

SECTION A

Objective (20 marks)

1. Diagram 1 shows a safety equipment found in a laboratory.



Rajah 1

What is the function of this equipment?

- A A specially designed equipment to carry out experiments that release toxic vapours, flammable or pungent smells
- B Used to wash and clean the body when accident occurs on parts of the body
- C Used for extinguishing fire in the laboratory
- D Used to remove chemical substances, oil, dirt and microorganisms from the hands
2. Table 1 shows the melting points and boiling points of substances P, Q, R and S.

Substance	Melting point ($^{\circ}\text{C}$)	Boiling point ($^{\circ}\text{C}$)
P	-75	-15
Q	-20	97
R	35	147
S	5	120

Table 1

Which substances is a liquid at room temperature?

- A Q only
- B R only
- C Q and S
- D R and S

3. Diagram 2 shows the arrangement of particles of a substance that undergo change in the physical state through process Y.

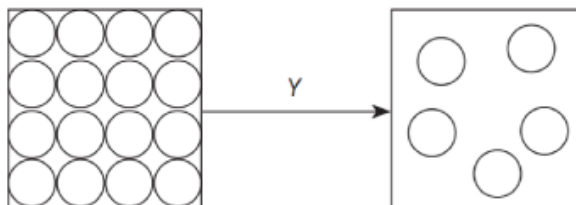


Diagram 2

Which of the following substances undergo process Y?

- I Bromine
 - II Iodine
 - III Chlorine
 - IV Naphthalene
- A I and IV
 - B I and III
 - C II and III
 - D II and IV
4. A calcium atom has 20 protons and its nucleon number is 40. A calcium ion, Ca^{2+} is formed when a calcium donates 2 electrons.
- How many neutrons in a calcium ion, Ca^{2+} ?
- A 20
 - B 22
 - C 18
 - D 40
5. The statements below show the information of an atomic structure model.

Discovered neutral particles, that are neutrons in the nucleus.
Neutrons contribute almost half of the mass of an atom.

Who are the scientists who identify this?

- A JJ Thomson
- B Ernest Rutherford
- C James Chadwick
- D Niels Bohr

6. Diagram 3 shows the heating curve of solid acetic acid.

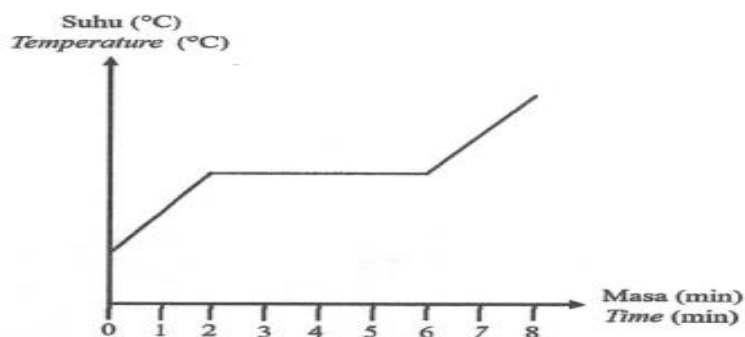


Diagram 3

Which statement can be deduced from Diagram 3?

- A No heat is absorbed in the first 2 minutes
- B Acetic acid needs 8 minutes to melt completely
- C Acetic acid undergoes physical changes between second minute to sixth minute
- D The attractive forces between particles of acetic acid become stronger after 6 minutes

7. Chemical equation can be interpreted qualitatively and quantitatively.

Which of the following is the balanced chemical equation for the following reactions?

Sodium metal reacts with water to produce aqueous solution of sodium hydroxide and hydrogen gas

- A $\text{Na}_2 + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + 2\text{H}$
- B $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$
- C $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}$
- D $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$

8. What is the number of atoms in 0.5 mol of carbon dioxide gas?

[Avogadro constant = $6.02 \times 10^{23} \text{ mol}^{-1}$]

- A $3 \times 6.02 \times 10^{23}$
- B $0.5 \times 6.02 \times 10^{23}$
- C $0.5 \times 3 \times 6.02 \times 10^{23}$
- D $0.5 \times 2 \times 6.02 \times 10^{23}$

9. Which of the following statements is true about 1 mole of substance?

- A 1 mole of copper contains 6.02×10^{23} molecule
- B 1 mole of neon gas contains 6.02×10^{23} atoms
- C 1 mole of oxygen gas contains 6.02×10^{23} atoms
- D 1 mole of water contains 6.02×10^{23} atoms

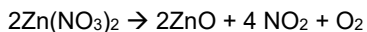
10. Which of the following is the correct pair of compounds and its chemical formula?

	Compound	Chemical formula
A	Sodium oxide	NaO
B	Potassium chloride	KCl ₂
C	Copper (II) nitrate	CuNO ₃
D	Lead (II) chloride	PbCl ₂

11. The chemical formulae of calcium nitrate and potassium phosphate are Ca(NO₃)₂ and K₃PO₄ respectively.
What is the chemical formula of calcium phosphate?

- A Ca(PO₄)₃
- B Ca(PO₄)₂
- C Ca₃PO₄
- D Ca₃(PO₄)₂

12. The following equation represents the decomposition reaction of zinc nitrate.



What is the maximum volume of nitrogen dioxide gas released at standard temperature and pressure (STP) when 18.9g of zinc nitrate was heated?

