



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**ADDITIONAL COMBINED SCIENCE**

**5130/01**

Paper 1 Multiple Choice

**October/November 2007**

**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.

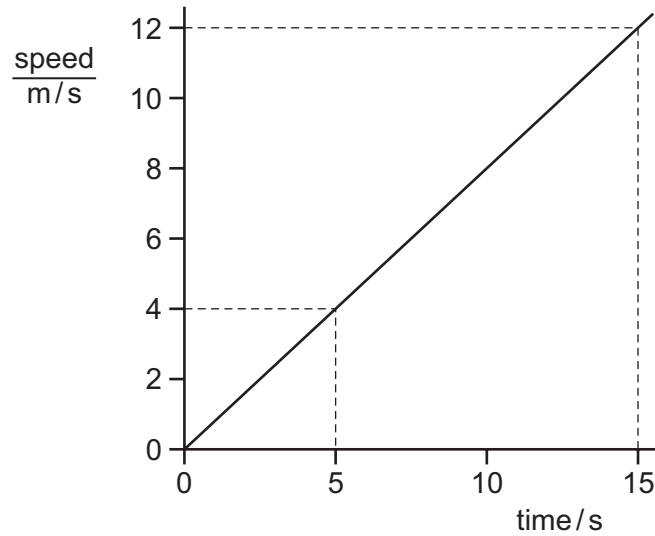
Any rough working should be done in this booklet.

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

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

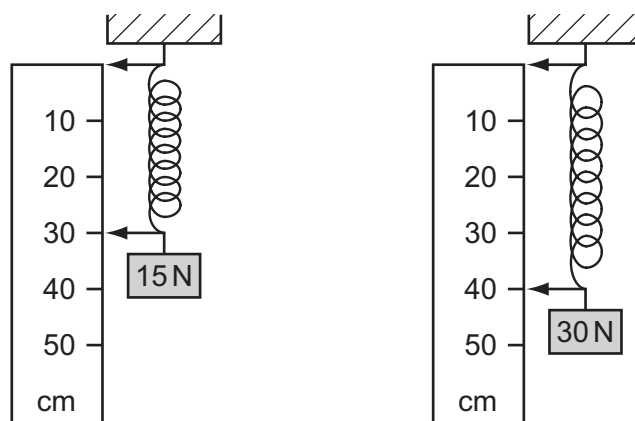


- 1 The graph shows the motion of a car from rest.



How far does the car travel whilst increasing its speed from 4 m/s to 12 m/s?

- A** 10 m      **B** 40 m      **C** 80 m      **D** 90 m
- 2 Which property of a body is affected by the gravitational field strength?
- A** density  
**B** mass  
**C** volume  
**D** weight
- 3 The diagrams show the same spring with different weights attached.



When the weights are removed, the spring returns to its original length.

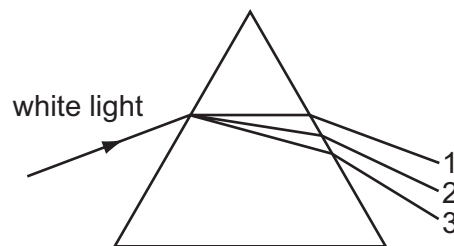
What is the original length of the spring?

- A** 25 cm      **B** 20 cm      **C** 15 cm      **D** 10 cm

- 4 What surrounds the bulb of a thermometer when marking the upper and lower fixed points?

	upper fixed point 100 °C	lower fixed point 0 °C
<b>A</b>	boiling water	pure melting ice
<b>B</b>	boiling water	salt and ice
<b>C</b>	steam	pure melting ice
<b>D</b>	steam	salt and ice

- 5 A spectrum is formed when white light passes through a prism.



In which position are the colours green, red and yellow seen?

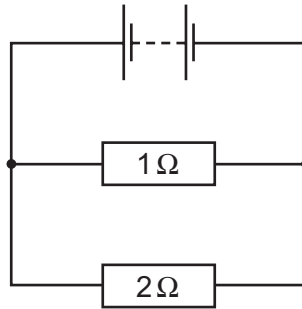
	1	2	3
<b>A</b>	green	red	yellow
<b>B</b>	green	yellow	red
<b>C</b>	red	green	yellow
<b>D</b>	red	yellow	green

- 6 A trumpet and a flute are played by two students. The note from the trumpet is louder and has a lower pitch than the note from the flute.

