(7 pages) **Reg. No. :** .....

Code No. : 7816 **Sub. Code : WPHSE 36**

M.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Physics — Core

Skill Enhancement Course II — SEWAGE AND WASTE WATER TREATMENT AND REUSE

(For those who joined in July 2023)

Time : Three hours Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

1. A process of contact and adhesion whereby the particles of a dispersion form larger-size clusters is called ————.

(a) Coagulation (b) Flocculation

(c) Suspension (d) Sedimentation

2. What is the test used to select the type of coagulant required?

(a) Bar test (b) Jar test

(c) Stock test (d) Coagulant test

3. What is the size of the small rapid sand filter bed?

(a) 50 sqm (b) 80 sqm

(c) 100 sqm (d) 120 sqm

4. Bacteriostatic and Bactericidal are types of ————

(a) Analgesics (b) Antibiotics

(c) Antiseptics (d) Antihistamines

5. Which out of the following does not help in disinfecting water?

(a) Filtration (b) Chlorine tablets

(c) Alums (d) Boiling

6. Which of these is the strongest disinfectant?

(a) Ozone (b) Chlorine

(c) Chlorine dioxide (d) UV rays

7. Free chlorine is used to destroy bacteria. This reaction is classified as which order reaction?

(a) First (b) Pseudo first

(c) Second (d) Zero

8. Which of the following is a chemical method of disinfection?

(a) Disinfection by heat

(b) Disinfection by light

(c) Metal ions

(d) Metal ions, Alkalis and acids

9. The pathogenic bacteria do not last long at a pH _____

(a) > 11 (b) < 11

(c) < 8 (d) > 8

10. What is night soil?

(a) Soil containing urea

(b) Human excreta

(c) Animal excreta

(d) Human excreta, animal excreta and urea

11. Which of the following is not a physical disinfection means?

(a) Heat (b) Sound

(c) Metals (d) UV

12. _____ is the process where all the living micro-organisms, including bacterial spores are killed.

(a) Disinfection (b) Sterilization

(c) Incineration (d) Pyrolysis

13. What is the most effective dosage of UV to be used as a disinfectant?

(a) 20 – 100 mJ/cm^2

(b) 10 – 20 mJ/cm^2

(c) 100 – 120 mJ/cm^2

(d) 130 – 150 mJ/cm^2

14. Primary sludge constitutes which of the following?

(a) Chemical sludge

(b) Settlable solids

(c) Biological solids

(d) Biological and settlable solids

15. _____ uses anaerobic digestion.

(a) Incineration (b) Combustion

(c) Fermentation (d) Oxygenation

PART B — (5 × 4 = 20 marks)

Answer ALL questions by choosing either (a) or (b).

Each answer should not exceed 250 words.

16. (a) Explain the process of flocculation and its significance in the recovery and reuse of water from sewage.

Or

(b) Compare sedimentation and sedimentation with coagulation as methods of recovery in wastewater treatment.

17. (a) Explain how UV radiation is used as a method of disinfection.

Or

(b) Compare antisepsis and sterilization.

18. (a) Explain the theory of chemical disinfection and how it works to eliminate microorganisms from water.

Or

(b) Discuss the role of chlorination as a chemical method of disinfection.

19. (a) Discuss the effectiveness of ultraviolet (UV) radiation as a physical method of disinfection.

Or

(b) Examine the concept of water disinfection by microwave heating.

20. (a) Compare the effectiveness of chemical disinfection methods in different water treatment.

Or

(b) Discuss the significance of chemical and biological methods in eradicating vectors in wastewater treatment processes.

PART C — (5 × 8 = 40 marks)

Answer ALL questions by choosing either (a) or (b).

Each answer should not exceed 600 words.

21. (a) How does sedimentation contribute to the recovery and reuse of water from sewage and wastewater?

Or

(b) Discuss the role of filtration in the recovery of water from sewage and wastewater.

22. (a) Evaluate the process of chlorination as a common method of disinfection in water treatment.

Or

(b) Define sterilant and examine its role in achieving aseptic and sterile conditions in medical facilities.

23. (a) Explore alternative chemical methods of disinfection beyond chlorination, such as ozonation, chloramines.

Or

(b) Describe the role of coagulation/flocculation agents as pretreatment in chemical disinfection processes.

24. (a) Discuss the principles and applications of solar disinfection (SODIS).

Or

(b) Provide an overview of physical disinfection methods.

25. (a) Explore emerging technologies and advancements in disinfection and sterilization.

Or

(b) Evaluate the environmental implications of using biological methods for vector eradication.
