



# MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY  
DEPARTMENT OF BUILDING AND CIVIL ENGINEERING  
FIRST YEAR SECOND SEMESTER EXAMINATION FOR

CRAFT CERTIFICATE IN PLUMBING

1305/314: PLUMBING THEORY

DATE:

TIME:

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## INSTRUCTIONS

**ANSWER ALL THE FIVE QUESTIONS**

1. a) i List Three types of water impurities (3 marks)  
ii With the aid of a neat sketch explain the operation of a rapid sand filter (5 marks)
- b) i Define the following terms as used in the chlorination of water  
-Super chlorination  
-De-chlorination (4 marks)  
iii State Four advantages of break point chlorination (4 marks)
- c) Sketch one type of joint used in each of the following pipe materials  
i. PVC  
ii. GI (4 marks)
2. a) Using a single line diagram show a labeled direct system of domestic cold water for a two storey house with a kitchen sink, bath, WC and hot water cylinder on the ground floor and a WC, wash hand basin and a bath tub on the first floor. (12 marks)
- b) i Give the chemical equations for each of the following reactions:-  
- Removal of temporary hardness from water by addition of lime

- Removal of permanent hardness from water by addition of soda ash

(4 marks)

ii Briefly explain the Base Exchange method of softening water (4 marks)

3. a) Explain the following terms

i. Back siphonage

ii. Nominal capacity

iii. Actual capacity

iv. Service pipe

v. Main

(10 marks)

b) i with the aid of a labeled sketch illustrate the layout of water supply pipe

from the main to the water meter

(5 marks)

ii sketch a typical section of a storage tank and label all the parts and

indicating all relevant dimensions .

(5 marks)

4. a) i Illustrate the following

I. Shallow well

II. Deep well

III. Artesian well

(6 marks)

ii Give Six installation requirement for a cold water cistern

(6 marks)

b) Sketch and label the following

i. A centralized indirect water system for a three storey building

ii. A section through a cistern type hot water heater

(8 marks)

5. a) Sketch a detailed section to show

i. A standing seam

ii. battened roll covered with sheet metal

(8marks)

b) i State three functions of a felt underlay in sheet metal roof covering

ii state four safety precautions to be observed when using a ladder (4 marks)

c) name and sketch the three types of urinals and give one advantage of each (8 marks)