

CHEMISTRY 9-1

0971 P1

2020 — 2025

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1 - (0971/11_Summer_2020_Q1)

Nitrogen is heated in a balloon, which expands slightly.

Which statements about the molecules of nitrogen are correct?

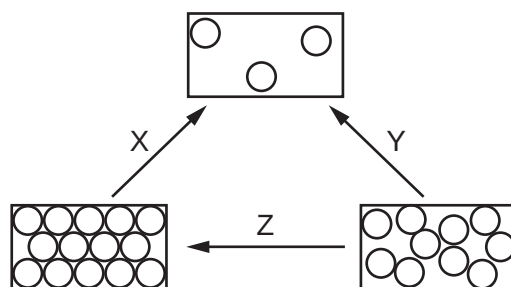
- 1 They move further apart.
- 2 They move more quickly.
- 3 They remain the same distance apart.
- 4 Their speed remains unchanged.

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

2 - (0971/12_Summer_2020_Q1)

Each rectangle shows the arrangement of particles in each of the three states of matter.

X, Y and Z represent the processes needed to change from one state to another.

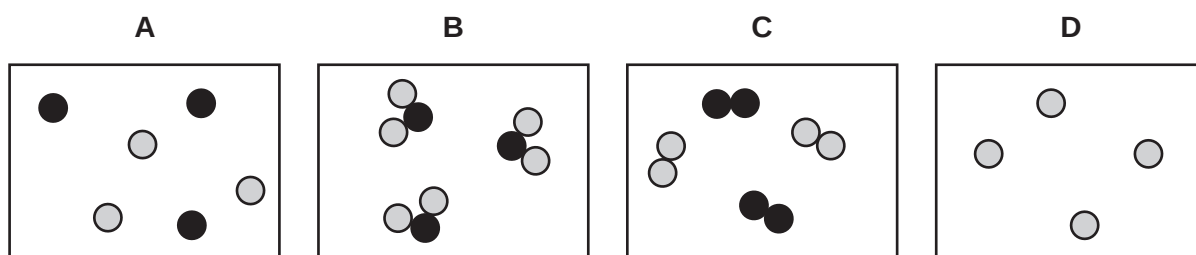


What are the processes X, Y and Z?

	X	Y	Z
A	evaporating	subliming	condensing
B	evaporating	subliming	freezing
C	subliming	evaporating	condensing
D	subliming	evaporating	freezing

3 - (0971/12_Summer_2020_Q23)

Which diagram shows a mixture of noble gases?



4 - (0971/12_Winter_2020_Q1)

'The movement of a substance **very slowly** from an area of high concentration to an area of low concentration.'

Which process is being described?

- A** a liquid being frozen
- B** a solid melting
- C** a substance diffusing through a liquid
- D** a substance diffusing through the air

5 - (0971/12_Winter_2020_Q2)

Oxygen melts at -219°C and boils at -183°C .

At which temperature is oxygen a liquid?

- A** -225°C **B** -189°C **C** -175°C **D** 25°C

6 - (0971/11_Summer_2021_Q1)

Which row describes the arrangement and movement of particles in a liquid?

	arrangement of particles	movement of particles
A	touching and regular	vibrating
B	touching and random	moving around each other
C	touching and regular	moving around each other
D	touching and random	moving very fast

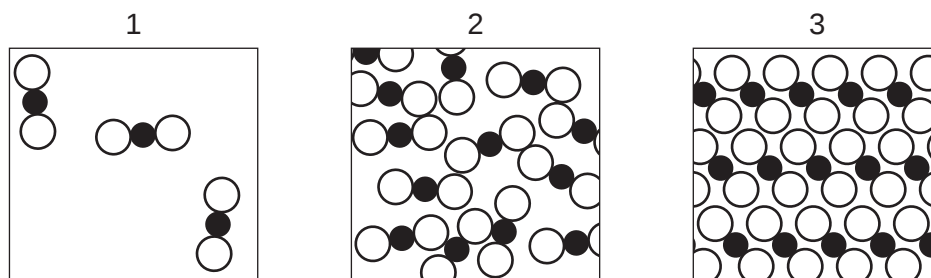
7 - (0971/12_Winter_2021_Q1)

Which row describes what happens to the particles in solid iodine when it is heated and turned into a gas?

	separation of particles	speed of particles
A	closer together	faster
B	closer together	slower
C	further apart	faster
D	further apart	slower

8 - (0971/11_Summer_2022_Q1)

Diagrams of the three states of matter for carbon dioxide are shown.



Which two diagrams show the states of matter before and after the sublimation of carbon dioxide?

- A** 2 to 1 **B** 2 to 3 **C** 3 to 1 **D** 3 to 2

9 - (0971/12_Summer_2022_Q1)

Substances change state when their temperature is changed.

Which changes of state take place when the temperature of a substance is lowered?

- 1 boiling
- 2 condensation
- 3 freezing
- 4 melting

- A** 1 and 4 **B** 2, 3 and 4 **C** 2 and 3 only **D** 3 only

10 - (0971/12_Winter_2022_Q1)

Which statement describes the particles in a liquid?

