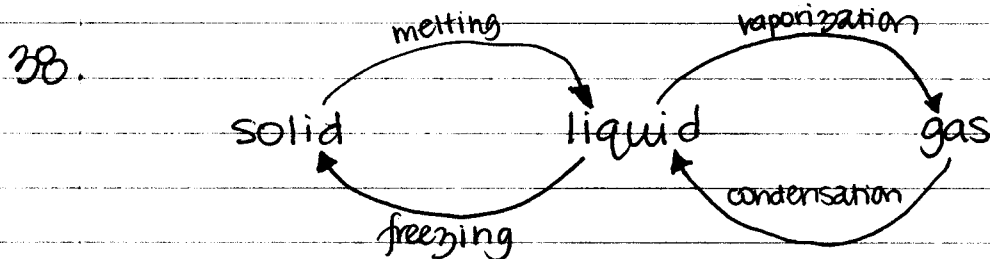


Chem 30A: Answers to problems not found in text.

Chapter 5:

36. see text and notes for definition



82. b & d

Chapter 13:

12. When food is flash-frozen, water molecules do not have sufficient time to form large crystals. If food is frozen slowly, the formation of these crystals breaks cell walls. Thus, the food, <sup>frozen slowly,</sup> tastes awful.

14. Heat capacity is the amount of heat required to raise the temperature of an object  $1^{\circ}\text{C}$ .

16. skip.

18. Rainwater contains dust,  $\text{CO}_2(\text{g}) + \text{O}_2(\text{g})$ . During thunderstorms, water reacts with  $\text{N}_2(\text{g})$  to form  $\text{HNO}_3$ .

## Unit 11: Water (continues)

(2)

20. Hard water contains  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$  and  $\text{Fe}^{2+}$ . These ions form soap scum.

28. Primary sewage treatment allow sewage to collect in a pond, where the solid particles settle. Water is then discharged into a stream or lake. However, the water still contains suspended and dissolved particles.

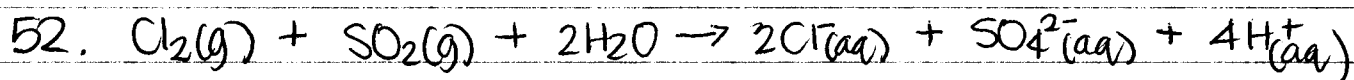
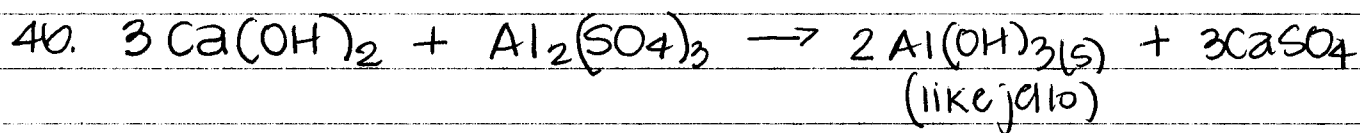
30. Sewage is placed in tanks and aerated with large blowers. Flocculants form and filter contaminants. Organic material is turned into sludge by aerobic bacteria.

32. Chlorine kills bacteria.

34. Organic materials are removed from wastewater by charcoal filtration.

36. This gel, formed by the reaction of aluminum sulfate + lime, removes suspended solids and bacteria out of the water.

38. skip



Chlorine is reduced; chlorine,  $\text{Cl}_2$ , is the oxidizing agent;  $\text{SO}_2(\text{g})$  is the reducing agent.

Chapter 17:

2.  $\text{CO}_3^{2-}(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{HCO}_3^{-}(\text{aq}) + \text{OH}^{-}(\text{aq})$
8. Acid neutralizes the ionic "head".
10. The hard water ions react with soap, forming soap scum.
12. Hard water ions are exchanged for  $\text{Na}^{+}(\text{aq})$ , making the water soft.
14. Detergents work (clean clothes) in hard water and acidic water.
16. see text for definitions
18. Ammonia should not be used on asphalt, tile, wood or aluminum. These surfaces may stain, pit or erode when ammonia is placed on them.
20. Vinegar cuts grease and grime. Vinegar will react with marble surfaces because marble is  $\text{CaCO}_3(\text{s})$ .
30.  $\text{PO}_4^{3-}(\text{aq}) + \text{H}_2\text{O} \rightarrow \text{HPO}_4^{2-}(\text{aq}) + \text{OH}^{-}(\text{aq})$
32.  $2\text{PO}_4^{3-}(\text{aq}) + 3\text{M}^{2+}(\text{aq}) \rightarrow \text{M}_3(\text{PO}_4)_2(\text{s})$
38. A surface-active agent is soap.

40. A surfactant molecule without a charge on its water soluble head.

42. An amphoteric surfactant that contains both positive and negative charges

84. II structure

86. I structure

}

do not memorize these structures; know why soap is special, as found in your notes.