



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.

Tel: +254(0) 799 529 958, +254(0) 799 529 959, +254 (0)712 524 293

Website: www.must.ac.ke Email: info@mucst.ac.ke

UNIVERSITY EXAMINATIONS 2024/2025

FOUR YEAR FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

EMT 3409: INDUSTRIAL PLANT TECHNOLOGY

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- a) Outline Two sources of water from each of the following
 - i) Surface
 - ii) Under ground (4 marks)
- b) Treated water made safe and wholesome is supplied to consumers by the various water distribution methods. Outline four types of water distribution components stating the function for each (8 marks)
- c) i) Outline Three objective in the design of a Plant lay out (3 marks)
ii) Describe the term material handling as applied to plants (3 marks)
- d) Outline FOUR essential requirements of a good materials handling system (4 marks)
- e) Briefly describe four Principles of Total Quality Management (4marks)
- f) State Four Questions addressed under Risk Analysis and management in a plant (4 marks)

QUESTION TWO (15 MARKS)

- a) Describe Three requirement for a water distribution system (3 marks)



b) using sketches describe the following water distribution methods

i. Dead End

ii. Grid iron (4 marks)

iii) Outline Two suitable applications for each of the methods in (bi) (2 marks)

c) A water pipe is designed to supply $20\text{m}^3/\text{s}$ of water from water treatment point to town 2.5 Km way. The frictional loss in mm of water per m of a pipe is indicated as 0.2 by the manufacture. Using the chart 1 provided, determine the following;

i) The pipe diameter required (3 marks)

ii) mean velocity of water flow in the pipe (3 marks)



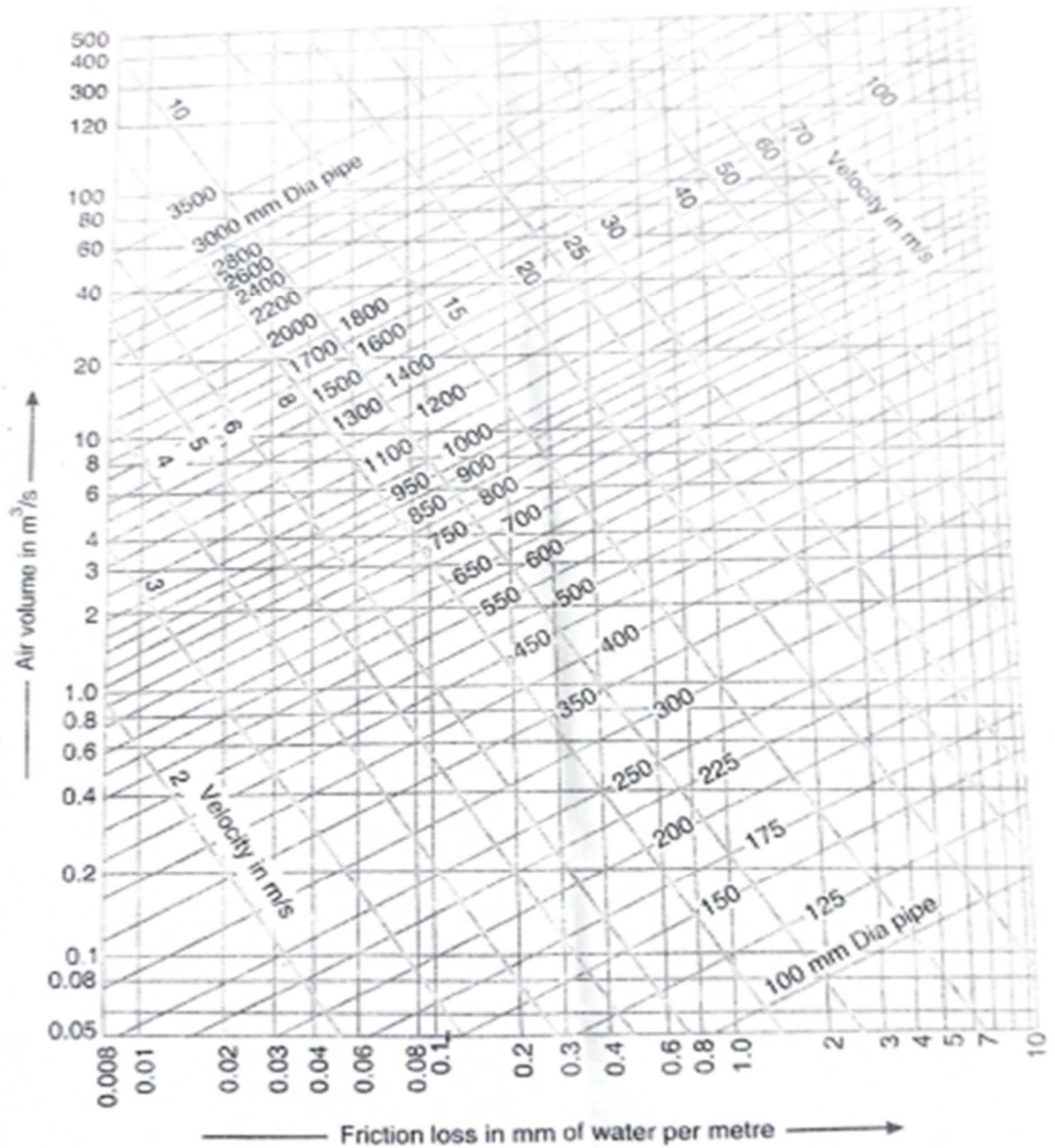


Chart Q2(c); Pipe sizing chart

QUESTION THREE (15 MARKS)

- a) Describe the term material handling (2 marks)
- b) Outline four factor considered in selection of a material handling system (4 marks)
- c) i) Outline Three types of plant layouts installed in facilities (3 marks)
 - ii) A plastic manufacturing industry consists of three group of equipment and workers that perform a sequence of operations over multiple units of an item or family of items. Identify a suitable plant for the industry and sketch the layout. (6 marks)

QUESTION FOUR(15 MARKS)

- a) Outline the four processes carried out in waste water treatment (4 marks)
- b) Using a block diagram, illustrate the layout of a waste water treatment plant (4 marks)
- c) i. Describe steps involve in planning for fire protection (3 marks)
 - ii. A library is to installed with a Dry-pipe sprinkler systems employ automatic sprinkler. Using a sketch, illustrate the installation (4 marks)

QUESTION FIVE (15 MARKS)

- a) Describe four steps performed in project planning (4 marks)
- b) A car manufacturing company, has been contracted for 2,000 units in a period on one year. As a production Engineer of the company, outline four causes that may cause lateness in this production (2 marks)
- c) i) Describe the activities carried/ performed under the following cycles in Total Quality management cycles
 - i, Planing (2 marks)
 - ii, Doing (2 marks)
 - iii, Acting (2 marks)
- ii) Describe Three methods of implementing TQM in a small Enterprise organization. (3 marks)

