08 The Periodic Table and Periodicity

Set A Concept Practice

Name | Time **55 minutes** | Total **45 marks** | Score ____ / 45

A From the lesson

28 MARKS

1 Which ion has the largest radius?

A Na^+ **B** Al^{3+} **C** P^{3-} **D** Cl^-

/1

Answer ☐ [1]

Learners' Alley, The Periodic Table and Periodicity slides

2 Which Period 3 element has the highest melting point?

A Mg **B** Al **C** Si **D** S

/1

Answer ☐ [1]

Learners' Alley, The Periodic Table and Periodicity slides

3 Which oxide reacts with both hydrochloric acid and aqueous sodium hydroxide?

A MgO **B** Al_2O_3 **C** SiO_2 **D** P_4O_{10}

/1

Answer ☐ [1]

Learners' Alley, The Periodic Table and Periodicity slides

4 Which statement about the Group 2 elements, magnesium to barium, is correct?

A Reducing power decreases down the group.

B The ionic radius increases down the group.

C Electronegativity increases down the group.

D Reactivity with water decreases down the group.

/1

Answer ☐ [1]

Learners' Alley, The Periodic Table and Periodicity slides

5 Astatine is below iodine in Group 17. Which statement is correct?

A Astatine displaces iodine from potassium iodide.

B Chlorine displaces astatine from sodium astatide.

C Astatine is a gas at room temperature.

D Astatine is more reactive than chlorine.

/1

Answer ☐ [1]

Learners' Alley, The Periodic Table and Periodicity slides

6 Which metal oxide is **not** reduced by heating with carbon?

A copper(II) oxide **B** lead(II) oxide **C** magnesium oxide **D** zinc oxide

Answer [ ] [1]

/1

Learners' Alley, The Periodic Table and Periodicity slides

7 **(a)** Explain why Mg^{2+} (0.065 nm) is much smaller than a Mg atom (0.160 nm).

.....

..... [2]

(b) Explain why the first ionisation energy of sulfur is lower than that of phosphorus.

.....

..... [2]

/4

Learners' Alley, The Periodic Table and Periodicity slides

8 **(a)** Why does aluminium conduct electricity better than sodium?

.....

..... [1]

(b) Why is the melting point of sulfur higher than that of chlorine?

.....

..... [1]

/2

Learners' Alley, The Periodic Table and Periodicity slides

9 **(a)** Explain why Na_2O gives an alkaline solution but SO_3 gives an acidic one.

.....

..... [2]

(b) Element X is a solid of low conductivity. Its only chloride is a liquid that does not conduct, and reacts with water to give a white solid and a strongly acidic solution. Identify X.

..... [1]

/3

Learners' Alley, The Periodic Table and Periodicity slides

10 Write the equation for rubidium reacting with water, and name the products.

.....

..... [2]

/2

Learners' Alley, The Periodic Table and Periodicity slides

11 Which decomposes at a lower temperature, calcium carbonate or barium carbonate? Explain.

.....

/2 ..... **[2]**

Learners' Alley, The Periodic Table and Periodicity slides

12 **(a)** Describe and explain what you see when bromine water is added to potassium iodide solution.

.....

..... **[2]**

(b) Why is HI less thermally stable than HCl?

/3 ..... **[1]**

Learners' Alley, The Periodic Table and Periodicity slides

13 **(a)** Excess zinc powder is added to blue copper(II) sulfate solution. Describe what you see and write the ionic equation.

.....

..... **[2]**

(b) Tin is between iron and lead in the reactivity series. Suggest how tin is extracted from tin(II) oxide.

/3 ..... **[1]**

Learners' Alley, The Periodic Table and Periodicity slides

14 **(a)** Why does a scratched galvanised bucket not rust, while a scratched tin can does?

.....

..... **[2]**

(b) How is rusting prevented on the parts of a steel pier under water?

/3 ..... **[1]**

Learners' Alley, The Periodic Table and Periodicity slides

B Practice

17 MARKS

15 What increases from Na to Ar across Period 3?

A density **B** melting point **C** non-metallic character **D** the number of electron shells

/1

Answer [1]

2024 BMSS O Prelim P1 Q25

16 Which statement describes a trend going from left to right across Period 3?

A The ability of the elements to conduct electricity increases.

B The number of neutrons in the atom increases.

C The number of valence electrons decreases.

D The tendency to gain electrons increases.

/1

Answer [1]

2024 BTYSS FYE O EOY P1 Q25

17 Magnesium and chlorine are both in Period 3. Which statement best explains why magnesium has more metallic character than chlorine?

A Magnesium has fewer electrons than chlorine.

B Magnesium has fewer electron shells than chlorine.

C Magnesium has fewer protons than chlorine.

D Magnesium has fewer valence electrons than chlorine.

/1

Answer [1]

2022 SJI O Prelim P1 Q21

18 Group 1 elements react with water. Which row describes the products and the trend in reactivity?

	products	trend in reactivity
A	metal hydroxide and hydrogen	less reactive down the group
B	metal hydroxide and hydrogen	more reactive down the group
C	metal oxide and hydrogen	less reactive down the group
D	metal oxide and hydrogen	more reactive down the group

A row A **B** row B **C** row C **D** row D

/1

Answer [1]

2024 SKSS O Prelim P1 Q27

19 Which statements about the elements in Group 1 are true?

I They are soft and can be cut easily.
II They are oxidising agents.
III The melting point decreases down the group.
IV The reactivity decreases down the group.

