

EXAMINATIONS COUNCIL OF SWAZILAND
 in collaboration with
 UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
 Swaziland General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

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COMBINED SCIENCE

6886/02

Paper 2 (Core)

October/November 2012

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs, tables or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

A copy of the Periodic Table is printed on page 20.

You may use a calculator.

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
1	
2	
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7	
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9	
10	
11	
12	
Total	

This document consists of **17** printed pages and **3** blank pages.

1 (a) Fig. 1.1 shows part of the human nervous system.

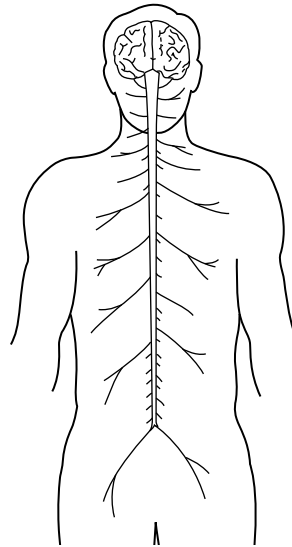


Fig. 1.1

On Fig. 1.1, label the **two** parts of the central nervous system. [2]

(b) (i) Explain what is meant by the term *homeostasis*.

.....
.....
..... [2]

(ii) Ice cream contains a lot of sugar. Describe how the human body keeps the blood sugar constant after eating ice cream.

.....
.....
.....
.....
.....
.....
..... [4]

2 Fig. 2.1 shows the deflection of alpha, beta and gamma radiations in an electric field.

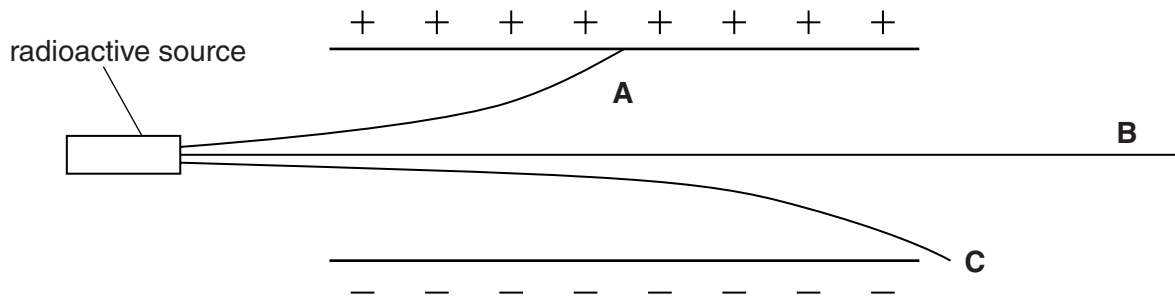


Fig. 2.1

(a) Name the radiations **A**, **B** and **C**.

A

B

C [3]

(b) State **two** dangers of the radiations to living organisms.

1

2 [2]

(c) State **one** use of gamma radiation.

..... [1]

3 Hydrogen chloride (HCl) and sodium chloride (NaCl) are common compounds of chlorine.

- (a) (i) Using dots and crosses, complete Fig. 3.1 to show the bonding in a hydrogen chloride molecule.

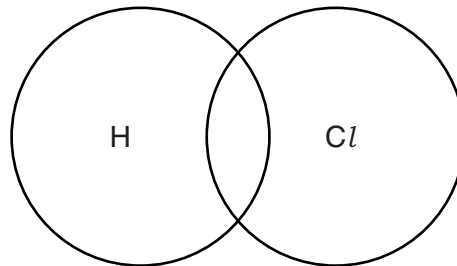


Fig. 3.1

[2]

- (ii) Name the type of bonding that occurs in HCl .

..... [1]

- (b) Explain why NaCl would have a very high melting point.

..... [1]

4 Bobo places a thermometer, which is at room temperature, near a lit Bunsen burner, to measure the temperature of the air.

- (a) State what happens to the liquid in the thermometer.

..... [1]

- (b) Bobo decides to paint the bulb of the thermometer black. He puts it at the same distance from the lit burner as in (a).

State and explain what he observes.

.....

 [2]

5 (a) Fig. 5.1 shows two types of blood vessels **A** and **B**.



Fig. 5.1

(i) State **two** visible differences between blood vessel **A** and blood vessel **B**.

- 1
- 2 [2]

(ii) Explain how the structure of blood vessel **B** is adapted to its function.

-
-
-
- [2]

(iii) State the nature of blood that is found in blood vessels similar to blood vessel **A**.

