



# Cambridge IGCSE™

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## COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice (Core)

May/June 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)

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### 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.

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



1 What are three characteristics of living organisms?

|          | characteristic 1 | characteristic 2 | characteristic 3 |
|----------|------------------|------------------|------------------|
| <b>A</b> | breathing        | reproduction     | sensitivity      |
| <b>B</b> | digestion        | growth           | movement         |
| <b>C</b> | excretion        | nutrition        | transpiration    |
| <b>D</b> | nutrition        | reproduction     | sensitivity      |

2 Which substance is required for photosynthesis to occur?

- A** chlorophyll
- B** glucose
- C** haemoglobin
- D** oxygen

3 The cytoplasm of a plant cell contains a 15% sugar solution. The plant cell is placed in sugar solutions of different concentrations.

In which solution would there be a net diffusion of water out of the cell?

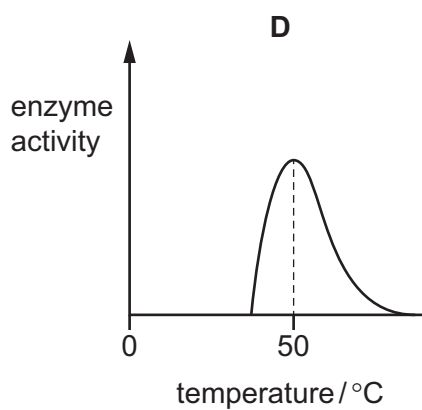
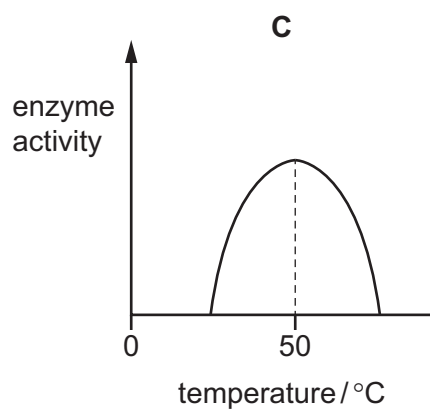
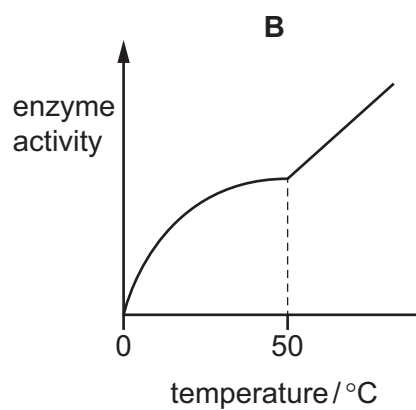
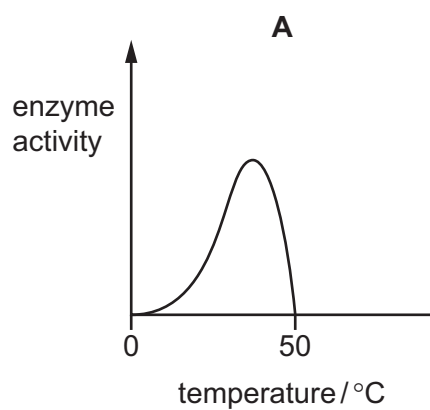
- A** 5% sugar solution
- B** 10% sugar solution
- C** 15% sugar solution
- D** 20% sugar solution

4 Which row shows what starch molecules and protein molecules are made from?

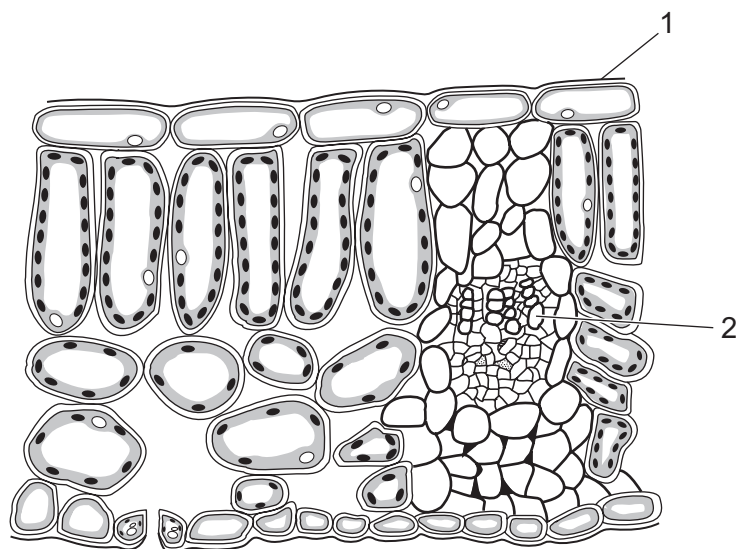
|          | starch   | proteins    |
|----------|----------|-------------|
| <b>A</b> | glucose  | amino acids |
| <b>B</b> | glucose  | fatty acids |
| <b>C</b> | glycerol | amino acids |
| <b>D</b> | glycerol | fatty acids |

