BOTSWANA EXAMINATIONS COUNCIL

JUNIOR CERTIFICATE EXAMINATION

INTEGRATED SCIENCE 14/2

Paper 2 **October/November 2011**

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	

051682

This question paper contains 13 printed pages.

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

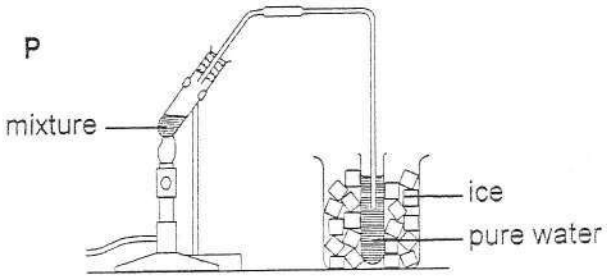
SECTION A

(70 Marks)

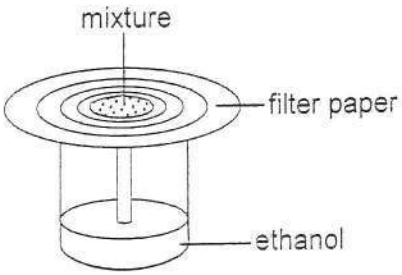
Answer **all** questions.

Diagrams P, Q and R below show some methods used for separating mixtures. Use the diagrams to answer question 1.

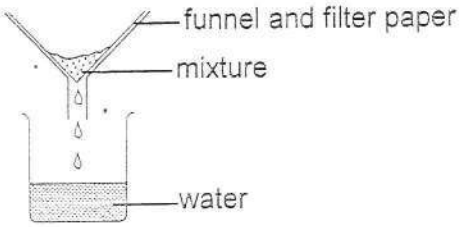
P



Q



R



1. (a) Name the methods shown in diagrams **P**, **Q** and **R**.

P .....

Q .....

R ..... (3)

(b) Which of the **three** diagrams shows the method that can be used to separate

(i) a salt solution?..... (1)

(ii) ink?..... (1)

(c) What is the use of ethanol in the method shown in diagram **Q**?

..... (1)

(d) What will be the effect of using hot water instead of ice in the method shown in diagram **P**?

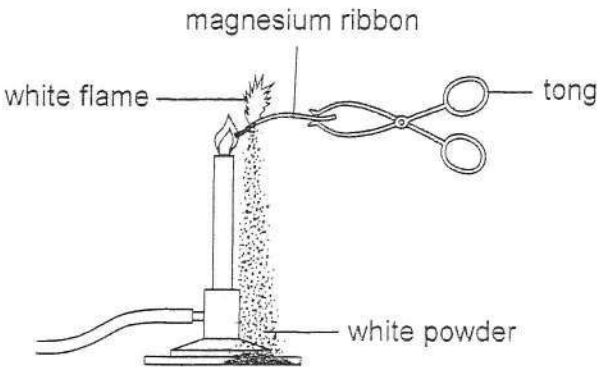
.....

..... (2)

(e) Give the term used to describe the pure water collected in the method shown in diagram **P**.

..... (1)

The diagram below shows a piece of magnesium ribbon burning in air.
Use it to answer question 2.



2. (a) Name the substance that reacted with magnesium to form the white powder.

..... (1)

(b) What is the chemical name for the white powder?

..... (1)

(c) (i) Is the white powder an element or a compound?

..... (1)

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

.....

..... (1)

(d) Magnesium can also react with dilute acids.

(i) Name any acid that can react with magnesium.

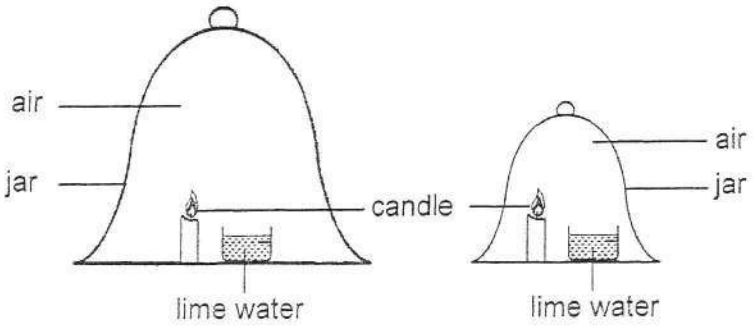
..... (1)

(ii) Write the word equation for a reaction between magnesium and the acid named in **(d) (i)**.

.....

..... (2)

The set-ups X and Y below were used to investigate the burning of fuels in air. Use the set-ups to answer question 3.



set-up X **set-up Y**

3. (a) (i) In which set-up will the candle burn the longest?

..... (1)

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

..... (1)

(b) (i) Burning of fuels in air is similar to respiration. What will appear on the walls of both jars after the candles have gone off?

