



Cambridge O Level

COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

October/November 2020

1 hour

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.

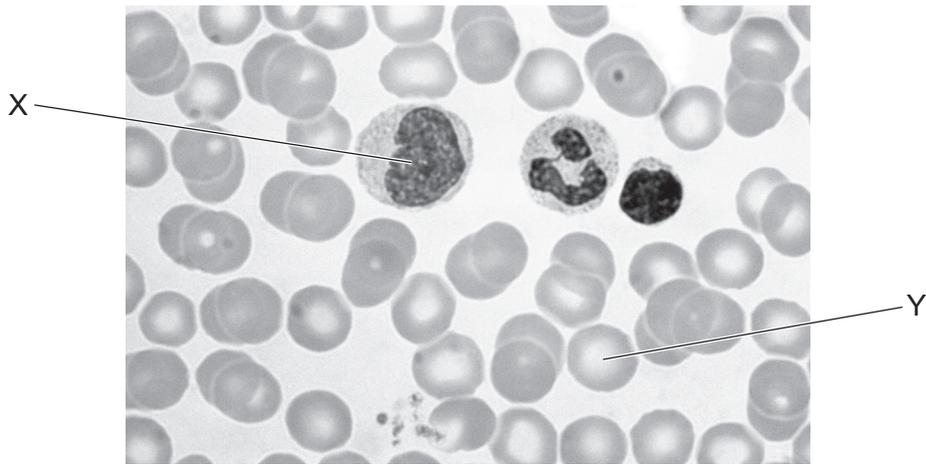
INFORMATION

- 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.



- 1 Some components of blood are shown in the photograph.

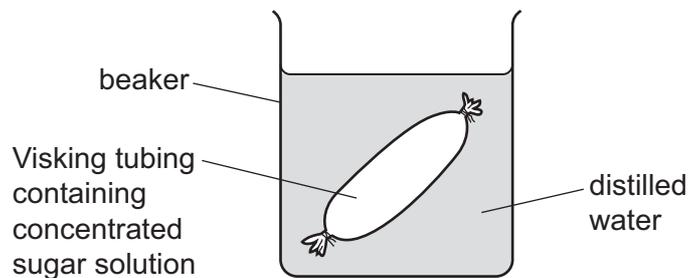


Which components are labelled X and Y in the photograph?

	X	Y
A	red blood cell	platelet
B	red blood cell	white blood cell
C	white blood cell	platelet
D	white blood cell	red blood cell

- 2 Visking tubing is a partially permeable membrane.

Some Visking tubing containing a concentrated sugar solution is weighed and placed in distilled water, as shown.



After two hours the Visking tubing is removed and re-weighed.

What happens to the mass and why?

- A** It decreases because sugar moves out.
- B** It decreases because water moves out.
- C** It increases because sugar moves in.
- D** It increases because water moves in.

- 3 The stomata of the leaves of many plants remain open all day and all night.

Which row shows the **overall** diffusion of gases through the stomata of such plants?

	during the day	during the night
A	carbon dioxide into the leaf	oxygen out of the leaf
B	carbon dioxide out of the leaf	oxygen into the leaf
C	oxygen into the leaf	carbon dioxide into the leaf
D	oxygen out of the leaf	carbon dioxide out of the leaf

- 4 Which person is most likely to have the largest energy requirement?

- A** an active 20-year-old man
- B** an active 20-year-old woman
- C** an active 60-year-old man
- D** an active 60-year-old woman

- 5 Why do plants wilt?

- A** Sugars are made by photosynthesis faster than water is lost by transpiration.
- B** Sugars move down the phloem faster than water is absorbed through root hair cells.
- C** Water is lost by transpiration faster than water is absorbed by root hair cells.
- D** Water moves up the xylem faster than sugars move down the phloem.

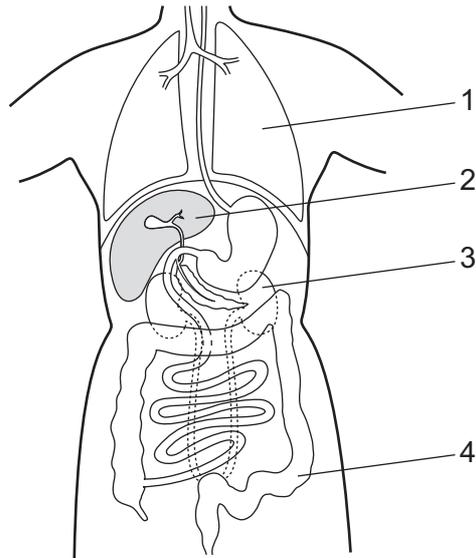
- 6 Which action increases the risk of coronary heart disease?

