BOTSWANA EXAMINATIONS COUNCIL

JUNIOR CERTIFICATE EXAMINATION

INTEGRATED SCIENCE 14/2

Paper 2 October/November 2010

Marks: 80 Time: 2 Hours

Candidate's Examination Number:	Centre			Candidate		

INSTRUCTIONS

1. Write your examination number in the space provided above.
2. Answer **ALL** questions.
3. All answers must be written in the spaces provided.
4. Marks will be lost if all necessary working is not shown.
5. Calculators may be used in this paper.

FOR EXAMINER'S USE ONLY

Section	Marks Scored
A	
B	
Total Marks	

190142

*This question paper contains **13** printed pages.*

DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO SO.

SECTION A (70 marks)

1. Complete the paragraph below by filling in some of the listed words.

carbon dioxide **chlorophyll** **glucose** **hydrogen**

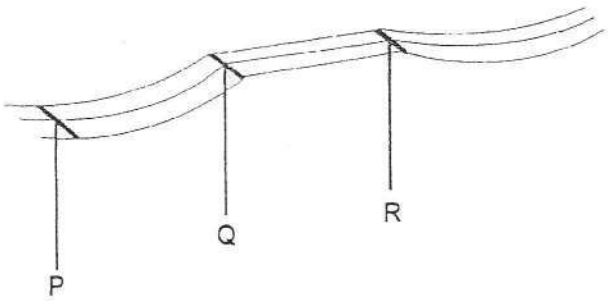
oxygen **photosynthesis** **respiration** **transpiration**

Green plants make their own food by the process of ..... This process takes place in chloroplasts in the leaves. ..... traps light energy from the sun. This energy is used to make ..... and water to react together to form ..... and ..... which are the reactants in the process of .....

(6)

Use the diagram and the information below to answer question 2.

A company installed electric cables between pylons P, Q and R as shown. The installation was done during a hot day.



2. During an inspection of the installed electric cables, it showed that the company had made a mistake.

(a) From the diagram, identify the mistake made by the company in installing the electric cables.

..... (1)

(b) Describe how the mistake can be of danger to people.

.....

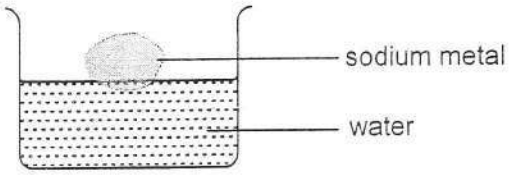
.....

.....

..... (3)

Use the information and the diagram to answer question 3.

A small lump of sodium metal is placed into a beaker containing water.



3. (a) The sodium metal floats in water. Which property of sodium makes it to float in the water?

..... (1)

(b) State **two** observations other than floating, that would be made during the reaction.

.....

..... (2)

(c) The solution produced during the reaction is alkaline.

(i) Name the alkali produced.

..... (1)

(ii) What colour change would be observed when a universal indicator solution is added to the solution?

from.....to..... (2)

(d) Hydrogen gas is also produced during the reaction.
Describe the test for hydrogen gas.

Test .....

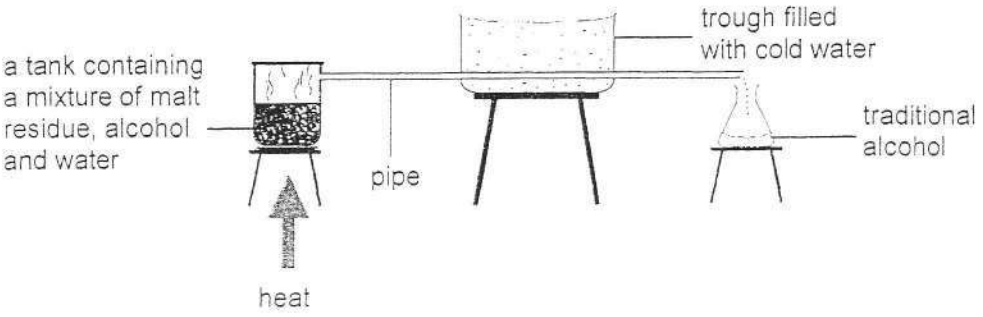
Results ..... (2)

(e) Name **one** of the substances that makes water hard.

..... (1)

Use the information and the diagram below to answer question 4.

