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BOTSWANA EXAMINATIONS COUNCIL

JUNIOR CERTIFICATE EXAMINATION

INTEGRATED SCIENCE 14/2

Paper 2 **October/November 2009**

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	

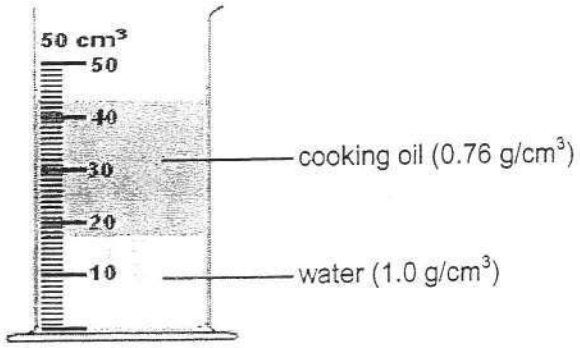
199142

*This question paper contains **15** printed pages.*

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

SECTION A (70 Marks)

The diagram below shows an instrument containing two liquids which do not mix. The densities of the two liquids are indicated in brackets. Use it to answer question 1.



1. (a) Name the instrument.

..... (1)

(b) State the term used to describe the type of liquids shown.

..... (1)

(c) (i) Calculate the volume of the cooking oil.

(2)

(ii) Calculate the mass of the cooking oil.

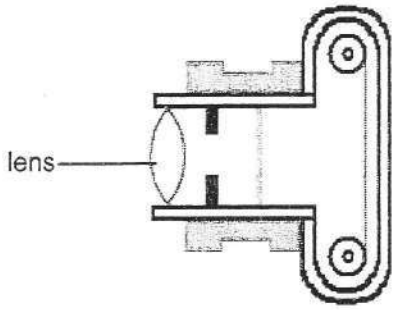
(2)

(d) An object of density 0.9 g/cm³ is dropped inside the instrument. On the diagram, mark with letter **X** the resting position of the object. (1)

(e) State a method that can be used to separate the two liquids.

..... (1)

The diagram below shows a simple camera.
Use it to answer question 2.



2. **(a)** Name the type of lens used.

..... (1)

(b) State **one** similarity between the human eye and a camera.

.....

..... (1)

(c) A simple camera was not working properly such that it formed blurred images. Suggest any **two** reasons why it formed blurred images.

.....

.....

..... (2)

3. (a) Why is water described as a "universal" solvent?

..... (1)

(b) A student prepared a salt solution using 80 cm^3 of water and 20 g of table salt.

(i) Calculate the concentration of the solution.

.....g/cm^3 (1)

(ii) Another student prepared a salt solution of concentration 2.0 g/cm^3 from a salt solution of concentration 1.0 g/cm^3 by adding more salt.

Describe another method that the student can use to prepare the same solution of concentration 2.0 g/cm^3 from a salt solution of concentration 1.0 g/cm^3.

.....

..... (2)

(c) State **two** diseases caused by drinking contaminated water.

.....

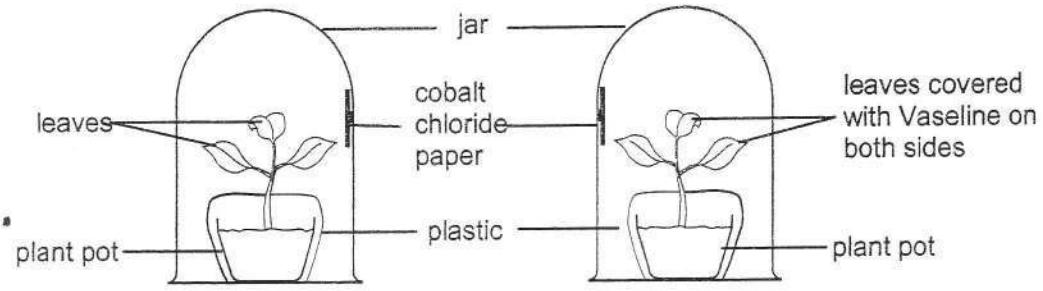
..... (2)

(d) Why is it important to conserve water in Botswana?

..... (1)

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

The experimental set-ups below were used to investigate transpiration. The set-ups were left for one hour.



Set-up A **Set-up B**

4. (a) What is the purpose of covering both plant pots with plastic?

..... (1)

(b) The cobalt chloride paper is blue when dry and pink when wet.

(i) What colours will be observed on the cobalt chloride papers after an hour in both set-ups?

Set-up A.....

Set-up B..... (2)

(ii) Explain your answers in **(b) (i)**.

