



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

Department of Building & Civil Engineering

UNIVERSITY EXAMINATION FOR DIPLOMA IN:

DIPLOMA IN CIVIL ENGINEERING

DBCE/Jan 2015/S-FT

EBC 2206: SOIL MECHANICS II

END OF SEMESTER EXAMINATION

SERIES: MAY 2016

TIME ALLOWED: 2 HOURS

Instruction to Candidates;

You should have the following for this examination;

- *Answer booklet*
- *Pocket calculator*

This paper consists of FIVE questions. Answer ANY THREE questions.

Use neat, large and well labelled diagrams where required

Maximum marks for each part of a question are as shown

This paper consists of THREE printed papers.



SGS ISO 9001:2008 Certified

QUESTION ONE

(a) Outline any **TWO** conditions of test applied in triaxial tests. **(8marks)**

(b) With the aid of a sketch explain shear mode of failure for triaxial test samples. **(6marks)**

(c) (i) Sketch typical graphical results expected from consolidated-undrained triaxial test.

(ii) Explain the sketch in (c) (i). **(6 marks)**

QUESTION TWO

(a) State **FOUR** main advantages for a direct shear strength test. **(6 marks)**

(b) The following results were obtained from drained shear strength tests done on a silty clay soil using a shear box.

Normal stress (KN/m ²)	150	250	350	450
Shear stress at failure (KN/m ²)	89	125	160	195

Determine the shear strength parameters for the soil tested

(c) Another specimen similar to the soil in 4.0 (a) is to be tested using triaxial apparatus under drained conditions, at a cell pressure of 250KN/m².

(i) Determine deviator stress that is anticipated to act at failure,

(ii) Calculate normal stress and shear stress that would develop on plane of failure.

(14 marks)

QUESTION THREE

(a) Briefly describe the general mode of failure applied to footings. **(8marks)**

(b) A circular footing is to be constructed to a depth of 2.0m in stiff clay of saturated unit weight 21.55 KM/m³. The undrained shear strength of the soil and factor of safety are 120 KN/m² and 3 respectively. Using Terzaghi's theory, calculate size of the footing if safe load of 367 KN/m² is to be supported. Take $N_c = 8.3$.

(12 marks)

QUESTION FOUR

- (a) Outline procedure for standard penetration test **(8 Marks)**
- (b) The results of triaxial shear strength tests done on soil samples obtained from a building construction site were as follows:

Test number	1	2	3
Cell pressure (KN/m ²)	150	300	500
Deviator stress at failure(KN/m ²)	190	380	625
Pore pressure at failure (KN/m ²)	69	141	241

Determine the shear strength parameters with respect to the following effective stresses.

(12 marks)

QUESTION FIVE

- (a) State **FOUR** Rankine’s assumptions for lateral earth pressure. **(4marks)**
- (b) Figure 1 shows a retaining wall 8m high supporting cohesionless soil.
- (a) Sketch a pressure distribution diagram
- (b) Determine (i) Magnitude of total active thrust

- (ii) Position at which horizontal thrust acts. **(16 marks)**

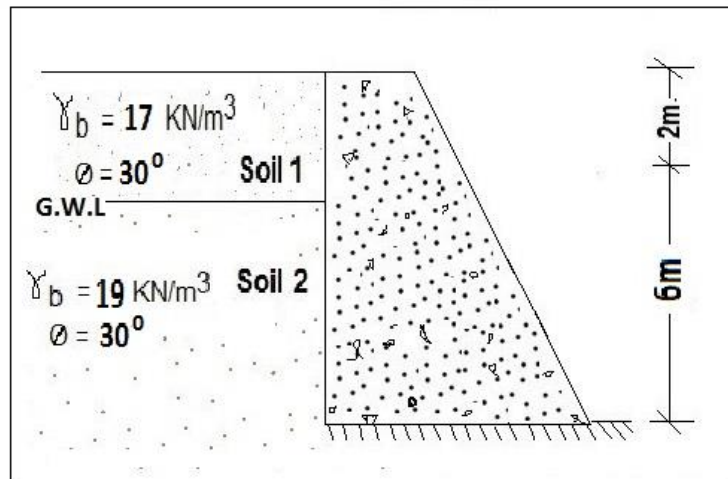


FIG.1