- [1]

(b) Plants absorb water from the soil and transport it to other parts through vessels.

(i) Name the vessels that transport water from the roots to the leaves.

- [1]

(ii) Explain the process by which root hair cells absorb water from the soil.

-
-
- [2]

6 (a) Ethanol, C_2H_5OH , can be used as a fuel.

(i) State **two** other uses of ethanol.

1

2 [2]

(ii) Draw the structural formula for ethanol.

[2]

(b) Fig. 6.1 shows a hydrocarbon.

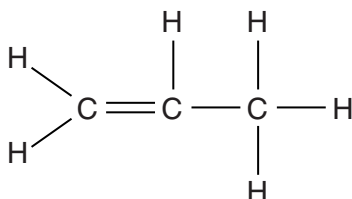


Fig. 6.1

(i) Name the hydrocarbon shown in Fig. 6.1.

..... [1]

(ii) Name the homologous series to which the hydrocarbon belongs.

..... [1]

(iii) Name the compound with two carbon atoms in this homologous series.

..... [1]

(c) Methane is a hydrocarbon that is used as fuel. When methane burns, it reacts with oxygen.

(i) Construct a word equation for the reaction of methane with oxygen.

..... [1]

(ii) Name this type of reaction.

..... [1]

- 7 Fig. 7.1 shows a pendulum that swings between **A** and **C**. The bob takes 1.25 seconds to move from **A** to **C**.

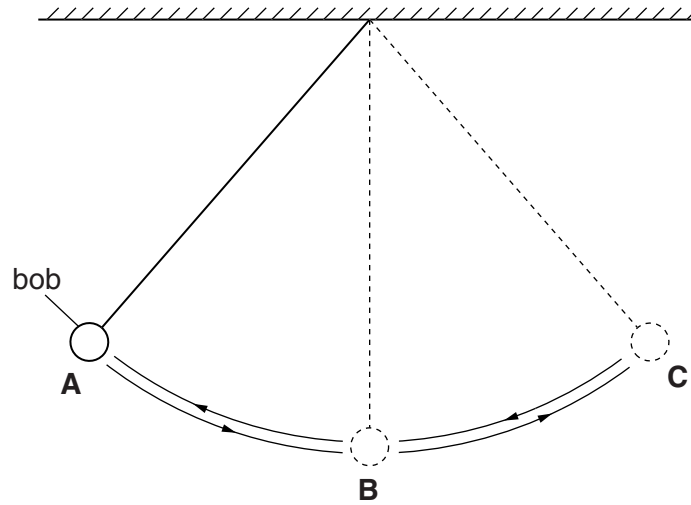


Fig. 7.1

- (a) Calculate the period of the pendulum.

..... [1]

- (b) The bob has a mass of 62.0 g and a volume of 5.5 cm³.

Calculate the density of the pendulum bob.

State the formula that you use and show your working.

..... [3]

(c) The total length of the arc path **ABC** followed by the bob as it swings is 40.0 cm.

Calculate the average speed of the bob as it swings from **A** to **C**.

State the formula you use and show your working.

..... cm/s [3]

8 (a) Fig. 8.1 shows a calendar for April and May. Thuli's menstruation days for April are shaded.

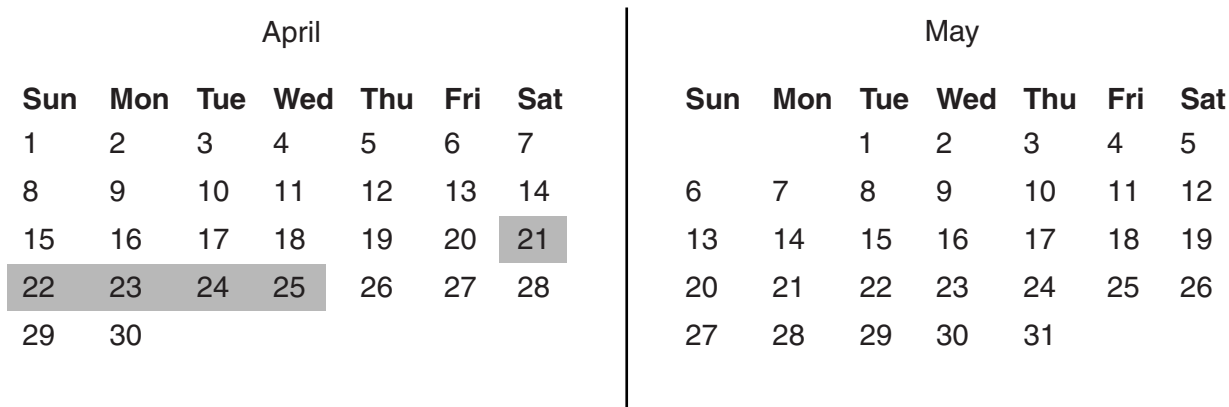


Fig. 8.1

(i) How long did Thuli's menstruation last?