Set-up A.....

.....

Set-up B.....

..... (1)

(c) State **two** factors which can affect the rate of transpiration.

.....

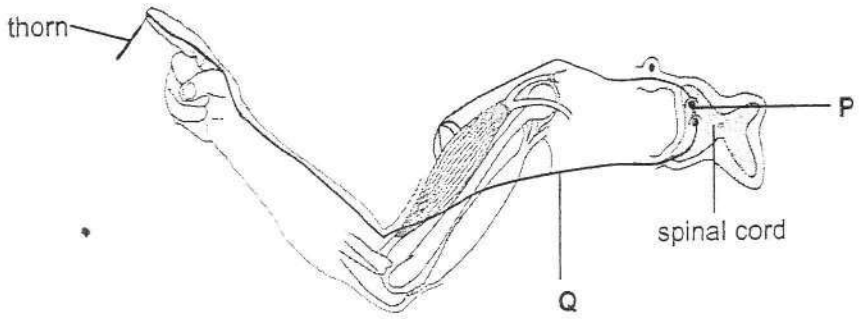
..... (2)

(d) State **one** characteristic of desert plants.

..... (1)

Use the information and the diagram below to answer question 5.

Tebogo was pricked by a sharp thorn on her finger. The diagram below shows the electrical pathway for messages to and from the central nervous system.



5. (a) Name the parts labelled **P** and **Q**.

P .....

Q ..... (2)

(b) What type of action is demonstrated in the diagram?

..... (1)

(c) On the diagram, use arrows to show the path followed by the message. (1)

(d) Briefly describe the events that occur in the nervous system when Tebogo responds to the pain.

.....

.....

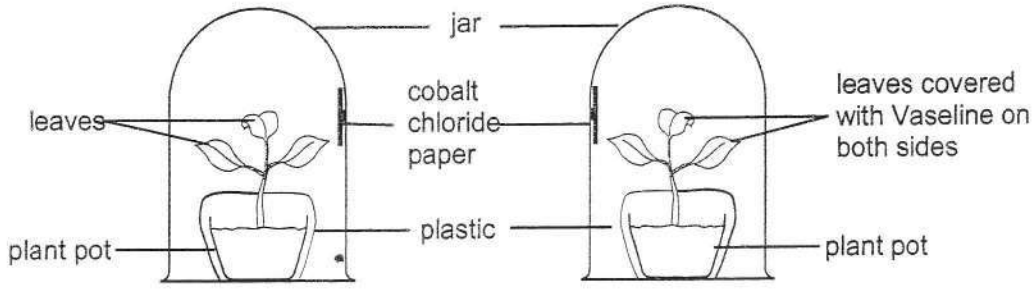
.....

.....

..... (4)

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

The experimental set-ups below were used to investigate transpiration. The set-ups were left for one hour.



Set-up A **Set-up B**

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.....

(1)

(b) The cobalt chloride paper is blue when dry and pink when wet.

(i) What colours will be observed on the cobalt chloride papers after an hour in both set-ups?

Set-up A.....

Set-up B.....

(2)

(ii) Explain your answers in **(b) (i)**.

Set-up A.....

.....

Set-up B.....

.....

(1)

(c) State **two** factors which can affect the rate of transpiration.

.....

.....

(2)

(d) State **one** characteristic of desert plants.

.....

(1)

Use the list of common household chemicals below to answer question 7.

- Table salt
- Vinegar
- Citric acid
- Milk of magnesia
- Bleaching agent

7. Which of the chemicals:

(a) can be used to ease pain caused by ant bites?

..... (1)

(b) is used to preserve vegetables?

..... (1)

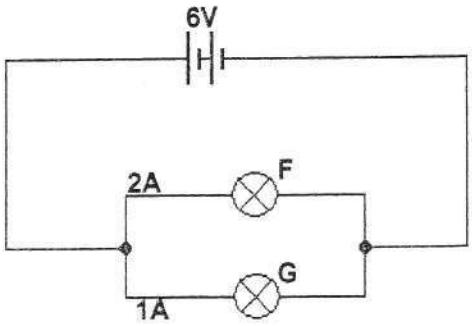
(c) is contained in lemon juice?

..... (1)

(d) is neutral?

..... (1)

The diagram below shows a circuit with two bulbs connected in parallel. Use it to answer question 8.



8. (a) (i) State the reason why the current passing through the bulbs is **not** equal.

.....

(1)

(ii) Given that $\mathbf{V} = \mathbf{IR}$, where $\mathbf{R}$ is the resistance, $\mathbf{I}$ is the current and $\mathbf{V}$ is the voltage, calculate the resistance of bulb **F**.

