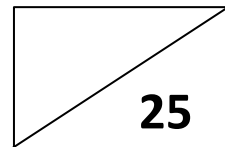




2025 SECONDARY 2 SCIENCE

Past Year Papers Practice 4

Duration: 35 minutes



Name: _____ () Class: 2/ _____

Section A – Multiple Choice Questions (5 marks)

Each question is worth 1 mark.

Answer all questions in this section in the table provided below.

1.		2.		3.		4.		5.	
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1. Which statement about atoms is correct?

- A** The mass of an atom is almost entirely due to its nucleus. A
- B** The protons and neutrons attract each other.
- C** The protons and neutrons have opposite charges.
- D** The shell furthest away from the nucleus always contain the most electrons.

2. Three elements W, X and Y are found one after another, in the same period in the Periodic Table. They have increasing proton (atomic) numbers. If element Y is a noble gas, which row about the formation of the ions of element W is correct?

	each atom of element W	ions of element W are
A	gains one electron	negatively charged
B	gains two electrons	negatively charged
C	loses one electron	positively charged
D	loses two electrons	positively charged

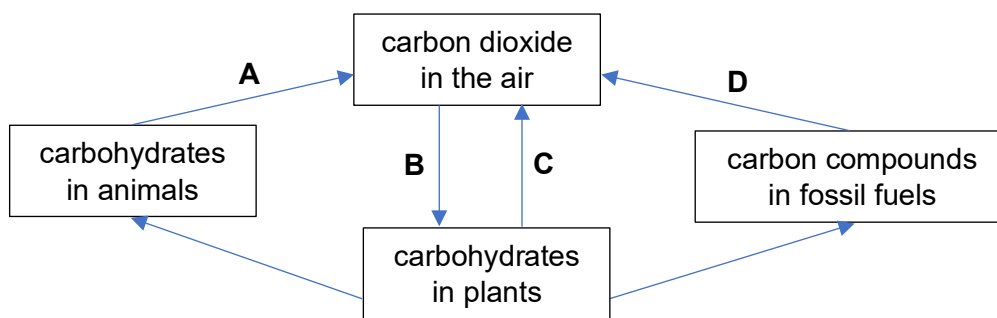
C

3. A piece of red litmus paper was immersed in an unknown solution and removed after a minute. The red litmus paper remained red.

Which is a valid conclusion about the unknown solution?

- A** The solution cannot be alkaline. A
- B** The solution may turn Universal Indicator blue.
- C** The pH of the solution cannot be 7.
- D** The pH of the solution can be higher than 7.

4. The diagram shows part of the carbon cycle. Which stage releases oxygen gas into the atmosphere?



5. Which human action is **not** paired correctly with its effects on the environment?

	human action	effects on the environment
A	bring reusable bag to do shopping	reduces the use of plastic bags
B	increase rate of reforestation	increases the carbon dioxide in the air by reducing carbon store
C	take public transport or walk	reduces the combustion of fossil fuels
D	wasting food	depletes energy, water and natural resources

B

Section B – Structured Questions (20 marks)
Answer all of the questions in the spaces provided.

6. (a) Use the Periodic Table provided to complete the following table. [2]

particle	symbol	number of			electronic structure
		proton	neutron	electron	
nitrogen atom	N	7	7	7	2.5
sodium ion	$^{23}_{11}\text{Na}^+$	11	12	11	2.8

- (b) Two nitrogen atoms can combine chemically to form a nitrogen molecule, N₂. [1]

Determine the relative molecular mass of N₂.

$14.0 \times 2 = 28$

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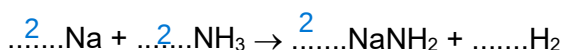
- (c) Element Z has two naturally occurring isotopes:
- Isotope Z-63 with a relative abundance of 69.2%
 - Isotope Z-65 with a relative abundance of 30.8%

Calculate the relative atomic mass of element Z. Show your working clearly and give your answer to 1 decimal place. [1]

$63 \times 69.2 + 65 \times 30.8 / 100$

- (d) Study the following chemical equation.

