THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING

EBC 3201: PUBLIC HEALTH ENGINEERING

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: OCTOBER 2012
TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

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

Question One (20 marks)

a) Compare the following sources of water with reference to quality.

i) Roof catchment
ii) Streams and rivers
iii) Ground water **(9 marks)**

b) Outline **FOUR** points considered in the location of water supply intakes from surface water sources. **(8 marks)**

c) State **THREE** reasons for raw water storage. **(3 marks)**

Question Two (20 marks)

a) State **FOUR** objectives of water treatment. **(4 marks)**

b) Outline **THREE** main factors that determine the methods chosen for water treatment. **(6 marks)**

c) With the aid of sketches outline the working principle of:
i) Cascade Aerators
ii) Multiple Tray Aerators **(10 marks)**

Question Three (20 marks)

a) A water supply is to have the following components.
- River intake (pumped)
- Aeration
- Chemical dosing plant for coagulants
- Low lift pumps
- Filters
- Screens
- Elevated tank for clear water
- Floculators
- Preliminary settling tank
- Clarifiers
- Disinfection plant

Using a flow diagram, arrange the components in the correct sequence starting from the first. **(6 marks)**

b) Define the following terms as used in water treatment.
i) Flash mixing
ii) Flocculation
iii) Coagulation
iv) Coagulant aid sedimentation **(10 marks)**

c) State **FOUR** objectives of aerators in water treatment. **(4 marks)**

Question Four (20 marks)

a) State **FOUR** factors that influence disinfection of water. **(4 marks)**

b) Outline **THREE** methods that are used in disinfection of water for drinking. **(6 marks)**

c) (i) With the aid of a well labeled diagram, illustrate a tower house intake, located in a river and equipped with a pump.

(ii) State **TWO** reasons that would favour the use of such an intake. **(10 marks)**

Question Five (20 marks)

a) State **ONE** reason for fitting a reservoir with the following:

i) Vent pipe
ii) Wash out
iii) Roof
iv) Overflow pipe
v) Ball valve **(5 marks)**

b) Briefly describe the following water treatment processes.

i) Aeration
ii) Filtration **(8 marks)**

c) With the aid of sketch, explain any suitable method used to exclude the first 'foul' flow from a roof catchment after a storm. **(7 marks)**