.....Ω

(2)

(b) On the diagram, draw the voltmeter measuring the voltage across bulb **F**.

(2)

(c) The two bulbs are then connected in series.

(i) What will happen to the brightness of the bulbs?

.....

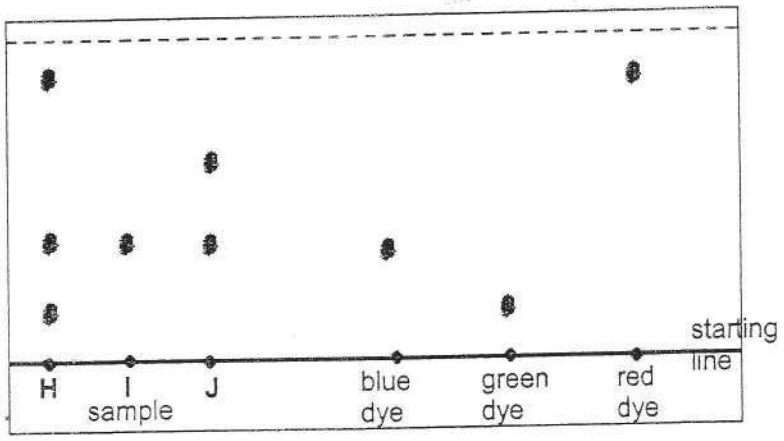
(1)

(ii) Explain your answer in **(c) (i)**.

.....

(1)

The diagram below shows a chromatogram obtained using solutions of three single dyes of colours blue, green and red and three other samples H, I, and J. Use it to answer question 9.



9. (a) Which of the samples H, I and/or J contain the following:

(i) one dye only?

..... (1)

(ii) a dye other than blue, green or red?

..... (1)

(b) Which dye is present in all samples?

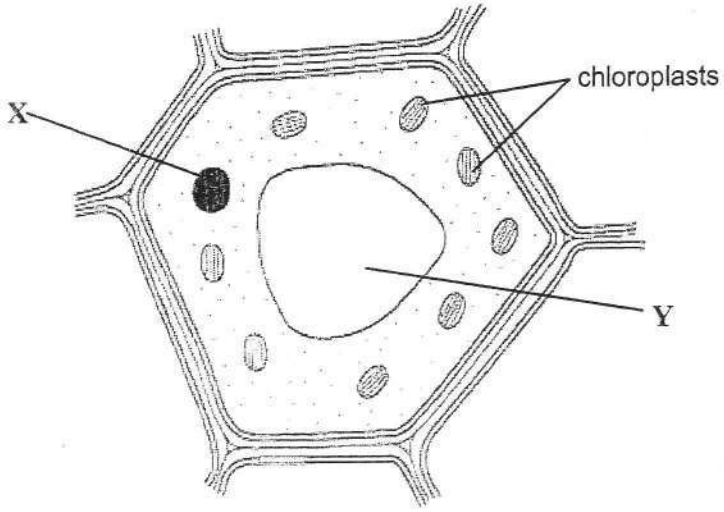
..... (1)

(c) Explain why the starting line of the chromatogram should be drawn with a pencil rather than with ink.

.....

..... (2)

Use the diagram of a leaf cell shown below to answer question 10.



10. (a) (i) Name the part labelled **Y**.

..... (1)

(ii) What is the function of the part labelled **X**.

..... (1)

(b) Suppose all chloroplasts of many plants in the world are to be completely damaged.

(i) What would be the colour of the leaves?

..... (1)

(ii) What would be the long-term effect of the damaged chloroplasts to the temperature of the atmosphere?

..... (1)

(iii) Explain your answer in **(b) (ii)**.

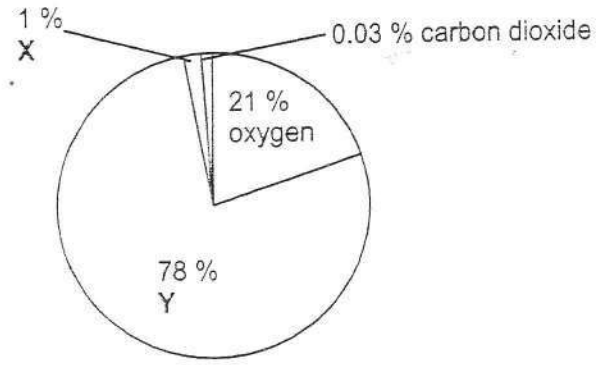
.....

