Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/12**

Paper 1 Multiple Choice (Core) **October/November 2020**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.

[Turn over

1 Which would be considered movement by an organism?

1 a tree's leaves being blown by the wind

2 migration of zebra in Africa

3 a student changing their seating position in a classroom

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

2 The length of an insect in a photograph is measured as 17 mm. The actual length of the insect is 12 mm.

What is the magnification of the insect in the photograph?

A ×1.2 **B** ×1.3 **C** ×1.4 **D** ×1.5

3 Which type of biological molecule contains carbon, hydrogen, oxygen and nitrogen?

A fat

B protein

C reducing sugar

D starch

4 A mixture of starch and saliva was set up at four different temperatures. Each mixture was tested with iodine solution after 15 minutes and again after 30 minutes.

The results are shown in the table.

temperature / °C	colour with iodine solution	
	15 minutes	30 minutes
0	blue-black	blue-black
15	blue-black	brown
35	brown	brown
95	blue-black	blue-black

What do the results suggest?

A The enzyme in saliva is inactive at 95 °C.

B The enzyme in saliva is slow to work at 35 °C.

C The enzyme in saliva works equally well at 15 °C and 35 °C.

D The enzyme in saliva works faster at higher temperatures.

5 Which conditions will result in the highest rate of photosynthesis?

	light intensity	carbon dioxide concentration
A	high	high
B	high	low
C	low	high
D	low	low

6 Into which part of the alimentary canal does the pancreas release digestive juices?

A anus

B large intestine

C oesophagus

D small intestine

7 Under which conditions will transpiration from a plant be fastest?

	temperature	humidity
A	high	high
B	high	low
C	low	high
D	low	low

8 What is the equation for aerobic respiration?

A carbon dioxide + water → oxygen + glucose

B glucose + carbon dioxide → oxygen + water

C oxygen + glucose → carbon dioxide + water

D oxygen + water → glucose + carbon dioxide

9 A plant shoot grows towards a light source.

This is an example of what?

A gravitropism

B homeostasis

C transpiration

D phototropism

[Turn over

10 What describes pollination?

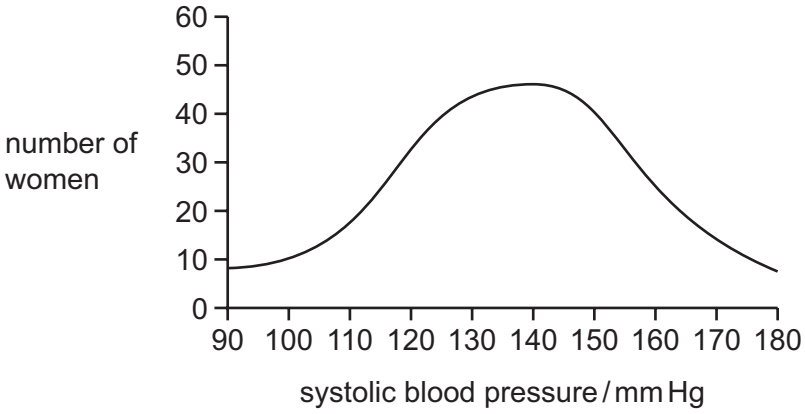
A fertilisation of an egg by a pollen grain

B pollen being carried by bees

C transfer of pollen from a stigma to a stamen

D transfer of pollen from an anther to a stigma

11 The graph shows the systolic blood pressure of a group of women.



What can be concluded from the graph?

A Blood pressure shows continuous variation.

B Blood pressure shows discontinuous variation.

C Genes affect blood pressure.

D Women are more at risk of high blood pressure than men.