How do the amplitude and frequency of the sound from the trumpet compare to the amplitude and frequency from the flute?

	trumpet's amplitude	trumpet's frequency
<b>A</b>	larger	higher
<b>B</b>	larger	lower
<b>C</b>	smaller	higher
<b>D</b>	smaller	lower

- 7 What is measured by the energy dissipated when a source drives a unit charge round a complete circuit?
- A electromotive force
  - B potential difference
  - C power
  - D resistance
- 8 The diagram shows two resistors in parallel with a battery.

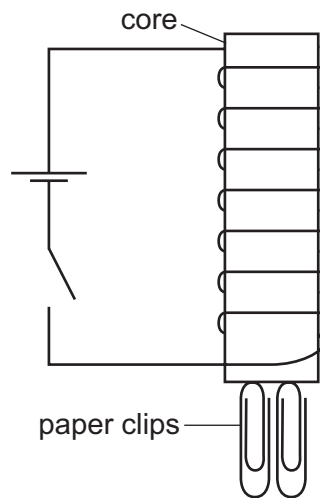


What is the effective resistance of the two resistors?

- A  $0.67\ \Omega$
  - B  $1.0\ \Omega$
  - C  $1.5\ \Omega$
  - D  $3.0\ \Omega$
- 9 In an a.c. electric circuit in a house, the switch for any device is always connected to the 'live' lead.
- Why is this?
- A No current ever flows in the neutral lead of the device.
  - B The device will be shorted if the switch is in the earth lead.
  - C The device can never be switched off if the switch is in the neutral lead.
  - D The device can only be isolated (made safe) if the switch is in the live lead.

- 10 Four different substances are tested by using each as the core of an electromagnet.

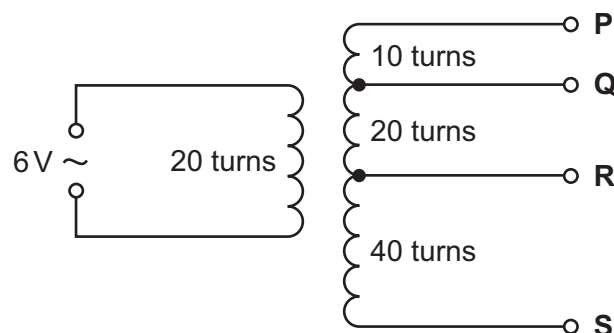
The number of paper clips each holds is recorded when there is a current in the electromagnet and when the current is switched off.



Which substance is the best for making the core of an electromagnet?

	number of paper clips held when there is a current in the electromagnet	number of paper clips held when current is switched off
<b>A</b>	8	4
<b>B</b>	6	0
<b>C</b>	5	1
<b>D</b>	4	0

- 11 The number of turns between each pair of output terminals of a transformer is shown in the diagram.

