

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**SCIENCE (CHEMISTRY, BIOLOGY)**

**5126/01**

Paper 1 Multiple Choice

October/November 2006

**1 hour**

Additional Materials: Multiple Choice Answer Sheet  
Soft clean eraser  
Soft pencil (type B or HB is recommended)

**READ THESE INSTRUCTIONS FIRST**

Write in soft pencil.

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

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

**Read the instructions on the Answer Sheet very carefully.**

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

This document consists of **16** printed pages.



- 1 Potassium nitrate crystals can be separated from sand by using the processes shown.

What is the correct order for the processes?

	first <span style="display: inline-block; width: 150px; border-bottom: 1px solid black; position: relative; top: -5px;">→</span> last			
<b>A</b>	filter	dissolve	evaporate	crystallise
<b>B</b>	dissolve	evaporate	crystallise	filter
<b>C</b>	dissolve	evaporate	filter	crystallise
<b>D</b>	dissolve	filter	evaporate	crystallise

- 2 Which statement about the molecules in ice is correct?

- A** The molecules all move with the same speed.  
**B** The molecules are diatomic.  
**C** The molecules move randomly.  
**D** The molecules vibrate about fixed positions.

- 3 Strontium has an isotope of nucleon number 90.

How many protons, neutrons and electrons are present in an atom of this isotope?

	protons	neutrons	electrons
<b>A</b>	38	50	38
<b>B</b>	38	52	38
<b>C</b>	38	52	40
<b>D</b>	40	50	38

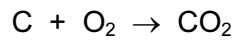
- 4 Under what conditions does sodium chloride conduct electricity?

conducts electricity			
	when solid	when molten	in aqueous solution
<b>A</b>	no	no	no
<b>B</b>	no	yes	yes
<b>C</b>	yes	no	no
<b>D</b>	yes	yes	yes

- 5 How many electrons are shared in the covalent bonds in a methane molecule?

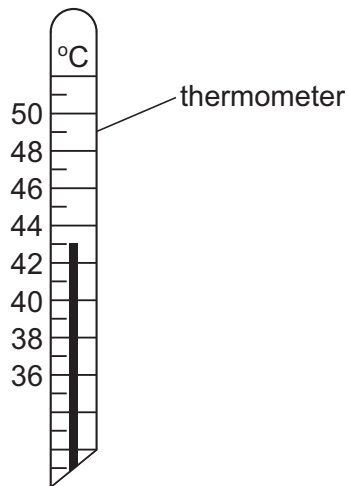
- A** 2                      **B** 4                      **C** 6                      **D** 8

- 6 A 6 g sample of pure carbon is completely burned in oxygen.



Which mass of carbon dioxide is produced?

- A** 12g                    **B** 22g                    **C** 38g                    **D** 44g
- 7 A thermometer is placed in water and the temperature is measured as shown.



An endothermic change takes place as a solid is dissolved in the water. The temperature changes by 4.5°C.

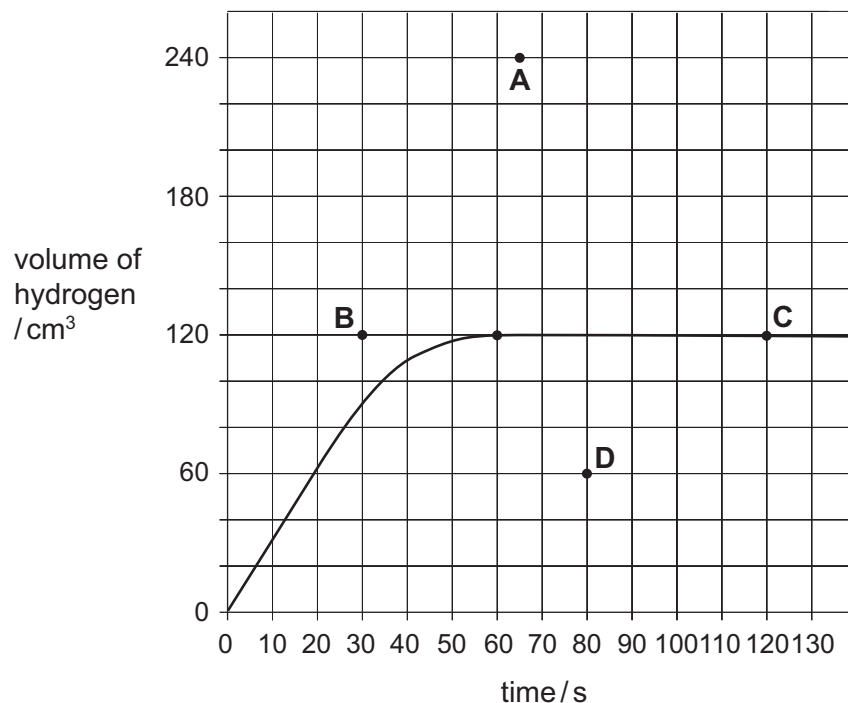
What is the final temperature?

