

**/10 Part I – Multiple Choice: Select and write the best answers to the left of the question**

- 1) Substance X has 35 positively charged particles in its nucleus, and has 36 negatively charged molecules orbiting the nucleus. What could Substance X be? /1
- Bromine atom
  - Krypton atom
  - Bromine ion
  - Krypton ion
- 2) Carbon dioxide molecules are connected with what sort of bonds? /1
- Ionic bonds
  - Lewis bonds
  - Single bonds
  - Covalent bonds
- 3) A litmus paper turns to a slight shade of blue when dipped into Chemical X. Chemical X is a: /1
- Strong acid
  - Weak acid
  - Weak base
  - Strong base
- 4) Which of the following is an organic molecule? /1
- H<sub>2</sub>O
  - CH<sub>4</sub>
  - CO<sub>2</sub>
  - Al<sub>4</sub>C<sub>3</sub>
- 5) Which of the following is an example of an acid? /1
- Baking soda
  - Bleach
  - Lime juice
  - Blood
- 6) What is produced in an acid-base neutralization reaction? /1
- Salt molecules
  - Water molecules
  - Both A and B
  - None of the above

- 7) Strontium nitride is: /1
- $\text{Si}_3\text{N}_2$
  - A covalent compound
  - A polyatomic compound
  - A compound containing five atoms
- 8) What is released when acids react with metal? /1
- Salts
  - Water molecules
  - There will be no reaction
  - Hydrogen gas
- 9) In order to be acidic, a substance must be: /1
- Containing hydrogen atoms
  - Dissolved in water
  - High in pH
  - Liquid
- 10) When phenolphthalein is added to Solution Y, the solution turns pink. Adding indigo carmine turns the solution blue. Which of the following is a probable value for the pH of Solution Y? /1
- 2.3
  - 4.5
  - 10.7
  - 13.2

**/60 Part II – Short Answer**

- 11) Predict the products, name and indicate whether the products would be acidic or basic: /18
- $\text{Na}_2\text{O}_{(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$  \_\_\_\_\_ Acid / Base
  - $\text{SO}_{2(g)} + \text{H}_2\text{O}_{(l)} \rightarrow$  \_\_\_\_\_ Acid / Base
  - $\text{CaO}_{(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$  \_\_\_\_\_ Acid / Base
  - $\text{MgO}_{(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$  \_\_\_\_\_ Acid / Base
  - $\text{CO}_{2(g)} + \text{H}_2\text{O}_{(l)} \rightarrow$  \_\_\_\_\_ Acid / Base
  - $\text{XeO}_{3(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$  \_\_\_\_\_ Acid / Base

12) Write the formulas/name the following compounds, and label C for covalent and I for ionic. /20

Chemical	Formula/Name	Ionic or Covalent
Sulfur trioxide:		
XeO <sub>3</sub> :		
Rubidium cyanide:		
Diiodine hexabromide:		
PbO <sub>2</sub> :		
Hg <sub>2</sub> SO <sub>3</sub> :		
Silver dichromate:		
NH <sub>4</sub> CH <sub>3</sub> COO:		
Pentagermanium heptaantimonide:		
(NH <sub>4</sub> ) <sub>2</sub> S		

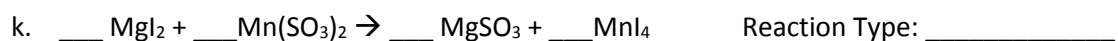
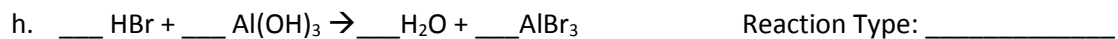
13) Draw in respect to the given criteria in the table

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	Bohr Diagram	Lewis Dot Diagram
Oxygen atom		
Sulfur ion		

14) List two similarities and two differences between acids and bases. /2

15) Balance the equations and determine the reaction type: /12



**/10 Part III – Long Answer**

16) Explain how water molecules are produced during an acid-base neutralization reaction. /1

17) Catalytic converters in cars convert poisonous nitrogen oxides into nitrogen and oxygen gas. Briefly explain how catalysts speed up reactions. /2

18) A 10kg bundle of branches burns faster than a 10kg tree trunk. Explain why this is so. /2

19) Ocean and Jimmy both scheme to avoid the science test by providing a poisoned beverage to their instructor, Alex. Ocean dumps a packet of powdered cyanide into a cup of hot coffee. Jimmy prepares pellets of cockroach repellent, which he puts into iced tea. If both substances are equally poisonous, who is more likely to succeed in their devious plot, and why? /5