



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY

Department of BUILDING & Civil engineering

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING

TCV 4327 : PUBLIC HEALTH ENGINEERING II

END OF SEMESTER EXAMINATION

SERIES: JANUARY 2025

TIME: 2 HOURS

PAPER A

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) 20 Marks

- a) Explain the conventional treatment of municipal wastewater (12 marks)
- b) Explain the operation of micro strainer as a tertiary process in wastewater treatment (8 marks)

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 Marks)

- a) Explain the operation of septic tank as a small wastewater treatment unit (6 marks)
- b) Design a septic tank of 120 users. Sewage flow is 100litre per head per day. The detention period is one (1) day. Assume depth of 1.2m, free board 0.3m, L:B ratio as 1:3 (8 marks)
- c) State the effects of discharging untreated wastewater to the environment (6 marks)

QUESTION THREE (20 Marks)

- a) With the aid of a sketch explain the operation of a biological(trickling) filter (10 marks)
- b) Design a grit chamber with the following particulars
- Population = 50 000 people
 - Water consumption = 135l/h/d
 - Sewage generation = 80% of water supply
 - Horizontal velocity = 0.2m/sec
 - Provide 25% additional length (10 marks)

QUESTION FOUR (20 Marks)

- a) Design a sedimentation for of the following particulars
- Quantity = 12Mld
 - Detention period = 6 hours
 - Horizontal velocity = 0.2m/min
 - Assume depth = 4m from(2.5-4m)
 - Assume sludge and free board each, 0.5m (10 marks)
- b) State the roles of NEMA in safe guarding environment (6 marks)
- c) State the benefits of waste water management (4 marks)

QUESTION FIVE (20 Marks)

- a) State the processes of treating River water for better health care (4 marks)
- b) Determine the settling velocity of a discrete particle with the following particulars
- Particle size = $(5 \times 10^{-3})^2$
 - SG - 2.65
 - Gr = 9.81
 - $C = (1.012 \times 10^{-2})^2$ (6 marks)
- c) Explain the activated sludge process of treating wastewater (6 marks)
- d) Outline the following
- i) Post chlorination
 - ii) Super chlorination
 - iii) Chlorination
 - iv) Discrete particle (4 marks)

