

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.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions. A copy of the Periodic Table is printed on page 20.

At the end of the examination, fasten all your work securely together. The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use									
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This document consists of 19 printed pages and 1 blank page.



1 Fig. 1.1 shows a plant, and also a cell from part of the plant.







(a) From which part of the plant, **A**, **B**, **C** or **D**, does the cell come?

.....

(b) On the diagram of **the cell** in Fig. 1.1, label the following structures.

Use label lines and the appropriate letters.

- P a partially permeable membrane
- **Q** the part of the cell that contains DNA
- **R** a structure where energy from sunlight is absorbed

[3]

[1]

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(c)	3 Describe how you would test a leaf from the plant for starch.	Cambr
(d)	Complete these sentences about part A of the plant shown in Fig. 1.1. Use some these words.	 [3] of
	anthers asexual ovules petals sepals sexual stigma	
	Flowers are responsible forreproduction.	
	Themake pollen, which contains the male gametes.	
	The female gametes are found inside the[[3]

www.papacambridge.com 4 Fig. 2.1 shows the inside of a refrigerator. freezing compartment Fig. 2.1 (a) (i) Draw arrows on Fig. 2.1 to show what happens to the air cooled by the freezing compartment. [1] (ii) Name this method of heat transfer. [1] (iii) Use the idea of density to explain why this happens. [2] (b) The refrigerator has a lamp inside. The supply voltage is 240 V and the current passing through the lamp when lit is 0.04 A. Calculate the resistance of the lamp. State the formula that you use and show your working. formula used working Ω [2]

2

www.papacambridge.com (c) The refrigerator walls are insulated using both expanded polystyrene and alu foil.

Explain how the structure of the refrigerator wall will help to maintain a lower temperature inside the refrigerator.

..... [3] _____

		444	
		6	
3	Hydrog	gen peroxide, H_2O_2 , is a colourless liquid.	r
	Hydrog decomp	gen peroxide slowly decomposes into simpler substances. The equation for the position reaction is shown below.	CO
		hydrogen peroxide \rightarrow water + oxygen	12
	(a) Ho	ow many atoms are there in one molecule of hydrogen peroxide?	J
		[1]	
	(b) (i)	The decomposition of hydrogen peroxide is usually carried out in the presence of a catalyst.	
		State the purpose of adding a catalyst to a reaction mixture.	
		[1]	
	(ii)	The solid compound manganese dioxide, MnO_2 , is used as a catalyst in the reaction above. Manganese is a metal in the fourth period of the Periodic Table.	
		What name is given to the family of metals which contains manganese?	
		[1]	

- www.papaCambridge.com (c) (i) Hydrogen peroxide contains two non-metallic elements bonded together. Name the type of chemical bonding in hydrogen peroxide molecules.
 - (ii) Oxygen molecules, O₂, are made of two oxygen atoms joined by a **double** bond. Suggest the displayed formula of an oxygen molecule.
 - (iii) The symbolic equation for the decomposition of hydrogen peroxide is shown below. The equation is not balanced.

Balance the equation.

 \dots $H_2O_2 \longrightarrow \dots H_2O + O_2$

[1]

[1]

7



www.papaCambridge.com 9 (d) Fig. 4.2 shows changes in the concentration of carbon dioxide in the atmosphere last 160 000 years. 400 350 carbon 300 dioxide concentration /p.p.m. 250 200 150 160 000 120 000 80 000 40 000 0 years before the present time Fig. 4.2 (i) Suggest one human activity that is causing the current increase in carbon dioxide concentration in the atmosphere. [1] (ii) Explain how the information in Fig. 4.2 suggests that human activities are not entirely to blame for increases in the concentration of carbon dioxide in the atmosphere.[1] (iii) Explain why many people are worried about this increase in carbon dioxide concentration.

.....

[2]

- A space rocket is launched to the Moon. 5
- www.papaCambridge.com (a) After launch, the empty fuel tanks are released and fall back to Earth. As a tank fall two forces act on it as shown in Fig. 5.1.