Traditional alcohol is made by mixing malt powder, sugar and plenty of water. The mixture is allowed to ferment for 2-3 days in a warm room. The mixture is then boiled to separate the traditional alcohol as shown in the set-up below.



4. (a) Name the separation technique used above.

.....

(1)

(b) In this set-up, what is the purpose of the cold water in the trough?

.....

(1)

(c) Explain why the pipe passing through the trough is at the bottom rather than at the top.

.....

.....

.....

(3)

(d) State **two** other separation techniques besides the one named in **(4) (a)**.

.....

.....

(2)

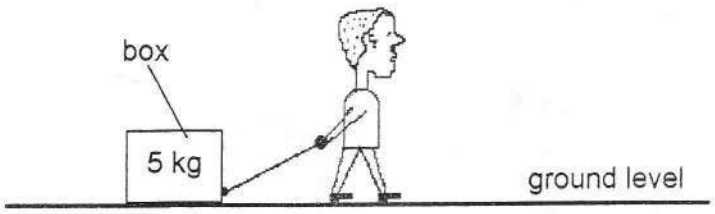
(e) The concentration of the alcohol produced is about 96% by volume. Suggest **two** permanent effects that the alcohol might have on people who drink it without diluting it.

.....

.....

(2)

The diagram below shows a boy pulling a box along the ground. Use it to answer question 4.



4. (a) (i) Using an arrow, show the direction of the force exerted by the box. (1)

(ii) Calculate the weight of the box.

(2)

(b) Suggest **two** changes that the student can make for the box to move more easily.

_____

_____ (2)

(c) What type of energy enables the boy to pull the box?

_____ (1)

(d) State **one** difference between weight and mass.

_____ (1)

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5. Complete the paragraph below by filling in some of the listed words.

excretion	**growth**	**movement**
nutrition	**respiration**	**sensitivity**

A living organism can be compared to a machine such as a car. The supply of petrol for the car is similar to ..... . The release of energy when the petrol is burnt is similar to .....in a living organism. This can bring about the .....of wheels. ..... in living organisms is similar to the release of exhaust fumes by the car. (4)

---

6. (a) Using symbols, draw a circuit diagram with the following components:

- two cells,
- a switch,
- two bulbs connected in series and
- an ammeter.

(4)

(b) The bulbs are then connected in parallel.
How would this affect the brightness of the bulbs?

_____ (1)

7. Define the following terms:

(a) Hormone

_____

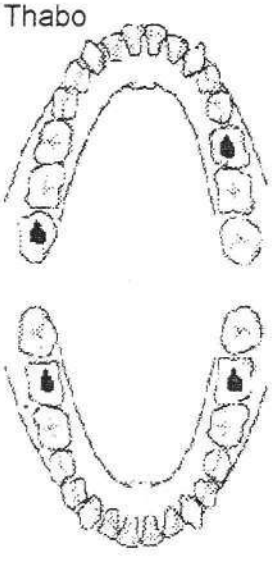
_____ (2)

(b) Supersaturated solution

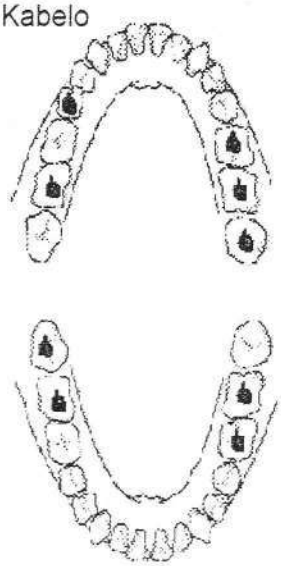
_____ (1)

Thabo and Kabelo live in two different towns. The diagrams below show their upper and lower teeth. Use the diagrams to answer question 8.

Thabo



Kabelo



Key
- decayed tooth

8. (a) The water in one of the towns contains fluoride salts.

(i) Who of the two lives in this town?

_____ (1)

(ii) Give a reason for your answer in (a) (i) above.

_____

_____ (1)

(iii) Explain the function of the fluoride salts in the water.

