TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 11)
DIPLOMA IN CIVIL ENGINEERING (DCE 11)

EBC 2304: SOIL MECHANICS II

END OF SEMESTER EXAMINATION
SERIES: APRIL 2013
TIME ALLOWED: 2 HOURS

Instructions to Candidates:
You should have the following for this examination

- *Answer Booklet*
- *Scientific Calculator*

This paper consists of **FIVE** questions.
Answer any **THREE** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One

a) State **FIVE** objectives of site investigation. **(10 marks)**

b) A square foundation of 3.5m side is to be founded at a depth of 1.5m in medium sand (= 19.4KN/m^3). The water table is located at a depth of 3.6m. During site investigation a standard penetration test produced the following values:

Depth B.S (m)	1.4	2.2	3.0	3.8	4.6	8.4
N Value	7	9	12	12	17	20

Determine an estimate for the allowable bearing capacity based on a maximum settlement of 25mm. Use fig 11.9. **(10 marks)**

Question Two

a) With the aid of a sketch, describe Rotational slip as applied in slope failure. **(5 marks)**

b) The slope of a water-retaining embankment is 1 vertical to 2 horizontal and the vertical height is 10m. The soil is fully saturated and has an undrained cohesion of 30KN/m^2 and a unit weight of 18KN/m^3. Determine the factor of safety against shear failure along the trial circle shown in figure 1 when the water table is 6m above the toe. Use the following data:

For zone A (FBDE): Area $A_A = 41.92m^2$
Centroid distance, $d_A = 13.0m$

For zone B (EDA): Area, $A_B = 144.11m^2$

Centroid distance, $d_B = 4.44m$

$\theta = 76.06^o$

Sector angle **(15 marks)**

A

Question Three

a) (i) Explain the term soil erodibility
(ii) State **FOUR** factors which provide resistance to soil erodibility. **(6 marks)**

b) Outline the **SIX** factors which control the rate and magnitude of soil erosion by wind. **(14 marks)**

Question Four

a) With the aid of a sketch, outline the plate loading test. **(15 marks)**

b) Outline **TWO** factors which influence methods used in site investigation. **(5 marks)**

Question Five

a) A cutting in a saturated clay is inclined at a slope of 1 vertical: 1.5 horizontal and has a vertical height of 10m. The bulk unit weight of the soil is 18.5KN/m^3 and its undrained cohesion is 40KN/m^3

4.32m

Determine the factors of safety against immediate shear failure along the slip circle shown in figure 2:

(i) Allowing for tension crack empty of water and

(ii) Allowing for tension crack when full of water **(15 marks)**

b) Explain the **TWO** classes of slopes, giving **TWO** examples in each case. **(5 marks)**