

Quiz 1 and 2 questions

1) Bioterrorism is an intentional release of biologic agents to terrorize a civilian population or manipulate the government. An individual working on a confidential operation stayed in a location for 55 years. Owing to his work, he used to leave this location only for 20 days per year. An investigative study concluded that the drinking water used by all the residents in this location was mixed with a chemical compound (code name “Acetanomena”) by this individual at concentrations of 10 mg/l, throughout his stay in this location. Estimate lifetime average Chronic Daily Intake (rounded off to two decimal places, in units of mg/kg-d) of Acetanomena, for this individual whose body weight, expected lifetime and ingestion rate are 78 kgs, 70 years and 2000 ml/d, respectively.

2) Which of the following does not feature in the list of Central Pollution Control Board’s regulated air pollutants’ list.

a) Arsenic b) Lead c) Ammonia d) Methane

3) While discussing the hockey-stick phenomena in this class, video of which of the famous individual was shown

a) George Bush b) Al Gore c) Donald Trump d) Bill Clinton

4) Air quality of a day where the concentrations of SO₂, NO₂ and PM_{2.5} are 80 µg/m³, 80 µg/m³ and 80 µg/m³, respectively is

a) Severe b) Very Poor c) Moderate d) Satisfactory

5) Which of the following statements is correct about ambient PM_{2.5} in New Delhi:

a) PM_{2.5} has both primary and secondary components

b) PM_{2.5} has only primary components

c) PM_{2.5} has only secondary components

d) PM_{2.5} concentration rarely exceeds its corresponding national ambient air quality standard.

6) Leakage of volatile gases from storage tanks is unfortunately common in some industries. Mr. Sheldon is an unfortunate industrial worker, who stayed in the premises of one such industry for 40 years. Due to his extraordinary commitment to work, he used to leave this location only for 20 days per year. An enthusiastic environmental engineer measured the average concentration (over the period of Mr. Sheldon's stay in this premises) of a chemical compound (Code name: Airopia) in air as $200 \mu\text{g}/\text{m}^3$. Estimate lifetime average Chronic Daily Intake (rounded off to three decimal places, in units of $\text{mg}/\text{kg-d}$) of Airopia (slope factor of $0.013 \text{ kg-d}/\text{mg}$), for Mr. Sheldon whose body weight, expected lifetime and inhalation rate are 65 kgs, 60 years and $175 \text{ cm}^3/\text{s}$, respectively.

7) Matching Question:

24 hour averaged concentration of Sulfurdioxide, Nitrogen dioxide, Lead and respirable particulate matter are 300, 60, 0.4 and $260 \mu\text{g}/\text{m}^3$. Match these pollutants with AQI category

Sulfurdioxide

Nitrogen dioxide

Lead

Respirable particulate matter

8) Air quality in IIT Delhi turns severe every winter. To study the trend in concentrations of PM10 in the ambient air near Kumaon hostel, a high volume sampler (HVS) which operates at a flow rate of $275 \text{ cm}^3/\text{s}$, was set up by a hostel resident. This resident used Teflon filter, which weighs 1.003 g, in the HVS. After operating the instrument for 24 hours, the student measured the weight of the filter as 1.0065 g. The ambient PM10 concentration (rounded off to one decimal places, in units of $\mu\text{g}/\text{m}^3$) is