_____ (2)

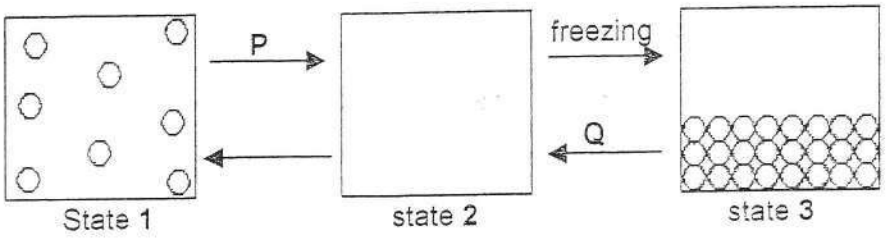
(b) Why is the decay more likely in the molar teeth?

_____

_____ (1)

(c) On the diagram, label with letter **X** the tooth used for cutting. (1)

The diagram below shows the arrangement of particles in state 1 and state 3. Use it to answer question 9.



9. (a) On the diagram, draw the arrangement of the particles in state 2. (1)

(b) What processes do letters P and Q represent?

P_____

Q_____ (2)

(c) (i) In which state 1, 2 or 3 would a substance be easily compressed?

_____ (1)

(ii) Explain your answer to (c) (i) above.

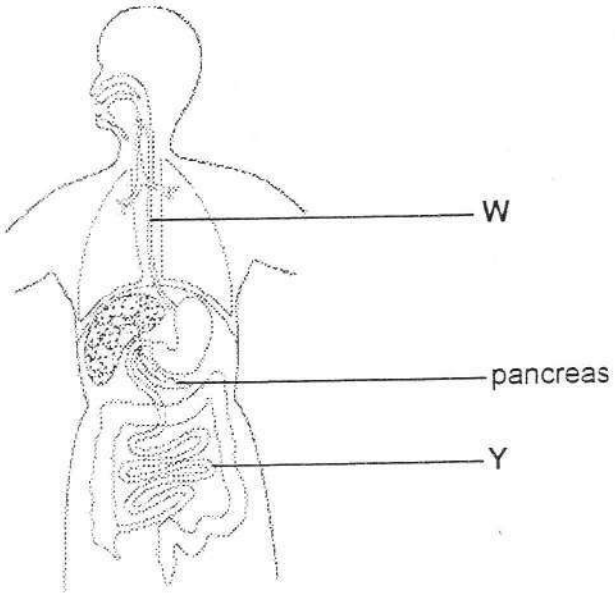
_____ (1)

(d) Name the process by which a substance changes directly from state 1 to state 3.

_____ (1)

_____

The diagram below shows a digestive system of humans.
Use it to answer question 10.



10. (a) Name the parts labelled W and Y.

W_____

Y_____ (2)

(b) The pancreas is damaged such that it can no longer do its job. Describe how this would affect the body processes.

_____

_____

_____

_____ (4)

(c) (i) On the diagram, label with letter **X** the part where digestion of proteins begins. (1)

(ii) Describe the positive test for proteins.

_____

_____

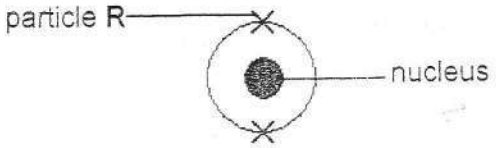
_____ (3)

(d) State the enzyme used to digest fats.

_____ (1)

_____

The diagram below shows the structure of an atom. Use it to answer question 11.



11. (a) Name **two** particles found in the nucleus.

_____ and _____ (2)

(b) Name the particle labelled R and state its charge.

Name_____

Charge_____ (2)

The table below shows the results obtained when solutions W, X and Y are tested with a red litmus paper and a blue litmus paper. Use it to answer question 12.

Solution	Results obtained using red litmus paper	Results obtained using blue litmus paper
W	Red	Blue
X	Red	Red
Y	Blue	Blue

12. (a) Which solution is an alkaline?

_____ (1)

(b) Which solution will **not** react with the other solutions in the table?

_____ (1)

(c) Which of the solutions is **most** likely to be vinegar?

_____ (1)

SECTION B (10 Marks)

A student carried out an experiment to find out how change in voltage across a circuit affects the current. The voltage was changed using a variable resistor. The results are recorded in the table below. Use it to answer question 1(a) to (e).

Voltage (V)	Current (A)
0.8	0.4
2.1	1.05
4.2	2.1
6.1	3.05
8.2	3.4
9.2	4.6
11.6	5.8

1. (a) On the grid on page 12, draw a graph of voltage against current. (3)

(b) Using your graph, find the voltage that would give a current of 5.25 A. Show how the value was obtained.

