Chemistry

Standard level

Paper 1A

Practice paper

Topic: Periodicity (Topic 3)

1. Which set of elements is in the same period?
   A. Li, Na, K
   B. C, N, O
   C. F, Cl, Br
   D. Mg, Ca, Sr

2. What is the trend in atomic radius across Period 3 (Na to Cl)?
   A. Increases because shielding increases
   B. Decreases because effective nuclear charge increases
   C. Decreases because mass number increases
   D. Stays constant because shells stay the same

3. Which element has the highest electronegativity?
   A. Cesium
   B. Francium
   C. Fluorine
   D. Helium

4. Which of the following ions has the largest radius?
   A. Na^+
   B. Mg^{2+}
   C. F^-
   D. O^{2-}

5. What is the equation for the first ionization energy of sodium?
   A. $Na(s) \rightarrow Na^+(g) + e^-$
   B. $Na(g) \rightarrow Na^+(g) + e^-$
   C. $Na(g) + e^- \rightarrow Na^-(g)$
   D. $Na^+(g) \rightarrow Na^{2+}(g) + e^-$

6. Which group 17 element is a solid at room temperature?
   A. Fluorine
   B. Chlorine
   C. Bromine
   D. Iodine

7. Which oxide forms a solution with a pH < 7 when added to water?
   A. Na_2O
   B. MgO
   C. P_4O_{10}

D. Al_2O_3

8. Which of the following is correct for the reaction of sodium with water?
A. It produces a basic solution and hydrogen gas
B. It produces an acidic solution and oxygen gas
C. It forms a precipitate of sodium hydroxide
D. No reaction occurs under standard conditions

9. Which property increases down Group 1?
A. Electronegativity
B. First ionization energy
C. Reactivity with water
D. Melting point

10. Aluminum oxide (Al_2O_3) is described as being:
A. Acidic
B. Basic
C. Neutral
D. Amphoteric

11. Which list shows elements in order of increasing first ionization energy?
A. Li < Na < K
B. F < Cl < Br
C. K < Na < Li
D. Ne < Ar < Kr

12. What happens to the metallic character of elements across a period from left to right?
A. Increases
B. Decreases
C. Stays the same
D. First increases then decreases

13. Which species is isoelectronic with Neon (Ne)?
A. Ar
B. Mg^+
C. O^{2-}
D. Cl^-

14. What is the correct balanced equation for the reaction of sulfur trioxide with water?
A. $SO_3 + H_2O \rightarrow H_2SO_3$
B. $SO_3 + H_2O \rightarrow H_2SO_4$
C. $SO_2 + H_2O \rightarrow H_2SO_3$
D. $2SO_3 + H_2O \rightarrow H_2S_2O_7$

15. Which halogen is the strongest oxidizing agent?
A. F_2
B. Cl_2
C. Br_2
D. I_2

16. Which of the following represents the first electron affinity of chlorine?
A. $Cl(g) \rightarrow Cl^+(g) + e^-$
B. $Cl^-(g) \rightarrow Cl(g) + e^-$
C. $Cl(g) + e^- \rightarrow Cl^-(g)$
D. $Cl_2(g) + 2e^- \rightarrow 2Cl^-(g)$

17. Which element is in the d-block of the periodic table?
A. Calcium
B. Scandium
C. Silicon
D. Sulfur

18. What is the trend in melting points of Group 17 elements down the group?
A. Increases due to increasing London dispersion forces
B. Decreases due to decreasing electronegativity
C. Increases due to increasing boiling point
D. Decreases due to increasing atomic radius

19. Which oxide does NOT react with water?
A. SO_2
B. P_4O_{10}
C. SiO_2
D. Na_2O

20. Which observations are made when lithium reacts with water?
I. Bubbles of gas
II. Lithium floats
III. Solution turns phenolphthalein pink

A. I and II only
B. I and III only
C. II and III only
D. I, II and III