



UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION
OCTOBER 2025 SEMESTER

COURSE CODE : HGD20403
COURSE TITLE : WATER SUPPLY & SEWAGE
PROGRAMME NAME : DIPLOMA IN ENVIRONMENTAL HEALTH
DATE : 26 JANUARY 2026
TIME : 2:00PM - 5:00PM
DURATION : 3 HOURS



INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Section A consist 25 MCQ or EMQ questions. Answer ALL questions.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet. *Tick if applicable*
9. Refer to the attached Formula/ Appendies. *Tick if applicable*

THERE ARE 12 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 25 marks)

Answer ALL questions.

Please use the objective answer sheet provided.

1. What type of nitrogen is a significant indicator of pollution by sewage?
 - A. Nitrate Nitrogen
 - B. Ammoniacal Nitrogen
 - C. Total Kjeldahl Nitrogen
 - D. Nitrite Nitrogen

2. Which agency is primarily responsible for analyzing water samples under the Drinking Water Quality Surveillance Program?
 - A. Ministry of Health
 - B. Department of Chemistry
 - C. Public Works Department
 - D. Department of Environment

3. Which parameter is commonly analyzed to determine the organic pollution in water?
 - A. Dissolved Oxygen (DO)
 - B. Turbidity
 - C. Biochemical Oxygen Demand (BOD)
 - D. pH

4. According to water quality standards, what parameter is primarily monitored to ensure bacteriological safety?
 - A. Residual chlorine
 - B. Total dissolved solids
 - C. pH level
 - D. Turbidity

5. What is a critical factor in selecting a site for a water treatment plant?
 - A. Proximity to an industrial area
 - B. Accessibility for maintenance and operations
 - C. High land cost
 - D. Distance from raw water sources

6. The percentage of a rock's total volume that is taken up by pore space is called the _____.
 - A. Permeability
 - B. Aquifer
 - C. Recharge
 - D. Porosity

7. What is the process by which water enters the small pore spaces between particles in soil or rocks?
 - A. Sublimation
 - B. Precipitation
 - C. Transpiration
 - D. Infiltration

8. A hole dug into an aquifer to reach groundwater is called _____
- A. decreases and the aquifer's pore water pressure decreases.
 - B. decreases and the aquifer's pore water pressure increases.
 - C. increases and the aquifer's pore water pressure increases.
 - D. increases and the aquifer's pore water pressure decreases.
9. Which of the following is not true about gas chlorination systems?
- A. Increases Algae
 - B. Control slime
 - C. Disinfection of swimming pools
 - D. Improves Taste
10. _____ is a process by which particles settle to the bottom of the liquid.
- A. Coagulation.
 - B. Filtration
 - C. Disinfection.
 - D. Sedimentation.
11. The excess presence of which of the following cause the teeth of children mottled and discolored?
- A. Hardness
 - B. Chlorides
 - C. Fluorides
 - D. Iron

12. What is the most common used coagulant?
- A. Coal.
 - B. Limestone.
 - C. Ferric Sulphate.
 - D. Alum.
13. _____ devices remove materials which would damage equipment or interfere with a process.
- A. Screening.
 - B. Grit
 - C. Oxidation
 - D. Reduction
14. Units for colloidal solids are _____
- A. FTU.
 - B. POV.
 - C. NTU.
 - D. JTU.
15. Which of the following is the most likely source of point pollution?
- A. Leakage of radioactive waste from a secure landfill covering many acres.
 - B. Runoff of fertilizer applied to lawns by a single lawn-care company.
 - C. Animal wastes that wash away from parks located in a specific city.
 - D. Sewage containing household chemicals from one housing subdivision.

16. What is non-point source pollution?
- A. Pollution that occurs over a wide area and enters streams in water that runs off from fields, parking lots, and other surfaces.
 - B. Pollution that results in many pollutants coming together.
 - C. Pollution that can be traced to a place, such as an open pipe that drains into a body of water.
 - D. The process of filtering pollutants out of fresh water.
17. Which of the following cannot be affected by water pollution?
- A. None of the above
 - B. Groundwater
 - C. Lakes
 - D. Oceans
18. _____ is a process in which bodies of water (lakes, ponds, and rivers) receive excess nutrients that stimulate excessive growth of algae.
- A. Irrigation
 - B. Deforestation
 - C. Hydrology
 - D. Eutrophication
19. It is a sequence of conditions through which water passes or circulates on and below the earth's surface and the atmosphere.
- A. Hydrology.
 - B. Hydrological Cycle.
 - C. Water Cycle.
 - D. Hydraulics.

