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.*

QUESTION ONE

(a) State **THREE** reasons that make the "triaxial shear strength test." preferred to the 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 100KN/m^2.

(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 TWO

(a) Outline **THREE** modes of failure for triaxial test samples **(9 marks)**

(b) Outline any **ONE** condition of test applied in triaxial tests. **(5marks)**

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

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

QUESTION THREE

(a) (i) Outline **THREE** conditions a foundation must satisfy.

(ii) Briefly describe General mode of failure that can occur beneath a footing.

(12 marks)

(b) A square footing 2.2m x 2.2m is to be founded at a depth of 2.0m in a sand soil of the following properties: Ø= 35^O C = 15KN/m^2 γ_b= 17.5KN/m^3 and γ_{sat}= 20 KN/m^3 Determine the ultimate bearing capacity considering water table to be at foundation level.

(8 marks)

QUESTION FOUR

(a) State four assumptions made in Terzaghi's theory applied to footings. **(8marks)**

(b) A strip footing is to transmit a safe load of 325KN/m run at a depth of 2m to a ground of the following properties: C = 18KN/m^2 Ø = 20^O γ_b= 19 KN/m^3

Using figure 1, determine breadth for the footing taking. Take factor of safety F = 3.

(12 marks)

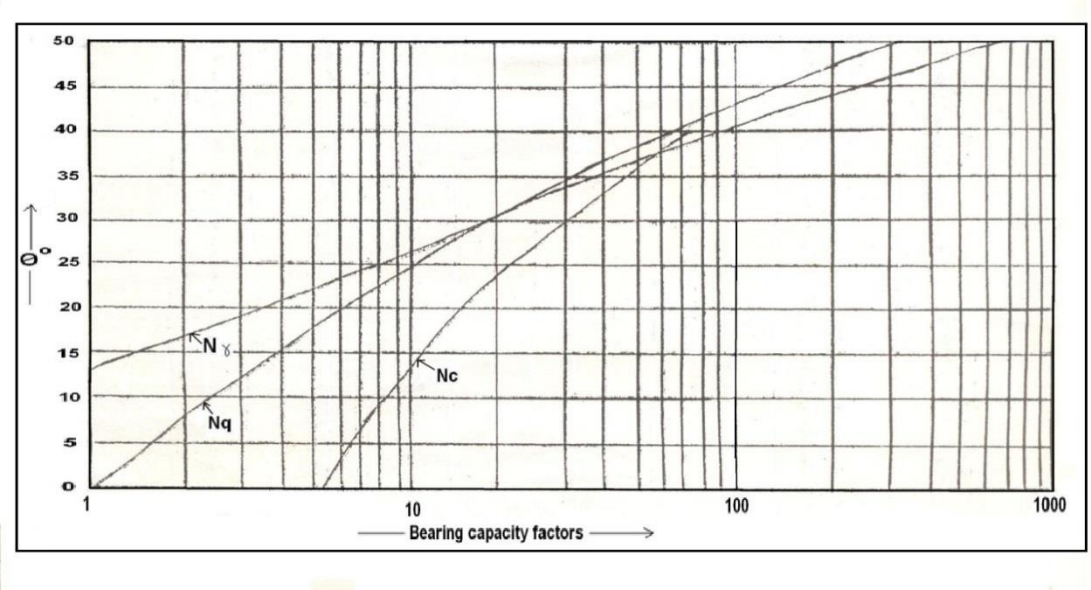

FIG.1

QUESTION FIVE

Figure 2 shows a retaining wall 10m high supporting cohesionless soils and having a horizontal surcharge of 12KN/m^2.

(a) Sketch a pressure distribution diagram **(15 marks)**

(b) Determine **(i)** Magnitude of total active thrust

(ii) Position at which horizontal thrust acts. **(5 marks)**

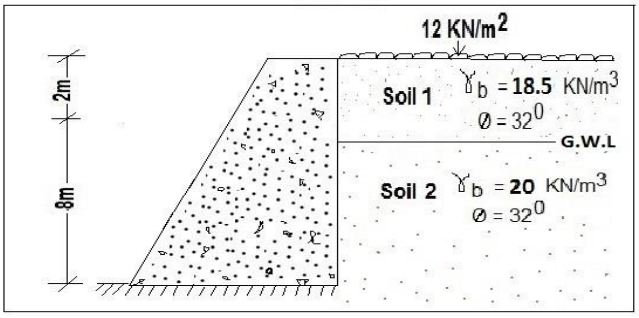

FIG.2