- A** decreasing fat in the diet
- B** decreasing smoking
- C** increasing physical exercise
- D** increasing salt in the diet

- 7 Which statement about respiration is correct?

- A** Aerobic respiration produces carbon dioxide and water and releases more energy than anaerobic respiration.
- B** Aerobic respiration produces lactic acid and releases less energy than anaerobic respiration.
- C** Anaerobic respiration produces carbon dioxide and water and releases less energy than aerobic respiration.
- D** Anaerobic respiration produces lactic acid and releases more energy than aerobic respiration.

- 8 The diagram shows a body outline with some of the organs labelled 1, 2, 3 and 4.



Urea, carbon dioxide and water are excreted from the body.

Which row correctly shows where urea and carbon dioxide are excreted?

	urea	carbon dioxide
A	2	1
B	2	4
C	3	1
D	3	4

- 9 Which component of the blood transports hormones around the body?

- A** plasma
- B** platelets
- C** red blood cells
- D** white blood cells

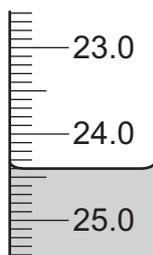
- 10 What are the effects of alcohol and heroin on the body?

	alcohol	heroin
A	depressant	depressant
B	depressant	stimulant
C	stimulant	depressant
D	stimulant	stimulant

- 11 Tropical rainforests are being destroyed by human activity. Cutting down the trees can change the concentration of gases in the atmosphere.

What is the most likely result of cutting down the trees?

- A less carbon dioxide and less oxygen in the atmosphere
 - B less carbon dioxide and more oxygen in the atmosphere
 - C less oxygen and more water vapour in the atmosphere
 - D more carbon dioxide and less water vapour in the atmosphere
- 12 Which statement about asexual reproduction is correct?
- A Asexual reproduction only occurs in plants.
 - B Offspring produced are not genetically identical.
 - C Only one parent is needed for asexual reproduction.
 - D The offspring are formed from a zygote.
- 13 Which method of birth control can give protection against infection by syphilis?
- A hormonal
 - B mechanical
 - C natural
 - D surgical
- 14 Part of a burette is shown.



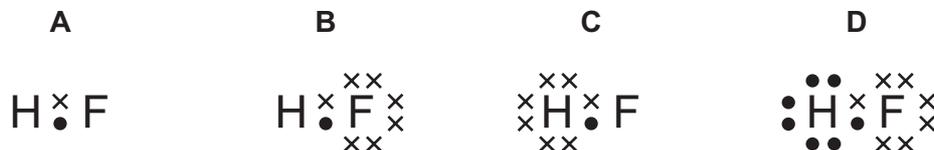
What is the reading on the burette?

- A 24.30
 - B 24.40
 - C 25.60
 - D 25.70
- 15 Which statement about isotopes of the same element is correct?
- A They have different chemical properties.
 - B They have different numbers of protons.
 - C They have the same nucleon number.
 - D They have the same number of electrons in their outer shell.

16 Which particle contains the same number of electrons as an atom of neon?

- A Cl^- B Li C Li^+ D O^{2-}

17 Which diagram shows the outer electrons in a molecule of hydrogen fluoride, HF?



18 The equation for the decomposition of calcium carbonate is shown.



Which mass of calcium oxide is produced from 10.0 g of calcium carbonate?

- A 4.4 g B 5.0 g C 5.6 g D 10.0 g

19 Which statement describes a solution that contains hydrogen ions?

- A It reacts with acids to produce salt.
 B It reacts with ammonium chloride to produce a gas which turns red litmus paper blue.
 C It reacts with metals to produce a gas which pops with a lighted splint.
 D It turns red litmus paper blue.

20 X and Y are two elements in the same period of the Periodic Table.

Y is to the right of X in the period.

Which statement is correct?

- A X and Y have similar properties.
 B X has more electron shells than Y.
 C X has more nucleons than Y.
 D X has more metallic character than Y.

