



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONICS

ENGINEERING

UNIVERSITY EXAMINATION FOR:

INSTITUTION BASED

THE DEGREE IN BACHELOR OF TECHNOLOGY IN

ELECTRICAL ENGINEERING

TMC 4252 : Fluid Mechanics

END OF SEMESTER EXAMINATION

SERIES: APRIL 2017

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Choose No questions. Attempt Choose instruction.

Do not write on the question paper.

- a) Define and explain fluid characteristics. (2 marks)
- b) Explain the surface tension. (2 marks)
- c) Derive the expression for capillary rise of a liquid. (5 marks)
- d) Calculate the minimum size of glass tubing that can be used to measure water level ,if the capillary rise in the tube is not to exceed 0.25mmTake the surface tension of water in contact with air as 0.0735N/m (5 marks)
- e) A triangle plate of 1 .5 m altitude is immersed in water .the plane of the plate is inclined at 30° with free water surface and the base is parallel to and at a depth of 2 meters from water surface. Find the total pressure on the plate and the position of centre of pressure (6 marks)

Question Two

- f) Define the following terms
 - i. Orifice
 - ii. Weir
 - iii. Notch (6 marks)
- g) Derive the expression for actual discharge over a triangular notch (9 marks)
- h) Find the discharge over a triangular notch of angle 60o when the head over the triangular notch is 0.2 m. Assure $C_d=0.62$ (5 marks)

Question Three

- a. Define an orifice (2 marks)
- b. Explain how to determine the co-efficient of velocity (6 marks)
- c. Explain briefly hydraulic coefficients (3 marks)
- d. A tank has two identical orifices in one of its vertical sides and in the same vertical plane. The upper orifice is 1.5 m below the water surface and the lower one is 3 m below the water surface .Find the point, at which the two jets will intersect, if the co-efficient of velocity is 0.92 for both the orifices (9 marks)

Question Four

- a. Describe types of venturimeters with appropriate diagrams (6marks)
- b. Derive the theoretical discharge of a horizontal venturimeter (10 marks)
- c. A horizontal with an inlet diameter 200 mm and a throat diameter of 100mm is used to measure the flow of water. The pressure at inlet is 0.18 N/mm^2 and vacuum pressure at the throat is 280 mm of mercury. Find the rate of flow. The value of C_d is 0.98nturimeter (4 marks)

Question Five

- a) Derive Bernoullis Equation and state the assumption made. (10 marks)
- b) A pipe 200 m long slopes down at 1 in 100 and tapes from 600 mm diameter at the higher end to 300 mm diameter diameter at the lower end and carries 100 litres /sec Of oil (specific gravity 0.8).If the pressure gauge at the higher reads 60kN/m^2 . Calculate:
- i. Velocities at the two ends
- ii. Pressure at the lower end (10 marks)