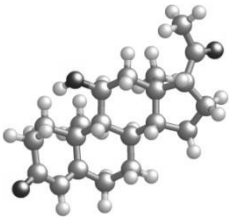


*Chem!stry*

**Name:** …… **(  )**

**Class:** ……

**Date:** …… **/** …… **/** ……

## Assignment on the Periodic Table

**Question 1:**

Element **X** forms an oxide of formula $\mathbf{X_2O_5}$. In which Group of the Periodic Table is element **X** likely to be found?

**A** Group 1. **B** Group 2.

**C** Group 13. **D** Group 15.

**Question 2:**

The element astatine (At) is beneath iodine in Group 17 of the Periodic Table. Which one of the following is likely to be a property of astatine?

**A** It burns readily in air.

**B** It forms a basic oxide.

**C** It displaces iodine from aqueous potassium iodide.

**D** It can be liberated from its salts by chlorine.

**Question 3:**

An element **E** shows variable valency, acts as a catalyst and forms coloured compounds. In which part of the Periodic Table is element **E**?

**A** The Period lithium to neon. **B** Group 1.

**C** The transition metals. **D** Group 2.

**Question 4:**

Which formula represents the oxide of an element **Y** in Group 2 of the Periodic Table?

**A** YO **B** $YO_2$ **C** $YO_3$ **D** $Y_2O$

**Question 5:**

Which statement about the ions of the Group 17 elements is correct?

**A** Each ion contains an odd number of electrons.

**B** Each ion contains more protons than neutrons.

**C** Each ion contains more electrons than protons.

**D** Each ion has seven electrons in its valence shell.

**Question 6:**

Rubidium (Rb) is an element in the same Group of the Periodic Table as lithium, sodium and potassium. Which statement about rubidium is likely to be correct?

**A** It reacts slowly with cold water.

**B** It forms an insoluble hydroxide.

**C** It is produced during the electrolysis of aqueous rubidium chloride.

**D** It forms a sulfate of formula $Rb_2SO_4$.

**Question 7:**

The table below shows the electron configurations for five elements:

| **Element:** | **P** | **Q** | **R** | **S** | **T** |
|---|---|---|---|---|---|
| **Electron Configuration:** | 2, 7 | 2, 8, 1 | 2, 8, 2 | 2, 8, 6 | 2, 8, 8, 2 |

Which two elements are in the same Group of the Periodic Table?

**A** **P** and **Q** **B** **Q** and **R**

**C** **R** and **S** **D** **R** and **T**

**Question 8:**

Which of the following statements correctly describes a trend in the properties of the elements from left to right across a Period of the Periodic Table?

**A** The number of neutrons in the nuclei of the atoms decreases.

**B** The first ionization energy of the elements decreases.

**C** The atomic radius of the atoms decreases.

**D** The electronegativity value of the elements decreases.

**Question 9:**

Metal **R** can displace metal **Q** from its salt. Metal **S** is displaced from its salt by metal **T**. Metal **R** can displace metal **S** from its salt. Metal **T** is displaced from its salt by metal **Q**.

Based on the information provided, arrange the four metals, **Q**, **R**, **S** and **T** in order, from the most reactive to the least reactive.

| | Most reactive → Least reactive |
|---|---|
| **A** | **Q → R → T → S** |
| **B** | **Q → R → S → T** |
| **C** | **R → Q → T → S** |
| **D** | **R → S → T → Q** |

**Question 10:**

Which of the following statements is correct for both chlorine and for iodine?

**A** It is a gas at room temperature and pressure.

**B** It can displace bromine from potassium bromide.

**C** It reacts with sodium to form a salt.

**D** It is a reducing agent (readily gives electrons to other chemicals).

**Question 11:**

Which gas is used to fill an electric light bulb to help the wire filament last as long as possible?

**A** Air. **B** Carbon dioxide.

**C** Argon. **D** Oxygen.

**Question 12:**

Which statement is most likely to be true about the elements in Group 1 of the Periodic Table?

**A** They occur uncombined in nature.

**B** They are equally reactive.

**C** They form chlorides of similar formulae.

**D** They become less metallic as their atomic number increases.

**Question 13:**

Which statement about the elements in the Periodic Table is correct?