- 5 An enzyme can stop working at certain temperatures.

Which enzyme stops working when the temperature reaches 50 °C?



- 6 The diagram shows a section through part of a leaf as seen under a light microscope.



What are the labelled parts?

|          | 1         | 2      |
|----------|-----------|--------|
| <b>A</b> | cuticle   | phloem |
| <b>B</b> | cuticle   | xylem  |
| <b>C</b> | epidermis | phloem |
| <b>D</b> | epidermis | xylem  |

- 7 Which features are found in a typical animal cell?

|          | cell membrane | cell wall | chloroplast | cytoplasm | nucleus | vacuole |
|----------|---------------|-----------|-------------|-----------|---------|---------|
| <b>A</b> | ✓             | ✓         | ✓           | ✓         | x       | x       |
| <b>B</b> | ✓             | x         | x           | ✓         | ✓       | ✓       |
| <b>C</b> | ✓             | x         | x           | ✓         | ✓       | x       |
| <b>D</b> | x             | ✓         | ✓           | x         | x       | ✓       |

- 8 In the equation for aerobic respiration, what is X?



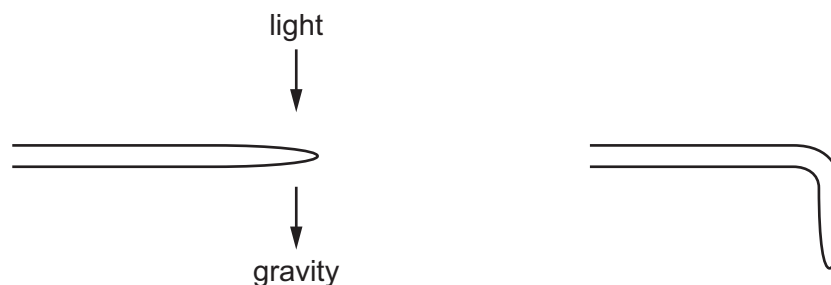
- A** amino acids
- B** carbon dioxide
- C** oxygen
- D** starch

- 9 Four people have the same resting pulse rate and the same blood glucose concentration. The table shows their pulse rates and blood glucose concentrations later on the same day.

Which person has the highest concentration of adrenaline in their blood?

|          | pulse rate / beats per minute | blood glucose concentration /mg per dm <sup>3</sup> |
|----------|-------------------------------|-----------------------------------------------------|
| <b>A</b> | 70                            | 65                                                  |
| <b>B</b> | 70                            | 100                                                 |
| <b>C</b> | 120                           | 65                                                  |
| <b>D</b> | 120                           | 100                                                 |

- 10 The diagram shows the root of a plant exposed to light and gravity, and the same root a day later.



Light does **not** influence the growth of roots in this plant.

Which row shows how the root has responded?

|          | gravitropism                 | phototropism                 |
|----------|------------------------------|------------------------------|
| <b>A</b> | grows away from the stimulus | no response                  |
| <b>B</b> | grows towards the stimulus   | no response                  |
| <b>C</b> | no response                  | grows away from the stimulus |
| <b>D</b> | no response                  | grows towards the stimulus   |

- 11 Which is a definition of asexual reproduction?

