### 1. ♥ STUDY CHECK

Identify the alkene and alkyne groups in the molecule:

$$\begin{array}{c} H \\ C = C \\ H_3C - C \equiv C - C \\ H \end{array}$$

Show work to get full credit

### 2. ♥ STUDY CHECK

Classify the following molecules as alcohol or ether.

Show work to get full credit

#### 3. ♥ STUDY CHECK

Classify the following molecules as an aldehyde or ketone

#### 4.

# **STUDY CHECK**

Name the alkane with formula  $C_7H_{16}$  and give the formula for nonane. Show work to get full credit

#### 5.

# **STUDY CHECK**

Classify the following molecules as an carboxylic acid or ester:

Show work to get full credit

# 6. ♥ STUDY CHECK

Classify the following molecules as an amide or amine:

# 7. ♥ STUDY CHECK

Classify the following molecules as an carboxylic acid or base:

Show work to get full credit

### 8. ♥ STUDY CHECK

Calculate the solubility of nitrogen in water after exposing water to a 5 atm nitrogen pressure, given that Henry's constant is  $6.1\times10^{-4} M/atm$ . Show work to get full credit

### 9. ♥ STUDY CHECK

Using the following data, calculate the order and rate constant and write down the rate law.

t (s)	0	6	12	18	24
$\overline{[A],(M)}$	1.0000	0.5000	0.2500	0.1250	0.0625

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Name:

#### **10. ♥ STUDY CHECK**

The Arrhenius parameters for the gas-phase reaction below are  $6 \times 10^{-12}$  s<sup>-1</sup> and 665J/mol.

$$H_2S + OH \longrightarrow HS + H_2O$$

Calculate: (a) the rate constant at 300K. (b) the temperature at which the rate constant is  $5\times10^{-12}\,\rm s^{-1}$ 

Show work to get full credit

#### 11. ♥ STUDY CHECK

Assess whether the reaction below:

$$2\,NO_{(g)} + O_{2(g)} \longrightarrow 2\,NO_{2(g)}$$

$$r^{Exp} = k^{Exp} [\text{NO}]^2 [\text{O}_2]$$

is correctly represented by the following mechanism:

(1) 
$$NO_{(g)} + NO_{(g)} \xrightarrow{k_1} N_2O_{2(g)}$$
 (equil.)

(2) 
$$N_2O_{2(g)} + O_{2(g)} \xrightarrow{k_2} 2NO_{2(g)}$$
 (slow)

Show work to get full credit

#### 12. ♥ STUDY CHECK

Write down the following dissociation or acid-base reaction involving one proton:  $HCl_{(g)} + NH_{3(g)} \longrightarrow$ 

Show work to get full credit

#### 13. ♥ STUDY CHECK

The hydroxyl concentration in a basic solution is  $2.3 \cdot 10^{-6}$  M. Calculate the concentration of protons.

### 14. ♥ STUDY CHECK

Calculate the PH of: (a) a 0.001M H<sub>2</sub>SO<sub>4</sub> solution (b) a 0.001M NaOH solution. Show work to get full credit

#### 15. ♥ STUDY CHECK

Calculate the PH of a 0.01M sodium acetate (CH<sub>3</sub>COONa).  $K_a = 1.75 \times 10^{-5}$ Show work to get full credit

#### 16. ♥ STUDY CHECK

Calculate the PH of 5mL of a 0.2M HF/0.3M KF ( $K_a = 6.30 \times 10^{-4}$ ) after adding 1mL of HCl 0.2M. Show work to get full credit

#### 17. ♥ STUDY CHECK

A 5mL sample of 2M  $H_2SO_4$  is titrated with with 25 mL of a NaOH 1M solution. (a) indicate whether you are before, after or at the endpoint (b) indicate whether the titrate is an acid or a base, and a weak or a strong electrolyte (c) indicate the formula that would need to be used to calculate the PH (d) calculate the PH

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## 18. ♥ STUDY CHECK

When titrating an acid with a strong base using Methyl orange ( $K_a = 3.9 \times 10^{-4}$ ), indicate the PH at which the concentration of the acid form of the indicator is four times the one of the base base. Show work to get full credit

#### 19. ♥ STUDY CHECK

A mixture is prepared by adding 50mL of 0.03M-GaCl $_3$  with 75mL of 0.05M-NaOH. Calculate the number of moles of Ga(OH) $_3$  that precipitate and the concentration of the leftover ion in solution.

Show work to get full credit

#### 20. ♥ STUDY CHECK

Using the thermodynamic tables at the end of the chapter, locate the values of molar entropies for the following molecules: (a)  $Ag_{(s)}$  (b)  $SO_{2(g)}$  (c)  $Zn_{(s)}$  (d)  $Br_{2(l)}$  Show work to get full credit