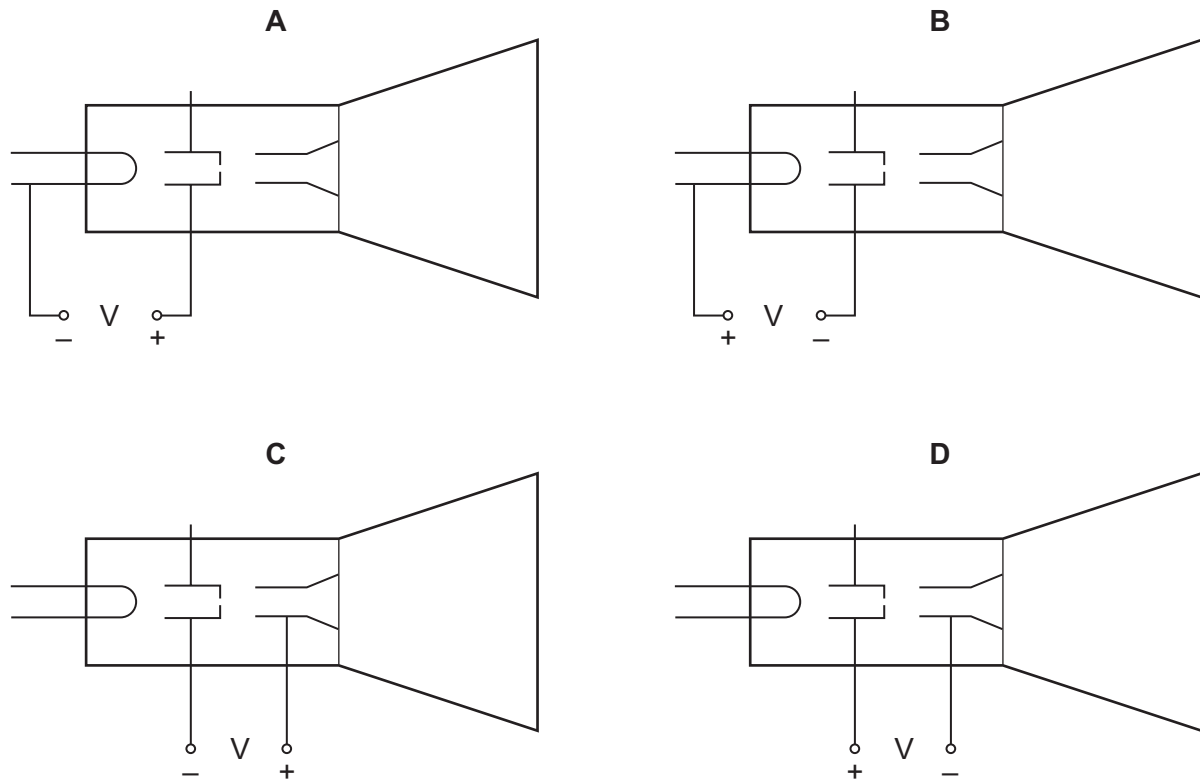


Between which terminals will the output be 12V?

- A** P and Q      **B** Q and R      **C** R and S      **D** P and R

12 A cathode ray tube uses a high potential difference,  $V$ , to accelerate electrons through the tube.

Which diagram shows the correct arrangement?



13 A radioactive source is placed 2 cm in front of a Geiger-Muller tube which is connected to a meter. Different absorbers are placed between the tube and the radioactive source.

The results are as follows.

absorber	average count per minute
20 mm air	2600
1 mm paper	2600
2 mm aluminium	1500
2 mm lead	800

What is the radioactive source emitting?

- A alpha particles only
- B alpha particles and beta particles
- C beta particles and gamma rays
- D gamma rays only

14 What is the best method of obtaining pure water from ink?

- A chromatography
- B distillation
- C filtration
- D freezing

15 Which statement about the particles in a gas is **not** correct?

- A They are able to move randomly.
- B They are arranged in regular patterns.
- C There are large spaces between the particles.
- D They spread throughout their container.

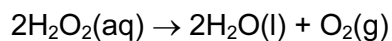
16 Substance X has the following properties.

- It conducts electricity when molten.
- It has a high melting point.
- It dissolves in water.

What is X?

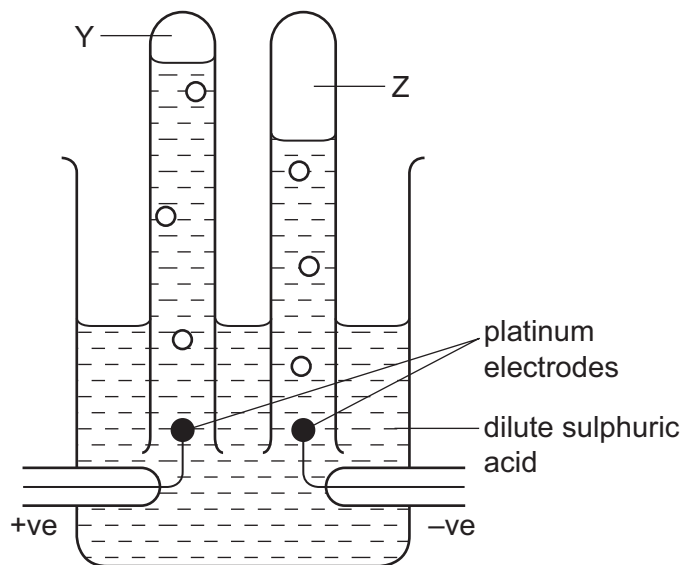
- A barium sulphate
- B copper
- C iodine
- D sodium chloride

17 What can be deduced from the following equation?



- A Addition of a catalyst speeds up the reaction.
- B The reaction occurs at room temperature.
- C 200 cm<sup>3</sup> of hydrogen peroxide produce 100 cm<sup>3</sup> of oxygen.
- D 17 g of hydrogen peroxide completely decompose into 9 g of water and 8 g of oxygen.