- A** 38.0°C                    **B** 38.5°C                    **C** 47.0°C                    **D** 47.5°C

- 8 In an experiment, 0.325 g of zinc reacts with an excess of  $1.0 \text{ mol/dm}^3$  hydrochloric acid. The graph shows how the volume of hydrogen collected varies with time.

In a second experiment, 0.650 g of zinc reacts with an excess of  $1.0 \text{ mol/dm}^3$  hydrochloric acid.

For the second experiment, at which point does the graph become horizontal?



- 9 The pH values of four aqueous solutions are shown.

Which solution contains a weak acid?

	pH value
<b>A</b>	2
<b>B</b>	5
<b>C</b>	7
<b>D</b>	9

- 10 Which statement about the elements in Group I of the Periodic Table is correct?

- A** The proton (atomic) number of an element is one greater than that of the element above it.
- B** They are equally reactive.
- C** They become less metallic as the proton (atomic) number increases.
- D** They form chlorides of similar formula.

11 An experiment is carried out to find the order of reactivity of some metals.

Three metals are placed in separate solutions containing an aqueous metal ion.

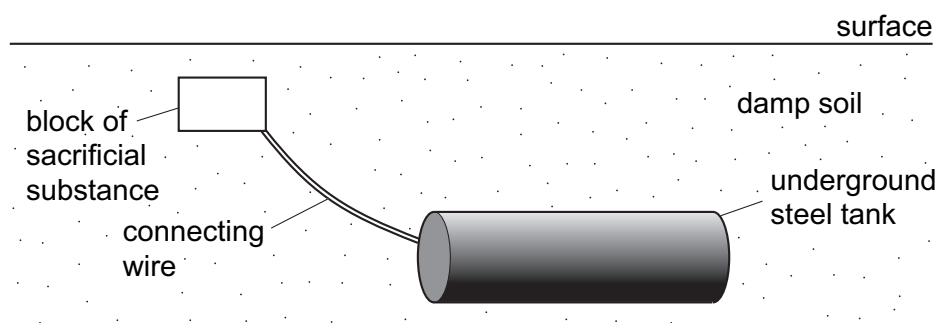
The results are shown.

metal	aqueous metal ion				key
	Mg <sup>2+</sup>	Al <sup>3+</sup>	Fe <sup>2+</sup>	Zn <sup>2+</sup>	
Mg	x	✓	✓	✓	✓ = reaction observed
Fe	x	x	x	x	x = no reaction observed
Zn	x	x	✓	x	

What is the order of reactivity of the metals (most reactive first)?

- A** Mg Zn Fe Al  
**B** Fe Zn Al Mg  
**C** Mg Al Zn Fe  
**D** Mg Al Fe Zn

12 Underground steel tanks can be prevented from rusting by sacrificial protection.



Which element is most suitable for use as the sacrificial substance?

- A** carbon  
**B** copper  
**C** iron  
**D** magnesium

13 Aluminium cooking utensils are used in many kitchens.

What property of aluminium is **not** important for this use?

- A It has a high melting point.
- B It is a good conductor of electricity.
- C It is a good conductor of heat.
- D It is resistant to corrosion.

