

These questions are multiple-choice questions that ask you to select only **one** answer choice from a list of four choices. Each correct answer gives you one point.

### CHEMISTRY

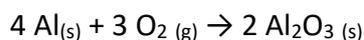
31. The electrons with principle energy level  $n = 2$  of a stable atom of boron (atomic number = 5) would have an electron arrangement of:

- A. [ ] [↑] [↑] [↑] [ ]
- B. [ ] [↑↓] [↑] [ ] [ ]
- C. [↑] [↑] [↑] [ ] [ ]
- D. [↑↓] [↑] [ ] [ ] [ ]

32. In group 18, He (helium) is unique because:

- A. it does not have an octet configuration in its ground state
- B. it has a higher reactivity than the other noble gases
- C. it forms a stable salt containing the  $[\text{He}_3]^+$  ion
- D. it has an extremely high melting point

33. The value of  $\Delta H^0$  for the following reaction is  $-3352$  kJ:



The value of  $\Delta H_f^0$  for  $\text{Al}_2\text{O}_{3(s)}$  is:

- A.  $-3352$  kJ
- B.  $-1676$  kJ
- C.  $+3352$  kJ
- D.  $-16.43$  kJ

34. What is the empirical formula for an oxide of nitrogen which is found to contain 63.2% oxygen by mass? ( $M_N = 14$  g/mol,  $M_O = 16$  g/mol)

- A.  $\text{N}_2\text{O}$
- B.  $\text{N}_2\text{O}_3$
- C.  $\text{NO}_2$
- D.  $\text{N}_2\text{O}_5$

35. A piece of stone has a mass of 24.595 grams and a volume of  $5.34 \text{ cm}^3$ . What is the density of the stone? Pay attention to the number of significant figures and precision of your calculation!

- A.  $0.217 \text{ cm}^3/\text{g}$
- B.  $4.61 \text{ g}/\text{cm}^3$
- C.  $0.22 \text{ cm}^3/\text{g}$
- D.  $4.606 \text{ g}/\text{cm}^3$

36. Uranium isotopes have different

- A. atomic numbers
- B. atomic masses
- C. numbers of protons
- D. numbers of electrons

37. The total number of electrons allowed in a  $l = 1$  sublevel is:

- A. 2 electrons
- B. 6 electrons
- C. 8 electrons
- D. 14 electrons

38. How many unshared pairs of electrons does water have?

- A. one
- B. two
- C. three
- D. four

39. In the reaction,  $\text{CO}_{(g)} + \text{NO}_{2(g)} \rightleftharpoons \text{CO}_{2(g)} + \text{NO}_{(g)}$ , which of the following changes would result in the formation of more products at equilibrium?

- A. increasing the pressure of the reaction mixture
- B. removing  $\text{CO}_{(g)}$  from the reaction mixture
- C. adding  $\text{NO}_{2(g)}$  to the reaction mixture
- D. adding  $\text{CO}_{2(g)}$  to the reaction mixture

40. How many mL of water must be added to 450 mL of 0.8 M glucose to dilute the solution to 0.4 M?

- A. 900 mL
- B. 600 mL
- C. 300 mL
- D. 450 mL