Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/11**

Paper 1 Multiple Choice (Core) **May/June 2017**

45 minutes

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, 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.
DO **NOT** WRITE IN ANY BARCODES.

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.
Electronic calculators may be used.

1 What is **not** produced by artificial selection?

A bacteria with antibiotic resistance

B cows with high milk yield

C sheep with thick wool

D wheat with resistance to disease

2 Which food is high in iron?

A citrus fruit

B milk

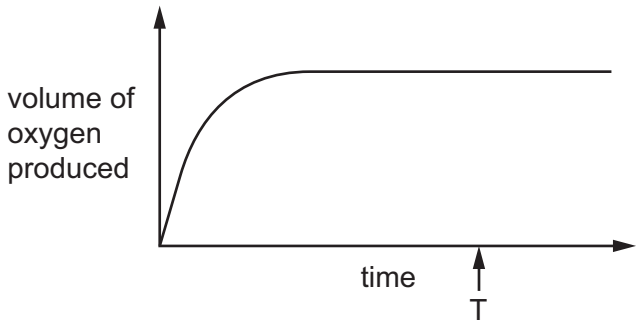
C oily fish

D red meat

3 Catalase is an enzyme that breaks down hydrogen peroxide to water and oxygen.

In an experiment, the volume of oxygen produced by the break down of hydrogen peroxide was measured.

The graph shows the results.



Which description is the rate of oxygen production at time T?

A at its maximum

B steadily decreasing

C steadily increasing

D zero

4 In a plant, what leads to offspring that are identical to the parent?

A asexual reproduction

B insect pollination

C seed germination

D sexual reproduction

5 The ribs are lowered as we breathe out.

Which characteristic of living organisms does this illustrate?

A growth

B movement

C respiration

D sensitivity

6 Which tissue carries water up the stem of a plant?

A epidermis

B phloem

C spongy mesophyll

D xylem

7 Which structure carries nerve impulses away from the central nervous system?

A motor neurone

B relay neurone

C sensory neurone

D spinal cord

8 What is the order of decreasing diameter of the structures found in the breathing system?

A alveoli → bronchi → capillaries

B alveoli → capillaries → bronchi

C bronchi → alveoli → capillaries

D capillaries → bronchi → alveoli

9 What would be the effects of deforestation on the level of atmospheric carbon dioxide and the amount of soil?

	carbon dioxide level	amount of soil
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

10 A frightened animal may need to run away suddenly.

Which substance is released to stimulate an increase in blood glucose concentration?

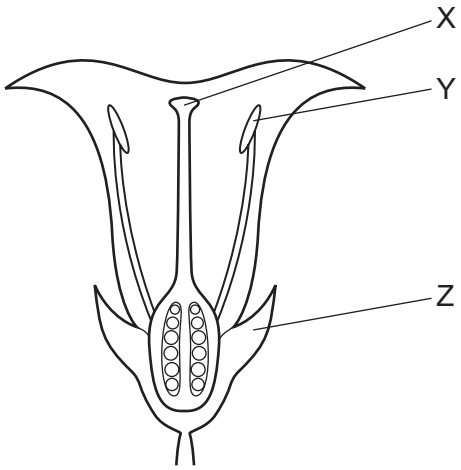
A adrenaline

B haemoglobin

C plasma

D platelets

11 The diagram shows a cross-section of a flower.



What are the parts labelled X, Y and Z?

	X	Y	Z
A	anther	sepal	stigma
B	anther	stigma	sepal
C	sepal	anther	stigma
D	stigma	anther	sepal

12 Which cross results in all possible offspring having the same genotype?

A BB × Bb **B** BB × bb **C** Bb × Bb **D** Bb × bb

13 Which structural feature is found in a plant cell but **not** in an animal cell?

A cell membrane

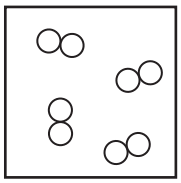
B cell wall

C cytoplasm

D nucleus

14 Which diagram represents molecules of a compound?

A



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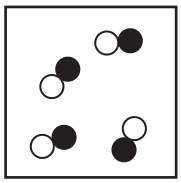
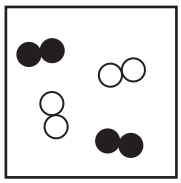


C



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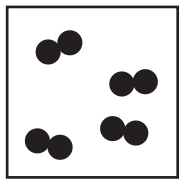


15 How many atoms of metals and of non-metals are shown in the formula Na_2SO_4?

	atoms of metals	atoms of non-metals
A	1	1
B	1	2
C	2	4
D	2	5

16 Molten lead(II) bromide is electrolysed.

Which row describes one lead ion, Pb^{2+}, and the electrode at which lead is produced?

	type of ion	electrode
A	anion	anode
B	anion	cathode
C	cation	anode
D	cation	cathode

[Turn over

17 When sodium is added to water it reacts violently and melts.

Which row describes the type of reaction and how the temperature of the water changes during the reaction?

	type of reaction	temperature of the water
A	endothermic	decreases
B	endothermic	increases
C	exothermic	decreases
D	exothermic	increases

18 Marble (calcium carbonate) reacts with dilute hydrochloric acid.

1 g of powdered marble reacts faster with the same volume and concentration of acid than a 1 g lump of marble.