- A** production of genetically different offspring from one parent
- B** production of genetically different offspring from two parents
- C** production of genetically identical offspring from one parent
- D** production of genetically identical offspring from two parents

**12** Which part of the male reproductive system in humans produces sperm?

- A** penis
- B** scrotum
- C** testes
- D** urethra

**13** What is an undesirable effect of deforestation?

- A** a decrease in flooding
- B** an increase in atmospheric carbon dioxide
- C** an increase in the number of habitats for organisms
- D** an increase in the number of species

**14** Which row identifies a substance that exists only as separate atoms and a substance that exists as a molecule?

|          | separate atoms | molecule       |
|----------|----------------|----------------|
| <b>A</b> | helium         | methane        |
| <b>B</b> | hydrogen       | helium         |
| <b>C</b> | neon           | argon          |
| <b>D</b> | oxygen         | carbon dioxide |

**15** Which processes are involved in the separation of petroleum into useful fractions?

- A** condensation and crystallisation
- B** condensation only
- C** evaporation and condensation
- D** evaporation only

**16** Salt, sand and water are stirred together in a beaker.

The salt dissolves in the water.

What does the beaker contain?

- A** a mixture of a solution and a solid
- B** a mixture of three elements
- C** only one compound and one solid
- D** only one compound containing three elements

17 Which ion is formed from a metal?

- A  $\text{Cl}^-$                       B  $\text{H}^+$                       C  $\text{Na}^+$                       D  $\text{NH}_4^+$

18 Calcium hydroxide contains one calcium atom, two oxygen atoms and two hydrogen atoms.

What is the correct formula of calcium hydroxide?

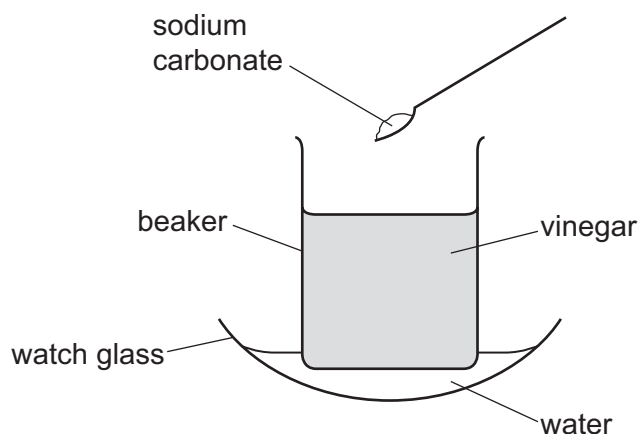
- A  $\text{CaOH}$                       B  $\text{Ca}(\text{OH})_2$                       C  $\text{CaOH}_2$                       D  $\text{CaO}_2\text{H}_2$

19 Dilute sulfuric acid is electrolysed using inert electrodes.

What is formed at the anode?

- A hydrogen  
B hydrogen sulfide  
C oxygen  
D sulfur dioxide

20 Solid sodium carbonate is added to vinegar in a beaker and stirred.



The water in the watch glass freezes.

Which statement about the reaction explains why the water freezes?

- A It is a redox reaction.  
B It is an endothermic reaction.  
C It is catalysed by sodium carbonate.  
D It is thermal decomposition.

- 21** A solid reacts with a solution.

Which change decreases the rate of the reaction?

- A** adding a catalyst
- B** using a higher concentration of the solution
- C** using a lower temperature
- D** using smaller pieces of the solid

- 22** Calcium oxide is added to water containing universal indicator. The universal indicator turns blue.

What is the pH of the solution?

- A** 1                      **B** 6                      **C** 7                      **D** 11

- 23** Solution X is mixed with nitric acid and aqueous barium nitrate.

A white precipitate is formed.

Which ion is present in solution X?

- A** carbonate
- B** chloride
- C** nitrate
- D** sulfate

- 24** Element R reacts with chlorine to form a coloured ionic compound with the formula  $\text{RCl}_3$ .

$\text{RCl}_3$  acts as a catalyst in some reactions.

Which statement about element R is correct?

- A** It conducts electricity only when molten.
- B** It is a transition element.
- C** It has a low melting point.
- D** It has a low density.

- 25** Copper can be made from copper oxide by reacting it with carbon at a high temperature.

Why is carbon used?

- A** It does not react with copper.
- B** It is a conductor of electricity.
- C** It is a high melting point solid.
- D** It is more reactive than copper.

- 26** Which volume of air contains about 20 cm<sup>3</sup> of oxygen?

- A** 25 cm<sup>3</sup>
- B** 50 cm<sup>3</sup>
- C** 80 cm<sup>3</sup>
- D** 100 cm<sup>3</sup>

- 27** Which reaction involves combustion?

