



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

**COMBINED SCIENCE**

**5129/11**

Paper 1 Multiple Choice

**October/November 2012**

**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.

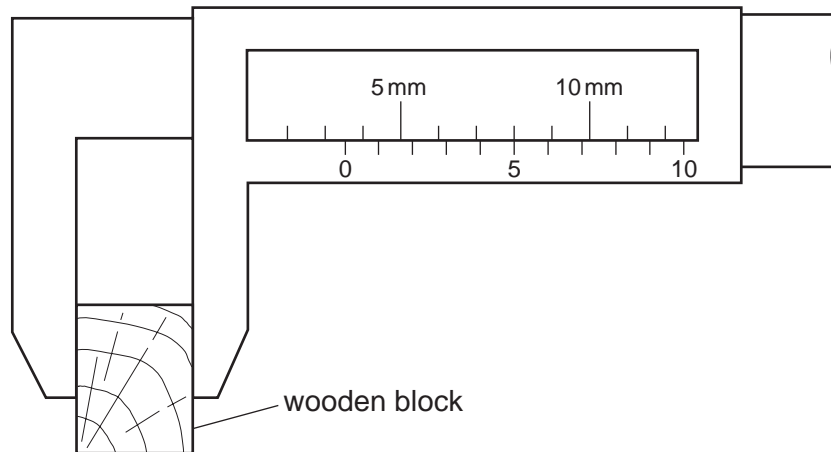
Any rough working should be done in this booklet.

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

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



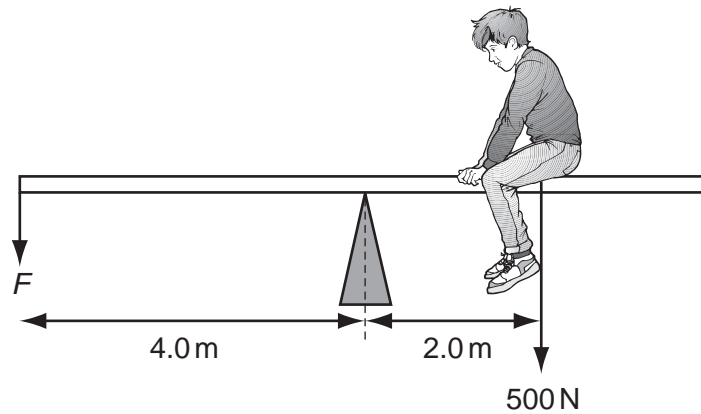
- 1 The width of a wooden block is measured using vernier calipers.



What is the width of the block?

- A** 3.5 mm      **B** 5.3 mm      **C** 8.0 mm      **D** 8.5 mm
- 2 The velocity of a moving car is constant during part of a journey.  
What is the acceleration during this time?
- A** decreasing all the time  
**B** increasing all the time  
**C** increasing, then decreasing to zero  
**D** zero all the time
- 3 What describes the density of a material?
- A** the amount of matter in the material  
**B** the mass per unit volume of the material  
**C** the pull of gravity on the material  
**D** the volume per unit mass of the material

- 4 The diagram shows a boy of weight 500 N sitting on a see-saw. He sits 2.0 m from the pivot.

