MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIFTH YEAR SECOND SEMESTER EXAMINATION

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECV 522 – DAM DESIGN AND CONSTRUCTION

DATE: **TIME:**

INSTRUCTIONS

Answer Question One and Any Other Two Questions

1. a) Define the following terminologies as used in dam design and construction

(5 marks)

i) Dam
ii) Riprap
iii) Training wall
iv) Abutment
v) Embankment

b) A masonry dam with a height of 4 m retains earth having a unit weight of 19.6 kN/m^3 with angle of shearing resistance of 30°. Using Rankine's theory, calculate the active lateral thrust P acting on the wall. (15 marks)

2. **Fig. 2** is a cross-section of a masonry dam retaining water against its vertical face. Analyze the stability condition of the dam. Unit weight of the dam is 21.6 kN/m^3.

(20 marks)

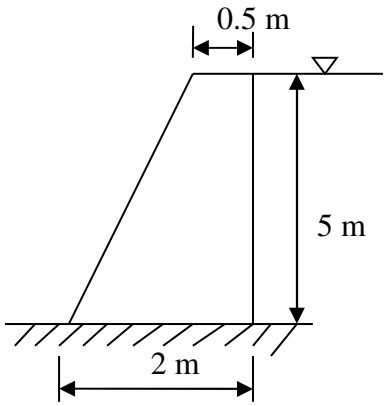

Fig. 2

3. A stepped masonry dam section is shown in **Fig. 3**. Determine:

a) horizontal thrust, P (8 marks)
b) position x, at which it acts on the dam. (6 marks)
c) factors considered in locating a dam (6 marks)

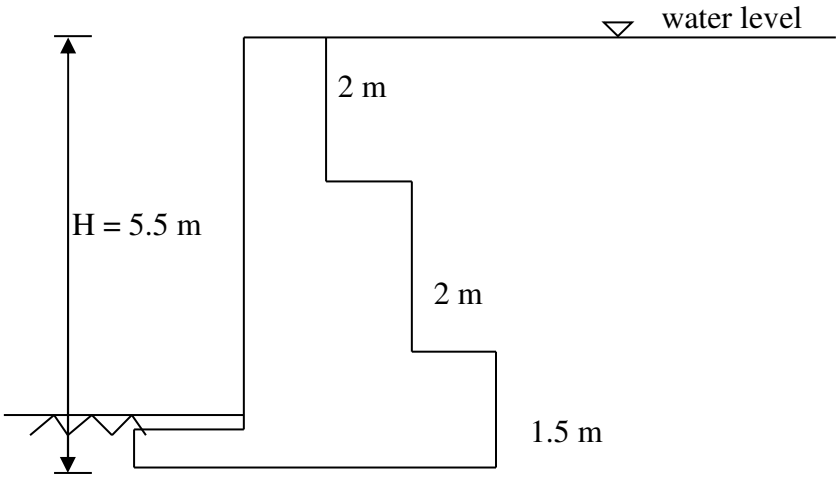

Fig. 3

4. Analyze the safety of the dam in Q3. (20 marks)

5. **Fig. 5** shows plan of a dam. Using Third Angle Orthographic Projection, draw section Y-Y to a scale of 1:50 given that base length of dam = 8 m, vertical height = 4.5 m. The side slopes are 1:2. The freeboard is at 0.45 m from the top of the dam. (20 marks)

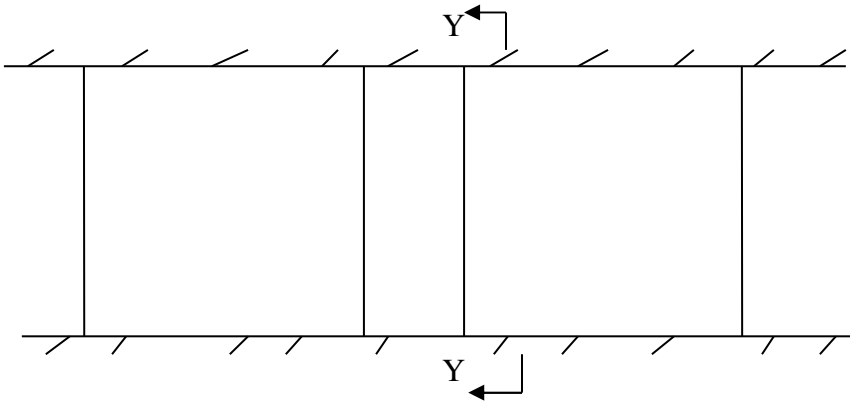

Fig. 5