TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

INSTITUTIONAL BASED PROGRAMME

UNIVERSITY EXAMINATION FOR:

- DIPLOMA IN BUILDING AND CIVIL ENGINEERING

EBC 2206: SOIL MECHANICS II

END OF SEMESTER EXAMINATION

SERIES: JULY 2017

TIME: 2 HOURS

DATE: ----JULY 2017

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-Drawing instruments.

-Scientific calculator

This paper consists of **FIVE** questions.

Attempt **any THREE questions**.

Do not write on the question paper

Mobile Phones are NOT allowed inside the examination room

QUESTION ONE

(a) Briefly explain the following:

(i) Cohesion

(ii) Angle of shearing resistance

(iii) Undisturbed soil **(10 marks)**

(b) (i) Explain the term 'shallow footing' as applied to Terzaghi's theory on shallow foundations.

(ii) Explain each term that form Terzaghi's theory for bearing capacity. **(10 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)

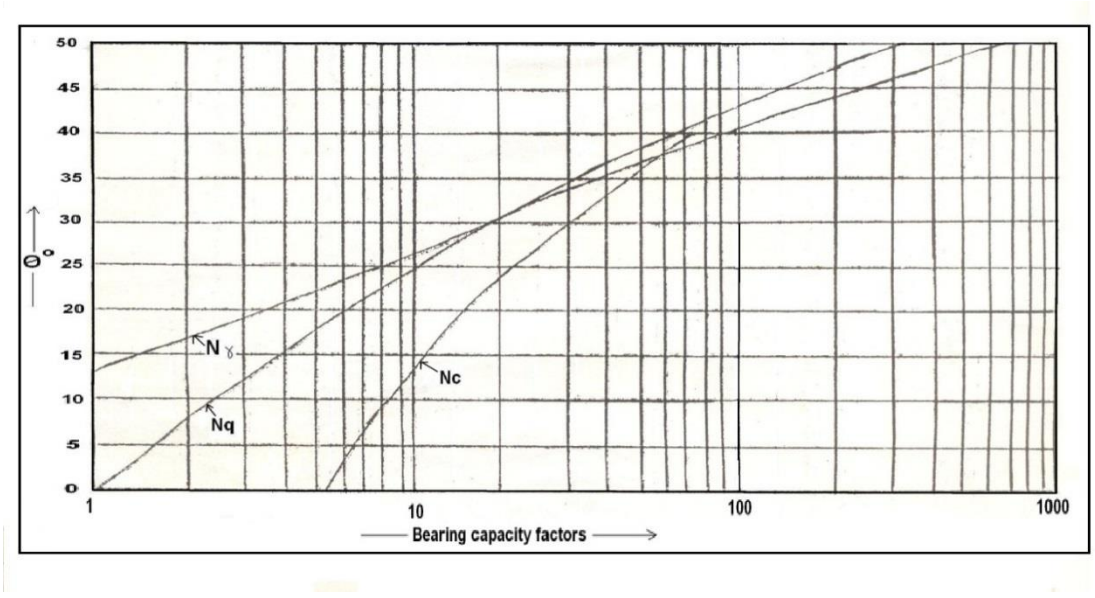

Fig.1

QUESTION FIVE

(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. **(8 Marks)**

(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.

(6 marks)