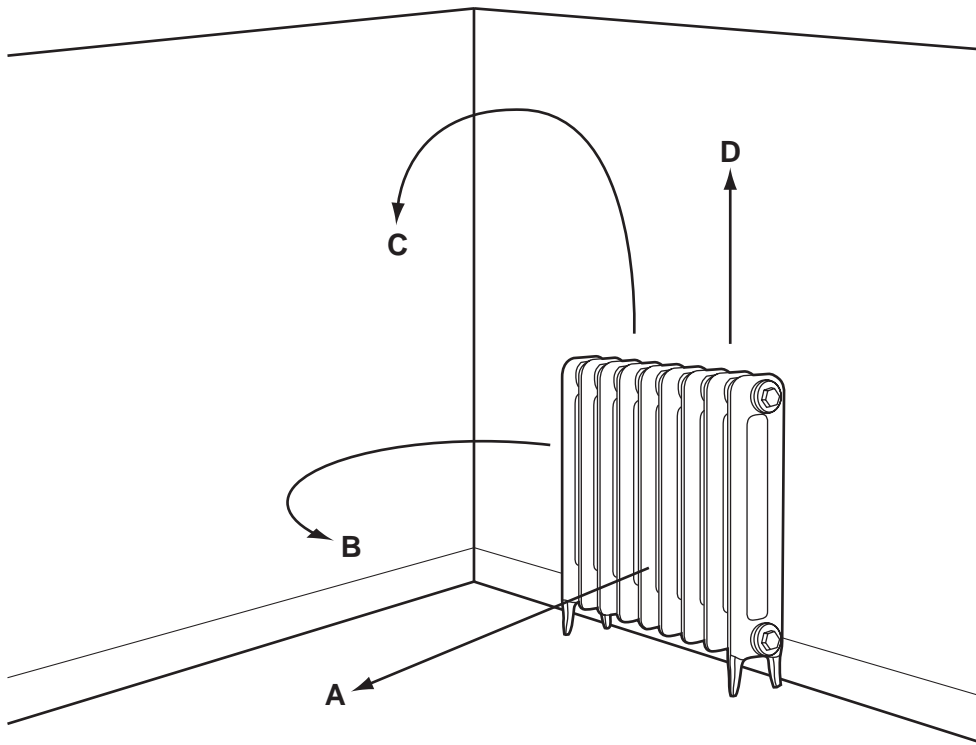


What is the force  $F$  needed to balance the see-saw?

- A** 250 N      **B** 750 N      **C** 1000 N      **D** 3000 N
- 5 A cell will deliver 3000 J of energy to a 2 W electric motor before the cell is exhausted.  
How long will the motor run?
- A** 25 minutes  
**B** 100 minutes  
**C** 1500 minutes  
**D** 6000 minutes
- 6 How much work is done in lifting a mass of 90 g vertically through a distance of 10 m?  
(gravitational field strength is 10 N/kg.)
- A** 0.9 J      **B** 9 J      **C** 90 J      **D** 900 J

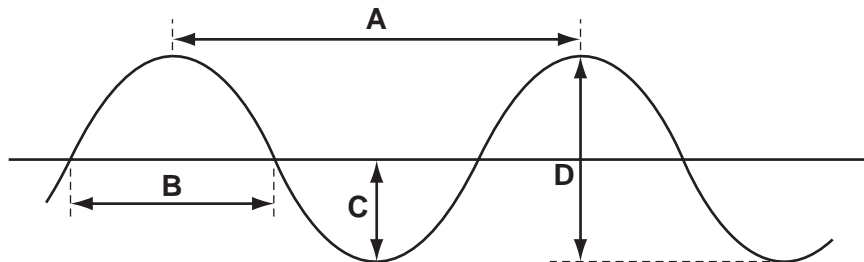
7 The diagram shows a radiator being used to heat a room.

Which arrow shows the movement of the air around the room?



8 The diagram shows the cross-section of a water wave.

Which is the amplitude of the wave?



9 Radio waves, visible light and X-rays are all part of the electromagnetic spectrum.

Which is the correct order of increasing wavelength?

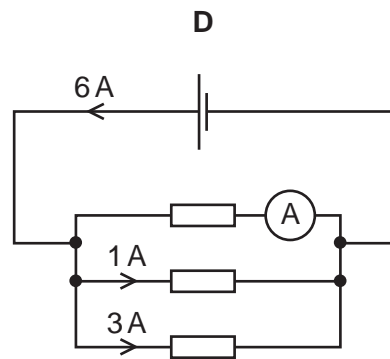
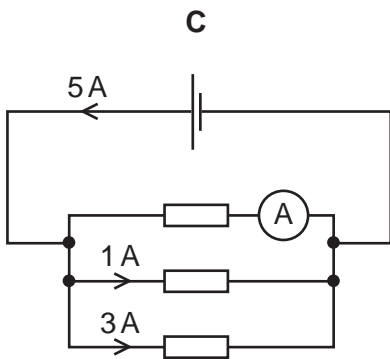
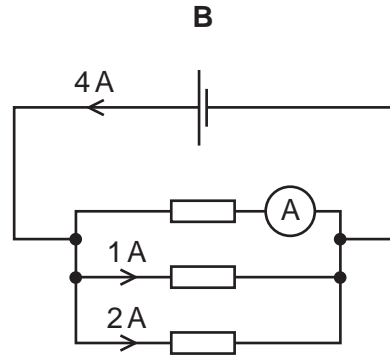
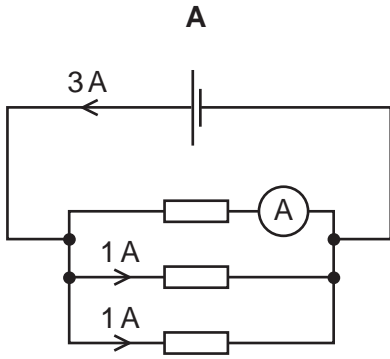
	shortest wavelength	→	longest wavelength
<b>A</b>	visible light	radio waves	X-rays
<b>B</b>	visible light	X-rays	radio waves
<b>C</b>	X-rays	radio waves	visible light
<b>D</b>	X-rays	visible light	radio waves