.....

.....

..... (3)

The pie chart below shows the percentage of different components of clean air by mass. Use it to answer question 11 (a).



11. (a) Name the components labelled **X** and **Y**.

X..... (1)

Y..... (1)

(b) State **one** use of oxygen.

..... (1)

(c) Describe the test for oxygen.

.....

..... (2)

(d) After it has rained, the air contains a lot of water vapour but after a few days the air becomes dry. Explain what happens to the water vapour.

.....

..... (2)

SECTION B

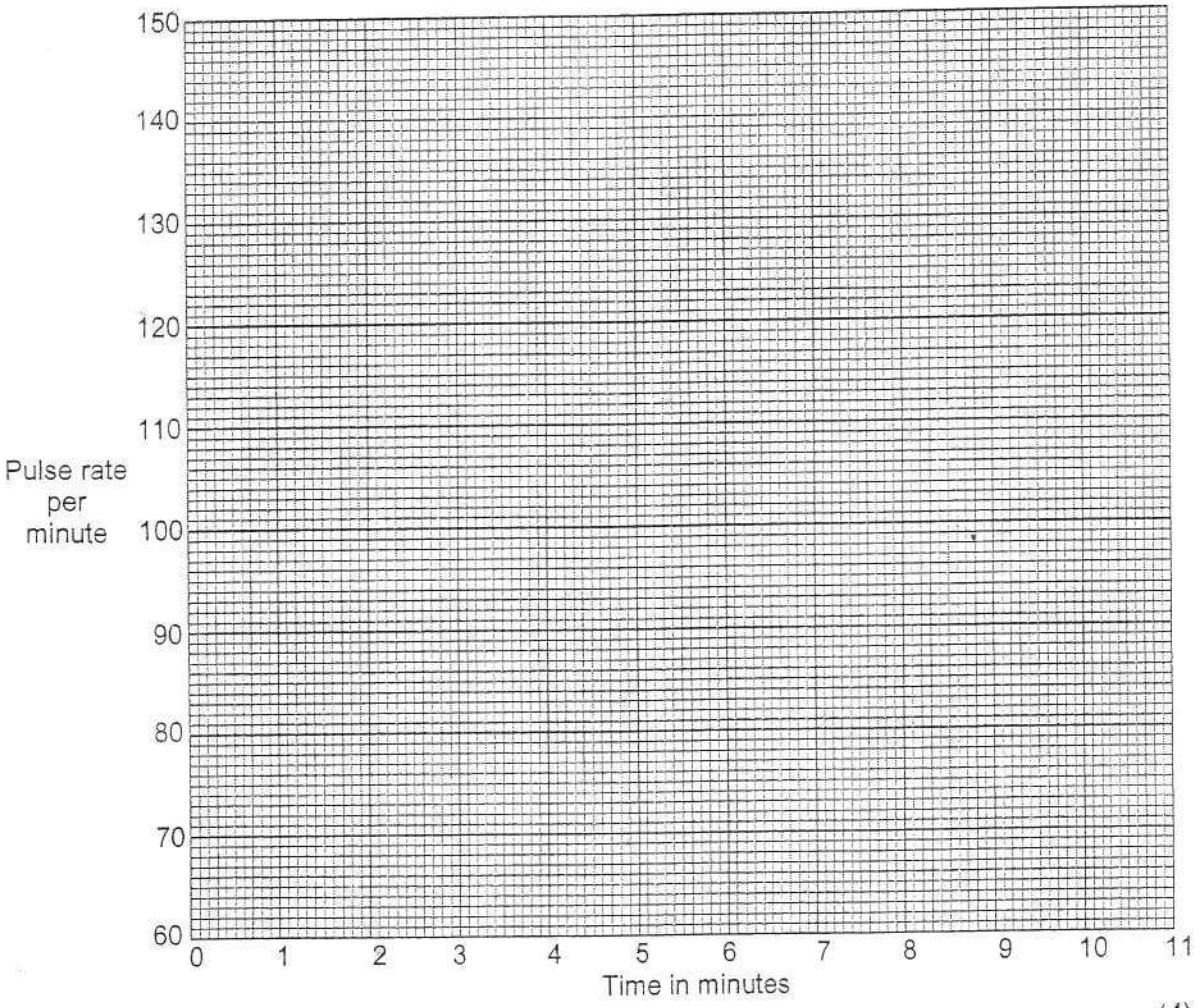
(10 Marks)

Answer all questions in this section

The table below shows the pulse rate of a student during exercise and immediately after exercising. The student exercised for five minutes. Use it to answer question 1.