21 Four different metals are reacted separately with cold water, steam and dilute hydrochloric acid.

The results are shown.

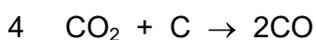
metal	cold water	steam	dilute hydrochloric acid
W	no reaction	reacts slowly	reacts vigorously
X	no reaction	no reaction	reacts slowly
Y	reacts slowly	reacts vigorously	reacts explosively
Z	reacts slowly	reacts slowly	reacts vigorously

What is the order of reactivity of the four metals?

	least reactive \longrightarrow most reactive			
A	X	W	Z	Y
B	X	Z	W	Y
C	Y	W	Z	X
D	Y	Z	W	X

22 A number of different reactions take place in the blast furnace.

The equations for some of these reactions are shown.



Which statement about these reactions is correct?

- A** Reaction 1 increases the temperature.
- B** Reaction 3 is a redox reaction.
- C** Reaction 4 is thermal decomposition.
- D** Reaction 5 removes impurities from the iron.

23 Which noble gas is most abundant in clean air?

- A argon
- B helium
- C krypton
- D neon

24 Some reactions of nitrogen and its compounds are shown.

- 1 $\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$
- 2 $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$
- 3 $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
- 4 $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4$

Which reactions are used in the manufacture of the fertiliser ammonium sulfate?

- A 1 and 2 B 1 and 3 C 2 and 4 D 3 and 4

25 What is the main constituent of natural gas?

- A ethene
- B methane
- C nitrogen
- D oxygen

26 The equation shows the cracking of a hydrocarbon.



What is X?

- A C_9H_{20} B C_7H_{20} C C_7H_{16} D C_2H_4

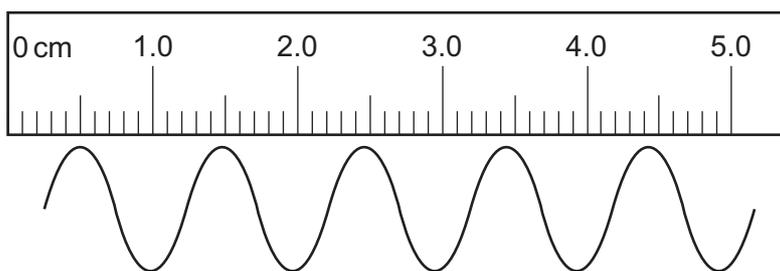
27 Ethanol is made by reacting ethene with steam.

Ethanol is also made by the fermentation of sugar obtained from plants.

Which statement is correct?

- A Fermentation is a faster process than reacting ethene and steam.
- B Fermentation produces ethanol from a renewable source.
- C Reacting ethene with steam produces impure ethanol.
- D Reacting ethene with steam uses very little energy.

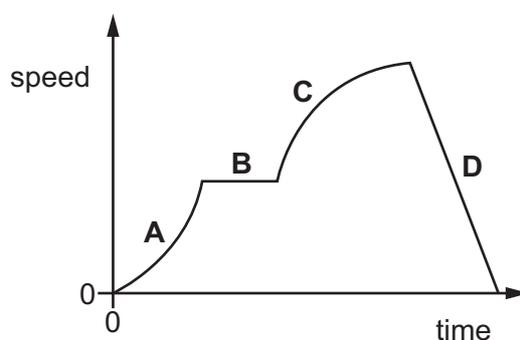
28 The diagram shows a wave measured with a ruler.



What is the wavelength of the wave?

- A** 0.98 cm **B** 1.5 cm **C** 3.9 cm **D** 4.4 cm

29 Which part of the speed–time graph shows constant non-zero acceleration?

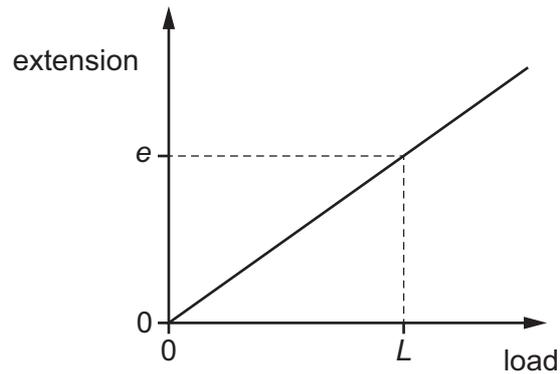


30 The driving force on a moving car of mass 1000 kg is 2000 N. The car is moving along a level road. The frictional force opposing the motion is 1500 N.