10 A 12V lamp uses a current of 2A.

Which is the resistance when the lamp is working correctly?

- A  $6\Omega$                       B  $10\Omega$                       C  $14\Omega$                       D  $24\Omega$

11 In which circuit does the ammeter read 2A?



12 Electrical energy can be calculated from

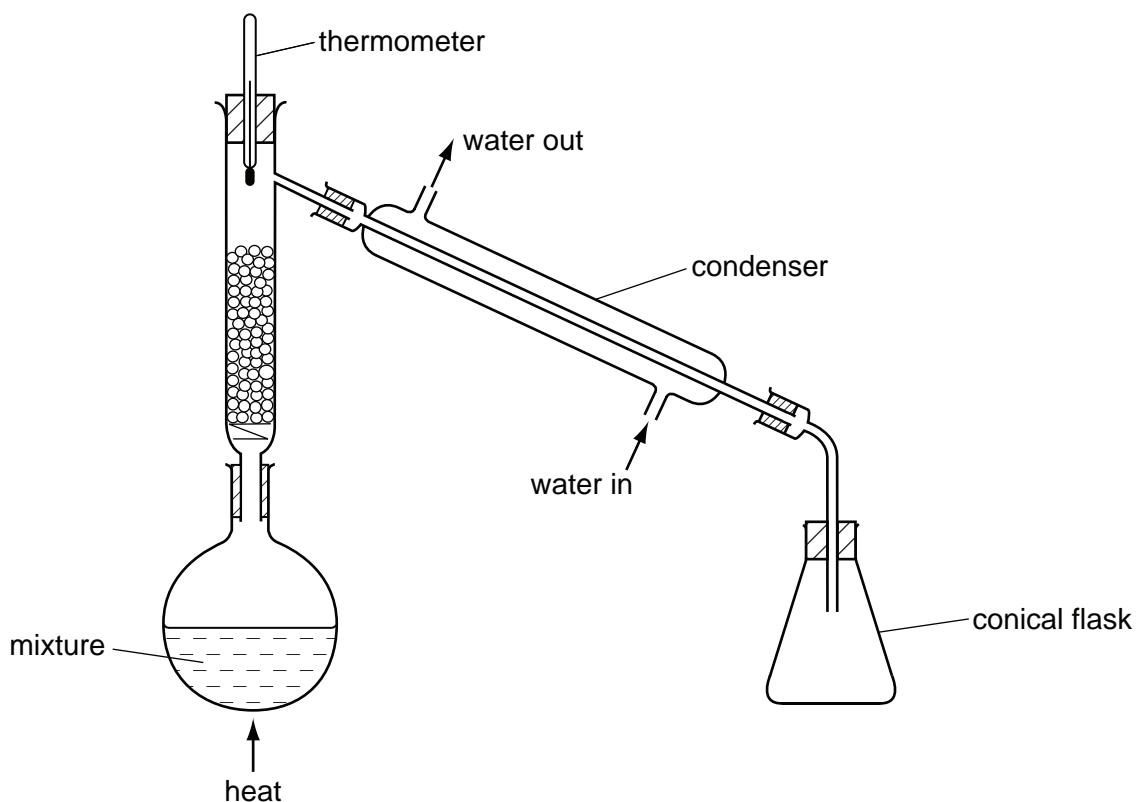
- A amperes  $\times$  coulombs.  
 B amperes  $\times$  ohms.  
 C volts  $\times$  amperes.  
 D volts  $\times$  coulombs.