14 Methane, sulphur dioxide and carbon dioxide are gases which affect the atmosphere and the environment.

In what way do these gases affect the environment?

	methane	sulphur dioxide	carbon dioxide
<b>A</b>	depletion of the ozone layer	acid rain	global warming
<b>B</b>	global warming	photochemical smog	acid rain
<b>C</b>	photochemical smog	global warming	depletion of the ozone layer
<b>D</b>	global warming	acid rain	global warming

15 What is the main constituent of natural gas?

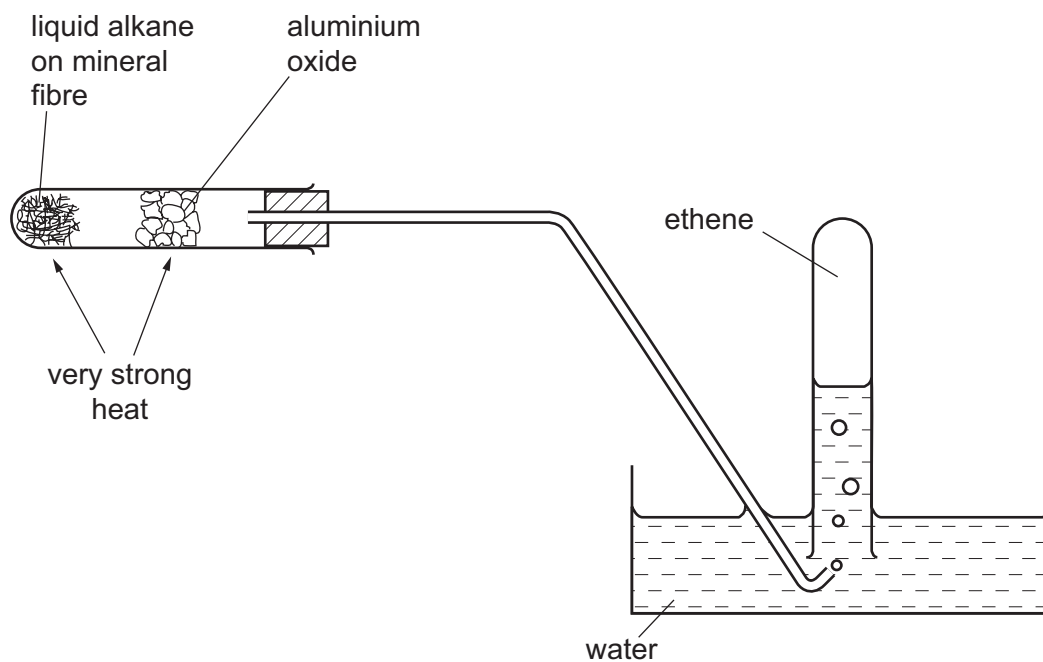
- A ethane
- B helium
- C hydrogen
- D methane

16 Octane is an alkane containing eight carbon atoms per molecule.

What is its molecular formula?

- A  $C_8H_{14}$
- B  $C_8H_{16}$
- C  $C_8H_{18}$
- D  $C_8H_{20}$

17 The experiment shown is carried out.



Which process occurs?

- A cracking
- B dehydrogenation
- C distillation
- D polymerisation

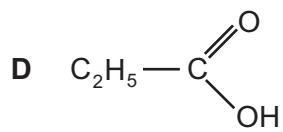
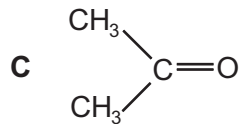
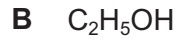
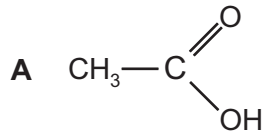
18 A hydrocarbon has the formula  $C_6H_{12}$ .

Which observation could confirm the homologous series to which the hydrocarbon belongs?

- A burning in air with a sooty flame
- B decolourising aqueous bromine
- C effervescence when mixed with sodium carbonate solution
- D turning Universal Indicator blue

19 Wine can deteriorate after a period of time because of atmospheric oxidation.

Which compound is formed by the oxidation of the alcohol in the wine?



20 Which of the following contains the  $\begin{matrix} \text{O} \\ \parallel \\ \text{—C—N—} \\ | \\ \text{H} \end{matrix}$  linkage?