A I and II **B** I and III **C** II and IV **D** I, II and III

/1

Answer [1]

2024 PLMGSS O Prelim P1 Q34

20 Rubidium is in the same group as sodium. Which statement about rubidium is **not** correct?

A It forms ionic bonds with halogens.

B It forms rubidium hydroxide when it reacts with water.

C It reacts more explosively with water than sodium.

D Its melting point is higher than that of sodium.

/1

Answer [1]

2024 Dunman O Prelim P1 Q26

21 Which statement is correct?

A Group 1 elements are less reactive than the Group 2 element in the same period because they only need to lose one electron to have complete shells.

B Group 1 elements are stored under oil to avoid reaction with oxygen and water in the air.

C Group 1 elements become more reactive down the group because the number of outer shell electrons increases.

D The melting point of Group 1 elements decreases down the group because there is more attraction between positive ions and the delocalised electrons.

/1

Answer [1]

2024 ANDSS O Prelim P1 Q27

22 How do the atomic radius and the strength of the forces between molecules change going down Group 17?

	atomic radius	strength of forces between molecules
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

A row A **B** row B **C** row C **D** row D

/1

Answer [1]

2021 SJI O Prelim P1 Q7

23 Which property of the halogens decreases down Group 17?

A ability as an oxidising agent **B** boiling point **C** colour intensity **D** density

/1

Answer [1]

2023 CGSS O Prelim P1 Q25

24 The reactivity of the halogens decreases down the group. Which statement explains this?

A Decreasing distance between the nucleus and the outer shell makes it easier for the atom to attract electrons.

B Increasing distance between the nucleus and the outer shell makes it easier for the atom to attract electrons.

C Decreasing distance between the nucleus and the outer shell makes it harder for the atom to attract electrons.

D Increasing distance between the nucleus and the outer shell makes it harder for the atom to attract electrons.

/1

Answer [1]

2024 Whitley O Prelim P1 Q27

25 Elements P and Q are in Group 17. P is a liquid and Q is a solid at room temperature. Which statement is correct?

A Atoms of P have more electron shells than atoms of Q.

B Molecules of Q have more atoms than molecules of P.

C P is a stronger oxidising agent than Q.

D Q displaces P from an aqueous solution of P.

/1

Answer [1]

2024 AES O Prelim P1 Q26

26 A halogen reacts with a solution containing bromide ions: $X_2 + 2Br^-(aq) \rightarrow 2X^-(aq) + Br_2(aq)$. Which row is true?

	X_2	colour change
A	chlorine	orange to colourless
B	chlorine	colourless to orange
C	iodine	orange to colourless
D	iodine	colourless to orange

A row A **B** row B **C** row C **D** row D

/1

Answer [1]

2024 BBSS O Prelim P1 Q16

27 A solution of a lithium halide and a halogen are mixed. A reaction occurs and the mixture darkens. What are the reactants?

A bromine and lithium chloride

B iodine and lithium fluoride

C chlorine and lithium iodide

D chlorine and lithium fluoride

/1

Answer [1]

2024 SCGS O Prelim P1 Q21

28 Astatine is below iodine in Group 17. Which row describes astatine?

	state at room temperature	reactivity
A	gas	does not displace chlorine, bromine or iodine
B	gas	displaces iodine but not chlorine or bromine
C	solid	does not displace chlorine, bromine or iodine
D	solid	displaces iodine but not chlorine or bromine

A row A **B** row B **C** row C **D** row D

/1

Answer [1]

2024 CHS O Prelim P1 Q26

29 Alkali metals and halogens react readily to form salts. Which pair reacts most vigorously?

	alkali metal	halogen
A	lithium	fluorine
B	lithium	iodine
C	potassium	fluorine
D	potassium	iodine

A row A **B** row B **C** row C **D** row D

/1

Answer [1]

2026 St Patrick's School O MYE P1-P3 Q5

30 Which statement about the elements in Group 18, helium to xenon, is correct?

A Argon reacts with iron to form a compound.

B Helium is less dense than air.

C The elements change from gas to solid down the group.

D The elements exist as covalent molecules.

/1

Answer [1]

2023 Catholic High School O Prelim P1 Q25

31 Which statement about the elements in Group 18 is correct?

A Atoms of the elements are held together by weak covalent bonds.

B Going down the group, the number of electrons in the atom increases by eight for each element.

C The outer shell of each noble gas is fully filled with electrons.

D They are coloured gases at room temperature.

/1

Answer [1]

2026 Dunman O Prelim P1 Q24

10 The Periodic Table of Elements

Group																	
1	2											13	14	15	16	17	18
							1 H hydrogen 1.0										2 He helium 4.0
3 Li lithium 6.9	4 Be beryllium 9.0		**Key** atomic number atomic symbol name relative atomic mass									5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2
11 Na sodium 23.0	12 Mg magnesium 24.3	3	4	5	6	7	8	9	10	11	12	13 Al aluminium 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium –	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3
55 Cs caesium 132.9	56 Ba barium 137.3	57–71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	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 –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

lanthanoids	57 La lanthanum 138.9	58 Ce cerium 140.1	59 Pr praseodymium 140.9	60 Nd neodymium 144.2	61 Pm promethium –	62 Sm samarium 150.4	63 Eu europium 152.0	64 Gd gadolinium 157.3	65 Tb terbium 158.9	66 Dy dysprosium 162.5	67 Ho holmium 164.9	68 Er erbium 167.3	69 Tm thulium 168.9	70 Yb ytterbium 173.1	71 Lu lutetium 175.0
actinoids	89 Ac actinium –	90 Th thorium 232.0	91 Pa protactinium 231.0	92 U uranium 238.0	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 –