What is the reason for this observation?

A The powder has a larger mass.

B The powder has a larger surface area.

C The powder has a smaller mass.

D The powder has a smaller surface area.

19 Aluminium reacts with iron(III) oxide, forming iron.

The equation for this reaction is shown.

$$\text{aluminium} + \text{iron(III) oxide} \rightarrow \text{iron} + \text{aluminium oxide}$$

Which statement explains why this is a redox reaction?

A Aluminium gains oxygen and iron loses oxygen.

B Aluminium is reduced and iron(III) oxide is oxidised.

C Aluminium oxide is oxidised and iron is reduced.

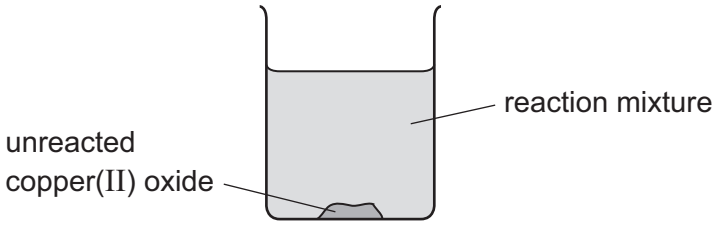
D Iron gains oxygen and aluminium loses oxygen.

20 The pH of water changes when ammonia is bubbled into it.

What happens to the pH and why?

	pH	ammonia is
A	decreases	acidic
B	decreases	alkaline
C	increases	acidic
D	increases	alkaline

21 Copper(II) sulfate is made by adding an excess of solid copper(II) oxide to dilute sulfuric acid.



What is the sequence of steps used to obtain copper(II) sulfate crystals from the reaction mixture?

	step 1	step 2	step 3	step 4
A	evaporation	crystallisation	filtration	evaporation
B	evaporation	filtration	crystallisation	filtration
C	filtration	crystallisation	filtration	evaporation
D	filtration	evaporation	crystallisation	filtration

22 Which statement about Group I metals is correct?

A Potassium is a hard metal and is more reactive than sodium.

B Potassium is a soft metal and is less reactive than sodium.

C Sodium is a hard metal and is less reactive than lithium.

D Sodium is a soft metal and is more reactive than lithium.

23 What is a use for argon?

A as a catalyst

B in alloys

C in lamps

D neutralising chemical waste

24 Which element is used to extract some metals from their ores?

A carbon

B copper

C iron

D nitrogen

25 Four solutions are tested with Universal Indicator paper and with anhydrous copper(II) sulfate.

Which row shows the observations for pure water?

	Universal Indicator paper	anhydrous copper(II) sulfate
A	turns blue	turns blue
B	turns blue	turns white
C	turns green	turns blue
D	turns green	turns white

26 Why do farmers add lime to soil?

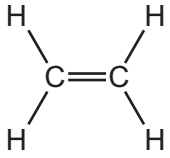
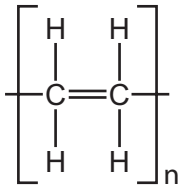
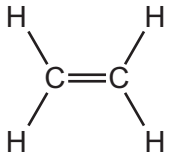
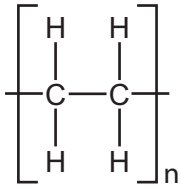
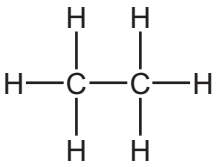
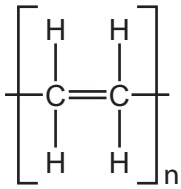
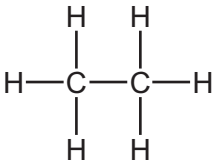
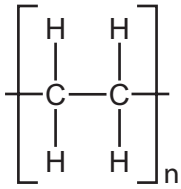
A It acts as a fertiliser.

B It adds nitrogen to the soil.

