



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE



*Faculty of Engineering & Technology*

DEPARTMENT OF CIVIL AND BUILDING ENGINEERING

## DIPLOMA IN CIVIL ENGINEERING AND CAD

END OF COURSE 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). Briefly describe the construction of Dolphins. **(7 Marks)**
- (b). With the aid of sketches, outline the procedure for forming a Franki Pile. **(8 Marks)**

### Question TWO

- (a). With the aid of a suitable sketch, outline the design principles of cantilever retaining walls. **(8 Marks)**
- (b). (i). State the **THREE** advantages of pneumatic caissons.  
(ii). Sketch and label a pneumatic caisson. **(7 Marks)**

### Question THREE

- (a). With the aid of sketches, describe the following:  
(i). Rockfill dam  
(ii). Earth dam **(7 Marks)**
- (b). With the aid of a sketch, briefly describe the backhoe dredger and its operations in dredging. **(8 Marks)**

### Question FOUR

- (a). State **FOUR**:  
(i). function of railway sleepers.  
(ii). Details that should be looked into in connection with the maintenance of points and crossings of railway lines. **(8 Marks)**
- (b). State **SEVEN** functional requirements of bridges. **(7 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.

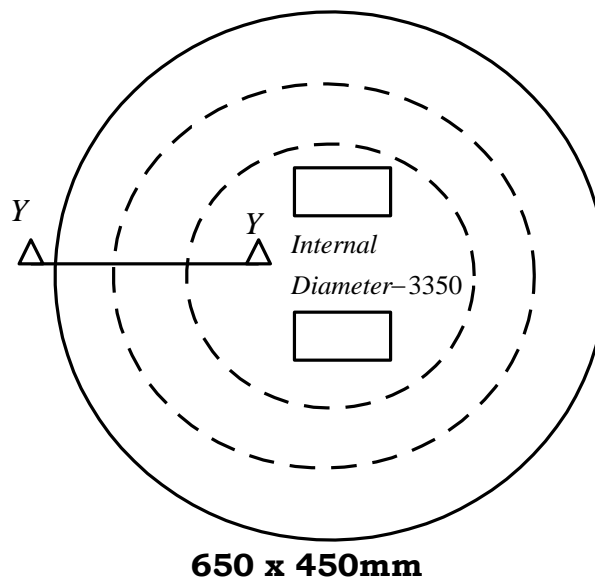
**(12 Marks)**

### **SECTION B**

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

### **Question SEVEN**

(a).



**MS CAST IRON MANHOLE AND FRAME**

**Fig. 1**

Figure shows plan of a circular tank.

To a scale of 1:50, draw section Y-Y, given the following information:

- |   |   |             |
|---|---|-------------|
| - Foundation (reinforced)               | - | 350mm thick |
| - Floor slab                            | - | 200mm thick |
| - R.C inner wall                        | - | 220m thick  |
| - Solid concrete block wall             | - | 110mm thick |
| - Mastic asphalt (vertical)             | - | 20mm thick  |
| - Cover slab with mesh reinforcement    | - | 150mm thick |
| - Assume any other relevant information |   |             |

**(24 Marks)**

(b). To a scale of 1:50, draw a section through a box caisson given the following information:

- Width of caisson - 6.8m
- Height of caisson - 5.1m
- Wall thickness - 400m
- Assume any other relevant information

**(16 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)**