1) **Define or describe**

a) Risk: The probability of a specific undesired consequence
b) CFC: Chlorofluorocarbons
c) NOAEL threshold: No Observable Adverse Effects Level
d) F.C.: Fecal Coliforms

2) What are the three steps of life cycle analysis?

Inventory Analysis
Impact Analysis
Improvement Analysis

Give two reasons why the life cycle analysis is not more widely used?

-Gathering the data is time consuming and expensive. This only gets worse as the LCA is more comprehensive.
-There is no universally accepted methodology. The assumptions made might be subjective.

3
a) Name three things that can affect the carbon cycle
-Deforestation
-Burning of fossil fuels
-Cement production

b) Two major contaminants of groundwater and their sources?
-Petroleum contaminants from Leaking Underground Storage Tanks (LUST)
-Nitrates, from agricultural fertilizers

4) What is bad ozone and its source?
It is ozone present at the ground level and is the main component of smog. Created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) from motor vehicles, industrial facilities in the presence of sunlight.

What is eutrophication and what is its cause?
It is the ecosystem response to the addition of nitrates and phosphates (from fertilizers/sewage) to an aquatic ecosystem. This promotes excessive plant and algae growth, to the detriment of other forms of aquatic life, leaving a body of water that is unable to support fish or other life forms and is also unsuitable for human uses. The cause is runoff from agricultural fields and the dumping of untreated sewage into bodies of water.

(Apparently there was a calculation question here. Comment if you know what it could possibly be :P)
It would have to do with the maximum contaminant levels present in water (MCL)

5) Explain the difference between a response curve for carcinogenic and non-carcinogenic chemicals?

Carcinogenic chemicals typically assume a linear relationship with no threshold. Any dose above zero results in some risk.
Non-carcinogenic chemicals exhibit a flat horizontal line until a certain threshold, above which adverse effects are observed.

6) Name three things that are affected by global warming?
-Rise of Sea level, and the flooding of low-lying regions
-Changes in weather patterns (increased droughts, floods, severity of storms)
-The viability of plant and animal life attempting to cope with rapid changes.

What is global warming potential (GWP)?
It is a measure devised to compare different emissions in terms of an equivalent mass of CO2, to determine its contribution to global warming in terms of its radiative forcing and atmospheric lifetime.

7)What are three uncertainties associated with risk assessment?
-Lack of information on source location(s).
-Poorly known history of contaminant releases
-Unknown variability in mass or concentration distributions of contaminants
-Complexity in the chemical composition of contaminants

How could you change something like this?

8)Something about mercury?
Mercury is a common contaminant and it bioaccumulates in the tissues of fish and other organisms. Humans can then be affected through the consumption of fish, suffering damage to the central nervous system and the brain.

9) What is the hazard quotient?
The metric used in risk assessments to compare an actual dose of the chemical to the reference dose. It is defined as the ration of the average daily dose (ADD), divided by the reference dose (RfD)

$$HQ = ADD / RfD$$

Give your opinion on overpopulation and the problem with controlling it.
10)
a)Why are population growth and economic growth important? They are key drivers of environmental change.

b)When are they not included in environmental analysis? Because you can't really quantify them directly into numbers to be fed into mathematical models, thus they lie in the field of the social sciences.

11) Advantages and disadvantages of battery powered cars?
Disadvantages:
Higher initial cost
Limited driving range

Advantages:
emit no pollutants directly
consume less energy

b) Something about fuel cells
It is a gas-powered electrochemical battery that takes hydrogen and oxygen and mixes them to produce electricity. The byproduct of this reaction is water. They're very expensive.

12) Problem utilizing P=Po(1+r)^t
P= final population
Po = initial population
r= yearly rate of increase <1.00
t= time in years

13)Problem utilizing Te=(So(1-a))^1/4/sigma
Te= Temperature of the earth in degrees K *** subtract 273 to obtain C if needed
So= Solar input (342W)
a= albedo (every surface has a value, 0.31 for the earth on average
sigma= Stefan-Boltzmann constant 5.67x10e-8