20. A hole dug into an aquifer to reach groundwater is called a/an _____.
- A. recharge zone
 - B. water table
 - C. well
 - D. aquitard / aquiclude
21. The following cause alkalinity in natural water.
- I. Potassium carbonate
 - II. Potassium bicarbonate
 - III. Sodium carbonate
 - IV. Sodium Chloride
- A. I and II
 - B. I, II, and III
 - C. III and IV
 - D. I, II, III and IV
22. When neighborhood residents noticed a large number of dead fish in a local creek, they traced the problem to a nearby gas station. It turned out that a tank of antifreeze had developed a leak. This is an example of _____.
- A. thermal pollution
 - B. non-point source pollution
 - C. ground water pollution
 - D. point source pollution
23. What is the role of a trickling filter in sewage treatment?
- A. Provide a surface for microbial growth
 - B. Separate oil and grease
 - C. Remove grit and sand
 - D. Aerate the water

24. What is the function of a sanitary survey in water quality management?

- A. To ensure compliance with discharge regulations
- B. To assess physical and chemical parameters
- C. To identify contamination sources affecting health
- D. To monitor bacteriological safety

25. What is the purpose of a grit chamber in wastewater treatment?

- A. To screen out large debris.
- B. To remove sand and grit.
- C. To aerate the water.
- D. To disinfect water.

SECTION B (Total: 75 marks)

Answer THREE (3) questions only.

Please use the answer booklet provided.

Question 1

Sewage treatment is the process of removing contaminants from domestic and municipal wastewater, containing mainly household sewage plus some industrial wastewater. The main processes involve removing as much of the solid material as possible, and then using biological processes to convert the remaining soluble material into a floc that entraps any remaining fine solids and which can then be settled as a sludge, leaving a liquid substantially free of solids, and with a greatly reduced concentration of pollutants.

Refer Below - Figure1 : Activated Sludge Process .

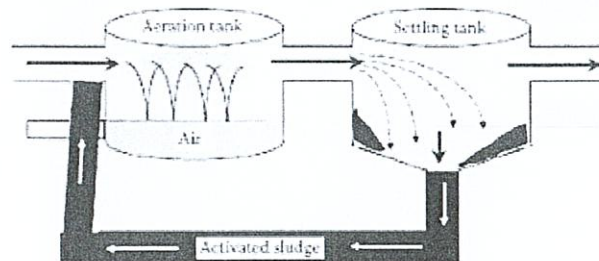


Figure 1: Activated Sludge Process

- (a) Identify whether the process is chemical or biological process. (1 marks)
- (b) Identify whether the system is attached growth or suspended growth system. (1 marks)
- (c) Identify whether the sludge yield or production in the system will produce at low or high sludge volume. (1 marks)

- (d) Compare (with a help of schematic diagram) the design of septic tank and Imhoff tank.

(22 marks)

Question 2

A town has a water treatment plant designed to treat surface water with high turbidity and organic pollutants. The plant uses conventional treatment processes.

- (a) Illustrate the process flow for the surface water treatment plant.

(10 marks)

- (b) Explain the importance of each process illustrated in (a) in a typical water treatment process.

(10 marks)

- (c) Outline the purpose of the coagulation and flocculation processes in water treatment.

(5 marks)

Question 3

Ensuring the safety and quality of drinking water is a critical responsibility, particularly in Malaysia, where the Ministry of Health (MOH) oversees the National Drinking Water Quality Surveillance Programme (NDWQSP). This programme monitors treated water quality, protects water sources, and ensures compliance with established standards to safeguard public health.

- (a) Describe FOUR (4) roles of the National Drinking Water Quality Surveillance Programme (NDWQSP) in ensuring safe drinking water in Malaysia.

(8 marks)

- (b) Determine FOUR (4) key parameters monitored under the drinking water quality standards set by MOH. Provide examples of how each parameter impacts water quality.

(12 marks)

- (c) Explain ONE (1) type of urban distribution system.

(5 marks)

Question 4

Water pollution is a significant global concern affecting both the environment and human health. It occurs when harmful substances such as chemicals, biological agents, or physical pollutants are introduced into water bodies, making them unsafe for consumption or other uses.

- (a) Explain how point sources and non-point sources contribute to water pollution. Provide an example of each.

(6 marks)

- (b) Describe the FOUR (4) categories of water pollutants and provide one example for each category.

(12 marks)

- (c) Assess the impacts of water pollution on human health and aquatic ecosystems.

(7 marks)

END OF EXAMINATION PAPER