- A** calcium carbonate → calcium oxide + carbon dioxide
- B** methane + oxygen → carbon dioxide + water
- C** sodium carbonate + hydrochloric acid → sodium chloride + water + carbon dioxide
- D** sodium hydroxide + hydrochloric acid → sodium chloride + water

- 28** A car travels at various speeds during a short journey.

The table shows the distances travelled and the times taken during each of four stages P, Q, R and S.

| stage                   | P   | Q   | R   | S   |
|-------------------------|-----|-----|-----|-----|
| distance travelled / km | 1.8 | 3.6 | 2.7 | 2.7 |
| time taken / minutes    | 2.0 | 2.0 | 4.0 | 3.0 |

During which two stages is the car travelling at the same average speed?

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

- 29** A solid, rectangular block of wood has length 4.0 cm, width 5.0 cm and height 6.0 cm.

The mass of the block is 90 g.

What is the density of the wood?

- A** 0.75 g/cm<sup>3</sup>
- B** 1.3 g/cm<sup>3</sup>
- C** 4.5 g/cm<sup>3</sup>
- D** 6.0 g/cm<sup>3</sup>

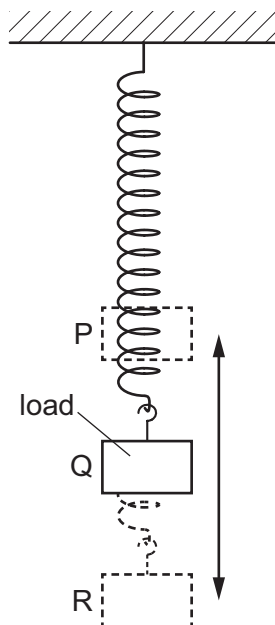
- 30** An object is travelling in a straight line at constant speed.

Which statement describes the resultant force on the object?

- A** It acts in the opposite direction to the motion of the object.
- B** It acts in the same direction as the motion of the object.
- C** It is constant, but not zero.
- D** It is zero.

- 31** A load hangs on a spring at point Q.

The load is now pulled down to point R and released. It moves up and down between its highest point P and its lowest point R.



Which statement describes the kinetic energy of the load?

- A** It is equal at points P, Q and R.
- B** It is greatest at point P.
- C** It is greatest at point Q.
- D** It is greatest at point R.

- 32** Electricity is generated using wind.

Which device is used in the process?

- A** dam
- B** nuclear reactor
- C** solar panel
- D** turbine

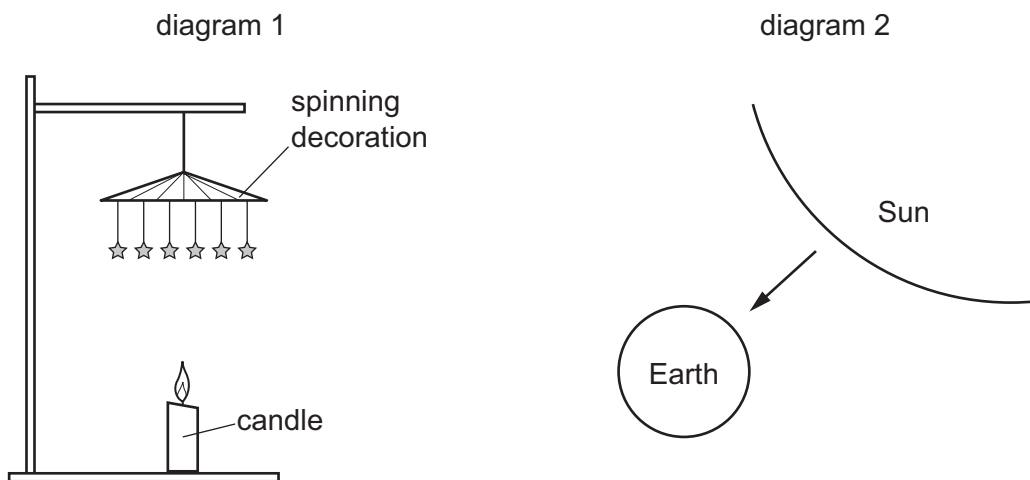
- 33** The molecules in a substance are close together but free to change positions with each other.

Which substance at 20 °C matches this description?