..... (1)

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

.....

..... (2)

(c) (i) What observation would be made in the lime water after the candles have gone off?

..... (1)

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

..... (1)

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

Diagram **1** shows a bent human arm. Diagram **2** is the cross-section of the upper arm taken through the line **X – Y** to show the humerus bone and structures **L** and **M**.

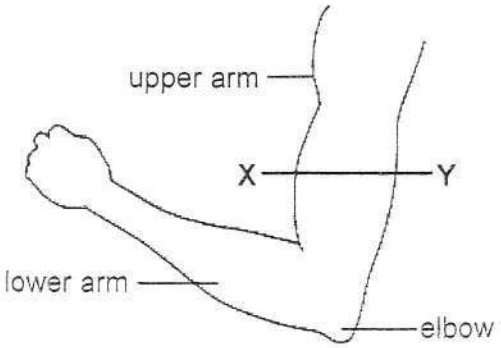


Diagram 1

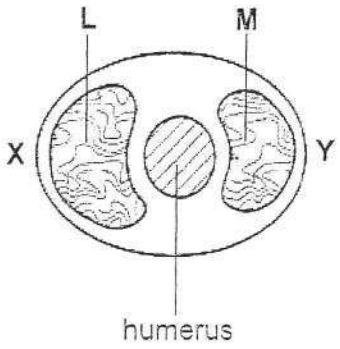


Diagram 2

4. (a) (i) What type of tissue are structures **L** and **M**?

..... (1)

(ii) What actions of structures **L** and **M** will make the arm to straighten?

L .....

M ..... (2)

(b) Name the type of joint at the elbow.

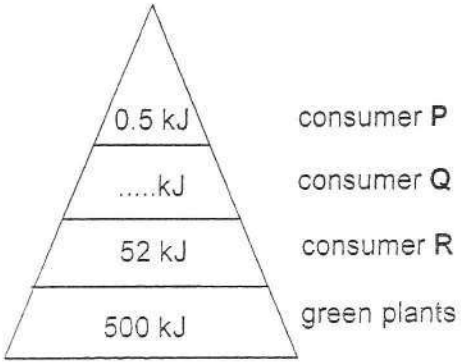
..... (1)

(c) State any **two** functions of the human skeleton.

.....

..... (2)

The diagram below shows a pyramid of energy consisting of green plants and consumers P, Q and R. The total energy stored in some organisms is shown. At each energy level, about 90% of the stored energy is lost.
Use the pyramid to answer question 5.



5. (a) (i) Calculate the total energy in consumer **Q**.

energy =.....kJ (2)

(ii) Suggest any **two** processes that lead to energy loss between the energy levels.

.....

..... (2)

(b) Green plants are producers in energy pyramids. What is a producer?

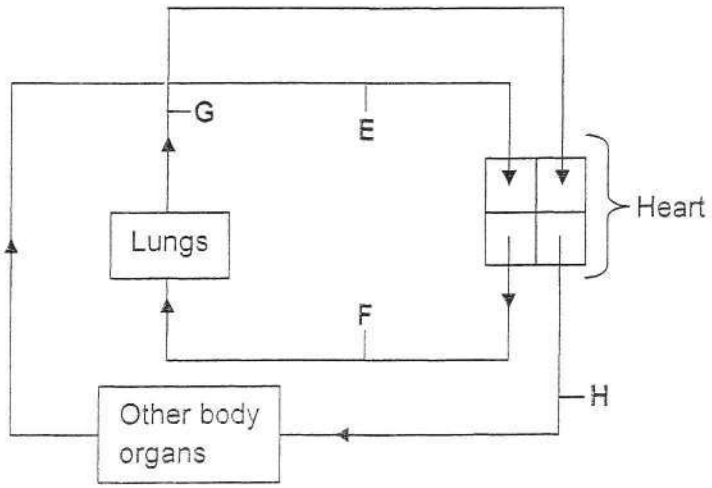
..... (1)

(c) Use the food chains below to construct a food web.

cabbage → caterpillar → sparrow → eagle
cabbage → hare → eagle
peas → hare → eagle
peas → caterpillar → sparrow → eagle

(4)

The diagram below represents the human circulatory system. The main blood vessels are labelled as E, F, G and H. Use it to answer question 6.



6. (a) Which of the blood vessels labelled **E**, **F**, **G** and **H**,

(i) carries blood that has the highest pressure?

..... (1)

(ii) carries blood that has the lowest pressure?

..... (1)

(b) Name the blood vessels **F** and **H**.

