Q1.

CAA: Clean Air Act

TDS: Total Dissolved Solids

NOAEL: No Observable Adverse Effects Level

IPCC: Intergovernmental Panel on Climate Change

MCL: Maximum Contaminant Level

Q2.

1. 1- Petroleum Compounds (organic chemicals) from leaking underground storage tanks.

2- nitrates from agricultural fertilizers.

1. 1- It minimizes the adverse impacts of wastes

2- It reduces the use of natural resources to make a new product

Q3.

1. Pathogen is a disease-causing agent such as bacteria, viruses, protozoa, and parasitic worms called helminthes.
2. An MCL of 1 mg/L is equivalent to one unit of contaminant per million units of water on a mass basis or one part per million by weight.

Q4.

1. it can damage vital organs or even kill
2. it tends to bio accumulate in tissues of fish and other organisms high in the food chain (affects humans through food chain)
3. central nervous system can be affected also

Q5. a) CDI is the average daily dose of a chemical over the lifetime of an individual body weight, whereas, the potency factor represents the incremental lifetime cancer risk corresponding to a CDI. (PF is a parameter)

b) 1- reference dose which is a key parameter used in risk assessment to characterize the safe dose of a non-carcinogenic chemical.

2- Hazard quotient is a metric used to compare the actual dose of a chemical to the reference dose and it’s the ratio of the average daily dose of a chemical divided by the reference dose

Q6. a) 1- population growth

2- GDP (gross domestic product) per capita

3-Energy intensity

b) Mercury is an example of a toxic metal that tends to bioaccumulate in tissues of fish and other organisms high in the food chain (accumulation of a substance in tissues of organisms)

Q7.

1. It is defined as the ratio of the average daily dose (ADD) of a chemical divided by the reference dose.
2. 1- assessment of hazards

2- development of dose-response relationships

3-exposure assessment

4- risk characterization

Q8.

Solutions are in the notebook (with ratios also)

For arsenic, the ratio is bigger than the EPA guideline, which means it should be rejected

For TCE, it is smaller so it is acceptable

Q9.

Q10.

Example p. 604

(20/15) \* (16,800/613,200) = 0.036 = CDI

Incremental risk (cancer risk) = CDI \* PF

* IR = 0.036 \* (0.0061) = 2.196 \* 10-4
* (2.196 \* 10 to the -4) \ (1x10 to the -6) = 219.6 which is great than EPA (1\*10 to the -6) Therefore, the cancer risk is high and it’s dangerous for the child to play in that playground (fucker!)

Q11.

1. 1- housing and industrial development

2- agriculture

3-emissions or discharges of chemical substances

1. Po = 1000000

R = 0.07

T = 10 years

P = Po (1+r) to the power t

P = 1,000,000 \* (1+0.05) to the power of 10

P = 1,628,894.63

Bonus:

1. Bad ozone is an air pollutant found at ground level and it comes from automobiles, power plants, and factories.
2. The chemicals that are widely used in fertilizers and detergents (nitrogen and phosphorous) are responsible for the over enrichment of nutrients in water plus over enrichment of nitrogen and phosphorous.