..... [1]

(ii) Circle the day when ovulation is likely to occur in May.

[1]

(iii) Shade the days when Thuli's next menstrual period is likely to occur.

[1]

(iv) Describe the process of menstruation.

.....

 [2]

(b) Fig. 8.2 shows a human foetus.

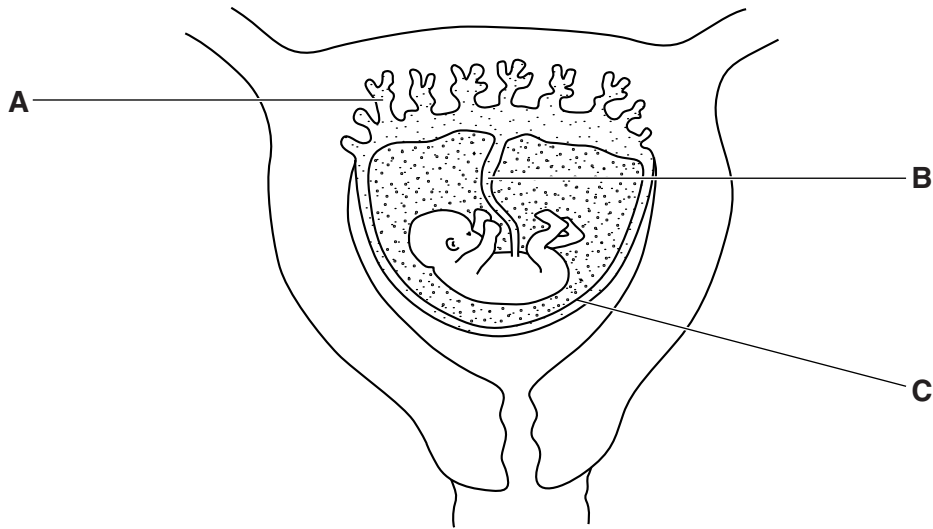


Fig. 8.2

(i) Identify the structures **B** and **C**.

B

C [2]

(ii) Describe **two** functions of structure **A**.

1

.....

2

..... [2]

- 9 Fig. 9.1 shows a circuit with a battery, a variable resistor and two lamps, L_1 and L_2 , connected in series.

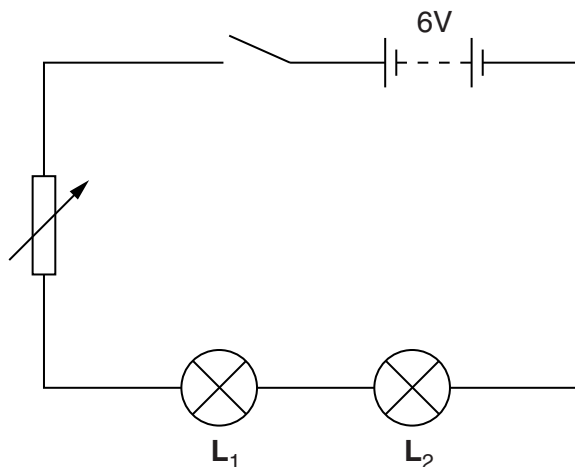


Fig. 9.1

L_1 has a resistance of $15\ \Omega$ and L_2 has a resistance of $25\ \Omega$.

- (a) Calculate the combined resistance of L_1 and L_2 .

..... Ω [1]

- (b) The variable resistor is set to zero resistance.

Calculate the current in the circuit.

State the formula that you use and show your working.

..... [2]

- (c) The resistance of the variable resistor is now increased.

State what happens to the brightness of the lamps.

..... [1]

(d) The lamps each have a filament that emits light when current passes through it.

(i) Name a material suitable for the filament.

..... [1]

(ii) Name a form of energy given out by the lamps, other than light.

..... [1]

(e) State **two** hazards of damaged insulation around a mains electric cable.