18 The diagram shows the electrolysis of dilute sulphuric acid.



Which gas collects at Y and at Z?

	Y	Z
<b>A</b>	hydrogen	oxygen
<b>B</b>	oxygen	hydrogen
<b>C</b>	hydrogen	sulphur dioxide
<b>D</b>	sulphur dioxide	hydrogen

19 Which statement about an endothermic reaction is correct?

- A**  $\Delta H$  for the reaction has a negative value.
- B** During the reaction, bonds are broken.
- C** Energy is given out to the surroundings.
- D** The reactants have more energy than the products.



20 The formulae of some oxides are shown.



How many of these oxides are acidic, amphoteric or basic?

	number of each type of oxide		
	acidic	amphoteric	basic
<b>A</b>	1	2	2
<b>B</b>	2	0	3
<b>C</b>	1	1	3
<b>D</b>	2	1	2

21 Why do metals conduct electricity?

- A Their atoms contain more electrons than protons.
- B Their atoms contain more protons than electrons.
- C They contain electrons that are free to move.
- D They contain ions that are free to move.

22 From which reaction is a gas produced?

- A adding calcium to water
- B adding dilute hydrochloric acid to calcium oxide
- C adding dilute sulphuric acid to copper
- D electrolysis of aqueous copper(II) sulphate, using copper electrodes

23 Which reaction does **not** occur in the atmosphere in the formation of acid rain?

- A  $2\text{CO} + 2\text{NO} \rightarrow \text{N}_2 + 2\text{CO}_2$
- B  $4\text{NO}_2 + 2\text{H}_2\text{O} + \text{O}_2 \rightarrow 4\text{HNO}_3$
- C  $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$
- D  $2\text{NO}_2 + \text{H}_2\text{O} \rightarrow \text{HNO}_2 + \text{HNO}_3$

24 Which substances are obtained from calcium carbonate using **only** heat and water?

- A Ca      CaO       $\text{Ca(OH)}_2$
- B Ca       $\text{Ca(OH)}_2$        $\text{CO}_2$
- C CaO       $\text{Ca(OH)}_2$        $\text{CO}_2$
- D CaO       $\text{CO}_2$        $\text{O}_2$

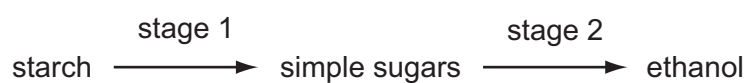
25 Why is methane used as a fuel?

- A It burns exothermically.
- B It has a low boiling point.
- C It is a gas.
- D It is odourless.

26 What is the general formula for alkenes?

- A  $C_nH_{2n+2}$
- B  $C_nH_{2n+1}$
- C  $C_nH_{2n}$
- D  $C_nH_{2n-2}$

27 Ethanol is produced from starch as follows.

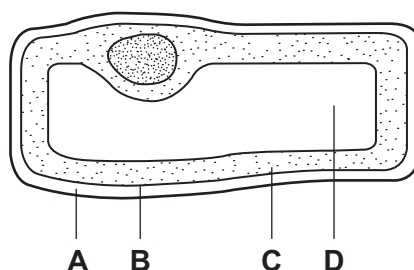


Which terms describe these stages?