What are the values of the acceleration and the accelerating force?

	<u>acceleration</u> m/s ²	resultant force /N
A	0.50	500
B	2.00	500
C	0.50	2000
D	2.00	2000

31 The diagram shows an extension–load graph for an elastic object.



A load of L produces an extension of e .

What happens when the load L is removed?

- A The extension continues to increase.
- B The extension reduces but does not return to zero.
- C The extension stays at e .
- D The extension returns to zero.

32 A metal cooking pan is used to heat up a liquid.



How does placing a lid on the pan reduce heat loss?

- A by reducing conduction through the air above the surface of the liquid
- B by reducing conduction through the liquid
- C by reducing convection in the air above the surface of the liquid
- D by reducing convection in the liquid

33 The frequency of some radio waves is 2.0×10^8 Hz.

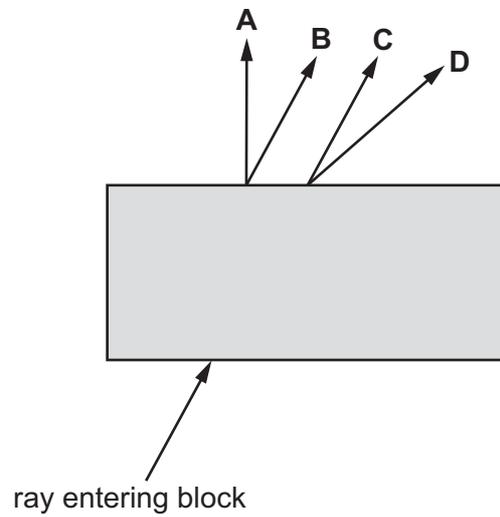
The speed of the waves is 3.0×10^8 m/s.

What is the wavelength?

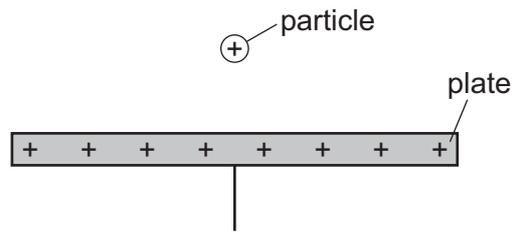
- A 0.67 m
- B 1.5 m
- C 1.0×10^8 m
- D 6.0×10^{16} m

34 The diagram shows a ray of light incident on a rectangular glass block.

Which arrow shows the correct path for the ray of light leaving the block?

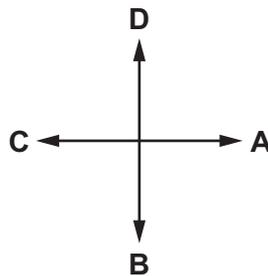


- 35 A positively charged particle with a very small mass is held stationary above a positively charged plate.



The particle is released.

Which arrow shows the direction in which the particle begins to move?



- 36 A 6.0 V electrical heater is switched on and transfers 360 J of electrical energy to thermal energy in a time of 2.0 minutes.

What was the current in the heater?

- A 0.033 A B 0.5 A C 2.0 A D 30 A
- 37 In which is a magnet **not** found?
- A a.c. generator
 B electric light bulb
 C machine for sorting metals at a recycling plant
 D compass
- 38 A permanent magnet is moved past a stationary coil and a voltage is induced across the coil.
- What produces a smaller induced voltage?
- A an iron core inside the coil
 B the magnet moving faster
 C the magnet moving slower
 D the magnet moving at the same speed in the opposite direction

39 How many electrons are there in an atom of ${}_{53}^{127}\text{I}$?

- A 53 B 74 C 127 D 180

40 An amateur scientist keeps some samples of radioactive rocks in a paper envelope.

Which radiations **cannot** get through the paper of the envelope?

- A alpha-particles and beta-particles
B alpha-particles only
C beta-particles and gamma-rays
D gamma-rays only

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The Periodic Table of Elements

		Group																				
I	II	III	IV	V	VI	VII	VIII															
3 Li lithium 7	4 Be beryllium 9	11 Na sodium 23	12 Mg magnesium 24	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	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 Ac actinium —	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

1
H
hydrogen
1

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
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 —

lanthanoids

actinoids

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).