A fats

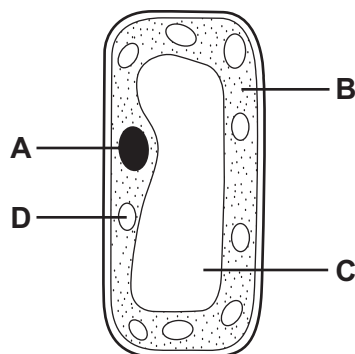
B nylon

C poly(ethene)

D *Terylene*

21 The diagram shows a cell from the leaf of a green plant.

In which part would the chromosomes be found?





22 Which part of the structure of a root hair cell is the site of uptake of water?

- A cell membrane
- B cell wall
- C cytoplasm
- D sap vacuole

23 Which of these processes **always** involves the movement of water molecules?

	diffusion	osmosis
<b>A</b>	✓	✓
<b>B</b>	✓	✗
<b>C</b>	✗	✓
<b>D</b>	✗	✗

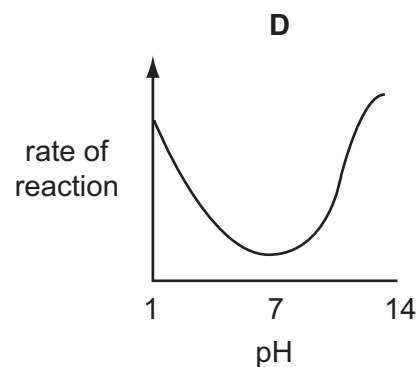
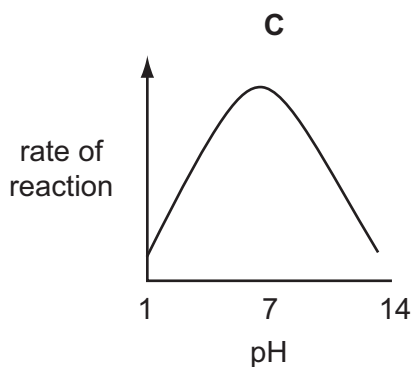
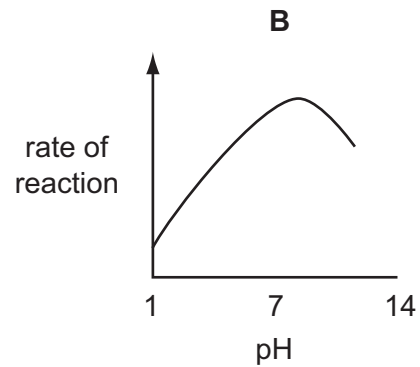
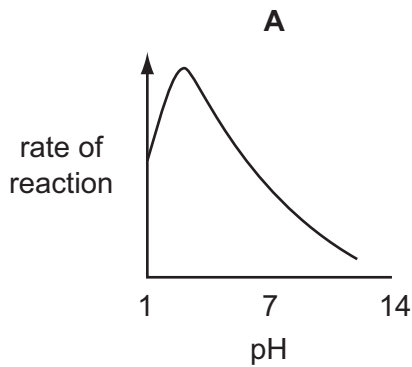
key