- A** They are close together but have no regular arrangement.
- B** They are densely packed in a regular order.
- C** They move freely at high speed and are widely spaced.
- D** They vibrate but do not move from a fixed position.

11 - (0971/12_Winter_2022_Q12)

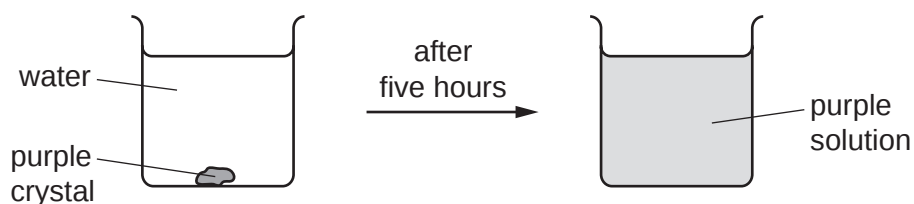
Some properties of four fuels are shown.

Which fuel is a gas at room temperature and makes two products when it burns in a plentiful supply of air?

	fuel	formula	melting point / °C	boiling point / °C
A	hydrogen	H ₂	-259	-253
B	methane	CH ₄	-182	-164
C	octane	C ₈ H ₁₈	-57	126
D	wax	C ₃₁ H ₆₄	60	400

12 - (0971/11_Summer_2023_Q1)

The diagram shows the result of dropping a purple crystal into water.

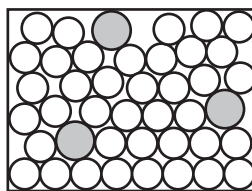


Which processes take place in this experiment?

	chemical reaction	diffusing	dissolving
A	✓	✓	✗
B	✓	✗	✗
C	✗	✗	✓
D	✗	✓	✓

13 - (0971/11_Summer_2023_Q25)

The diagram represents the structure of a solid.



Which solids does the diagram represent?

	brass	graphite	sodium chloride
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

14 - (0971/12_Summer_2023_Q1)

Four physical changes of ethanol are listed.

- 1 condensation
- 2 evaporation
- 3 freezing
- 4 boiling

In which changes do the particles move further apart?

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

15 - (0971/12_Winter_2023_Q1)

The melting points and boiling points of four elements are shown.

element	melting point/°C	boiling point/°C
W	−7	60
X	−101	−34
Y	114	184
Z	39	688

In which elements do the particles vibrate about fixed positions at 0 °C?

- A** W and X **B** W and Z **C** X and Y **D** Y and Z

16 - (0971/12_Winter_2023_Q6)

Which row describes the properties of a simple molecular substance?

	boiling point	electrical conductivity when solid
A	low	poor
B	high	poor
C	low	good
D	high	good

17 - (0971/11_Summer_2024_Q1)

The boiling point of sodium is 890 °C.

What happens to sodium atoms as the temperature of a sample of sodium changes from 950 °C to 900 °C?

- A** The atoms move more quickly and bonds are formed.
B The atoms move more quickly and bonds are neither broken nor formed.
C The atoms move more slowly and bonds are formed.
D The atoms move more slowly and bonds are neither broken nor formed.

18 - (0971/11_Summer_2024_Q2)

Which row shows the conditions for the particles of a gas colliding most frequently?

	pressure	temperature
A	high	high
B	high	low
C	low	high
D	low	low

19 - (0971/12_Summer_2024_Q1)

Which statement about gases is correct?

- A** Gases are difficult to compress when pressure is applied.
- B** The particles in gases are close together.
- C** The particles in gases have a random arrangement.
- D** The particles in gases move slowly past each other.

20 - (0971/12_Summer_2024_Q2)

A sample of argon gas is heated in a closed container.

Which row describes what happens to the pressure and the size of the argon atoms?

	pressure	size
A	decreases	increases
B	decreases	stays the same
C	increases	increases
D	increases	stays the same

21 - (0971/12_Winter_2024_Q1)

The table shows some information about the three states of matter.

	particle separation	particle arrangement	type of motion
1	touching with some particles having spaces between them	random	slide past each other at low speed
2	particles are far apart	random	rapid motion in straight lines
3	touching with very little space between the particles	regular	vibration only

Which row is correct?

	1	2	3
A	gas	liquid	solid
B	liquid	solid	gas
C	liquid	gas	solid
D	solid	gas	liquid

22 - (0971/12_Winter_2024_Q2)

Which arrow represents evaporation?



23 - (0971/12_Winter_2024_Q3)

In which states of matter does diffusion occur readily?

- A** gases and liquids
- B** gases only
- C** liquids and solids
- D** solids only

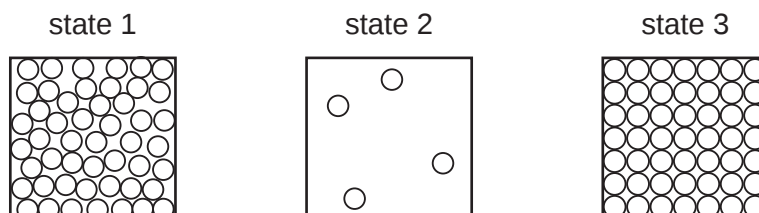
24 - (0971/11_Summer_2025_Q1)

Which process happens when water vapour changes to rain?

