Environmental Health – Exercises and OSPE (PSM)

# Section A: Short Answer Questions

1. 1. Define safe and wholesome water. Enumerate the criteria of potable water.

Answer: Safe and wholesome water: Free from pathogens, harmful chemicals, and acceptable to taste and appearance.  
Criteria: Free from pathogenic organisms, free from harmful chemical substances, pleasant taste, no colour/odour, within permissible limits of dissolved solids, fluoride, nitrates, hardness, etc.

1. 2. Describe the principle and uses of Horrock’s test in chlorination.

Answer: Principle: Determines the chlorine demand of water by adding known increments of bleaching powder solution.  
Uses: Helps calculate the correct amount of bleaching powder required to disinfect a given volume of water.

1. 3. List four major health hazards of poor solid waste management.

Answer: 1. Water pollution and spread of diarrhoeal diseases  
2. Vector breeding (flies, rodents, mosquitoes)  
3. Air pollution (burning waste → respiratory illness)  
4. Aesthetic nuisance and accidents.

1. 4. Enumerate four water-borne diseases with their causative agents.

Answer: 1. Cholera – Vibrio cholerae  
2. Typhoid – Salmonella typhi  
3. Hepatitis A – Hepatitis A virus  
4. Amoebic dysentery – Entamoeba histolytica

# Section B: Calculation Exercises

1. 1. A well has diameter 6 m and water depth 10 m. Horrock’s test shows blue colour in 5th cup. Calculate the bleaching powder needed.

Answer: Volume = πr²h = 3.14 × (3)² × 10 = 282.6 m³ = 2,82,600 L.  
Horrock’s test: 5th cup = 10 g for 455 L.  
Quantity = (2,82,600 ÷ 455) × 10 = ~6.21 kg bleaching powder.

1. 2. A rectangular tank measures 8 × 5 × 4 m. Horrock’s test shows blue colour in 3rd cup. Calculate bleaching powder required.

Answer: Volume = 8 × 5 × 4 = 160 m³ = 1,60,000 L.  
3rd cup = 6 g for 455 L.  
Quantity = (1,60,000 ÷ 455) × 6 = ~2.11 kg bleaching powder.

# Section C: OSPE Stations

1. Station 1: Safe Water

Q: Demonstrate how to test for residual chlorine using orthotolidine test.  
Checklist for examiner:  
- Takes water sample in test tube (1 mark)  
- Adds 1 ml orthotolidine reagent (1 mark)  
- Observes colour change (yellow = free chlorine) (1 mark)  
- Interprets correctly (≥0.5 mg/L = adequate) (2 marks)

1. Station 2: Solid Waste

Q: Show the correct method of segregation of waste at source.  
Checklist:  
- Correctly identifies colour coding (2 marks)  
- Biodegradable, recyclable, biomedical waste segregation (2 marks)  
- Explains importance (1 mark)

1. Station 3: Air Pollution

Q: Identify two ill-effects of indoor air pollution on health.  
Answer: Acute respiratory infections, chronic bronchitis, COPD, lung cancer, low birth weight.

1. Station 4: Vector Control

Q: Demonstrate the identification of Aedes mosquito using specimen provided.  
Checklist:  
- Spots white stripes on legs (1 mark)  
- Recognises day biting habit (1 mark)  
- Identifies disease transmission (Dengue, Chikungunya, Zika, Yellow fever) (3 marks)