**A** Group 18 elements are unreactive metals.

**B** Group 1 elements form covalent chlorides.

**C** Group 17 elements form negative ions.

**D** The elements become more metallic from left to right across a Period.

**Question 14:**

Many properties of an element and its compounds can be predicted from the position of the element in the Periodic Table. What property cannot be predicted in this way?

**A** The acidic or basic nature of its oxide.

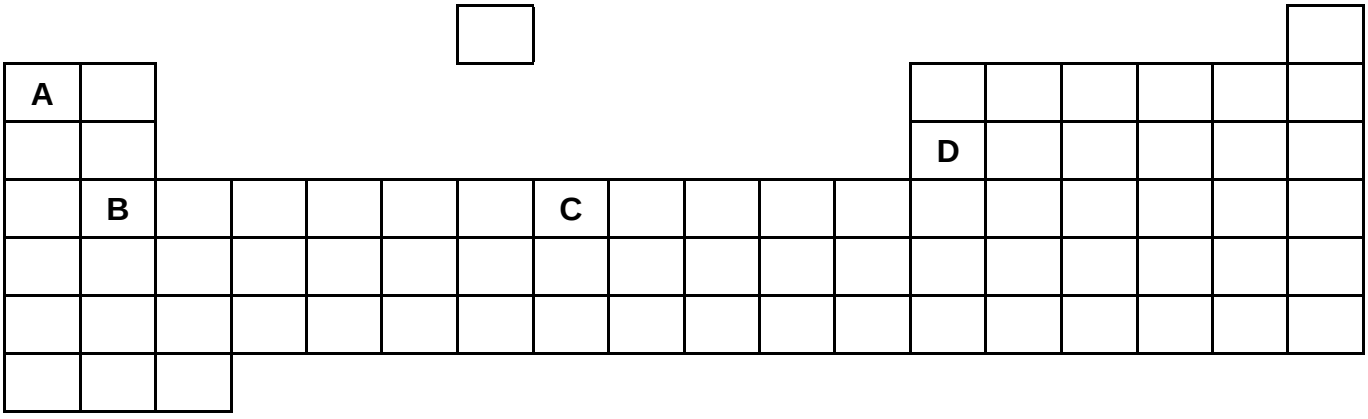
**B** The charge on its ion.

**C** The formula of its oxide.

**D** The number of isotopes that it has.

**Question 15:**

Element **Q** has a melting point greater than 1000°C. It has oxidation states of +2 and +3 in its compounds. It forms two chlorides, one is green and the other one is yellow. In which labelled position of the Periodic Table, shown below, is element **Q** likely to be found?



**Question 16:**

Astatine (At) is in Group 17 of the Periodic Table. Which one of the following is likely to be a property of astatine?

**A** It is a liquid at room temperature.

**B** It conducts electricity.

**C** It readily forms $At^+$ ions.

**D** It forms diatomic molecules, $At_2$.

**Question 17:**

The metal rubidium is below potassium in Group 1 of the Periodic Table. Which of the following statements is most likely to be correct?

**A** Rubidium is less dense than potassium.

**B** Rubidium has a higher melting point than potassium.

**C** Rubidium reacts more vigorously than potassium with cold water.

**D** Rubidium displaces metallic potassium from aqueous potassium chloride.

**Question 18:**

Which property decides the order of the elements in the Periodic Table?

**A** The masses of their atoms.

**B** The number of electrons in their valence shell.

**C** The number of neutrons in the nucleus.

**D** The number of protons in the nucleus.

**Question 19:**

Why does the colour of aqueous potassium bromide change when chlorine gas is bubbled into it?

**A** A compound is formed between chlorine and bromine.

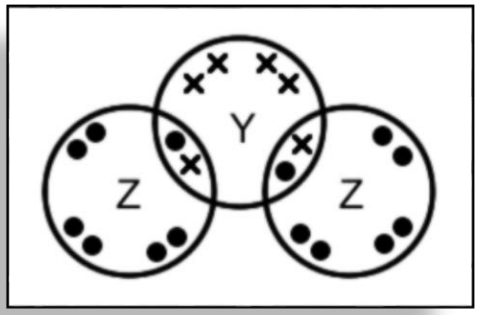
**B** A solution of potassium chloride is formed.

