THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

DIPLOMA IN CIVIL ENGINEERING AND CAD

END OF SEMESTER EXAMINATIONS

APRIL/MAY 2010 SERIES

CIVIL ENGINEERING CONSTRUCTION AND DRAWING

TIME: 3 HOURS

Instructions to Candidates

You should have the following for this paper:

- Answer Booklet
- Drawing Instruments
- Drawing paper Size A2

This paper consists of **EIGHT** Questions in **TWO** Sections, **A** and **B**.
Answer **FOUR** Questions from Section **A** and **ONE** Question from Section **B.**
Maximum marks for each part of a question are as shown.

SECTION A

(Answer **FOUR** Questions from this Section)

Question ONE

(a). With the aid of sketches, describe the following methods of ground water exclusion:

(i). Sump pumping
(ii). Freezing **(8 Marks)**

(b). With the aid of a sketch, describe the construction of "Cantilever retaining wall". **(7 Marks)**

Question TWO

(a). State **SEVEN** requirements of an ideal railway sleeper. **(7 Marks)**

(b). Using suitable sketches, show the **THREE** methods of construction of rock fill cofferdams to cater for water cut-off in high water heads. **(8 Marks)**

Question THREE

(a). (i). With the aid of sketches, describe the "head and benching" method of tunneling.
(ii). Explain the purpose of ventilation in tunnel construction.
(iii). Explain the term "alignment" as used in tunnels. **(7 Marks)**

(b). (i). State **FIVE** points to be looked into while carrying out inspection of Maintenance and inspection of masonry bridges.

(ii). State **THREE** purpose of River Training Works. **(8 Marks)**

Question FOUR

(a). Define the following terms as applied to water front structures:

(i). Berth
(ii). Quay
(iii). Wharf **(6 Marks)**

(b). Sketch and label the **THREE** main types of Breakwaters. **(9 Marks)**

Question FIVE

(a).   Sketch and label the parts of a slow sand filter.   **(10 Marks)**

(b).   State **FOUR** reasons of treating waste water.   **(4 Marks)**

Question SIX

(a).   Differentiate the following as used in dams:
    (i).   Piping from sloughing.
    (ii).   Earth dam from rockfill dam.   **(3 Marks)**

(b).   With the aid of a sketch outline the drilling of tube well using direct rotary drilling method.   **(12 Marks)**

SECTION B
(Answer **ONE** Question from this section)

Question SEVEN

(a).   The following information relates to a square reinforced concrete tank:

Internal length of sides	=	2200mm
Thickness of walls	=	150mm
Depth above base	=	1700mm
Thickness of base slab	=	300mm
Reinforcement: Base slab	=	Y10@150c/C main bars
	=	Y8@200c/C distribution bars
Walls	=	Y8@150c/C main bars
	=	Y8@200c/C distribution bars
Cover to reinforcement	=	40mm throughout

To a scale of 1:25, and using the above information, draw the reinforcement details to the square reinforced concrete tank of the following elements:
(i).   Base slab
(ii).   Vertical wall section   **(26 marks)**

(b).   To a scale of 1:50, draw a section through a reinforced concrete box caisson sunk to position given information:

Internal width of caisson	-	6000mm
Internal height of caisson	-	5000mm
Thickness of walls	-	200mm
Thickness of base	-	300mm
Water level from top of caisson	-	1000mm

Assume any other relevant information.   **(14 Marks)**

Question EIGHT

A double compartment septic tank has the following information:

- Compartment A   -   3000mm x 3700mm (internal)
- Compartment B   -   3700mm x 2000mm (internal)
- Depth of compartment B   -   1500mm
- Freeboard   -   400mm
- Depth compartment A, varies from 1.5m with a slope of 1:4 upto the base of external wall of compartment A.
- Wall thickness   -   200mm
- Size of inlet chamber   -   750mm x 500mm (internal)
- Size of outlet chamber   -   750mm x 500mm (internal)

To a scale of 1:25 draw and label:

(a).   A typical section of the septic tank.   **(25 Marks)**

(b).   A plan of the septic tank.   **(15 Marks)**