- A** boiling
- B** condensing
- C** evaporating
- D** freezing

25 - (0971/11_Summer_2025_Q2)

The diagrams show the arrangement of particles in three different states of matter.



Which row describes the change in energy of the particles and in particle motion for the given change in state?

	change in state	energy of particles	particle motion
A	1 → 2	decreases	decreases
B	2 → 1	decreases	increases
C	3 → 1	increases	increases
D	1 → 3	increases	decreases

26 - (0971/11_Summer_2025_Q14)

When a small piece of a Group I metal is placed into a large beaker of cold water, a reaction occurs.

Four statements about this reaction are listed.

- 1 The metal melts.
- 2 Hydrogen is produced.
- 3 Steam is produced.
- 4 The pH of the solution increases.

Which statements about this reaction describe a physical change?

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

27 - (0971/12_Summer_2025_Q1)

Substance L melts at -7°C and is a brown liquid at room temperature.

What is the boiling point of pure L?

- A** -77°C
- B** -7°C to $+7^{\circ}\text{C}$
- C** 59°C
- D** 107°C to 117°C

28 - (0971/12_Summer_2025_Q2)

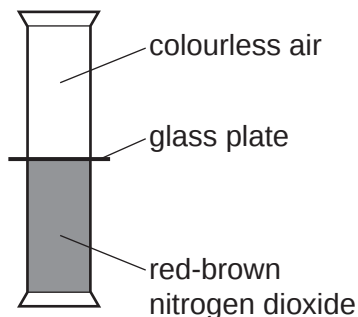
Which row describes how the volume of a gas changes when its temperature is increased at constant pressure and when its pressure is increased at constant temperature?

	temperature is increased at constant pressure	pressure is increased at constant temperature
A	volume decreases	volume decreases
B	volume decreases	volume increases
C	volume increases	volume decreases
D	volume increases	volume increases

29 - (0971/12_Summer_2025_Q3)

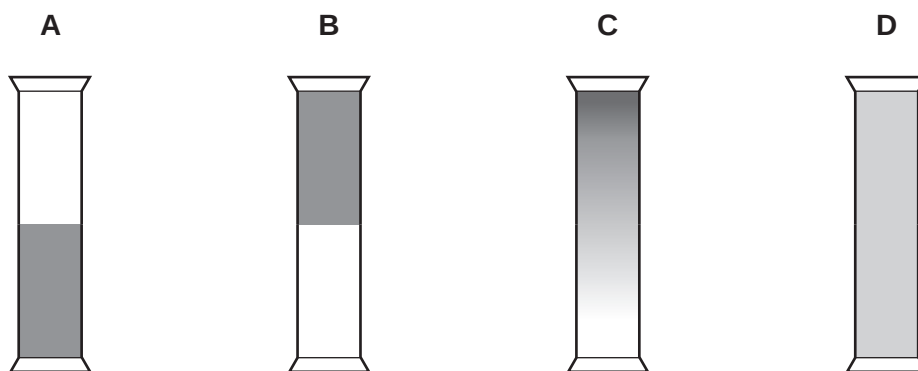
Nitrogen dioxide is a red-brown gas which is more dense than air.

The diagram shows the arrangement of two gas jars which contain nitrogen dioxide and air separated with a glass plate.



The glass plate is removed, and the gas jars are left for 24 hours.

Which diagram shows the gas jars after 24 hours?



30 - (0971/12_Winter_2025_Q1)

Water exists as solid ice, liquid water and steam.

In which states can water easily be compressed to half its original volume?

- A ice, liquid water and steam
- B liquid water and steam only
- C liquid water only
- D steam only

31 - (0971/12_Winter_2025_Q2)

The melting point of sulfur is 113°C .

Which row describes the arrangement and movement of sulfur particles at 25°C ?

	arrangement of particles	movement of particles
A	regular	vibrate about fixed positions
B	regular	random
C	random	vibrate about fixed positions
D	random	random

1 – A	21 – C	41 –	61 –	81 –
2 – D	22 – B	42 –	62 –	82 –
3 – A	23 – A	43 –	63 –	83 –
4 – C	24 – B	44 –	64 –	84 –
5 – B	25 – C	45 –	65 –	85 –
6 – B	26 – A	46 –	66 –	86 –
7 – C	27 – C	47 –	67 –	87 –
8 – C	28 – C	48 –	68 –	88 –
9 – C	29 – D	49 –	69 –	89 –
10 – A	30 – D	50 –	70 –	90 –
11 – B	31 – A	51 –	71 –	91 –
12 – D	32 –	52 –	72 –	92 –
13 – B	33 –	53 –	73 –	93 –
14 – C	34 –	54 –	74 –	94 –
15 – D	35 –	55 –	75 –	95 –
16 – A	36 –	56 –	76 –	96 –
17 – D	37 –	57 –	77 –	97 –
18 – A	38 –	58 –	78 –	98 –
19 – C	39 –	59 –	79 –	99 –
20 – D	40 –	60 –	80 –	100 –

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