



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

Department of BUILDING & Civil engineering

UNIVERSITY EXAMINATION FOR: DIPLOMA IN CIVIL ENGINEERING

DCE 2202 GEOTECHNOLOGY II

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: MARCH 2025

TIME: 2 HOURS

DATE: Pick Date AUGUST 2024

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 any THREE questions.

Do not write on the question paper.

QUESTION ONE

(a)) The data in table 1 refers to tri-axial tests performed on an undisturbed soil samples. The load dial calibration factor is 1.4N per division. Each sample is 75mm long and 37.5mm diameter. Plot a graph to determine the value of apparent cohesion, and the angle of internal friction for the soil.

(10 Marks)

TABLE 1

Test	Cell pressure (KN/m ²)	Axial load dial reading (divisions) at failure
1	50	65
2	150	105
3	250	146

(b) With the aid of a sketch, describe a fault.

(8 Marks)



(c) In regard to faults, differentiate between heave and overlap.

(2 Marks)

QUESTION TWO

(a) Fig.1 shows the conditions of a sheet pile wall. Calculate the active and passive pressures at all critical points.

(15 Marks)

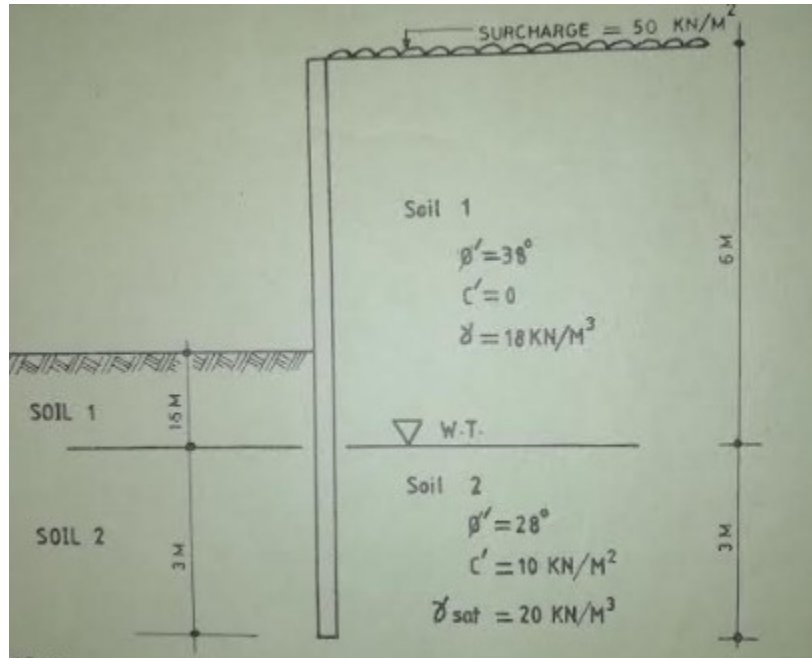


FIG. 1

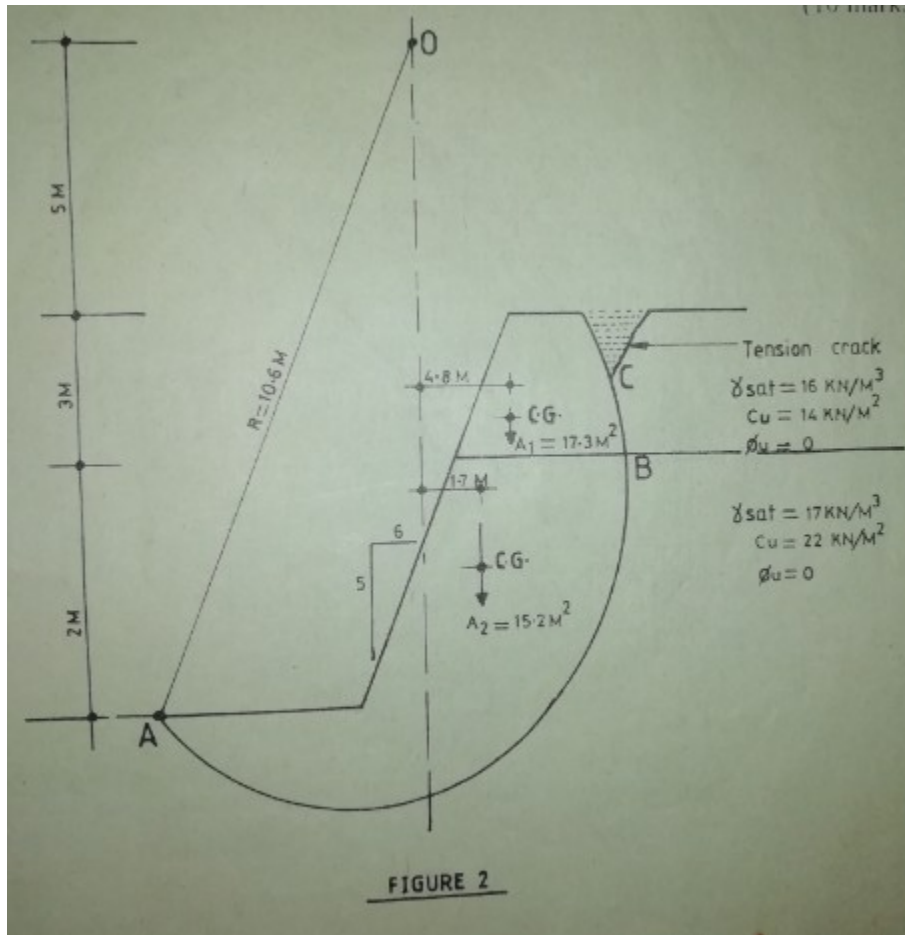
(b) Drilling methods enable determination of several things. Outline FIVE of them.