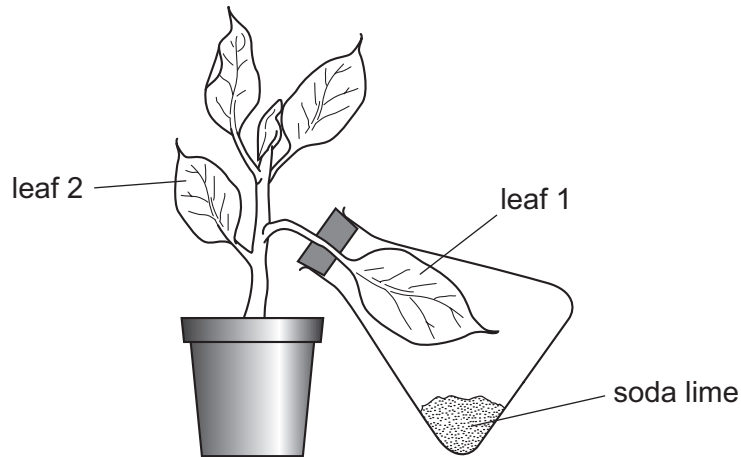
	stage 1	stage 2
<b>A</b>	cracking	oxidation
<b>B</b>	fermentation	distillation
<b>C</b>	hydrolysis	fermentation
<b>D</b>	hydrolysis	oxidation

28 The diagram shows a cell from the epidermis of an onion.

Which part allows some, but not all, dissolved substances to pass into or out of the cell?



- 29 In an experiment, the apparatus shown in the diagram below was left in the light for two days and then leaves 1 and 2 were tested for starch.

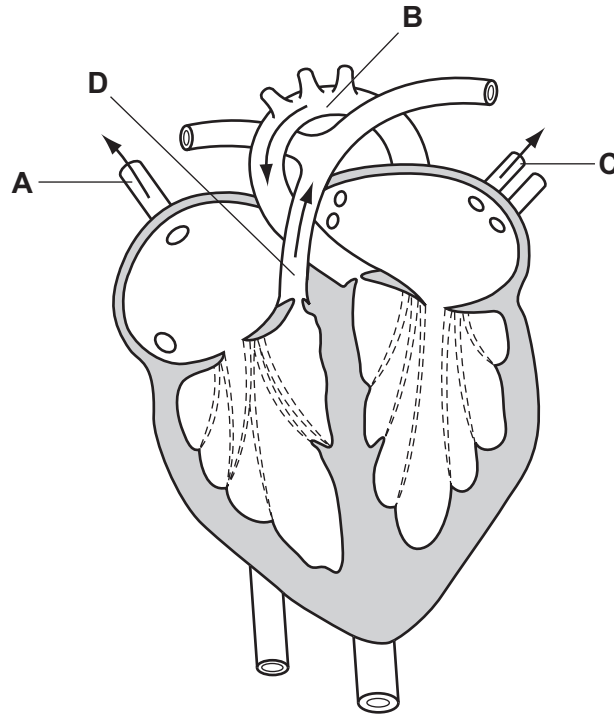


What could be shown by this experiment?

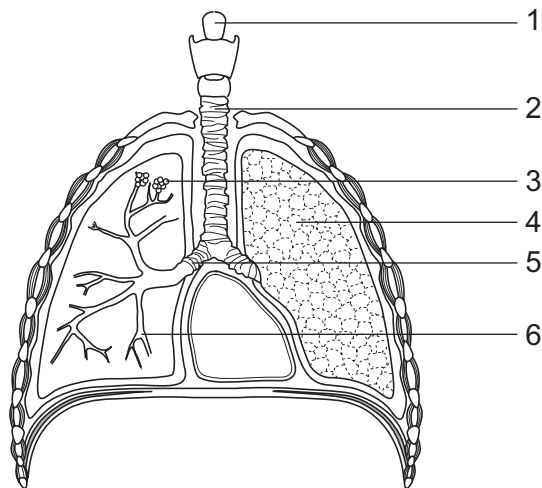
- A Carbon dioxide is given off during starch production.
  - B Carbon dioxide is needed for starch production.
  - C Oxygen is given off during starch production.
  - D Oxygen is needed for starch production.
- 30 What would result from a blockage of the bile duct?
- A Fat digestion would be slower.
  - B Intestinal contents would be neutralised.
  - C No more bile is produced.
  - D Protein and carbohydrate digestion would stop.
- 31 What is the pathway for water passing through the stem and leaves of a plant?
- A phloem sieve tubes → spongy mesophyll → stomata
  - B xylem vessels → spongy mesophyll → stomata
  - C phloem sieve tubes → stomata → palisade mesophyll
  - D xylem vessels → stomata → palisade mesophyll

32 The diagram shows a human heart.

In which vessel does the arrow show the **correct** direction of blood flow?



