



# TECHNICAL UNIVERSITY OF MOMBASA

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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) Explain briefly the meaning of the following properties of liquid lubricants.

(i) Viscosity

(ii) Pour Point

(iii) De-mulsification Value (10 marks)

(b) Explain **FIVE** considerations to be considered when selecting oil as a lubricant. (10 marks)

## Question TWO

(a) State any **FOUR** considerations to be considered during pipe materials selection for a water system pipeline (4 marks)

(b) List **FOUR** types of pipes used in water distribution pipeline. (4 marks)

(c) Water is to be supplied to a town with a population of 1.5 million at a rate of 200 l/h/person/day from a river 3.5 Km away. The entire day's supply needs to be pumped in 8 hours, the upgrade along the pipe line path is 1m in 12 Km Using the relationship.

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

where R is mean depth, S is the slope of energy line, V is the flow velocity and  $C_H = 120$ ; size the pipe.

(12 marks)

## Question THREE

Explain briefly how Ion-exchange process is carried out as a treatment for external boiler feed water. (20 marks)

## Question FOUR

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) Additive

### **Question FIVE**

- . (a) List any **FIVE** types of pipe appurtenances used in a steam distribution system. (5 marks)
- (b) Outline the daily maintenances carried in steam boilers. (15 marks)