Where necessary, write whole numbers in the spaces provided to balance the chemical equation. [1]



[Total: 5]

7. (a) Identify the type of chemical change described in each of the following scenarios. [1]

scenario	type of chemical change
When copper(II) carbonate is heated strongly, the solid turns from green to black and carbon dioxide gas is evolved.	THERMAL DECOMPOSITION
Rust forms at the iron legs of a table after some time.	chemical

- (b) Using the setup in Figure 7.1, the water is broken down to form hydrogen gas and oxygen gas by passing an electric current through it. This is known as electrolysis. Effervescence is observed around both carbon electrodes.

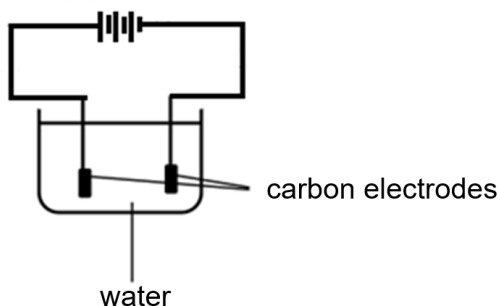


Figure 7.1

- (i) Is this a physical change or a chemical change? Explain why. [1]

Chemical because there is a change of state from liquid to gas

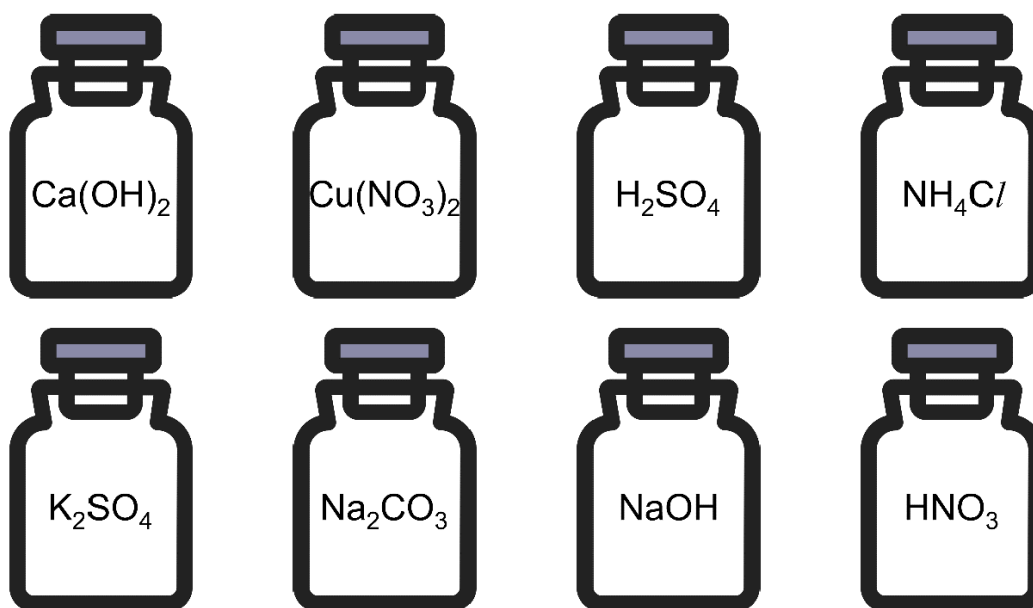
- (ii) Describe a test to confirm that the gas evolved at one of the electrodes in Figure 7.1 is hydrogen. [2]

Place a burning splint near to the electrodes and see if it extinguishes

[Total: 4]

8. Helen was working in her school's Science laboratory. The following reagents were on the laboratory work bench in front of Helen.

Note: All the reagents are in aqueous solution.



- (a) From the list of chemicals that are available to Helen in the laboratory, write the **chemical names** of **two** reagents that Helen could react together to form ammonia gas. [1]

NH_4Cl $\text{Ca}(\text{OH})_2$

- (b) From the list of chemicals that are available to Helen in the laboratory, write the chemical **names** of **two** reagents that Helen could react together to form carbon dioxide gas. [1]

H_2SO_4 Na_2CO_3

- (c) Write a balanced chemical equation for the reaction that takes place when the reagents named in 15 (b) react together.