12 Which type of organism gets its energy from dead or waste organic matter?

A carnivore

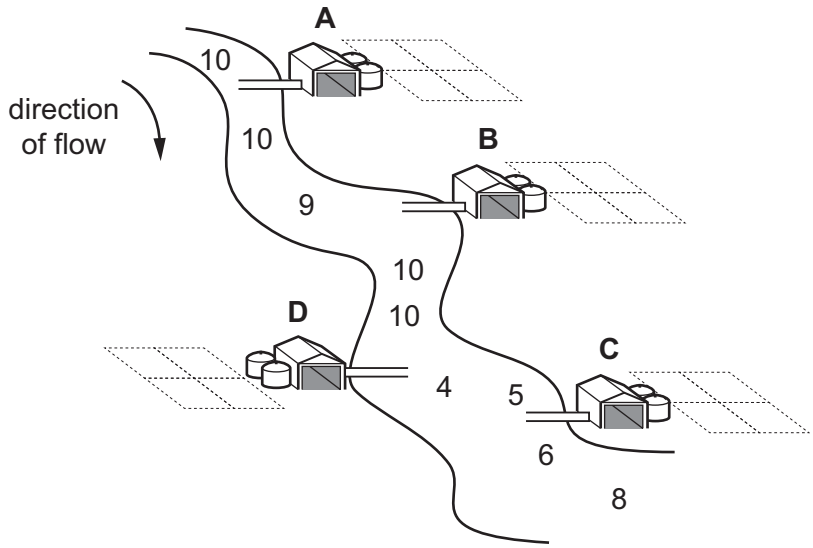
B consumer

C decomposer

D producer

13 The diagram shows a river and four farms. The numbers in the river show relative oxygen concentrations.

From which farm is untreated sewage leaking into the river?



14 Atoms are the smallest parts of ……1…… .

When atoms of the same type chemically join together, a ……2…… is formed.

When different types of atom chemically join together, they form ……3……. .

Which words complete gaps 1, 2 and 3?

	1	2	3
A	elements	molecule	compounds
B	elements	molecule	mixtures
C	molecules	compound	mixtures
D	molecules	mixture	compounds

15 An aqueous salt solution contains an insoluble impurity.

Which processes are used to obtain pure salt crystals?

A distillation then crystallisation

B distillation then chromatography

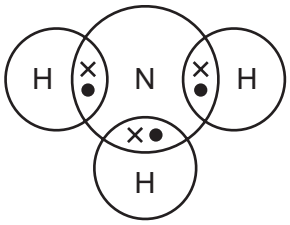
C filtration then crystallisation

D filtration then chromatography

[Turn over

16 Which dot-and-cross diagram represents a molecule of ammonia?

A



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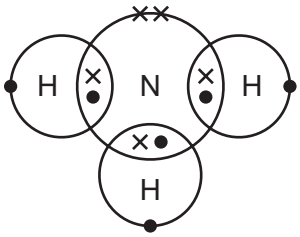

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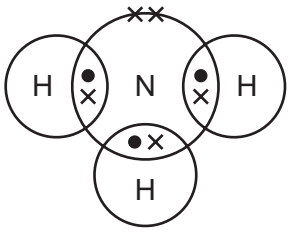

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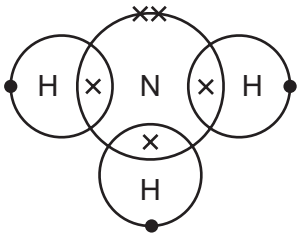
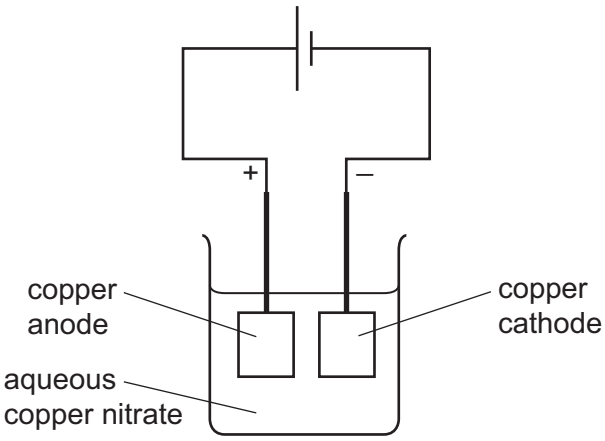


17 The diagram shows an electroplating experiment.



Which row shows the change in mass of each electrode?

	anode	cathode
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

18 Two processes are listed.

1 the conversion of liquid water into steam

2 the combustion of magnesium ribbon

Which row describes the two processes?

	process 1	process 2
A	endothermic	endothermic
B	endothermic	exothermic
C	exothermic	endothermic
D	exothermic	exothermic

19 Which word equation represents a redox reaction?

A carbon + copper oxide → copper + carbon dioxide

B hydrochloric acid + potassium hydroxide → potassium chloride + water

C magnesium carbonate → magnesium oxide + carbon dioxide

D sodium sulfate + barium nitrate → barium sulfate + sodium nitrate

20 Which compound is prepared by reacting an acid with a base?

A calcium oxide

B copper hydroxide

C hydrogen chloride

D magnesium sulfate

21 Which row shows the trends for Group I elements lithium to potassium?

	trend in melting point	trend in reaction with water
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

[Turn over

22 Which statement describes transition elements?

A They form colourless compounds.