13 An atom has a nucleus surrounded by electrons.

What are the charges on the nucleus and on the whole atom?

	charge on nucleus	charge on whole atom
<b>A</b>	neutral	neutral
<b>B</b>	neutral	positive
<b>C</b>	positive	neutral
<b>D</b>	positive	positive

14 A student tries to separate a mixture of ethanol and water by fractional distillation using the apparatus shown.



Which error has the student made?

- A** The condenser is at the wrong angle.
- B** The thermometer is in the wrong position.
- C** The top of the conical flask should be open.
- D** The water enters the condenser in the wrong place.

15 What is the nucleon number of the isotope of uranium,  ${}_{92}^{235}\text{U}$ ?

- A** 92
- B** 143
- C** 235
- D** 327

16 Which mass of oxygen combines with 6 g of carbon to form carbon dioxide, CO<sub>2</sub>?

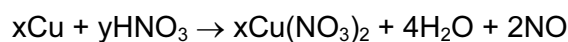
- A 4g                      B 8g                      C 16g                      D 32g

17 The table gives some properties of four substances.

Which substance is covalently bonded?

	melting point /°C	boiling point /°C	electrical conductivity when liquid	electrical conductivity in aqueous solution
A	808	1465	✓	✓
B	-114	78	x	x
C	64	748	✓	✓
D	327	1730	✓	x

18 The equation represents the action of dilute nitric acid on copper.



What are the values of x and y?

- A x = 1, y = 4  
B x = 1, y = 8  
C x = 3, y = 4  
D x = 3, y = 8

19 Which substance does dilute sulfuric acid **not** react with?

- A copper  
B potassium carbonate  
C sodium hydroxide  
D zinc oxide

20 Which row shows the electronic configuration of three metals?

- A 2      2,8      2,8,8  
B 2,1      2,8,1      2,8,8,1  
C 2,7      2,8,7      2,8,18,7  
D 2,8,3      2,8,4      2,8,5

21 Which statement indicates that sodium is a Group I (alkali) metal?

- A It is a good conductor of electricity.
- B It melts.
- C It burns readily in air.
- D It floats on water.

22 Q, R, S and T are four metals.

T reacts slowly with hydrochloric acid.

The oxide of Q is reduced by heating with carbon.

R reacts with steam but not with cold water.

S reacts violently with cold water.

What is the order of reactivity of the four metals, most reactive first?

- A  $Q \rightarrow T \rightarrow R \rightarrow S$
- B  $Q \rightarrow R \rightarrow T \rightarrow S$
- C  $S \rightarrow Q \rightarrow R \rightarrow T$
- D  $S \rightarrow R \rightarrow T \rightarrow Q$

23 Limestone is decomposed to lime during the production of iron in the blast furnace.

Which substance does lime react with?

- A carbon
- B haematite
- C oxygen
- D sand



24 The boiling points of some elements are given in the table.

element	boiling point/°C
nitrogen	-196
xenon	-108
oxygen	-183

A mixture of nitrogen, xenon and oxygen at  $-200^{\circ}\text{C}$  is allowed to warm up to  $-150^{\circ}\text{C}$ .

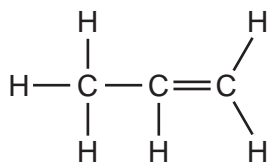
Which elements are still in the liquid state at  $-150^{\circ}\text{C}$ ?

- A a mixture of nitrogen and oxygen
  - B a mixture of nitrogen and xenon
  - C nitrogen only
  - D xenon only
- 25 Ammonium sulfate,  $(\text{NH}_4)_2\text{SO}_4$ , is added to soil to provide an element that is important for plant growth.

