

## Sample Questions

### Fundamentals of Chemistry

- Which of the following statements is NOT true about first order reactions?
  - The graph between  $\log(a-x)$  vs. time is a straight line with intercept equal to  $\log(a_0)$  and slope equal to  $-K/2.303$
  - The initial rate of reaction doubles when the reactant is doubled
  - Half-life is independent of initial concentration of reactant
  - Unit of rate constant is  $\text{sec}^{-2}$
- Which of the following gases is obtained when calcium carbide is hydrolyzed?
  - Methane
  - Acetylene
  - Ethane
  - Methylene
- Solubility product of AgI at  $25^\circ\text{C}$  is  $1 \times 10^{-16}$ . What will be the solubility of AgI in  $10^{-4}\text{N}$  solution of KI (in mol/L)?
  - $1 \times 10^{-10}$
  - $1 \times 10^{-12}$
  - $1 \times 10^{-20}$
  - $1 \times 10^{-22}$
- Which isomerism do nitro alkane and alkyl nitrile exhibit?
  - Geometrical Isomerism
  - Stereoisomerism
  - Metamerism
  - Functional Isomerism
- The volume of  $0.5\text{M H}_2\text{SO}_4$  solution required to neutralize 100 ml of  $0.2\text{ NaOH}$  solution is \_\_\_\_\_.
  - 10 ml
  - 20 ml
  - 80ml
  - 100 ml

6. Which of the following is the correct order of reactivity for unimolecular nucleophilic substitution reaction among alkyl halides?

- a.  $R-I > R-Br > R-Cl > R-F$
- b.  $R-F > R-Cl > R-Br > R-I$
- c.  $R-Cl > R-F > R-Br > R-I$
- d.  $R-F > R-Br > R-Cl > R-I$

7. Why does nitration of benzene require the presence of  $H_2SO_4$ ?

- a.  $H_2SO_4$  helps in the generation of the electrophile  $NO_2^+$
- b.  $H_2SO_4$  provides sufficient surface area for reaction to occur
- c.  $H_2SO_4$  stabilizes  $HNO_3$
- d.  $H_2SO_4$  activates the benzene ring towards nitration

8. Which of the following is NOT a 'non-typical transition element'?

- a. Zinc
- b. Manganese
- c. Cadmium
- d. Mercury

9. The decreasing order of the stability of dihalides of Si, Ge, Sn & Pb is:

- a.  $GeX_2 > SiX_2 > PbX_2 > SnX_2$
- b.  $GeX_2 > SiX_2 > SnX_2 > PbX_2$
- c.  $SnX_2 > PbX_2 > GeX_2 > SiX_2$
- d.  $PbX_2 > SnX_2 > GeX_2 > SiX_2$

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