B They have low densities.

C They have low melting points.

D They often act as catalysts.

23 Blue cobalt(II) chloride paper is added to a liquid.

It changes from blue to pink.

What is the liquid?

A bromine

B ethanol

C petrol

D water

24 Which process does **not** produce carbon dioxide?

A acid reacting with a metal

B acid reacting with sodium carbonate

C complete combustion of methane

D respiration

25 Some soil is treated with limestone to make it neutral.

What is the pH of the soil before it is treated?

A 5 **B** 7 **C** 9 **D** 11

26 Which substance is **not** a fossil fuel?

A coal

B hydrogen

C natural gas

D petroleum

27 Poly(ethene) is made from ethene by the process of addition polymerisation.

Which word describes ethene in this process?

A fuel

B catalyst

C monomer

D solvent

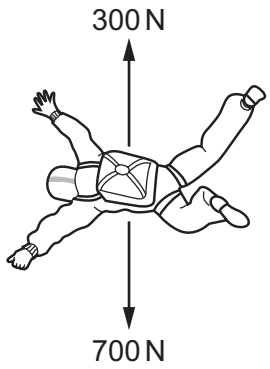
28 A man has a mass of 80 kg.

The gravitational field strength *g* is 10 N / kg.

What is the man's weight?

A 8.0 N **B** 80 N **C** 800 N **D** 8000 N

29 The diagram shows the two forces acting on a skydiver.



What is the resultant force on the skydiver?

A 400 N downwards

B 400 N upwards

C 1000 N downwards

D 1000 N upwards

30 Electricity is generated in power stations. Many power stations use steam to drive turbines.

Which type of power station does **not** use steam?

A chemical energy (fuel) power stations

B geothermal energy power stations

C hydroelectric energy power stations

D nuclear energy power stations

[Turn over

31 An electric kettle is switched on and the temperature of the water in it increases to 60 °C.

What is the main method of heat transfer within the water?

A boiling

B conduction

C convection

D radiation

32 A tank contains water.

A wave is produced and travels across the surface of the water.

What is the maximum height of the water as the wave passes compared with the original level of the water?

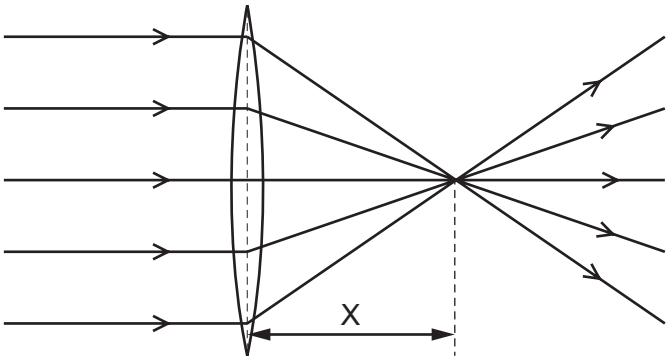
A the amplitude

B the frequency

C the speed

D the wavelength

33 The diagram shows light passing through a thin converging lens.



What is the distance X?

A the distance from the lens to an object

B the focal length of the lens

C the principal focus of the lens

D the wavelength of the light

34 A person stands 320 m away from a cliff and shouts. He hears an echo from the cliff 2.0 s later.

What is the speed of sound in the air?

A 160 m / s **B** 300 m / s **C** 320 m / s **D** 640 m / s

35 What is the unit for electromotive force (e.m.f.)?

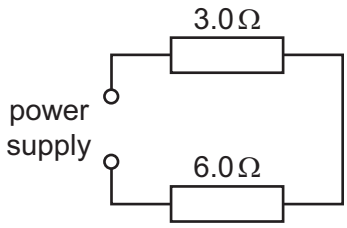
A ampere

B ohm

C newton

D volt

36 A 3.0 Ω resistor and a 6.0 Ω resistor are connected to a power supply as shown.



What is the combined resistance of the two resistors?

A 2.0 Ω **B** 4.5 Ω **C** 9.0 Ω **D** 18 Ω

37 An electric kettle is designed so that the usual current in its heater is 9.0 A. The owner of the kettle fits the plug with a fuse rated at 3 A.

What happens when the kettle is filled with water and switched on?