_____ (2)

(c) At what voltage did the student record the current incorrectly?

_____ (1)

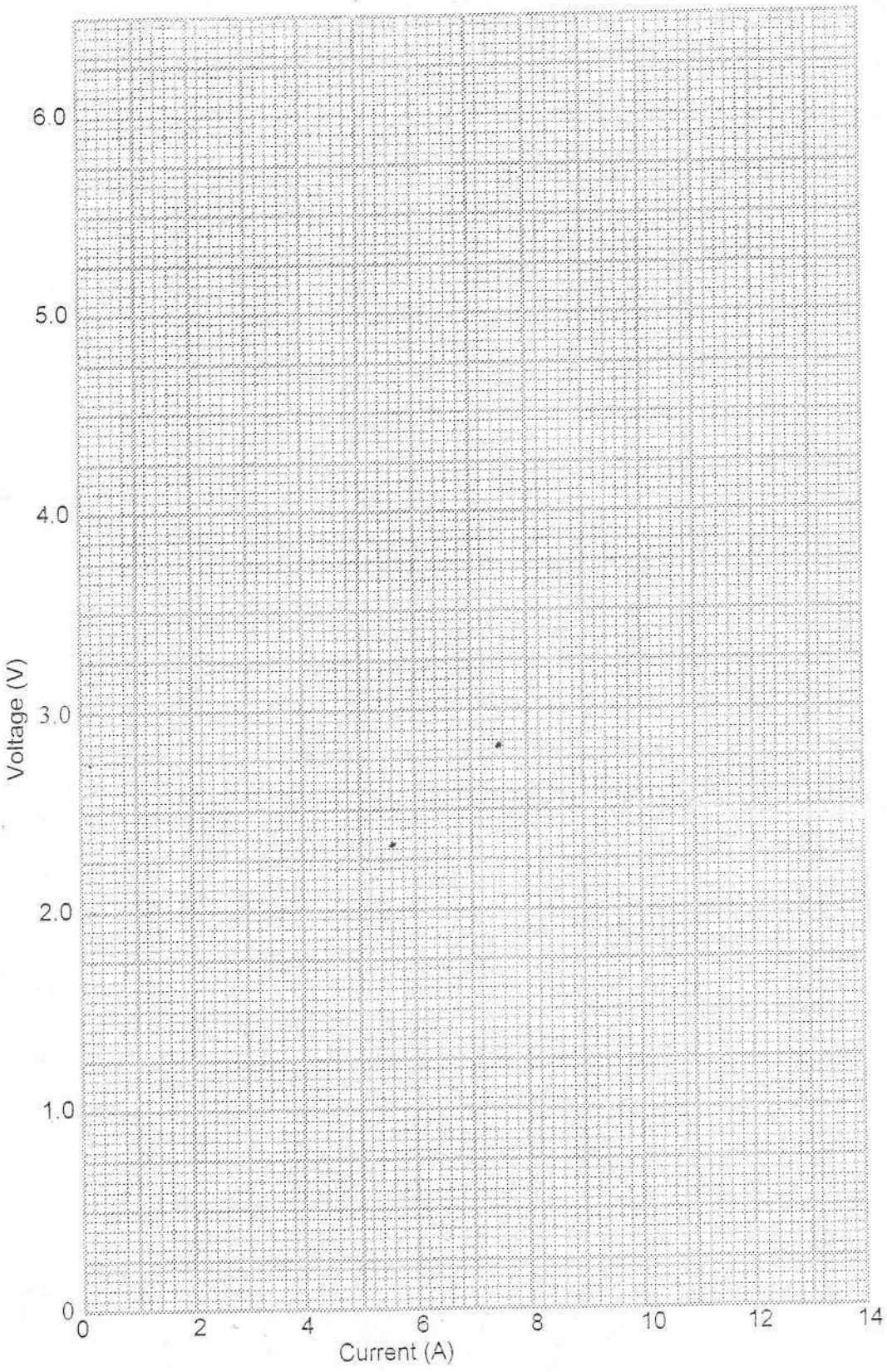
(d) The gradient of the graph represents the resistance. Calculate the resistance of the resistor.

(3)

(e) What conclusion can be made from the graph?

_____

_____ (1)


6.0
5.0
4.0
3.0
2.0
1.0
0
Voltage (V)
0
2
4
6
8
10
12
14
Current (A)