Blood vessel **F** ..... (1)

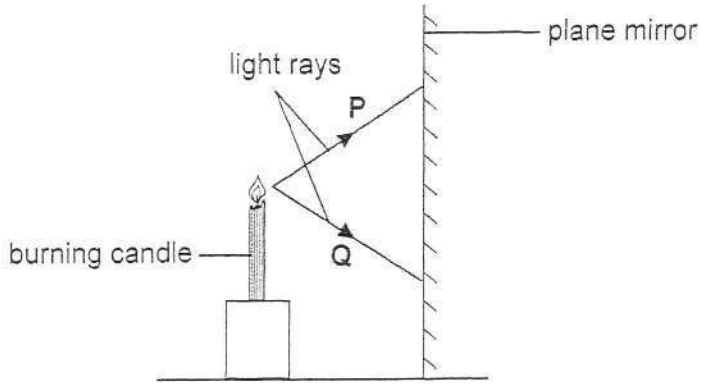
Blood vessel **H** ..... (1)

(c) Explain how physical exercise reduces the risk of heart attack.

.....

..... (1)

The diagram below shows two light rays P and Q from a burning candle. The light rays are falling on a plane mirror. Use the diagram to answer question 7.



7. (a) On the diagram, draw the reflected rays of **P** and **Q**. (2)

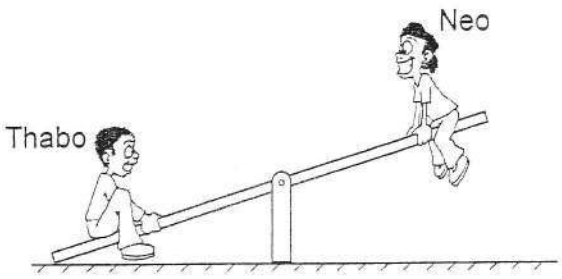
(b) On the diagram, draw the image of the candle. (3)

(c) State any use of a plane mirror.

.....

..... (1)

The diagram below shows Thabo and Neo playing on a see-saw.
Use it to answer question 8.



8. (a) On the diagram, clearly label with a line

(i) the pivot,

(ii) the load when Neo is moving up. (2)

(b) Neo has a mass of 55 kg. Calculate her weight. (g = 10 N/kg).

Weight =.....N (2)

(c) State what Thabo should do to keep Neo up yet applying less effort.

.....

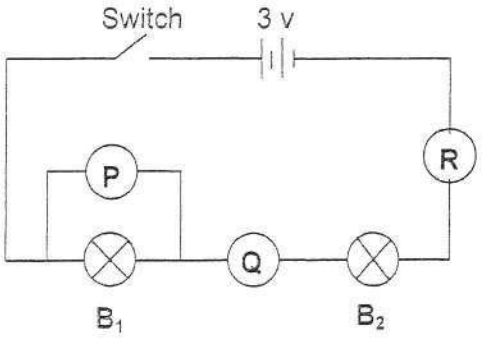
..... (1)

(d) What is a machine?

..... (1)

Use the information and the diagram of an electric circuit below to answer question 9.

Bulbs B_1 and B_2 are identical. Devices P, Q and R are metres.



9. (a) (i) Name the type of the circuit shown.

.....

(1)

(ii) State **one** disadvantage of using this type of circuit when wiring houses.

.....

.....

(1)

(b) Name the metres labelled P and Q.

P.....

Q.....

(2)

(c) When the switch is closed, meters P, Q and R show some readings.

(i) How will the reading on meter Q compare with that on meter R?

.....

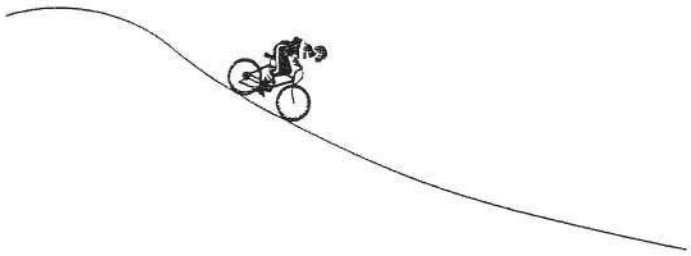
(1)

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

.....

(1)

The diagram below shows a man riding a bicycle down a slope without pedalling. Use it to answer question 10.



10. (a) Name the force that makes it possible for the man to ride the bicycle down the slope without pedalling.

..... (1)

(b) State the energy change that takes place as the man rides the bicycle down the slope without pedalling.

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

(c) (i) At the bottom of the slope, the man applied the brakes until the bicycle stopped moving.

Name the force that stopped the bicycle.

..... (1)

(ii) State the energy change that takes place when the brakes are applied.

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

(iii) The man travelled at a speed of 20 km/h and he took 30 seconds to reach the bottom of the slope. (1 hour = 3 600 seconds)

Given that, $s = \frac{d}{t}$, where s is the speed, d the distance and t the time, calculate the distance from the top of the slope to the bottom of the slope.

