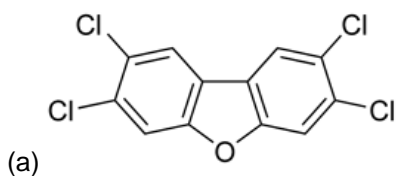
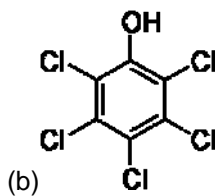


Test 2 – Toxins

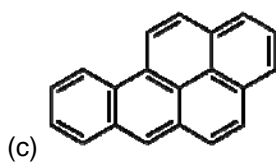
1. Match the chemical structures to the names for the following organic compounds:



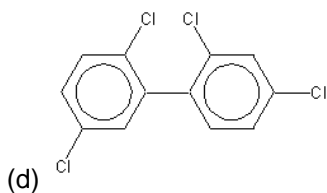
1. Benzo[a]pyrene



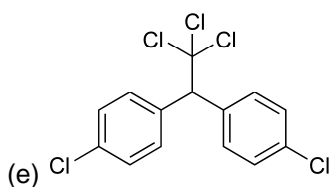
2. *para*-dichlorodiphenyltrichloroethane



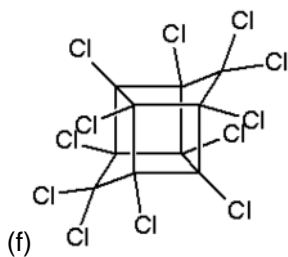
3. 2,3,7,8-tetrachlorodibenzofuran



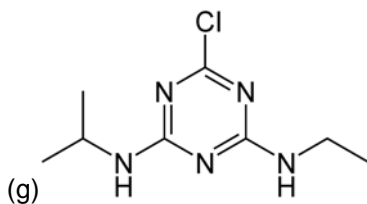
4. Atrazine



5. Mirex



6. 2,2',4,5'-tetrachlorobiphenyl



7. Pentachlorophenol

2. (a) Using the TEQ values listed in the textbook identify whether Mixture A or B is more toxic.

<u>Mixture A Substance</u>	<u>Weight %</u>
2,3,4,7,8-PCDF	9
1,2,3,4,7,8-HCDD	45
2,3,7,8-TCDF	46

<u>Mixture B Substance</u>	<u>Weight %</u>
1,2,3,7,8-PCDD	5
1,2,3,7,8,9-HCDF	32
2,3,7,8-TCDF	63

(b) What are the relative toxicities of Mixture A and Mixture B?

3. The Great Lakes system represents approximately 20 % of the surface fresh water in the world. The largest Great Lake is Lake Superior which has a volume of 12100 km<sup>3</sup>.

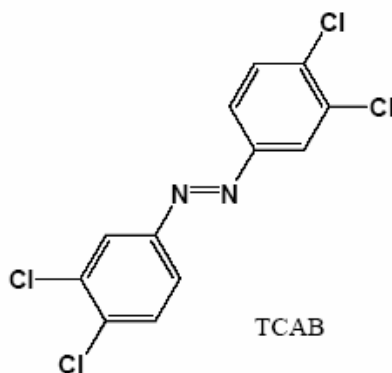
(a) In 1986 the water column total was 10,100 kg of PCBs. Using Figure 8-1 (b) estimate the water column total in 1992.

(b) Using the mass balance from Figure 8-1 (a) calculate the average residence time of PCBs in Lake Superior in 1986 and 1992.

(c) Explain why the river outflow of PCBs reduced from 60 (1986) to 13 (1992) even though the amount of water flowing through the lake is constant.

4.

Propanil<sup>®</sup> is a herbicide with the active ingredient N-(3,4-dichlorophenyl)propanamide, which is prepared by reacting propanoic acid and 3,4-dichloroaniline to eliminate a water molecule. However, during production the 3,4-dichloroaniline can oxidatively couple to produce 3,3',4,4'-tetrachloroazobenzene (TCAB).



Although N-(3,4-dichlorophenyl)propanamide is a low to moderate toxin, it owes much of its dioxin-like toxicity to the residual amounts (1000 - 2000 ppm) of TCAB present. Suggest why TCAB might be dioxin-like and how this herbicide system is similar to PCBs discussed in the chapter.

5. In a DDT biomagnification study the bioconcentration factors for links in a food chain were determined as follows:

Water → Zooplankton (800)

Zooplankton → Fish A (30)

Fish A → Fish B (2)

Fish B → Seagull (5)

(a) The biomagnification that occurs from water to seagulls is \_\_\_\_\_

(b) If water has a concentration of 0.0047 ppm DDT , the concentration of DDT in Fish B will be \_\_\_\_\_ ppm

(c) If a seagull had 1.36 ppm DDT in its tissue, one would expect its concentration in zooplankton to be \_\_\_\_\_ ppm

