



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECV 4506 : PUBLIC HEALTH ENGINEERING III

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: JULY 2025

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (COMPULSORY) 30 Marks

- a) Pit latrines have been used satisfactorily from time immemorial as an alternative form of sanitation system where it is not possible to have conventional sewerage. However, they have a disadvantage of producing bad smell as well as providing conducive environment for breeding of flies and mosquitoes. To minimize or eliminate these disadvantages improved forms of pit latrines have been developed. One such improved type of pit latrine is the Ventilated Improved Pit (VIP) latrine. Describe some of the salient features of a VIP latrine and how they minimize or eliminate the bad smell and also control breeding of flies. **(6 Marks)**
- b) There are a number of disposal methods of industrial effluents. For each of these methods there is a minimum effluent quality requirement before disposal. One such method is discharging industrial effluent into the sewers. State the requirements prior to discharging industrial wastewater into public sewers. **(6 Marks)**
- c) Write short notes on septic tank. **(6 Marks)**

- d) In solid waste management, vehicles and other equipment are required for transportation and handling of the wastes. State the factors, which influence the choice of appropriate equipment. **(6 Marks)**
- e) A retired educationist has decided to start a private primary school in a rural set up where there is no conventional sewerage system. The school will have a total population of 600. The proprietor intends to drill a borehole which will cater for all the water needs of the school. He is unsure which type of sanitation system that he should use for treatment and disposal of sewage generated in the school. Recommend the type of sanitation he should use and give reasons for your choice. **(6 Marks)**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 Marks)

- a. Industrial wastes disposal require consideration from the view point of the industrialist, the public and the sanitary engineer. Discuss the concerns and roles of each of these stakeholders in safe industrial wastewater disposal. **(4 Marks)**
- b. State the categories of contaminants in industrial wastewater. **(4 Marks)**
- c. State the methods of industrial wastes disposal. **(4 Marks)**
- d. Industrialization is important for a country economically but it also comes with its own challenges. Discuss. **(4 Marks)**
- e. Briefly describe one typical industry and how its wastes are treated. **(4 Marks)**

QUESTION THREE (20 Marks)

- a. State the broad classifications of solid wastes. **(2 Marks)**.
- b. Which of the categories stated in (a) is more offensive and why? **(2 Marks)**.
- c. Write short notes on “solid waste management”. **(4 Marks)**.
- d. Define the following terms as used in solid waste management.
 - i. mixed refuse
 - ii. Commercial/trade refuse
 - iii. Garbage
 - iv. Ashes**(4 Marks)**.
- e. Discuss the importance of record keeping in solid waste management. **(4 Marks)**.
- f. Explain the importance of proper refuse disposal. **(4 Marks)**.

QUESTION FOUR (20 Marks)

- a. Treated wastewater, can be reused for various purposes. Discuss two different uses of treated wastewater. **(4 Marks)**
- b. State the meaning of the following terms as used in sewage sludge treatment:
 - i. Dewatering of sludge
 - ii. De-gritting of sludge
 - iii. Sludge concentration**(6 Marks)**
- c. What is the purpose of sewage sludge drying? **(2 Marks)**
- d. Describe two methods of sludge drying. **(4 Marks)**
- e. Under what circumstances, is sludge disinfection, considered important? **(4 Marks)**