) Fluorine

B) Beryllium

C) Chlorine

D) Sulphur

11. What is the result after converting 582 centimetres (cm) to millimetres (mm)?

A) 58200 mm

B) 5820 mm

C) 58.2 mm

D) 5.82 mm

12. Which of the following is an International System of Units (SI unit)?

A) Luminous intensity

B) Area

C) Kelvin

D) Frequency

13. Which of the following is a renewable source of energy?

A) Coal

B) Biogas

C) Fossil fuels

D) Oil

14. Heat from a flame may be transferred to the handle of a frying pan by _____.

A) evaporation

B) radiation

C) conduction

D) convection

15. The ability to do work is the simplified definition of _____.

A) acceleration

B) force

C) power

D) energy

SECTION 2 - Short answers

1. a) A group of students visited a laboratory to observe the use/pacement of a few symbols they learnt in the classroom. Identify each symbol with the correct name.

Symbols	Names	Symbols	Names
	A. _____		B. _____

b) **After** completing an experiment, state TWO (2) actions you MUST complete before leaving lab

1 _____

2 _____

(4 marks)

2. Answer each question below.

a) There are seven (7) characteristics of living things. List two (2) below.

_____

b) What is a cell? (*Define in simple terms*).

_____

c) Complete the sequence below.

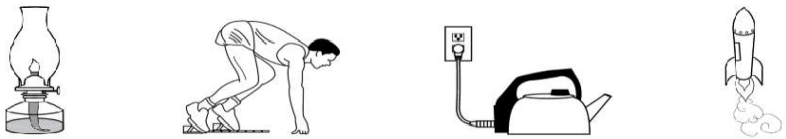
Cells ⟶ _____ ⟶ Organs ⟶ _____ ⟶ Organism

(4 marks)

3. Write the element in the spaces provided in the paragraph below, for the symbols given in brackets.

Nearby, a huge industrial complex was releasing toxic clouds containing (S) _____ dioxide. Soon my eyes began to blur, my throat constricted and I began falling as vehicles whizzing by released the (C) _____ dioxide from their exhaust. I woke up out of what I thought was a dream. Unfortunately, I fell and bruised my knee, so had to put (I) _____ on the wound to prevent infection. I then brushed my teeth with the toothpaste containing (F) _____ and went to bed as it was now late at night. **(4 marks)**

4. a) The diagrams below show some energy changes taking place.



I II III IV

State which diagram shows the conversion of energy given below. **Circle** the appropriate choice.

i) Conversion from electrical energy to heat energy I II III IV
ii) Conversion from potential energy to kinetic energy I II III IV

b) State **two (2)** forms of energy not mentioned previously.

_____

(4 marks)

SECTION 3 - Experimentation

1. One of the first tasks after safety is to know what you are using in the laboratory. Write the names **and** ONE (1) use of each apparatus in the spaces given below.

Apparatus/Instrument	Name	Use
A. 	Wire gauze	_____ _____
B. 	_____ _____	_____ _____
C. 	_____ _____	Provide stable support for lab equipment during experiments
D. 	_____ _____	_____ _____

(6 marks)

2. Build a food chain, **using four (4) organisms** to show the direction of energy transfer through an ecosystem. Also, state the name of each trophic level. ***Correct spelling must be used for both organisms and levels*.**

_____ → _____ → _____ → _____

_____ → _____ → _____ → _____

(5 marks)

3. Mr. Peel brought a sample of sea water from a beach near the school. The class was required to separate the sea water into its components. You are require to:
   a) List the laboratory apparatus and materials that the class needed for this experiment.

_____

_____

(2 marks)

b) List all the MAIN steps required, in a logical order, to carry out this separation. State **clearly** what each component is and which one is being separated.

1) _____

2) _____

3) _____

4) _____

(3 marks)

4. Give the name of each of the components given for a simple circuit. Then in the space provided, draw a simple circuit diagram **using only the components given below**.

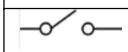
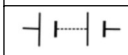
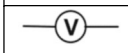
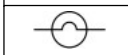
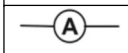
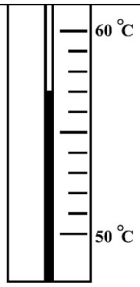
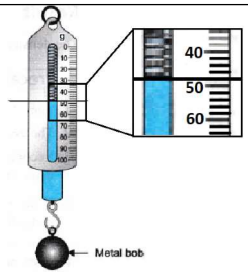
Symbol	Name	
	A.	Switch
	B.	
	C.	
	D.	
	E.	Ammeter

Diagram of simple circuit

(5 marks)

SECTION 4 - Data collection and analysis

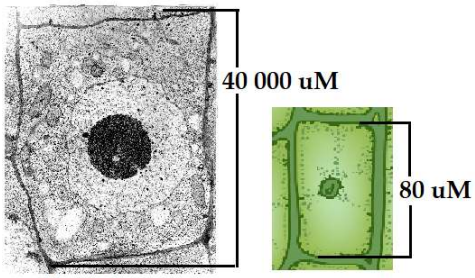
1. Read the values from the instruments given below and give the unit used for each measurement.

Instrument			
Value			
Unit			

(6 marks)

2. Perform each of the following calculations using the information given. Show all steps required to get to the final answer.

a) The diagram below shows the measurement of a plant cell and the image of the same plant cell under an electronic microscope in micrometres (uM). Calculate magnification showing how the units were dealt with.



Picture showing image and actual cell

$$\text{Magnification} = \frac{Image}{Object}$$

= ----------

=

(4 marks)

b) The main components of air include nitrogen, oxygen, carbon dioxide and inert gases. One litre (1 L) of air was collected in a gas sampling canister. Using the data in figure below, calculate the percentage of oxygen in the air collected in the gas chamber.

Volume of air, V_a = _____

Volume of oxygen, V_o = _____

(Below: Write your formula for % first THEN calculate.)

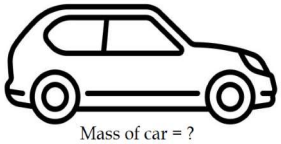
Percentage of oxygen, % = ----------

= ----------

=

(4 marks)

c) Show COMPLETE working to calculate the mass of a mini car if the ***force*** being exerted is **11925 N** as it accelerates at **15 ms^{-2}**. Use the correct unit wherever possible **and** in the final answer. *Rearrange the equation given first THEN plug in your values.* [***Hint:*** 1 N = 1 kg m s^{-2}]


Mass of car = ?

Force, F = Mass, m × Acceleration, a

∴ Mass, m = ----------

= ----------

=

(4 marks)