✓ yes

✗ no

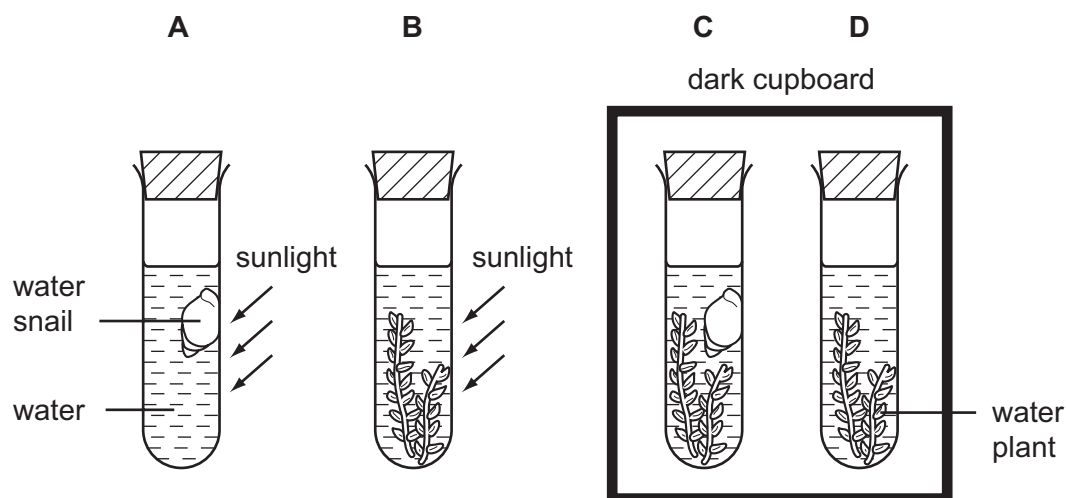
24 Pepsin is an enzyme that is active in the human stomach.

Which graph shows how the rate of reaction of pepsin is affected by pH?



25 An experiment is set up as shown, and left for one hour.

In which test-tube does the concentration of carbon dioxide **decrease**?



26 For which substances, required by plants for growth, do the plants need nitrate ions?

	proteins	starch	sugar
<b>A</b>	✓	x	x
<b>B</b>	✓	✓	x
<b>C</b>	x	✓	✓
<b>D</b>	x	x	✓

key

✓ = nitrate used

x = nitrate not used

27 The recommended diet for soldiers in freezing Arctic conditions is different from that recommended for tropical conditions.

What should the Arctic diet include?

- A** less fat
- B** less fibre
- C** more energy
- D** more protein

28 Which processes are functions of the liver?

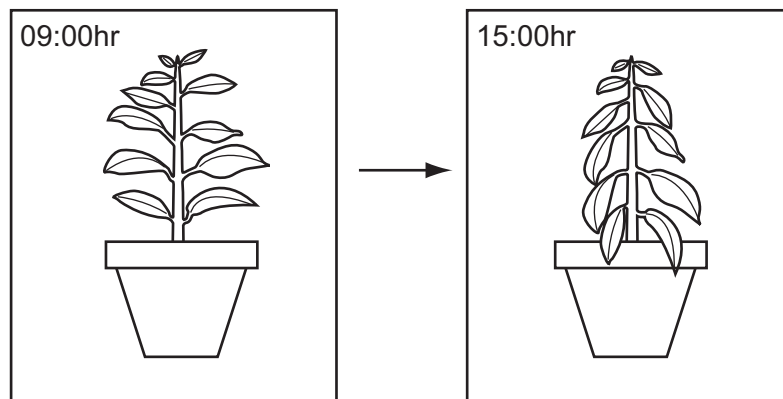
	absorbing food	assimilating food	helping with digestion of food
<b>A</b>	✓	✓	✓
<b>B</b>	✓	✓	✗
<b>C</b>	✓	✗	✓
<b>D</b>	✗	✓	✓

key

✓ = is a function

✗ = is not a function

29 A plant is left in the hot sun for six hours.

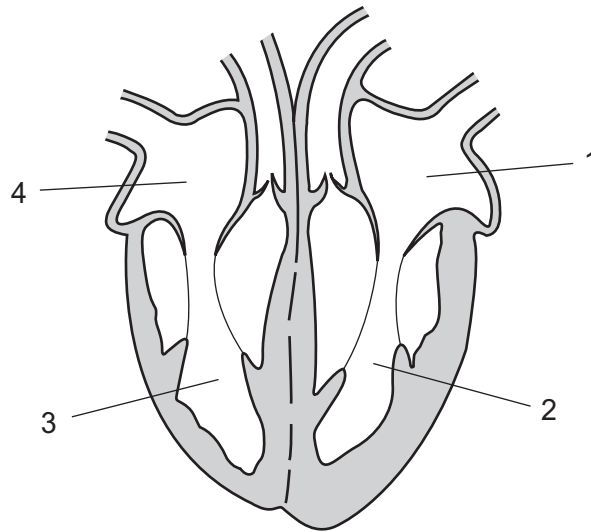


The diagram shows how the appearance of the plant changes during this time.