A The current in the circuit increases to greater than 9.0 A.

B The fuse blows immediately and the kettle fails to operate.

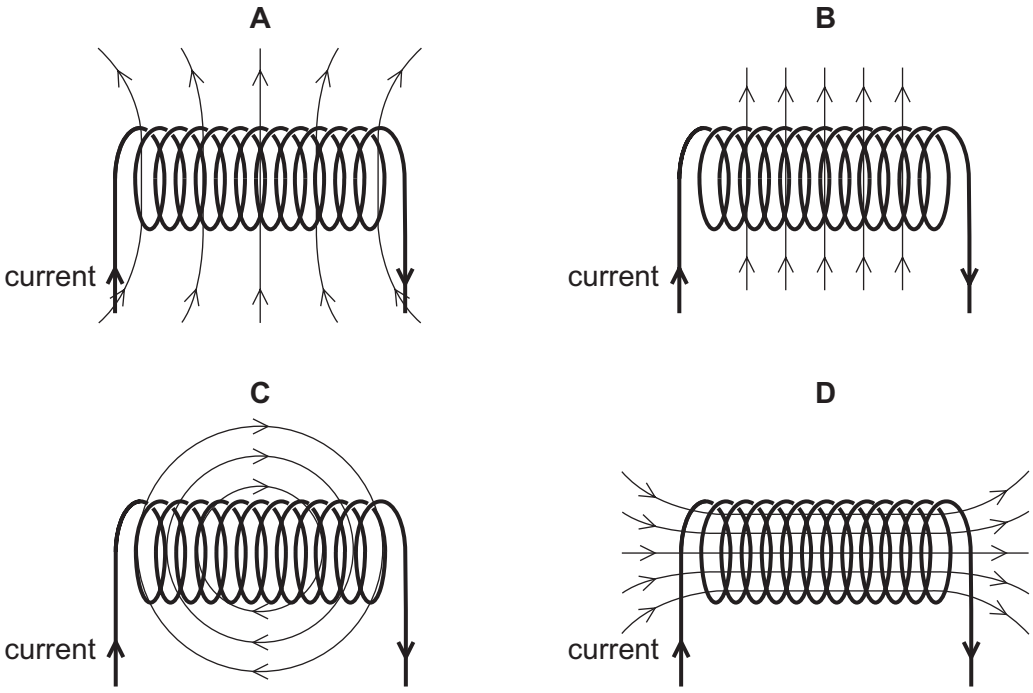
C The water reaches boiling point more quickly due to an increase in the voltage.

D The water reaches boiling point more slowly due to a decrease in the current.

[Turn over

38 A solenoid carrying a current produces a magnetic field.

Which diagram shows the magnetic field pattern?



39 Which type of radiation has the greatest ionising effect?

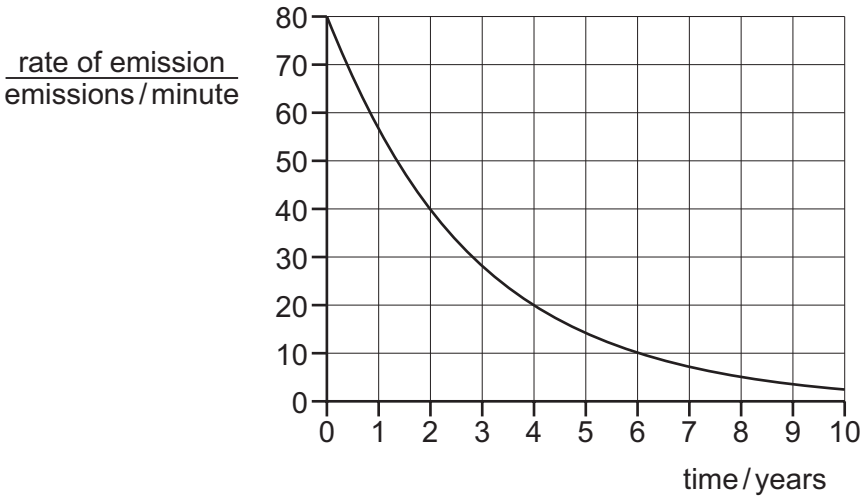
A infrared rays

B α-particles

C β-particles

D γ-rays

40 The graph shows how the rate of emission from a radioactive sample changes with time.



What is the half-life of this sample?

A 40 minutes

B 2.0 years

C 5.0 years

D 10 years

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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.).