**C** The chlorine oxidises bromide ions to bromine.

**D** The potassium bromide is reduced.

**Question 20:**

Study the molecule shown below:




The most likely identities of elements **Y** and **Z** are:

**A** **Y** = Sulfur **Z** = Chlorine

**B** **Y** = Sulfur **Z** = Oxygen

**C** **Y** = Phosphorus **Z** = Oxygen

**D** **Y** = Silicon **Z** = Chlorine

Please write your answers to the multiple choice questions in the table provided below:

| | | | | |
|---|---|---|---|---|
| **1.** | **2.** | **3.** | **4.** | **5.** |
| **6.** | **7.** | **8.** | **9.** | **10.** |
| **11.** | **12.** | **13.** | **14.** | **15.** |
| **16.** | **17.** | **18.** | **19.** | **20.** |

**Question 21:**

Use the following list of elements to answer the questions below:

**Bromine** **Carbon** **Chromium** **Helium**

**Magnesium** **Phosphorus** **Sodium** **Sulfur**

In your answer, you may use each element once, more than once, or not at all.

Choose one element which...

**a)** Forms a basic oxide, ……

**b)** Has a high density and forms coloured compounds, ……

**c)** Is composed of diatomic molecules, ……

**d)** Is a liquid at room temperature and pressure, ……

**e)** Exists as allotropes, ……

**Question 22:**

With reference to the Periodic Table, write the symbol for an element which:

**a)** Is in Group 15 of the Periodic Table, ……

**b)** Forms a chloride of formula **$XCl_2$**, ……

**c)** Forms an oxide of formula **$X_2O_3$**, ……...

**d)** Can displace chlorine from an aqueous solution of potassium chloride, ……

**e)** Is a metallic element that is more reactive than potassium, ……

**Question 23:**

**a)** Write the balanced chemical equation, including state symbols for the reaction between lithium and cold water:

……

**b)** A small piece of lithium of mass 0.35 g is added to cold water. The resulting solution is titrated with 2.00 mol/$dm^3$ hydrochloric acid. What volume of hydrochloric acid is required to neutralise the solution?

**c)** In what ways is the reaction between potassium and cold water different from the reaction between lithium and cold water?

……

……

**Question 24:**

**a)** Write the balanced chemical equation, including state symbols, for the reaction between an aqueous solution of chlorine and an aqueous solution of potassium iodide:

……

**b)** What observations would you make during the course of the reaction?

……

**c)** What observations would you make if a non-polar solvent, such as hexane, was added to the reaction mixture and the mixture shaken?

……

……

**Question 25:**

Transition metals and their compounds can be used as catalysts.

**a)** What is the function of a catalyst?

……

**b)** By naming the reactants, the products and the catalyst, give an example of a reaction which uses a catalyst:

……

**Question 26:**

The table below gives some information about the noble gases:

| Name | Symbol | Atomic Number | Relative Atomic Mass | Boiling Point / K | Density at r.t.p / g/dm$^3$ |
|---|---|---|---|---|---|
| **Helium** | He | 2 | 4 | 4 | 0.167 |
| **Neon** | Ne | | 20 | 27 | 0.833 |
| **Argon** | Ar | 18 | 40 | 87 | |
| | Kr | 36 | 84 | 121 | 3.50 |
| **Xenon** | Xe | 54 | 131 | 165 | 5.46 |
| **Radon** | Rn | 86 | 222 | | 9.25 |

**a)** Name the gas with the symbol Kr:

……

**b)** What is the atomic number of neon?

……

**c)** Calculate the density of argon at r.t.p.:

**d)** Predict the boiling point of radon:

……

**e)** How are these gases obtained commercially?

……

**f)** Suggest why argon costs less to produce that any of the other noble gases:

……

- Scan the QR code below to view the answers to this assignment.

http://www.chemist.sg/periodic_table/periodic_table_assignment_ans.pdf