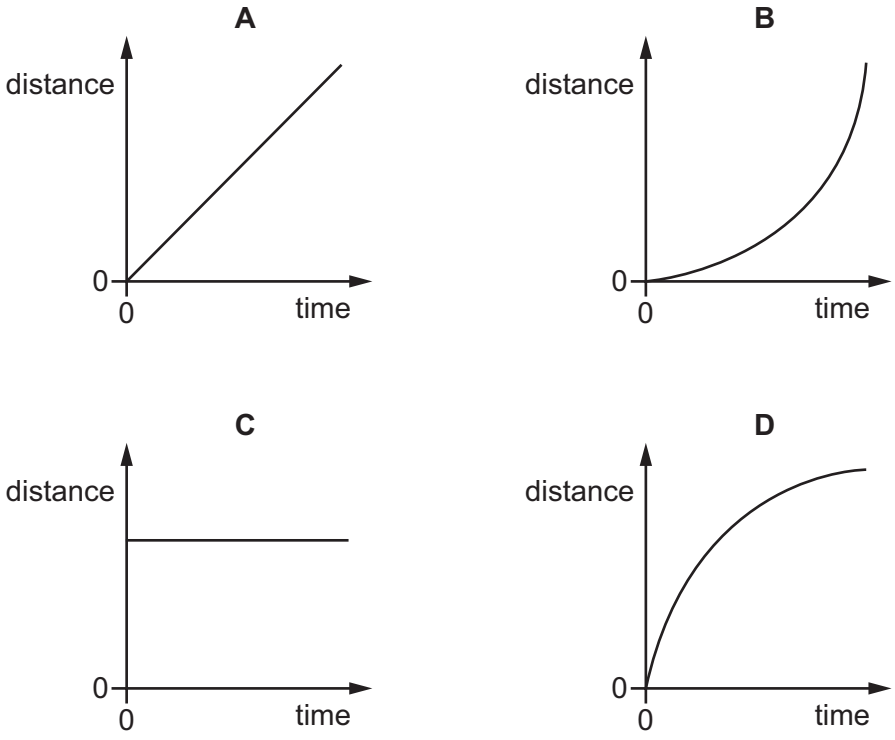
C It decreases the pH of the soil.

D It increases the pH of the soil.

27 Which monomer is used to form poly(ethene) and what is the structure of poly(ethene)?

	monomer	poly(ethene) structure
A		
B		
C		
D		

28 Which diagram shows the distance-time graph for an object moving with constant speed?



29 A student stands with both feet on some scales in order to measure his weight.

The reading on the scales is 500 N. He lifts one foot off the scales and keeps it lifted.

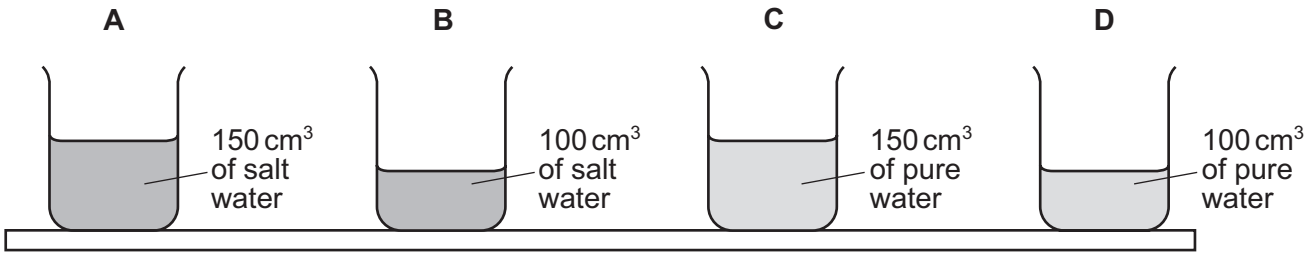
What is the new reading on the scales?

A 0 **B** 250 N **C** 500 N **D** 1000 N

30 A student places four identical beakers on a bench.

Two beakers contain salt water of density 1.1 g / cm^3 and two beakers contain pure water of density 1.0 g / cm^3. The quantity of water in each beaker is shown.

Which beaker exerts the greatest pressure on the bench?



31 The list contains three energy resources, P, Q and R.

P geothermal energy from hot rocks

Q nuclear fission in reactors

R sunlight on solar panels

Which of these resources are renewable?

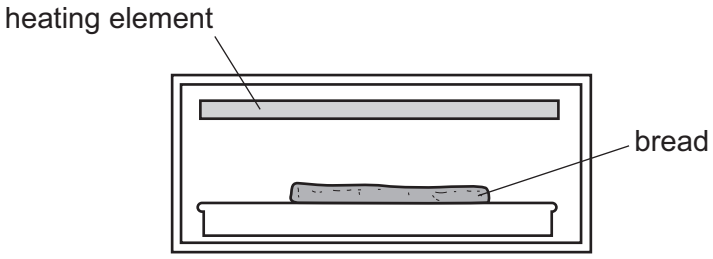
A P, Q and R

B P and Q only

C P and R only

D Q and R only

32 Bread can be cooked by placing it below a heating element.



Which process transfers thermal energy from the heating element to the bread?