- A** air
- B** copper
- C** iron
- D** water

- 34** In diagram 1, a candle heats air and the heated air causes a decoration to spin.

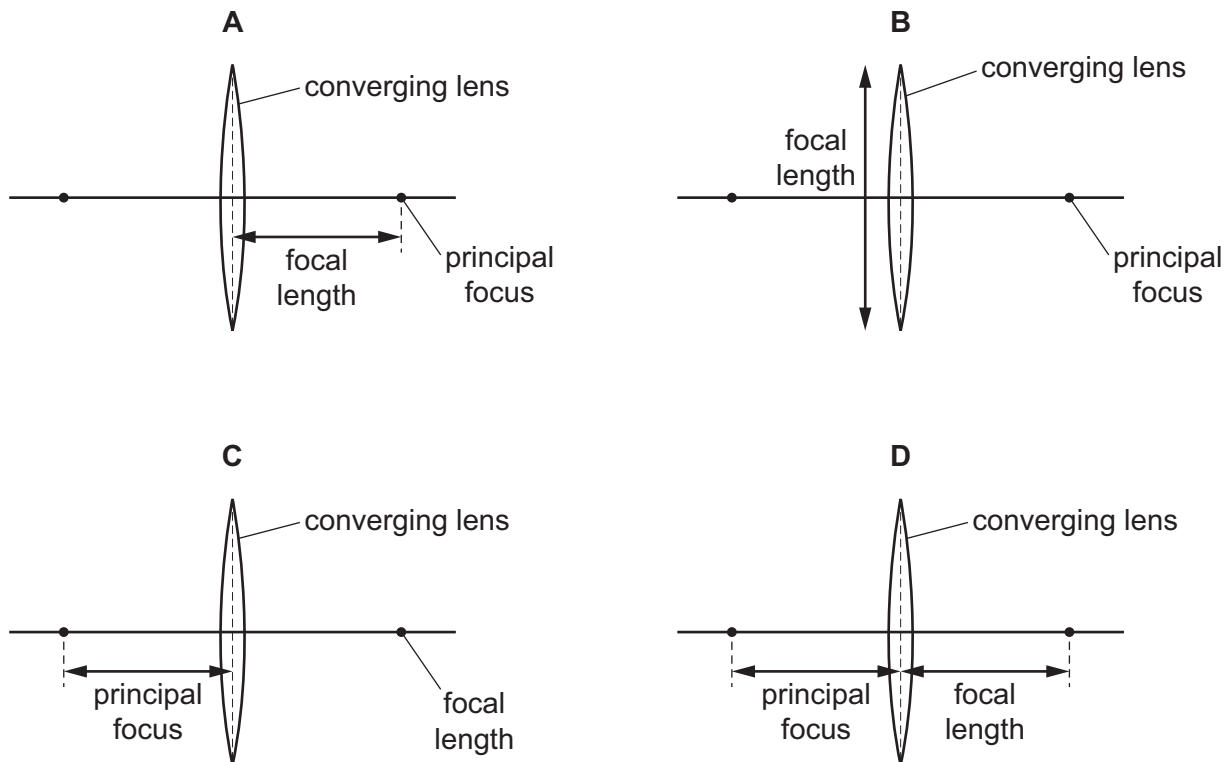
Diagram 2 shows the Earth being warmed due to heat produced by the Sun.



What is the main method of heat transfer involved in each case?

|          | candle to decoration | Sun to Earth |
|----------|----------------------|--------------|
| <b>A</b> | convection           | convection   |
| <b>B</b> | convection           | radiation    |
| <b>C</b> | radiation            | convection   |
| <b>D</b> | radiation            | radiation    |

35 Which diagram of a converging lens is correctly labelled?



36 The sound from a drum is loud and has a low pitch.

Which row describes the amplitude and the frequency of the sound wave?

|          | amplitude | frequency |
|----------|-----------|-----------|
| <b>A</b> | large     | high      |
| <b>B</b> | large     | low       |
| <b>C</b> | small     | high      |
| <b>D</b> | small     | low       |

37 Which list contains only electrical insulators?

- A** air, rubber, copper
- B** iron, plastic, glass
- C** plastic, glass, air
- D** steel, gold, aluminium