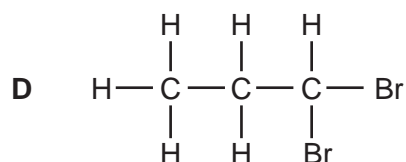
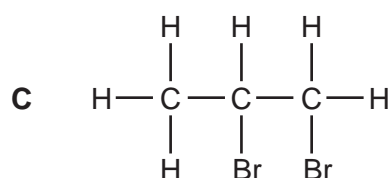
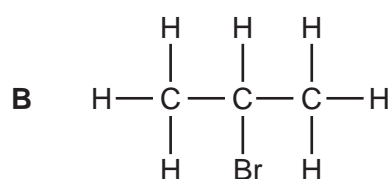
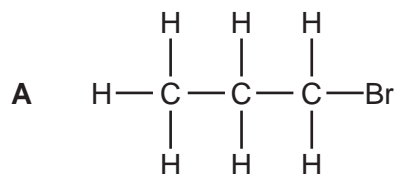
What is this element?

- A hydrogen
  - B nitrogen
  - C oxygen
  - D sulfur
- 26 Which equation does **not** represent an addition reaction?
- A  $\text{CH}_2\text{Cl}_2 + \text{Cl}_2 \rightarrow \text{CHCl}_3 + \text{HCl}$
  - B  $\text{C}_2\text{H}_4 + \text{Br}_2 \rightarrow \text{C}_2\text{H}_4\text{Br}_2$
  - C  $n\text{C}_2\text{H}_4 \rightarrow -(\text{CH}_2-\text{CH}_2)-_n$
  - D  $\text{C}_3\text{H}_6 + \text{H}_2\text{O} \rightarrow \text{C}_3\text{H}_7\text{OH}$

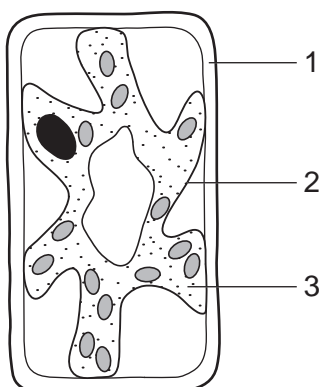
27 Propene is an unsaturated hydrocarbon. Its structure is shown.



What is produced when propene reacts with bromine?



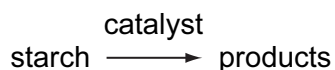
28 The diagram shows a typical plant cell after being placed into a concentrated salt solution for ten minutes.



Which numbered structures are partially permeable?

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

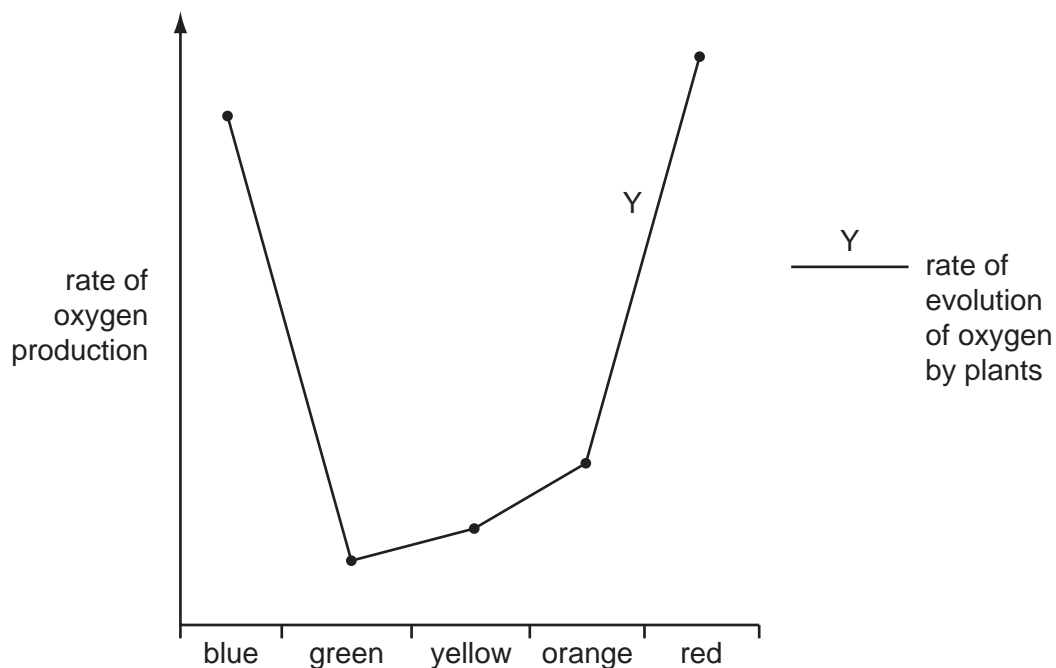
29 The following reaction occurs in the human alimentary canal.