33 The diagram shows the respiratory organs in the thorax.

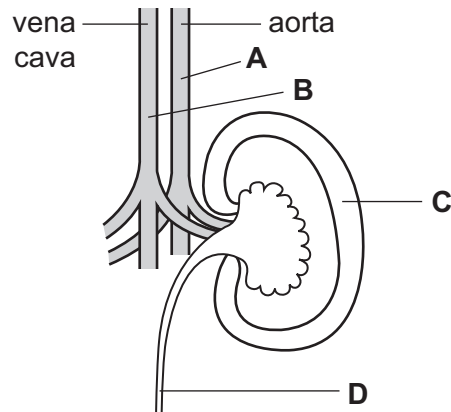


What are the labels for the bronchus and bronchioles?

- A 1 and 2
- B 2 and 3
- C 4 and 5
- D 5 and 6

34 The diagram shows part of the human urinary system.

Where is urea usually most concentrated?



35 What happens when the core temperature of the body increases?

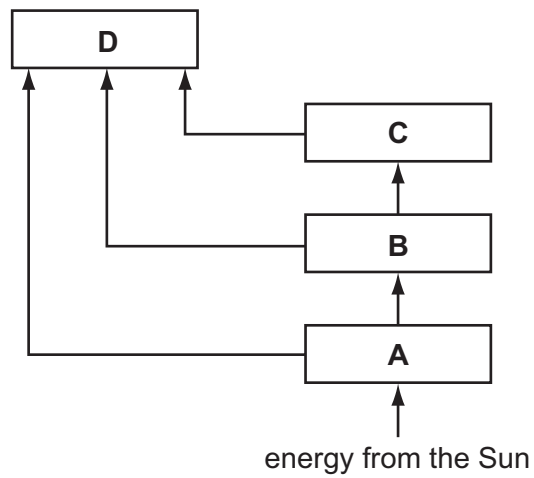
	diameter of surface blood vessels	urine production
<b>A</b>	decreases	decreases
<b>B</b>	decreases	increases
<b>C</b>	increases	decreases
<b>D</b>	increases	increases

36 What would be a dangerous result of a diabetic person injecting an accidental overdose of insulin?

- A** Glucose disappears from the urine.
- B** Glucose level in the plasma drops.
- C** Glucose in the liver increases.
- D** Glycogen in the muscles increases.

37 The diagram represents the flow of energy in an ecosystem during one year.

Which box represents the largest total mass of living organisms?



38 What is an effect of releasing untreated sewage into the environment?

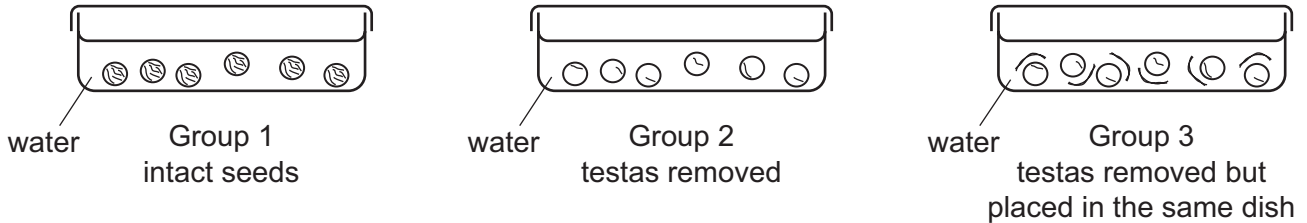
- A death of fish from lack of oxygen
- B increased carbon dioxide in the atmosphere
- C increased sulphur dioxide in the atmosphere
- D using up of soil minerals

- 39 The seeds of some plants will not normally germinate until they have been in the ground for several months. Seeds of one such plant were divided into three groups and covered with water in shallow glass dishes with loose-fitting lids.

*Group 1* were intact seeds.

*Group 2* were seeds from which the testas had been removed.

*Group 3* were seeds from which the testas had been removed, but the testas were placed separately in the same dish.



Only the seeds in Group 2 germinated.

What conclusion can be drawn from this experiment?