What explains the change in appearance of the plant?

- A** More water is lost by transpiration than is absorbed.
- B** Stomata have closed.
- C** The concentration of water in the cells has increased.
- D** There is less support provided by the xylem.

30 The diagram shows a section of the heart.

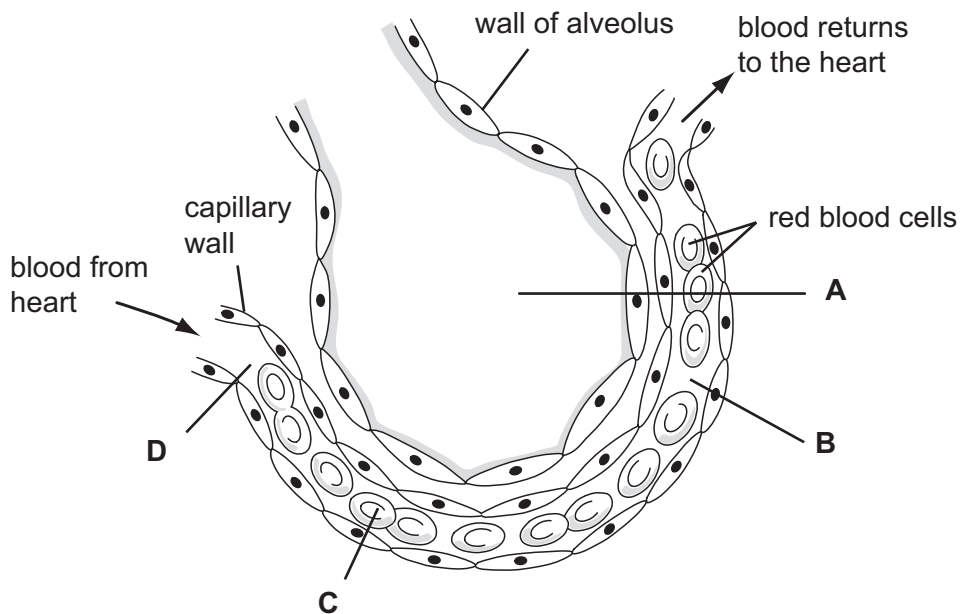


Which two chambers of the heart contain oxygenated blood?

- A** 1 and 2      **B** 1 and 4      **C** 2 and 3      **D** 3 and 4

31 The diagram shows a section through an alveolus and an associated blood capillary.

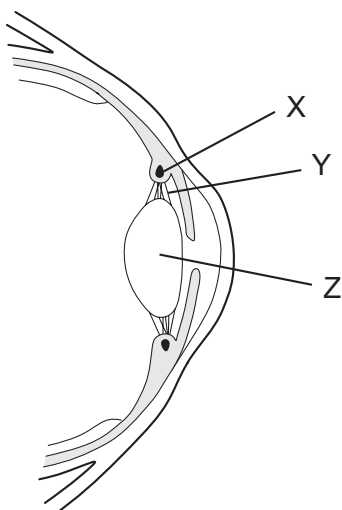
In which part is the concentration of carbon dioxide highest?



32 Which equation represents anaerobic respiration?

- A** glucose  $\rightarrow$  lactic acid  
**B** glucose  $\rightarrow$  lactic acid + carbon dioxide  
**C** glucose  $\rightarrow$  lactic acid + water  
**D** glucose + oxygen  $\rightarrow$  carbon dioxide + water

33 The diagram shows a section through part of the eye.



What happens to parts X, Y and Z when the eye focuses on a near object?

	X	Y	Z
<b>A</b>	contracts	tight	less convex
<b>B</b>	contracts	slack	more convex
<b>C</b>	relaxes	tight	less convex
<b>D</b>	relaxes	slack	more convex

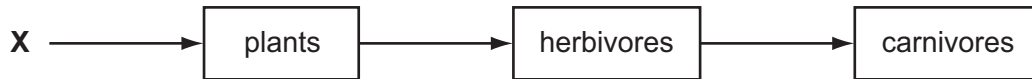
34 Many drugs affect the nervous system by acting as depressants.