What are the catalyst and the product?

	catalyst	product
<b>A</b>	acid	glucose
<b>B</b>	alkali	energy
<b>C</b>	amylase	maltose
<b>D</b>	bile	amino acid

30 The graph shows the effect of different colours of light on the rate of oxygen production by green plants.



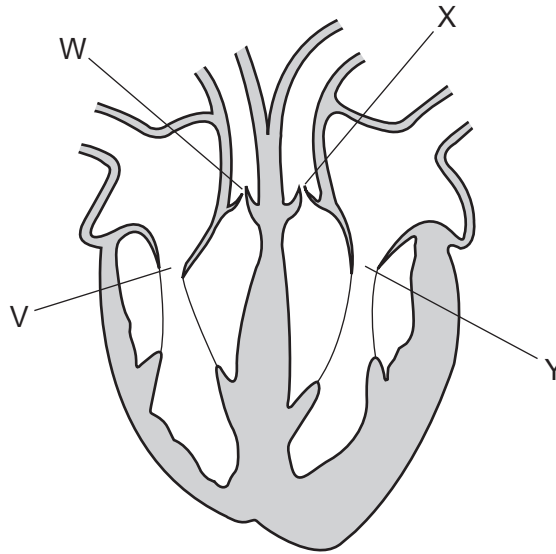
What can be deduced from the graph?

- A** Photosynthesis is least active in green light.
- B** Photosynthesis is most active in green light.
- C** Respiration is least active in green light.
- D** Respiration is most active in green light.

31 After starch is ingested, in which order do these processes occur?

- A absorption → assimilation → digestion
- B absorption → digestion → egestion
- C assimilation → digestion → absorption
- D digestion → absorption → assimilation

32 The diagram shows a human heart seen from the front.



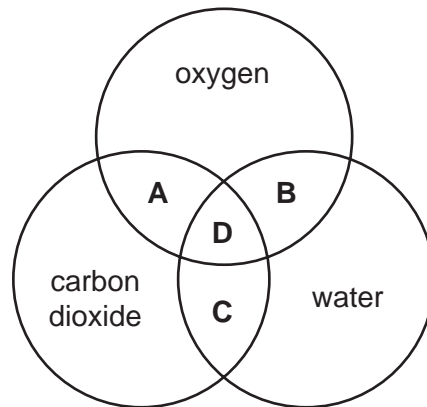
When blood is leaving the heart through the pulmonary artery and the aorta, are the labelled valves open or closed?

	V	W	X	Y
<b>A</b>	closed	closed	open	open
<b>B</b>	closed	open	open	closed
<b>C</b>	open	closed	closed	open
<b>D</b>	open	open	closed	closed

33 Which does **not** produce carbon dioxide?

- A a muscle fibre
- B a sensory neuron
- C blood
- D urine

34 Which area represents metabolic products that are removed by the lungs?



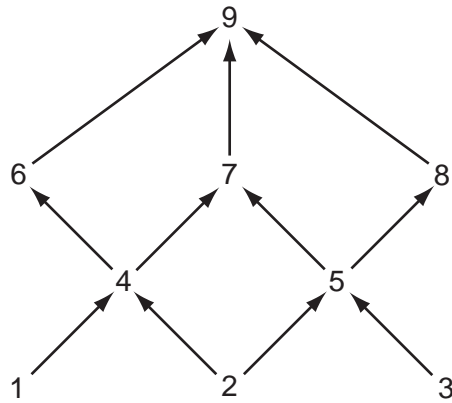
35 What happens to these structures when the eye focuses on a near object?

	ciliary muscles	suspensory ligaments
<b>A</b>	contract	tight
<b>B</b>	contract	loose
<b>C</b>	relax	tight
<b>D</b>	relax	loose

36 Which descriptions of drugs are correct?

	have side effects	are broken down by the liver
<b>A</b>	x	x
<b>B</b>	x	✓
<b>C</b>	✓	x
<b>D</b>	✓	✓