- A** The testas of the seeds are too tough for the radicles to penetrate them easily.
  - B** The seeds will not germinate until they have been thoroughly soaked with water.
  - C** The testa contains a water-soluble substance which inhibits germination.
  - D** Complete immersion of seeds in water inhibits germination.
- 40 Pure breeding pea plants with green pods are crossed with pure breeding pea plants with yellow pods.

All the offspring have green pods. Plants from these offspring are crossed.

What colour are the pods of the next generation?

- A** all green
- B** all yellow
- C** 1 green : 1 yellow
- D** 3 green : 1 yellow

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

		Group																																											
I	II	III	IV	V	VI	VII	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																																						
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	56 <b>Fe</b> Iron 26	55 <b>Mn</b> Manganese 25	59 <b>Co</b> Cobalt 27	59 <b>Ni</b> Nickel 28	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	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																																
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	101 <b>Ru</b> Ruthenium 44	101 <b>Tc</b> Technetium 43	103 <b>Rh</b> Rhodium 45	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54																																
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	186 <b>Os</b> Osmium 76	186 <b>Re</b> Rhenium 75	184 <b>W</b> Tungsten 74	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86																																
226 <b>Fr</b> Francium 87	226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89																																											
*58-71 Lanthanoid series																																													
†90-103 Actinoid series																																													
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">a</td> <td style="width: 5%; text-align: center;"><b>X</b></td> <td style="width: 5%; text-align: center;">b</td> <td style="width: 5%;"></td> <td style="width: 5%; text-align: center;">140 <b>Ce</b> Cerium 58</td> <td style="width: 5%; text-align: center;">141 <b>Pr</b> Praseodymium 59</td> <td style="width: 5%; text-align: center;">144 <b>Nd</b> Neodymium 60</td> <td style="width: 5%; text-align: center;">150 <b>Sm</b> Samarium 62</td> <td style="width: 5%; text-align: center;">152 <b>Eu</b> Europium 63</td> <td style="width: 5%; text-align: center;">157 <b>Gd</b> Gadolinium 64</td> <td style="width: 5%; text-align: center;">162 <b>Dy</b> Dysprosium 66</td> <td style="width: 5%; text-align: center;">165 <b>Ho</b> Holmium 67</td> <td style="width: 5%; text-align: center;">167 <b>Er</b> Erbium 68</td> <td style="width: 5%; text-align: center;">169 <b>Tm</b> Thulium 69</td> <td style="width: 5%; text-align: center;">173 <b>Yb</b> Ytterbium 70</td> <td style="width: 5%; text-align: center;">175 <b>Lu</b> Lutetium 71</td> </tr> <tr> <td style="text-align: center;"><b>Key</b></td> <td></td> <td></td> <td></td> <td style="text-align: center;">232 <b>Th</b> Thorium 90</td> <td style="text-align: center;">141 <b>Pa</b> Protactinium 91</td> <td style="text-align: center;">238 <b>U</b> Uranium 92</td> <td style="text-align: center;">150 <b>Np</b> Neptunium 93</td> <td style="text-align: center;">152 <b>Am</b> Americium 95</td> <td style="text-align: center;">157 <b>Cm</b> Curium 96</td> <td style="text-align: center;">162 <b>Bk</b> Berkelium 97</td> <td style="text-align: center;">165 <b>Es</b> Einsteinium 99</td> <td style="text-align: center;">167 <b>Fm</b> Fermium 100</td> <td style="text-align: center;">169 <b>Md</b> Mendelevium 101</td> <td style="text-align: center;">173 <b>No</b> Nobelium 102</td> <td style="text-align: center;">175 <b>Lr</b> Lawrencium 103</td> </tr> </table>														a	<b>X</b>	b		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	<b>Key</b>				232 <b>Th</b> Thorium 90	141 <b>Pa</b> Protactinium 91	238 <b>U</b> Uranium 92	150 <b>Np</b> Neptunium 93	152 <b>Am</b> Americium 95	157 <b>Cm</b> Curium 96	162 <b>Bk</b> Berkelium 97	165 <b>Es</b> Einsteinium 99	167 <b>Fm</b> Fermium 100	169 <b>Md</b> Mendelevium 101	173 <b>No</b> Nobelium 102	175 <b>Lr</b> Lawrencium 103
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The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

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