Distance = ...km (3)

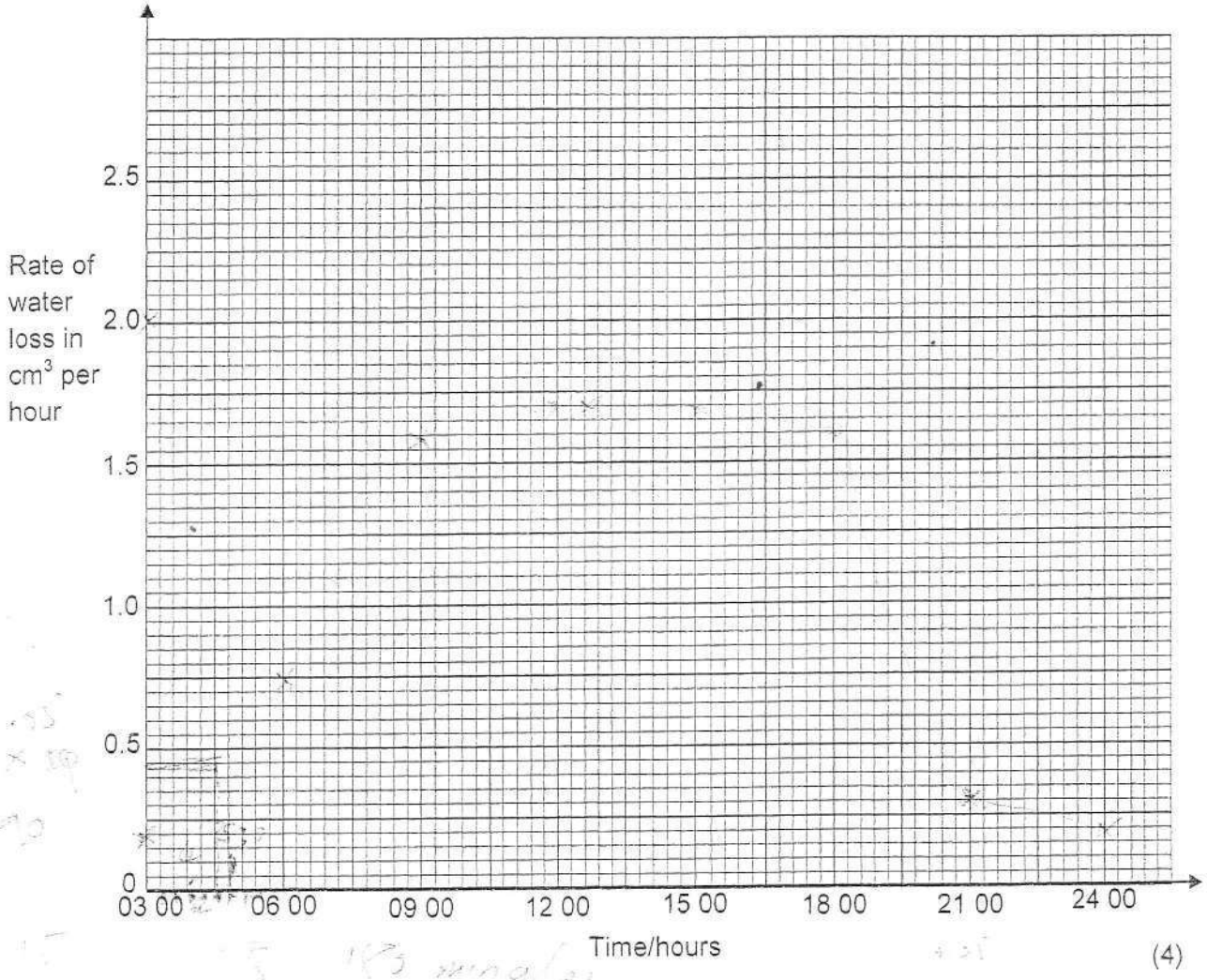
SECTION B (10 Marks)

Answer **all** parts of the question.

11. An experiment was conducted to investigate the rate of water loss by a plant at different times of the day. The results are as shown in the table below.

Time in hours	03 00	06 00	09 00	12 00	15 00	18 00	21 00	24 00
Rate of water loss in cm^3 per hour	0.2	0.75	1.60	1.70	1.70	1.60	0.30	0.20

(a) On the grid provided below, plot a graph of rate of water loss against time.



(4)

(b) Name the process that is being investigated.

.....

(1)

(c) Use the graph to find the rate of water loss at 04 30. Show on the graph how the value was obtained.

.....cm^3 per hour

(2)

(d) (i) Between which times was the rate of water loss constant?

.....

(1)

(ii) Suggest why the rate of water loss was constant between the times stated at **(d) (i)**.

.....

(1)

(e) Suggest how an increase in humidity at 10 00 would affect the rate of water loss in the next two hours.

.....

.....

(1)