Note: State symbols are **not** required.

[1]

[Total: 3]

9. Canadian pondweed is a species of aquatic plant from North America. A student grew Canadian pondweed along with another species of pondweed native to Singapore, in water tanks both separately and together. Figure 9.1 shows the results.

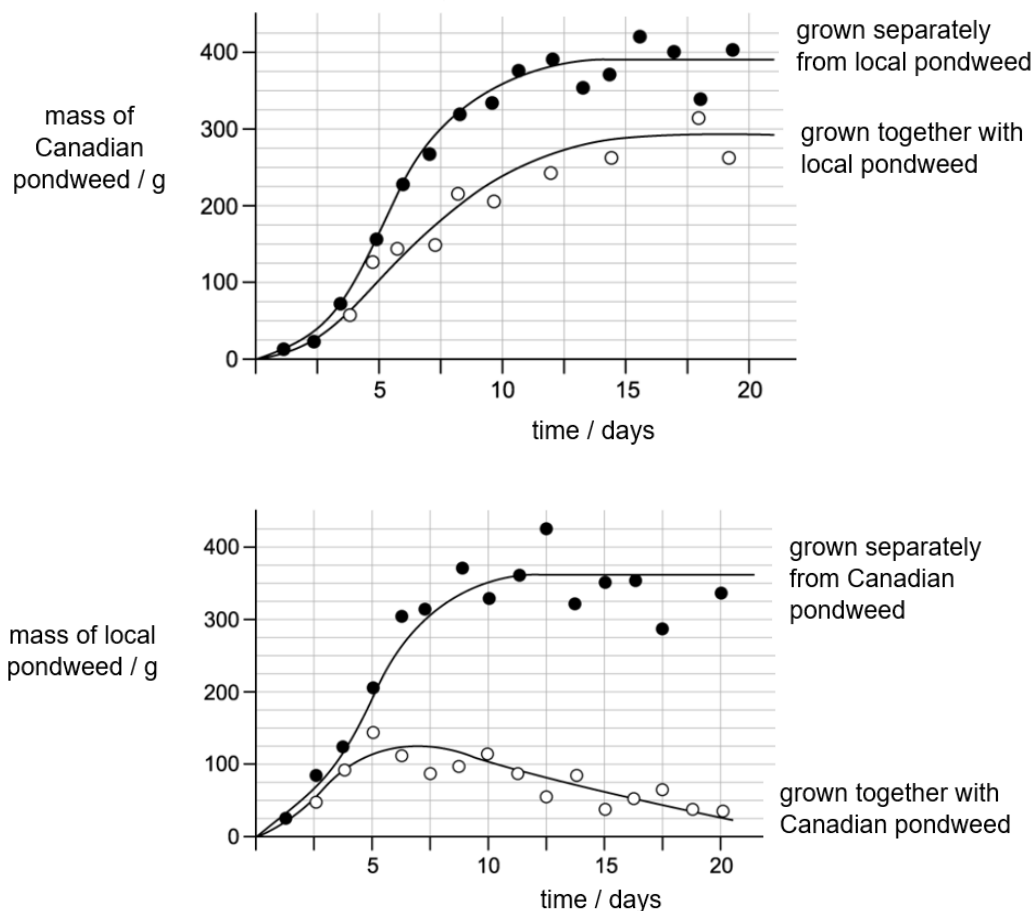


Figure 9.1

- (a) Besides light intensity and temperature, state one other physical factor that should be kept constant and explain how it affects pondweed growth. [1]

.....

.....

- (b) Describe the results when both species of pondweeds were grown together. [2]

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.....

- (c) Suggest what would happen if the Canadian pondweed were introduced into Singapore's local pond ecosystem. [1]

.....

.....

[Total: 4]

10. Figure 10.1 shows some lichen on the bark of trees. Lichen is made up of two types of organisms, algae and fungi growing together.



Figure 10.1

Figure 10.2 shows the cross-section of a type of lichen.

