



# TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

**UNIVERSITY EXAMINATION FOR:**

DMPL6 Y3S2

EPL2305: PLANT TECHNOLOGY IV

END OF SEMESTER EXAMINATION

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**DATE: Pick Date May 2016**

## Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass, student ID, drawing instruments and scientific calculator.

This paper consists of **FIVE** questions. Attempt any **THREE** questions.

**Do not write on the question paper**

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## Question ONE

(a) List any **FIVE** considerations when designing a water system pipe line. (5 marks)

(b) State any **FIVE** rules used for water system pipeline designing. (5 marks)

(c) (i) List any **FOUR** pipe appurtenances and state their functions of each in a water distribution pipe line. (2 marks)

(iii) A town having a population of 12 million is to be supplied with water at a rate of 200 l/h/day per person, will have to be delivered in 8 hours. The supply is from a river 5 km away.

What should be the size of the water main if the head is 16 metres. Take  $C_H$  for the main as 100.

Using the relationship.

$$V = 0.85 C_H R^{0.633} S^{0.54}$$

Where R is mean depth, S is the slope of energy line, V is the flow velocity and  $C_H$  is the Hezein William Co-efficient. (8 marks)

### Question TWO

. Explain how precipitation process is done as a treatment for external boiler feed water. (20 marks)

### Question THREE

- . (a) What is lubrication? (2 marks)
- (b) State the reasons for lubrication. (8 marks)
- (c) State the advantages of grease over oil as a lubricant. (10 marks)

### Question FOUR

(a) With the aid of a diagram, explain operation of the following steam traps.

- (i) Float Trap
- (ii) Bimetallic trap

(b) Briefly describe the following types of steam turbines.

- (i) Reaction Steam Turbine
- (ii) Impulse Steam Turbine

### Question FIVE

. With the aid of a diagram, explain the following process/features of a minimum size community water distribution system.

- (a) Screening
- (b) Pre-sedimentation
- (c) Coagulation
- (d) Flocculation
- (e) Sedimentation
- (f) Filtration

(20 marks)

(g) Disinfection

(h) Additives