37 The diagram represents nine organisms forming a food web.



Which of the organisms is a producer and which is a carnivore?

	producer	carnivore
<b>A</b>	1	4
<b>B</b>	2	6
<b>C</b>	9	1
<b>D</b>	9	8

38 What are possible harmful effects of deforestation?

	increased carbon dioxide in atmosphere	increased oxygen in atmosphere
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

39 What is always true of the offspring from asexual reproduction in plants?

- A** a new variety
- B** more resistant to disease
- C** same flower shape
- D** same size

40 What is an effective treatment for syphilis?

- A antibiotics
- B anti-viral drugs
- C condoms
- D isolation from other sexual partners

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

		Group															
		I	II	III	IV	V	VI	VII	VIII	IX	X						
		1 <b>H</b> Hydrogen 1															
7	9																
<b>Li</b> Lithium 3	<b>Be</b> Beryllium 4																
23	24																
<b>Na</b> Sodium 11	<b>Mg</b> Magnesium 12																
39	40																
<b>K</b> Potassium 19	<b>Ca</b> Calcium 20	45	48	51	52	55	56	59	59	64	65						
		<b>Sc</b> Scandium 21	<b>Ti</b> Titanium 22	<b>V</b> Vanadium 23	<b>Cr</b> Chromium 24	<b>Mn</b> Manganese 25	<b>Fe</b> Iron 26	<b>Co</b> Cobalt 27	<b>Ni</b> Nickel 28	<b>Cu</b> Copper 29	<b>Zn</b> Zinc 30						
85	88	89	91	93	96	101	101	103	106	108	112						
<b>Rb</b> Rubidium 37	<b>Sr</b> Strontium 38	<b>Y</b> Yttrium 39	<b>Zr</b> Zirconium 40	<b>Nb</b> Niobium 41	<b>Mo</b> Molybdenum 42	<b>Ru</b> Ruthenium 44	<b>Rh</b> Rhodium 45	<b>Pd</b> Palladium 46	<b>Ag</b> Silver 47	<b>Cd</b> Cadmium 48							
133	137	139	178	181	184	190	190	192	195	197	201						
<b>Cs</b> Caesium 55	<b>Ba</b> Barium 56	<b>La</b> Lanthanum 57	<b>Hf</b> Hafnium 72	<b>Ta</b> Tantalum 73	<b>W</b> Tungsten 74	<b>Os</b> Osmium 76	<b>Ir</b> Iridium 77	<b>Pt</b> Platinum 78	<b>Au</b> Gold 79	<b>Hg</b> Mercury 80							
	226	227															
<b>Fr</b> Francium 87	<b>Ra</b> Radium 88	<b>Ac</b> Actinium 89															
*58-71 Lanthanoid series †90-103 Actinoid series																	
				140	141	144	144	150	152	157	159	162	165	167	169	173	175
				<b>Ce</b> Cerium 58	<b>Pr</b> Praseodymium 59	<b>Nd</b> Neodymium 60	<b>Pm</b> Promethium 61	<b>Sm</b> Samarium 62	<b>Eu</b> Europium 63	<b>Gd</b> Gadolinium 64	<b>Tb</b> Terbium 65	<b>Dy</b> Dysprosium 66	<b>Ho</b> Holmium 67	<b>Er</b> Erbium 68	<b>Tm</b> Thulium 69	<b>Yb</b> Ytterbium 70	<b>Lu</b> Lutetium 71
				232	232	238	238	238	238	238	238	238	238	238	238	238	238
				<b>Th</b> Thorium 90	<b>Pa</b> Protactinium 91	<b>U</b> Uranium 92	<b>Np</b> Neptunium 93	<b>Pu</b> Plutonium 94	<b>Am</b> Americium 95	<b>Cm</b> Curium 96	<b>Bk</b> Berkelium 97	<b>Cf</b> Californium 98	<b>Es</b> Einsteinium 99	<b>Fm</b> Fermium 100	<b>Md</b> Mendelevium 101	<b>No</b> Nobelium 102	<b>Lr</b> Lawrencium 103

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

Key

a	<b>X</b>	b

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

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