Time in minutes	0	1	2	3	4	5	6	7	8	9	10	11
Pulse rate per minute	70	72	98	133	133	133	133	133	108	75	70	70

1. (a) Plot the graph of the pulse rate per minute against time in the grid below.



(4)

SECTION B (10 Marks)

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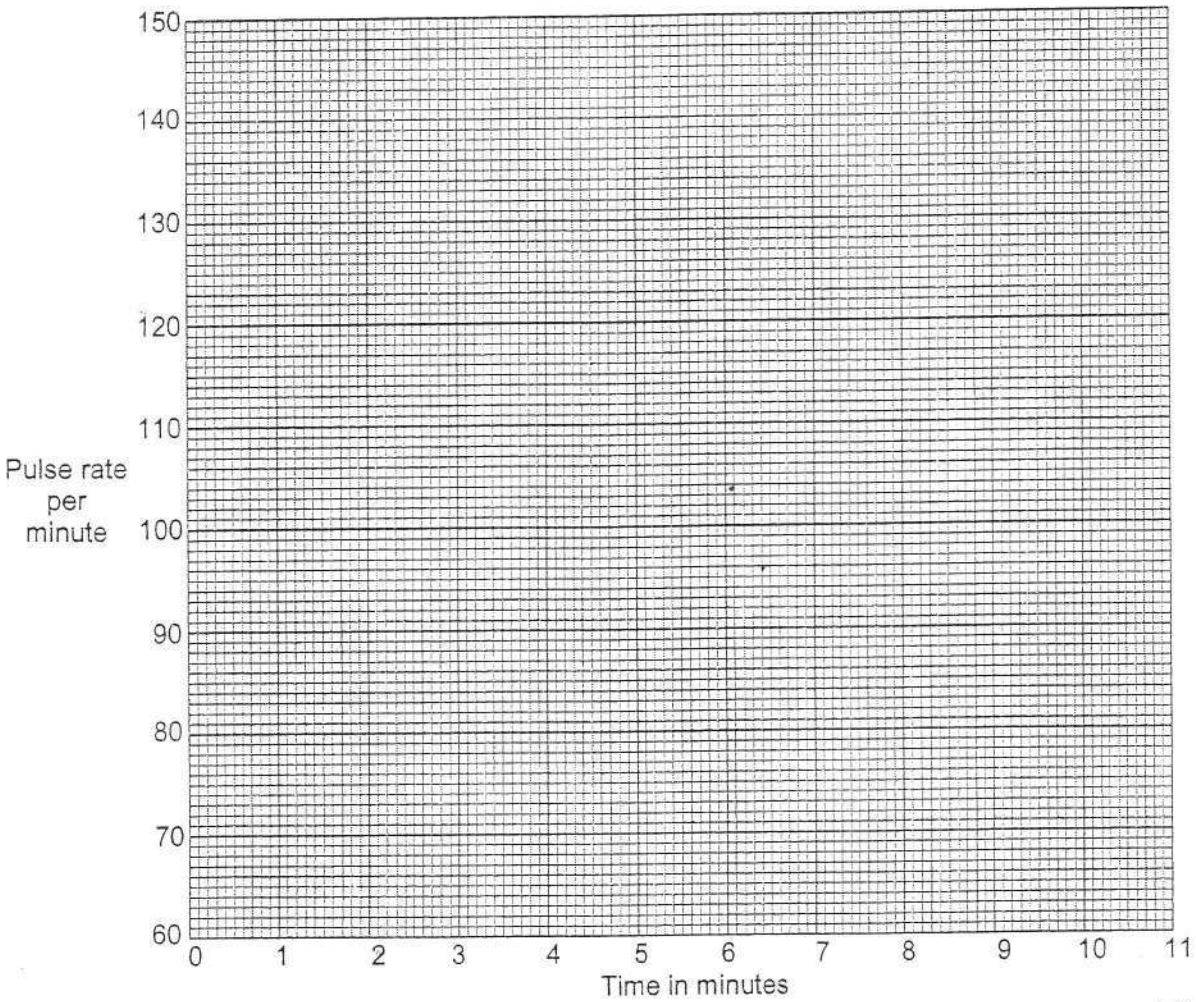

(4)

(b) At what times did the student have a pulse rate of 116?

..... (1)

(c) What is the normal pulse rate of the student?

..... (1)

(d) Why is the pulse rate constant from 3 minutes to 7 minutes?

..... (1)

(e) Explain why the pulse rate increases during the early stages of the exercise.

.....

.....

.....

..... (3)