A conduction

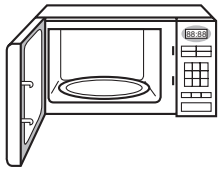
B convection

C evaporation

D radiation

33 Which waves are longitudinal?

A

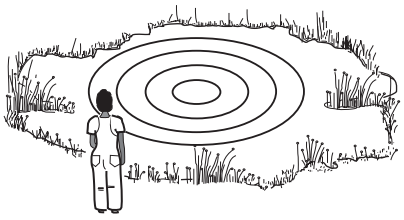


microwaves in an oven

B

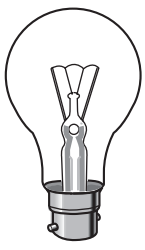
sound waves from a trumpet

C



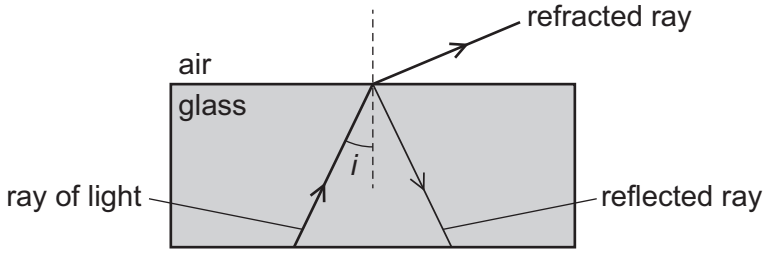
water waves on a pond

D



light waves from a lamp

34 A glass block is surrounded by air. The diagram shows what happens to a ray of light inside the glass block when it reaches the edge of the block.

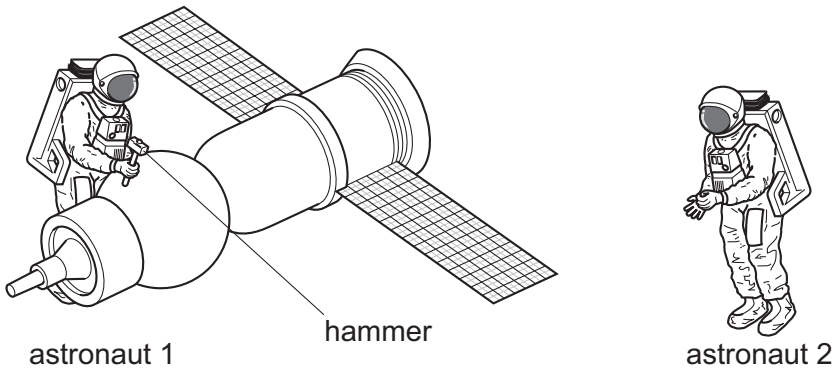


Angle *i* is changed so that total internal reflection takes place.

How is angle *i* changed and which ray then disappears?

	angle *i*	ray that disappears
A	decreases	reflected ray
B	decreases	refracted ray
C	increases	reflected ray
D	increases	refracted ray

35 Astronaut 1 uses a hammer to mend a satellite in space. Astronaut 2 is nearby. There is no air in space.



What does astronaut 2 hear compared with the sound heard if they were working on Earth?

A a louder sound

B a quieter sound

C a sound of the same loudness

D no sound at all

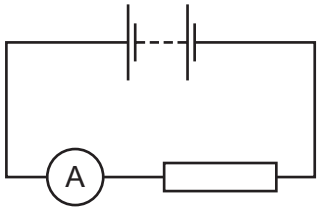
36 The N-pole of a magnet repels one end of bar X.

What happens when the **other** end of bar X is placed near to the poles of the magnet?

	other end near N-pole	other end near S-pole
A	attracts	attracts
B	attracts	repels
C	repels	attracts
D	repels	repels

37 A battery is connected to an ammeter and a resistor of resistance $1.5 \times 10^3 \Omega$.

The reading on the ammeter is 3.0 mA.



What is the potential difference (p.d.) across the battery?

A 0.50 V **B** 1.5 V **C** 2.0 V **D** 4.5 V

38 A fuse rated at 13 A is fitted in a circuit.

What is the main purpose of the fuse?

A to maintain a constant current of 13 A

B to prevent anyone from receiving an electric shock

C to prevent wires from overheating

D to reduce the current to 13 A if it becomes larger than 13 A

39 Which device is designed to allow a small direct current (d.c.) to control a large current?

A a generator

B a motor

C a relay

D a transformer

40 Which row compares the number of protons and the number of neutrons in atoms of different isotopes of an element?

	number of protons	number of neutrons
A	different	different
B	different	the same
C	the same	different
D	the same	the same

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

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