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

**10** What describes pollination?

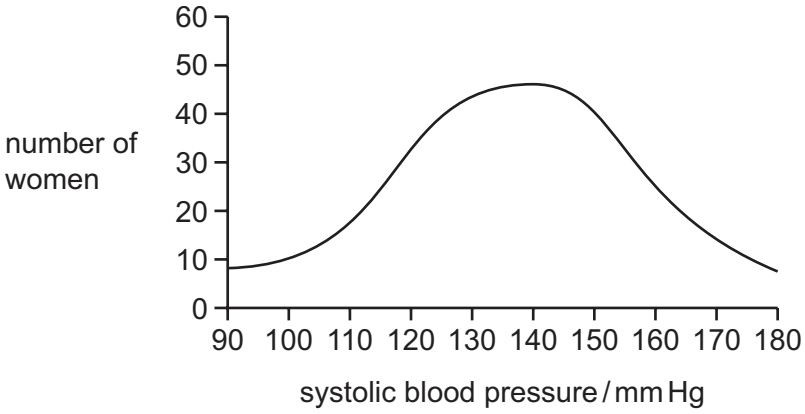
**A** fertilisation of an egg by a pollen grain

**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

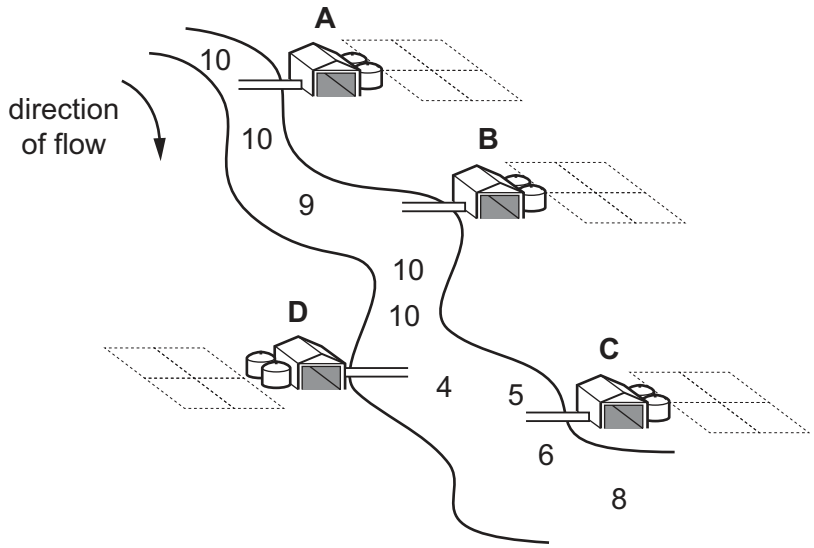
**B** consumer

**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

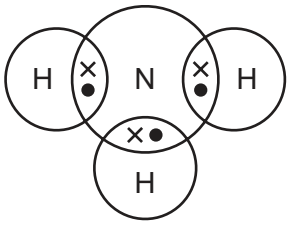
**B** distillation then chromatography

**C** filtration then crystallisation

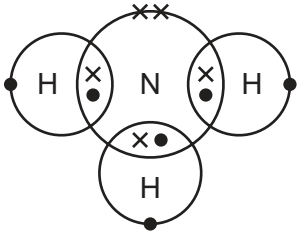
**D** filtration then chromatography

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

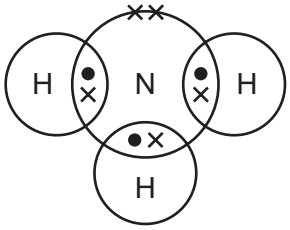
**A**



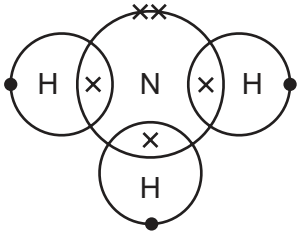

**B**



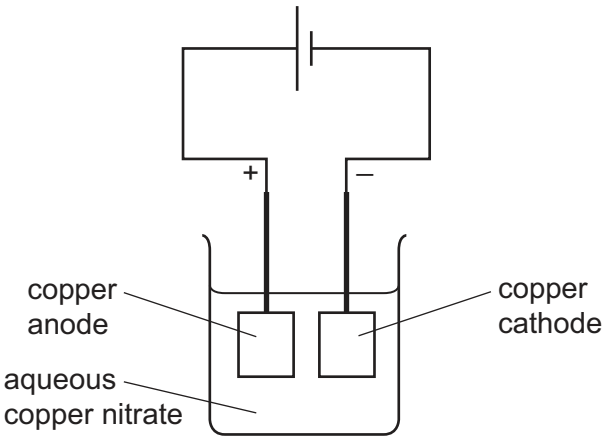

**C**




**D**




**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 |

**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

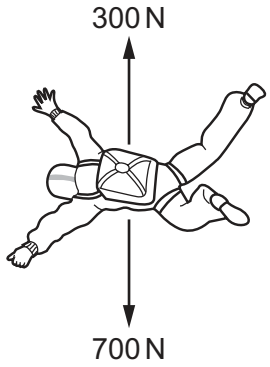
**28** A man has a mass of 80 kg.