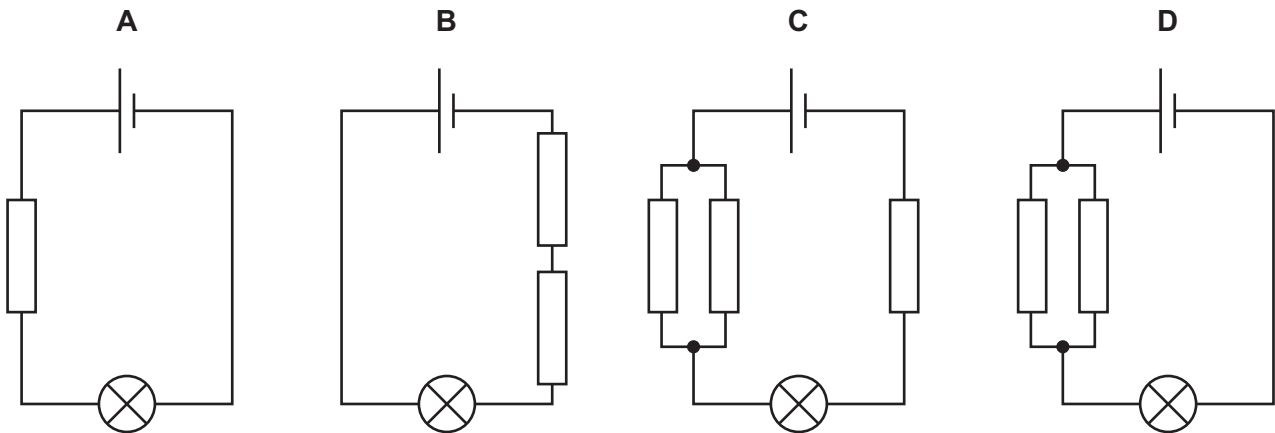
38 A potential difference (p.d.) of 10 V produces a current of 2.0 A in a resistor.

What is the resistance of the resistor?

- A**  $0.050\ \Omega$
- B**  $0.20\ \Omega$
- C**  $5.0\ \Omega$
- D**  $20\ \Omega$

**39** Four circuits contain identical cells, identical lamps and identical resistors.

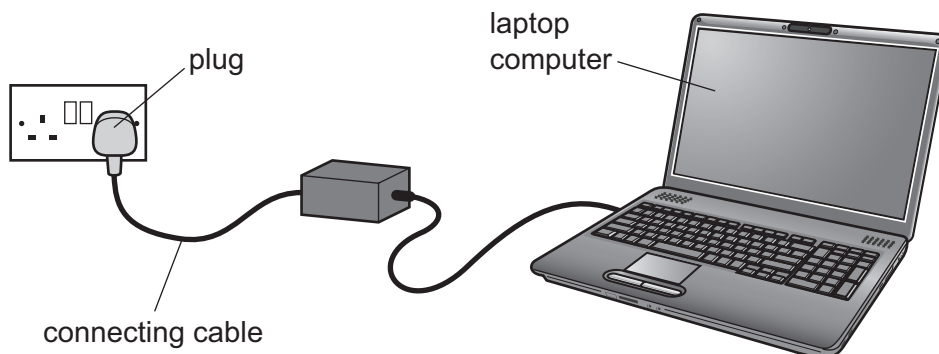
Which lamp glows most brightly?



**40** The charger for a laptop computer is connected by a cable to the mains supply through a plug.

The plug contains a 13 A fuse. The cable is designed to carry a current of 2 A.

A fault develops and the current in the cable increases to 5 A.



What is a possible danger caused by this larger current?

- A** A large amount of electrical energy is wasted.
- B** Somebody receives an electric shock.
- C** The fuse blows and starts a fire.
- D** The cable overheats and starts a fire.

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The Periodic Table of Elements

