



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

DIPLOMA IN ARCHITECTURE

DIPLOMA IN CIVIL ENGINEERING

CIVIL ENGINEERING CONSTRUCTION I

END OF SEMESTER EXAMINATIONS

MAY 2010 SERIES

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination:

- Answer booklet
- Drawing instruments

This paper consists of **FIVE** Questions.

Answer **THREE** Questions.

Question **ONE** is **COMPULSORY** and any other **TWO** Questions.

Maximum marks for each part of a question are as shown.

Question ONE (COMPULSORY)

- (a). Outline **FIVE** indicators of application of the labour-based approach. **(10 Marks)**
- (b). (i). Sketch and label a free standing precast concrete retaining wall.
- (ii). State **FIVE** advantages of the structure in (b) (i). **(12 Marks)**
- (c). State **FOUR** main reasons for underpinning. **(8 Marks)**

Question TWO

- (a). Using suitable sketches, show the **TWO** main methods of anchoring sheet piles to rock. **(7 Marks)**
- (b). State **FOUR** factors to be considered in design of double-wall cofferdams. **(4 Marks)**
- (c). (i). State **THREE** factors that influence type of cofferdam to be selected.
- (ii). Outline the **THREE** main causes of failure of single wall cofferdams. **(9 Marks)**

Question THREE

- (a). (i). State the **THREE** main circumstances that necessitate the use of pile foundations.
- (ii). With the aid sketches, state the **FIVE** stages of forming a Franki Pile. **(14½ Marks)**
- (b). (i). State the main factors to be considered while selecting a piling system.
- (ii). State the main factor that is used to ensure the actual penetration depth and safe working load of a piling system test.
- (iii). List the **TWO** main test loading methods applicable in piling. **(5½ Marks)**

Question FOUR

- (a). (i). Define the term Caisson.
- (ii). Differentiate between Caissons and Cofferdams.
- (iii). Using a suitable sketch, show construction method for a box caisson where a hard bearing layer is not available at foundation level. **(9 Marks)**

- (b). Briefly describe the working principles of a Pneumatic Caisson. **(5 Marks)**
- (c). (i). State **THREE** causes of tilting of caisson during installation.
- (ii). State **THREE** methods of rectifying the defect in c(i). above. **(6 Marks)**

Question FIVE

- (a). With the aid of a sketch, briefly describe principles of a multi-stage wellpoint dewatering method. **(11 Marks)**
- (b). State the **FOUR** design principles of retaining walls. **(4 Marks)**
- (c). State the **FIVE** adverse effects of ground water behind a retaining wall. **(5 Marks)**