



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: 16/5/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

1. a) Define the following terminologies as used in dam design and construction
 - i. Dam
 - ii. Riprap
 - iii. Training wall
 - iv. Abutment
 - v. Embankment (5 marks)
- 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)

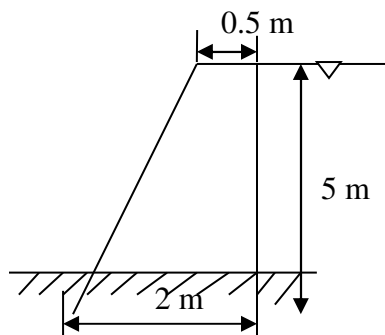
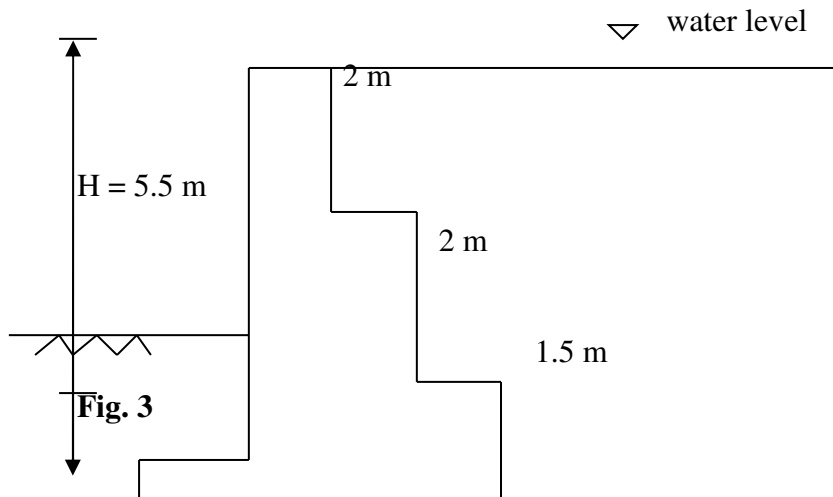


Fig. 2

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)



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)

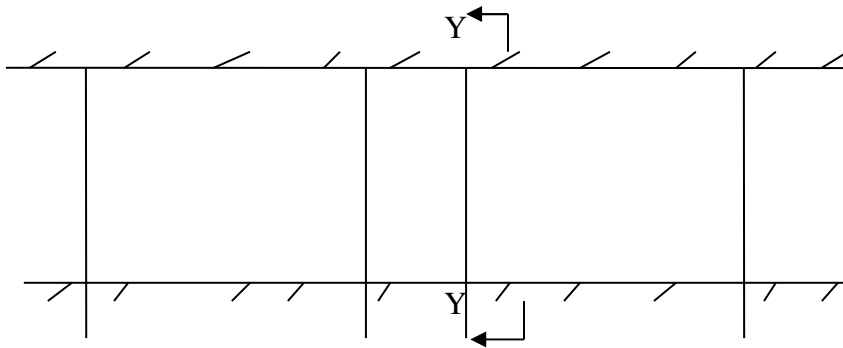


Fig. 5