| Group                             |                                    |                                                                                             |                                        |                                    |                                     |                                    |                                  |                                     |                                       |                                      |                                      |                                    |                                      |                                   |                                   |                                  |                                  |  |  |
|-----------------------------------|------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|-------------------------------------|------------------------------------|----------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|--|--|
| I                                 | II                                 |                                                                                             |                                        |                                    |                                     |                                    |                                  |                                     |                                       |                                      |                                      | III                                | IV                                   | V                                 | VI                                | VII                              | VIII                             |  |  |
| 3<br><b>Li</b><br>lithium<br>7    | 4<br><b>Be</b><br>beryllium<br>9   | <div>Key</div> <div>atomic number<br/>atomic symbol<br/>name<br/>relative atomic mass</div> |                                        |                                    |                                     |                                    |                                  |                                     |                                       |                                      |                                      | 1<br><b>H</b><br>hydrogen<br>1     |                                      |                                   |                                   |                                  |                                  |  |  |
|                                   | 2<br><b>He</b><br>helium<br>4      |                                                                                             |                                        |                                    |                                     |                                    |                                  |                                     |                                       |                                      |                                      |                                    |                                      |                                   |                                   |                                  |                                  |  |  |
|                                   | 11<br><b>Na</b><br>sodium<br>23    |                                                                                             |                                        |                                    |                                     |                                    |                                  |                                     |                                       |                                      |                                      | 12<br><b>Mg</b><br>magnesium<br>24 |                                      |                                   |                                   |                                  |                                  |  |  |
|                                   | 19<br><b>K</b><br>potassium<br>39  |                                                                                             |                                        |                                    |                                     |                                    |                                  |                                     |                                       |                                      |                                      | 20<br><b>Ca</b><br>calcium<br>40   |                                      |                                   |                                   |                                  |                                  |  |  |
| 37<br><b>Rb</b><br>rubidium<br>85 | 38<br><b>Sr</b><br>strontium<br>88 | 21<br><b>Sc</b><br>scandium<br>45                                                           | 22<br><b>Ti</b><br>titanium<br>48      | 23<br><b>V</b><br>vanadium<br>51   | 24<br><b>Cr</b><br>chromium<br>52   | 25<br><b>Mn</b><br>manganese<br>55 | 26<br><b>Fe</b><br>iron<br>56    | 27<br><b>Co</b><br>cobalt<br>59     | 28<br><b>Ni</b><br>nickel<br>59       | 29<br><b>Cu</b><br>copper<br>64      | 30<br><b>Zn</b><br>zinc<br>65        | 31<br><b>Ga</b><br>gallium<br>70   | 32<br><b>Ge</b><br>germanium<br>73   | 33<br><b>As</b><br>arsenic<br>75  | 34<br><b>Se</b><br>selenium<br>79 | 35<br><b>Br</b><br>bromine<br>80 | 36<br><b>Kr</b><br>krypton<br>84 |  |  |
| 55<br><b>Cs</b><br>caesium<br>133 | 56<br><b>Ba</b><br>barium<br>137   | 57–71<br>lanthanoids                                                                        | 72<br><b>Hf</b><br>hafnium<br>178      | 73<br><b>Ta</b><br>tantalum<br>181 | 74<br><b>W</b><br>tungsten<br>184   | 75<br><b>Re</b><br>rhenium<br>186  | 76<br><b>Os</b><br>osmium<br>190 | 77<br><b>Ir</b><br>iridium<br>192   | 78<br><b>Pt</b><br>platinum<br>195    | 79<br><b>Au</b><br>gold<br>197       | 80<br><b>Hg</b><br>mercury<br>201    | 81<br><b>Tl</b><br>thallium<br>204 | 82<br><b>Pb</b><br>lead<br>207       | 83<br><b>Bi</b><br>bismuth<br>209 | 84<br><b>Po</b><br>polonium<br>—  | 85<br><b>At</b><br>astatine<br>— | 86<br><b>Rn</b><br>radon<br>—    |  |  |
| 87<br><b>Fr</b><br>francium<br>—  | 88<br><b>Ra</b><br>radium<br>—     | 89–103<br>actinoids                                                                         | 104<br><b>Rf</b><br>rutherfordium<br>— | 105<br><b>Db</b><br>dubnium<br>—   | 106<br><b>Sg</b><br>seaborgium<br>— | 107<br><b>Bh</b><br>bohrium<br>—   | 108<br><b>Hs</b><br>hassium<br>— | 109<br><b>Mt</b><br>meitnerium<br>— | 110<br><b>Ds</b><br>darmstadtium<br>— | 111<br><b>Rg</b><br>roentgenium<br>— | 112<br><b>Cn</b><br>copernicium<br>— | 114<br><b>Fl</b><br>flerovium<br>— | 116<br><b>Lv</b><br>livermorium<br>— |                                   |                                   |                                  |                                  |  |  |

lanthanoids

actinoids

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

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