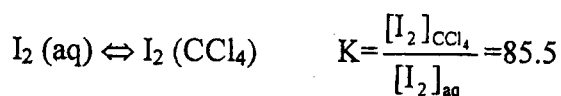


本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

考試日期：0302，節次：3

- Please define the following terms (20%, 4 % for each).
  - Extensive and Intensive property
  - Random error
  - Law of conservation of mass
  - Oxidation state
  - Polyatomic ion
- Balance the following equations (20%, 5% for each).
  - $\text{SiCl}_4(l) + \text{H}_2\text{O}(l) \rightarrow \text{SiO}_2(s) + \text{HCl}(g)$
  - $\text{Na}_2\text{HPO}_4(s) \rightarrow \text{Na}_4\text{P}_2\text{O}_7(s) + \text{H}_2\text{O}(l)$
  - $\text{P}_2\text{H}_4(l) \rightarrow \text{PH}_3(g) + \text{P}_4(s)$
  - $\text{S}_2\text{Cl}_2 + \text{NH}_3 \rightarrow \text{N}_4\text{S}_4 + \text{NH}_4\text{Cl} + \text{S}_8$
- Calculating the pH changes in a buffer solution: what is the effect on the pH of adding (a) 0.0060 mol HCl and (b) 0.000 mol NaOH to 0.300L of a buffer solution that is 0.250 M  $\text{HC}_2\text{H}_3\text{O}_2$  and 0.560 M  $\text{NaC}_2\text{H}_3\text{O}_2$  (20%).
- The concentration of a saturated solution of  $\text{I}_2$  in water is  $1.33 \times 10^{-3}$  M. Also,



A 10.0 mL sample of saturated  $\text{I}_2$  (aq) is shaken with 10.0 mL  $\text{CCl}_4$ . After equilibrium is established, the two liquid layers are separated.

- What mass of  $\text{I}_2$ , in mg, remains in the water layer?
  - If the 10.0 mL water layer in (a) is extracted with a second 10.0 mL portion of  $\text{CCl}_4$ , what will be the mass, in mg, of  $\text{I}_2$  remaining in the water?
  - If the 10.0 mL sample of saturated  $\text{I}_2$  (aq) had originally been extracted with 20.0 mL  $\text{CCl}_4$ , would the quantity of  $\text{I}_2$  remaining in the aqueous solution have been less than, equal to, or greater than in part (b)? Explain (20%).
- Draw a structure to correspond to each of the following names (10%, 2 % for each).
    - isopropyl methyl ether
    - cyclohexane
    - 2-butanol
    - propionaldehyde
    - diethylmethanamine
  - Indicate why each of these names is incorrect and give a correct name (10%, 2 % for each).
    - 3-pentene
    - 1-propanone
    - 2,6-dichlorobenzene
    - 2-methyl-4-butyloctane
    - 4,4-dimethyl-5-ethyl-1-hexyne