1

2 [2]

- 10 (a) A list of gases is shown in the box below. Use the gases in the box to answer the following questions. You may use any of the gases once, more than once, or not at all.

acetylene	ammonia	carbon dioxide	ethane	hydrogen	nitrogen	propane
-----------	---------	----------------	--------	----------	----------	---------

Name a gas that

- (i) is approximately 79% by volume of air,

..... [1]

- (ii) burns in oxygen to form carbon dioxide and water only,

..... [1]

- (iii) is used in welding.

..... [1]

- (b) Ammonia is used to make fertilisers. The use of fertilisers improves crop production.

- (i) Name **three** essential elements present in many fertilisers.

1

2

3 [3]

- (ii) Name **two** compounds that are commonly used as fertilisers.

1

2 [2]

11 Fig. 11.1 shows an object in front of a mirror.

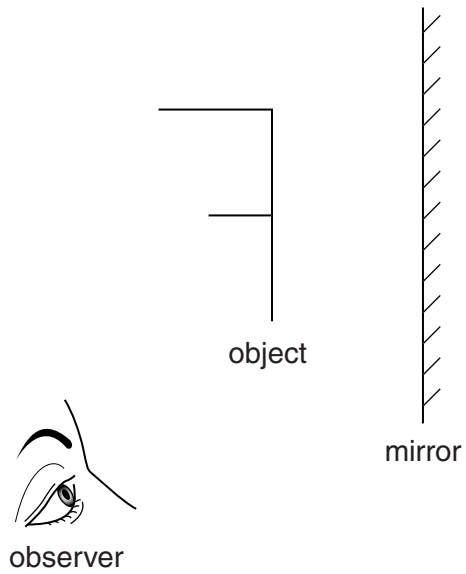


Fig. 11.1

On Fig. 11.1 draw an accurate diagram of the image of the object seen by the observer in the mirror. [3]

- 12 (a) Thoko investigates the reaction of four metals **P**, **Q**, **R** and **S**, with dilute hydrochloric acid and water.

The following are the results she obtained.

P reacts with steam but not with cold water.

Q reacts with dilute hydrochloric acid but not with steam or cold water.

R reacts quickly with cold water.

S does not react with dilute hydrochloric acid or with water.

- (i) Arrange the metals **P**, **Q**, **R** and **S** in order of their reactivity, starting with the most reactive.

most reactive

.....

.....

least reactive

[2]

- (ii) Identify **one** metal from **P**, **Q**, **R** and **S** which could be used to make cooking pots. Suggest a reason for your answer.

.....

..... [2]

- (iii) Suggest which of the metals **P**, **Q**, **R** and **S** could be copper.

..... [1]

- (b) Magnesium is a metal and carbon is a non-metal.

State **two** physical differences between carbon and magnesium.

1

2 [2]

DATA SHEET
The Periodic Table of the Elements

		Group												
I	II	III	IV	V	VI	VII	O							
7 Li Lithium 3	9 Be Beryllium 4	1 H Hydrogen 1	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10						
23 Na Sodium 11	24 Mg Magnesium 12		27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18						
39 K Potassium 19	40 Ca Calcium 20		70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36						
85 Rb Rubidium 37	88 Sr Strontium 38		65 Zn Zinc 30	64 Cu Copper 29	59 Ni Nickel 28	66 Cd Cadmium 48	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	122 Sb Antimony 51	127 I Iodine 53	131 Xe Xenon 54		
133 Cs Caesium 55	137 Ba Barium 56		197 Hg Mercury 80	197 Au Gold 79	195 Pt Platinum 78	201 Hg Mercury 80	197 Au Gold 79	204 Tl Thallium 81	207 Pb Lead 82	209 Pb Bismuth 83	210 Po Polonium 84	222 Rn Radon 86		
223 Fr Francium 87	226 Ra Radium 88		159 Tb Terbium 65	157 Gd Gadolinium 64	152 Eu Europium 63	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71	260 Lr Lawrencium 103		
			147 Pm Promethium 61	144 Nd Neodymium 60	141 Pr Praseodymium 59	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
			232 Th Thorium 90	238 U Uranium 92	231 Pa Protactinium 91	244 Pu Plutonium 94	243 Am Americium 95	247 Cm Curium 96	251 Cf Californium 98	252 Es Einsteinium 99	257 Fm Fermium 100	258 Md Mendelevium 101	259 No Nobelium 102	260 Lr Lawrencium 103

* 58–71 Lanthanoid series
† 90–103 Actinoid series

a	X	
b	X	

a = relative atomic mass
X = atomic symbol
b = atomic (proton) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).