(5 Marks)

QUESTION THREE

(a) Determine the short term factor of safety of the embankment shown in Fig.2, assuming the tension cracks are filled with water.

(10 Marks)



(b) Identify and explain FIVE geological problems associated with tunneling.

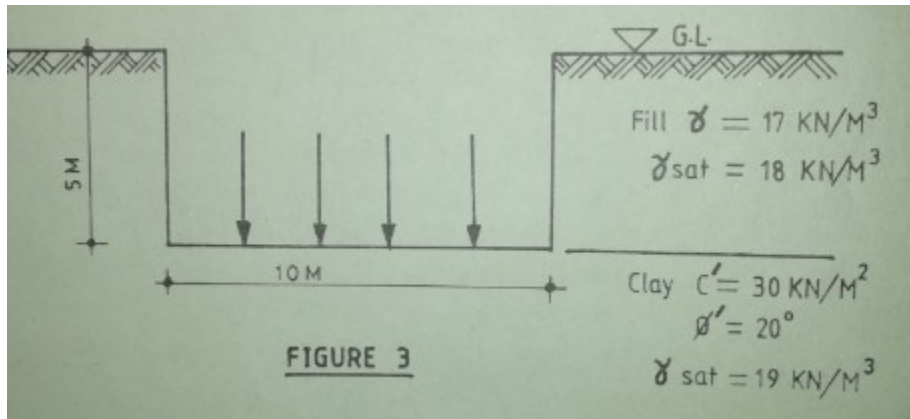
(10 Marks)

QUESTION FOUR

(a)) Figure 3 shows the section of a shallow foundation. Using the information given and chart 1, calculate the safe bearing pressure when water level is at:

- the ground level
- base of the foundation

(10 Marks)



(b) Identify and explain THREE areas of geological significance of folds.

(6 Marks)

(c) Explain the following terms as applied to folds:

- (i) Folds
- (ii) Limb
- (iii) Axial plane
- (iv) Fold axis

(4 Marks)

QUESTION FIVE

(a) In an undrained triaxial test on three specimens of a sandy clay soil taken from a depth of 3m below ground level the following results were obtained:

Cell pressure (KN/m ²)	Deviator stress (KN/m ²)
200	221
400	365
600	505

- (i) Determine the shear strength parameters.
- (ii) Obtain the Coulomb's equation for the soil

(10 Marks)

(c) Explain FOUR factors considered when selecting a site for a dam construction.

(8 Marks)

(d) Explain the term dam

(2 Marks)

Chart 1