Fig. 5.1

(i) Name forces F_1 and F_2 . F₁ F₂ [2] (ii) As it falls, the tank accelerates. What does this tell you about the two forces? [1] (b) The rocket travels 400 000 km to the Moon in 80 hours. Calculate the average speed of the rocket. State the formula that you use and show your working. formula used working km/h [2]

MAN D	
(c) One of the astronauts on the rocket has a mass of 90 kg. The gravitation strength of the Moon is about one-sixth that of the Earth.	For iner's
State the differences, if any, between	20
(i) the mass of the astronaut on the Earth and on the Moon,	Com
[1]	
(ii) the weight of the astronaut on the Earth and on the Moon.	
[1]	
(d) There is no atmosphere and there are no fossil fuel deposits on the Moon. To provide the energy needed to use his equipment on the Moon, the astronaut needs to use renewable energy resources.	
Suggest one renewable energy resource which is naturally available on the Moon.	
[1]	

12 The apparatus in Fig. 6.1 can be used to study the reaction between potassible of the potassible of the potassible of the potassium reacting with oxygen

6



(a) Suggest why the flask becomes warm during the reaction. [1] (b) One of the compounds formed in this reaction is potassium oxide. The chemical formula of potassium oxide is K₂O. (i) Explain the meaning of this formula. [1] (ii) Potassium oxide is made of positive and negative ions. Explain, in terms of protons and electrons, the difference between a **positive** ion and a neutral atom. [2]

		42
		13 ³³ 23
(c)	Wh Indi	en the reaction in Fig. 6.1 had finished, a student added water containing Un cator to the flask.
	Pre	dict the colour change of the Universal Indicator.
	Exp	lain your prediction.
		[2]
(d)	Pot the	assium metal reacts with water to form a solution of potassium hydroxide. During reaction a gas is given off.
	(i)	Write the chemical formula of potassium hydroxide.
		[1]
	(ii)	Name the gas which is given off and describe a test for this gas.
		name of gas
		test
		[3]

- 7 Tuberculosis (TB) is an infectious disease caused by a bacterium. HIV/AIDS is cause virus.
- www.papacambridge.com (a) Table 7.1 shows the percentage of people with TB and HIV/AIDS in four parts of the world in 2005.

part of the world	percentage of people with TB	percentage of people with HIV/AIDS			
sub-Saharan Africa	0.51	7.2			
Southeast Asia	0.35	1.1			
Americas	0.07	0.7			
Europe	0.06	0.5			

Table 7.1

(i) In which of these four parts of the world was there the largest percentage of people with TB?

.....

[1]

(ii) Describe any pattern that seems to link the percentages of people with TB and with HIV/AIDS.

......[1]

(iii) The virus that causes AIDS infects white blood cells. Explain how this could be responsible for the pattern that you have described in (ii).

.....

.....

[2]

(b) The TB bacterium usually infects cells in the lungs. Many of the cells in the alveoli are destroyed.

Explain how this can lead to a person feeling very tired and unable to carry out energetic exercise.

..... [2]



- 8 A student is having a medical examination.
 - (a) A dentist checks the student's teeth using a dental mirror. This is shown in Fig. 8.1.



Fig. 8.1

Draw a ray of light from the back of tooth A to the dentist's eye to show how the dentist is able to see the back of the tooth.

On the ray, draw arrows showing the direction in which the light travels. [3]

- (b) A doctor tests the student's hearing and confirms that the lowest and highest frequencies the student can hear are normal for a young person.
 - (i) Suggest a value for each of these.

	lowest frequency Hz	
	highest frequency Hz	[2]
(ii)) What is meant by the <i>frequency</i> of a wave?	
		 [1]
(iii)) Sound is one form of energy.	
	Name two other forms of energy.	
	1	
	2	 [1]

www.papaCambridge.com (c) The doctor wants to use a small torch to look down the student's throat. switches the torch on, it does not work.

Fig. 8.2 shows the circuit diagram for the torch.





(i) Explain what is wrong with the torch.

..... [1]

(ii) Draw the correct circuit diagram.

	18	1										
Alumii ndust	uminium, iron, sodium and chlorine are important elements produced by the choice dustry.											
a) U S [.]) Use the copy of the Periodic Table on page 20 to help you to answer this question State which of the elements above											
(i) is not in the same period of the Periodic Table as the other three,											
	[[1]										
(ii) has atoms which contain 11 electrons.											
	[[1]										
b) A st	luminium is a metal which resists corrosion and has a relatively low density. Th trength of aluminium can be improved by making it into an alloy.	ne										
E	xplain why aluminium alloys are important materials for use in aircraft construction.											
	[[3]										
 c) Ire M	on is produced when iron oxide reacts with carbon monoxide in a blast furnace. lost iron is converted into steel.	[3]										
c) Ira M (i	on is produced when iron oxide reacts with carbon monoxide in a blast furnace. lost iron is converted into steel.) The equation for the reaction between iron oxide and carbon monoxide is show below.	[3] vn										
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