[Molar mass: Zn(NO₃)₂ = 189 g mol⁻¹ ; Molar volume of gas at STP = 22.4 dm³ mol⁻¹]

- A 1.12 dm³
- B 2.24 dm³
- C 3.36 dm³
- D 4.48 dm³

13. What is the basic principle used to arrange the elements in the modern Periodic Table of Elements?

- A Increasing proton numbers
- B Increasing relative atomic mass
- C Increasing number of neutrons
- D Increasing nucleon numbers

14. Which of the following are the special characteristics of transition elements?

- I Form coloured compounds
- II Can be used as a catalyst
- III Have a low melting point
- IV Have only one oxidation number

- A I only
- B I and II
- C I, II and III
- D I, II, III and IV

15. Which characteristics is correct about elements in Group 1 in the Periodic Table as going down the group?

- A The tendency to release electron decrease
- B The reactivity decrease
- C All are conductor of heat
- D All insoluble in water

16. The scuba tank used by deep sea divers contains 79% nitrogen and 21% a mixture of oxygen and unknown elements.

Which of the following could be the element?

- A Argon
- B Fluorin
- C Helium
- D Hidrogen

17. Which characteristic is correct about elements in Group 17 in the Periodic Table as going down the group?

- A The intensity of colour decreases
- B The tendency to accept an electron decreases
- C The physical state changes from liquid to gas
- D Force of attraction between nucleus and electron become stronger

18. Element Z is located in the same group as neon, Ne and krypton, Kr in the Periodic Table of Elements.

Which of the following is the property of Z?

- A Chemically inert
- B Exists as diatomic molecules
- C Exists as liquid at room temperature
- D Conducts electricity in molten and aqueous solution

19. Electron arrangement of atom X is 2.1. Element X reacts with oxygen when heated.

Which of the following chemical equations represents the reaction?

- A $X + O_2 \rightarrow XO_2$
- B $X_2 + O_2 \rightarrow 2XO$
- C $2X + O_2 \rightarrow X_2O_2$
- D $4X + O_2 \rightarrow 2X_2O$

20. Chlorine is more reactive than bromine because

- I Chlorine exists as diatoms gas
 - II Valence shell of bromine is further from nucleus compared to chlorine
 - III Chlorine has a stronger nucleus attraction force towards the electrons
 - IV Van der Waals forces between bromine molecule are stronger
- A I and II
 - B II and III
 - C I, II and IV
 - D II, III and IV

OBJECTIVE ANSWER

Blacken your answer.

1.	(A)	(B)	(C)	(D)	11.	(A)	(B)	(C)	(D)
2.	(A)	(B)	(C)	(D)	12.	(A)	(B)	(C)	(D)
3.	(A)	(B)	(C)	(D)	13.	(A)	(B)	(C)	(D)
4.	(A)	(B)	(C)	(D)	14.	(A)	(B)	(C)	(D)
5.	(A)	(B)	(C)	(D)	15.	(A)	(B)	(C)	(D)
6.	(A)	(B)	(C)	(D)	16.	(A)	(B)	(C)	(D)
7.	(A)	(B)	(C)	(D)	17.	(A)	(B)	(C)	(D)
8.	(A)	(B)	(C)	(D)	18.	(A)	(B)	(C)	(D)
9.	(A)	(B)	(C)	(D)	19.	(A)	(B)	(C)	(D)
10.	(A)	(B)	(C)	(D)	20.	(A)	(B)	(C)	(D)

SECTION B (20 marks)

- 1 Diagram 4 shows the standard representation of silicone atoms, Si.

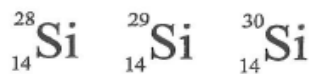


Diagram 4

- a) What is the meaning of isotopes?

.....
 [1M]

- b) Draw the atomic structure of Si-28.

[2M]

- c) The percentage of natural abundance of ${}^{28}_{14}\text{Si}$, ${}^{29}_{14}\text{Si}$ and ${}^{30}_{14}\text{Si}$ is 92%, 5% and 3% respectively. Calculate the relative atomic mass of silicone, Si.

[2M]

- d) Isotopes are widely used in various field.
 State one example of isotopes used in medicine field.

..... [1M]

- 2 Diagram 5 shows the apparatus set-up to determine the empirical formula of magnesium oxide.

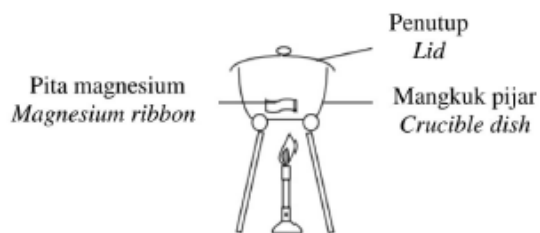


Diagram 5

- a) When carrying out this experiment, why does the crucible lid need to be opened once a while?

.....
[1M]

- b) The result of the experiment is shown in Table 2.

Description	Mass (g)
Crucible + lid	26.35
Crucible + lid + magnesium ribbon	28.75
Crucible + lid + magnesium oxide	30.35

Table 2

Based on the results in Table 2,

- (i) Hitung jisim bagi:

Magnesium :

Oxygen :

[2M]

- (ii) Calculate the number of moles of magnesium and oxygen.

[Relative atomic mass: Mg=24, O=16]

.....
[2M]

- (iii) Determine the empirical formula for the magnesium oxide in the experiment.

.....
[1M]

3 Diagram 6 shows part of Periodic Table of Elements.

[illegible]

Diagram 6

P, Q, R, S, T and U do not represent the actual symbols of the elements.

- a) Write the electron arrangement of ion T.

[1M]

- b) State the position of element S in the Periodic Table of Elements.

[1M]

- c) Arrange the atomic size of the elements in descending order.

[1M]

- d) Based on Diagram 6,

- (i) Which element exists as monoatomic gas?

[1M]

- (ii) Explain your answer in (d)(i).

[1M]

- e) Elements P and Q located in the same group but have different reactivity when react with oxygen. Explain why there is a difference in reactivity between these elements.

[3M]