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

**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?

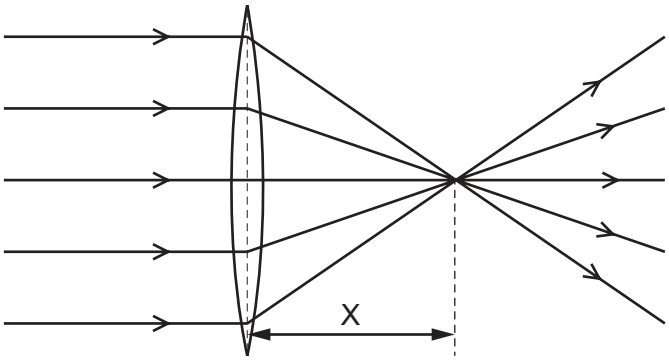
**A** the amplitude

**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.)?

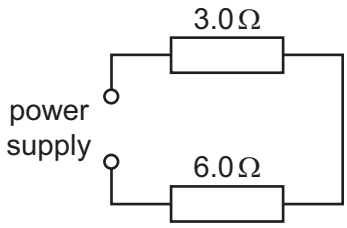
**A** ampere

**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.

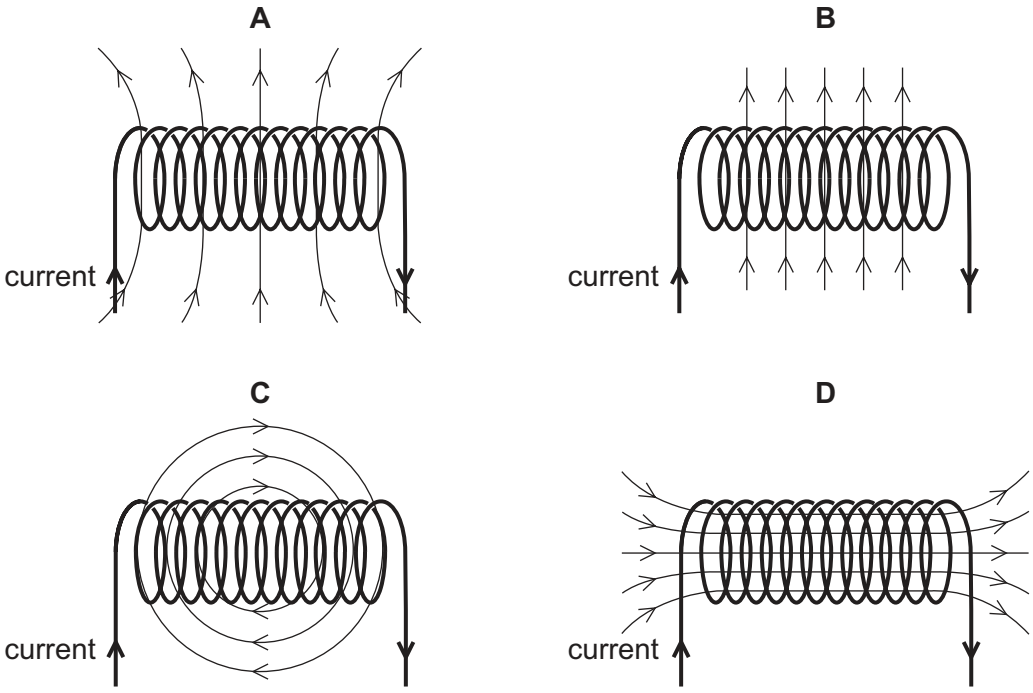
**B** The fuse blows immediately and the kettle fails to operate.

**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.

**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?

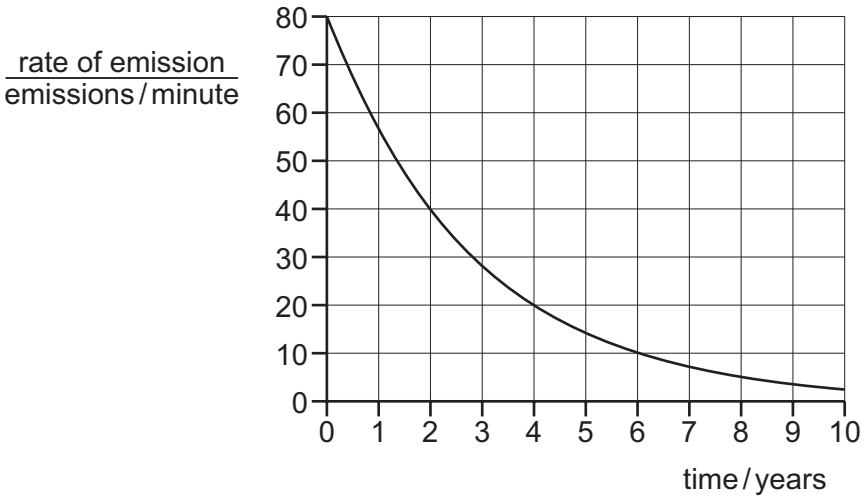
**A** infrared rays

**B** $\alpha$-particles

**C** $\beta$-particles

**D** $\gamma$-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.).