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 = $(5x10^{-3})^2$
   - SG – 2.65
   - Gr = 9.81
   - C = $(1.012x10^{-2})^2$ (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)