Which of these drugs are depressants?

	alcohol	heroin
<b>A</b>	✓	✓
<b>B</b>	x	x
<b>C</b>	✓	x
<b>D</b>	x	✓

key  
 ✓ = depressant  
 x = not a depressant

35 The diagram represents the energy flow through a food chain.



What provides the energy source (X) for this food chain?

- A decomposers
  - B herbivores
  - C plants
  - D sunlight
- 36 In a tropical rainforest which of these processes is linked to the removal of carbon dioxide from the atmosphere?
- A decay
  - B new plant growth
  - C respiration
  - D transpiration
- 37 In recent years, important rivers in many parts of the world have become more acidic.
- What has caused this change?
- A air pollution by sulphur dioxide
  - B water pollution by inorganic waste
  - C increased use of insecticides
  - D increased use of nitrate fertilisers
- 38 What will be most likely to produce flowers of the same type and colour?
- A growing plants from the seeds of one parent
  - B growing plants that have been produced by asexual reproduction
  - C growing plants at the same temperature
  - D growing plants in the same light intensity
- 39 How does a human female gamete differ from a male gamete?
- A The human female gamete contains a Y chromosome.
  - B The human female gamete is a ball of cells.
  - C The human female gamete is larger.
  - D The human female gamete swims more quickly.

40 How does **continuous** variation differ from discontinuous variation?

	continuous variation has two or more distinct types	continuous variation is controlled by
<b>A</b>	no	few genes
<b>B</b>	no	many genes
<b>C</b>	yes	few genes
<b>D</b>	yes	many genes

**DATA SHEET**  
**The Periodic Table of the Elements**

		Group																			
I	II	III	IV	V	VI	VII	0						0								
		1 <b>H</b> Hydrogen 1											4 <b>He</b> Helium 2								
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4											20 <b>Ne</b> Neon 10									
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulphur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18						84 <b>Kr</b> Krypton 36								
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36						131 <b>Xe</b> Xenon 54								
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	103 <b>Rh</b> Rhodium 45	112 <b>Cd</b> Cadmium 48	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54						227 <b>Ac</b> Actinium 89								
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	190 <b>Os</b> Osmium 76	195 <b>Pt</b> Platinum 78	192 <b>Ir</b> Iridium 77	201 <b>Hg</b> Mercury 80	209 <b>Bi</b> Bismuth 83	227 <b>Ac</b> Actinium 89						86 <b>Rn</b> Radon 86								
226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89											86 <b>Rn</b> Radon 86									
*58-71 Lanthanoid series																					
†90-103 Actinoid series																					
<table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; padding: 2px;">a</td> <td style="border: 1px solid black; padding: 2px;"><b>X</b></td> <td style="border: none; padding: 2px;">a = relative atomic mass</td> </tr> <tr> <td style="border: none; padding: 2px;">Key</td> <td style="border: 1px solid black; padding: 2px;">b</td> <td style="border: none; padding: 2px;">X = atomic symbol</td> </tr> <tr> <td style="border: none; padding: 2px;"></td> <td style="border: none; padding: 2px;"></td> <td style="border: none; padding: 2px;">b = proton (atomic) number</td> </tr> </table>													a	<b>X</b>	a = relative atomic mass	Key	b	X = atomic symbol			b = proton (atomic) number
a	<b>X</b>	a = relative atomic mass																			
Key	b	X = atomic symbol																			
		b = proton (atomic) number																			
140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71	103 <b>Lr</b> Lawrencium 103									
232 <b>Th</b> Thorium 90	238 <b>U</b> Uranium 92	91 <b>Pa</b> Protactinium 91	94 <b>Pu</b> Plutonium 94	95 <b>Am</b> Americium 95	96 <b>Cm</b> Curium 96	98 <b>Cf</b> Californium 98	99 <b>Es</b> Einsteinium 99	100 <b>Fm</b> Fermium 100	101 <b>Md</b> Mendelevium 101	102 <b>No</b> Nobelium 102	103 <b>Lr</b> Lawrencium 103	103 <b>Lr</b> Lawrencium 103									

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).