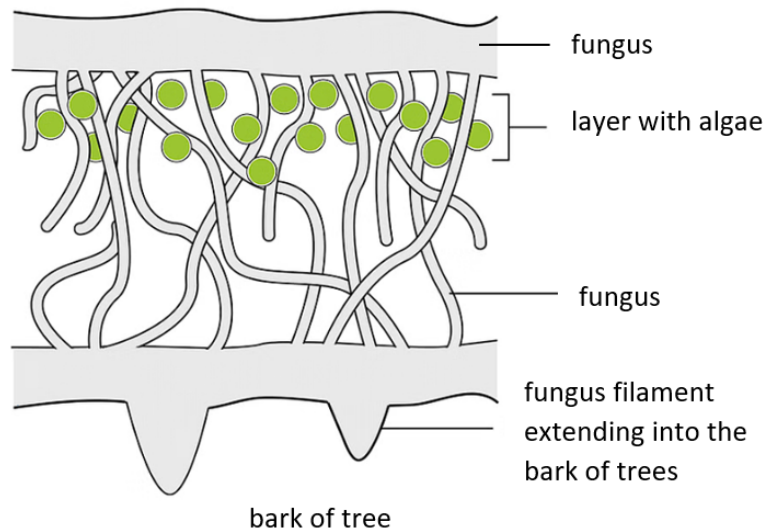


Figure 10.2

- (a) Algae contains chloroplasts while fungi have cell wall that is made up of chitin that is relatively strong and water-proof.

Suggest how algae and fungi benefit from their association with each other. [2]

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.....

- (b) State the relationship between the algae and fungi. [1]

.....

- (c) Lichens are sensitive to pollution as they can take up chemicals in the air.

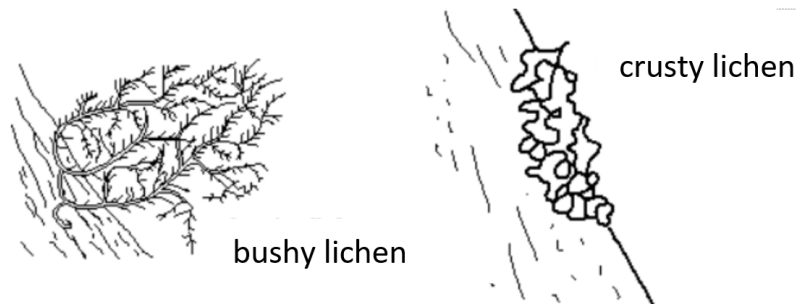


Figure 10.3

Using Figure 10.3, explain why bushy lichens are usually more sensitive to pollution. [1]

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[Total: 4]

Group																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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lanthanoids	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
	lanthanum	cerium	praseodymium	neodymium	promethium	samarium	euroium	gadolinium	terbium	dysprosium	holmium	erbium	thulium	ytterbium	lutetium	
	138.9	140.1	140.9	144.2	—	150.4	152.0	157.3	158.9	162.5	164.9	167.3	168.9	173.1	175.0	
	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	
	actinium	thorium	protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	californium	einsteinium	fermium	mendelevium	nobelium	lawrencium	
	—	232.0	231.0	238.0	—	—	—	—	—	—	—	—	—	—	—	
	actinoids	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
actinium		thorium	protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	californium	einsteinium	fermium	mendelevium	nobelium	lawrencium	
—		232.0	231.0	238.0	—	—	—	—	—	—	—	—	—	—	—	
89		90	91	92	93	94	95	96	97	98	99	100	101	102	103	
Ac		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	
actinium		thorium	protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	californium	einsteinium	fermium	mendelevium	nobelium	lawrencium	
—		232.0	231.0	238.0	—	—	—	—	—	—	—	—	—	—	—	
89		90	91	92	93	94	95	96	97	98	99	100	101	102	103	
Ac		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	
actinium	thorium	protactinium	uranium	neptunium	plutonium	americium	curium	berkelium	californium	einsteinium	fermium	mendelevium	nobelium	lawrencium		
—	232.0	231.0	238.0	—	—	—	—	—	—	—	—	—	—	—		