



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN CIVIL ENGINEERING

BCECD316: HYDRAULICS

Date:

Time:

INSTRUCTIONS:

- *This paper comprises five questions*
- *Question **one** is **compulsory** and carries 30 marks*
- *All other questions carry 20 marks each*
- *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

- a) Write short notes on types of open channel flow (12 marks)
- b) Write short notes on the working principle of hydraulic pumps (8 marks)
- c) What is Hydraulics (2 marks)
- d) Describe the working principle of a hydraulic turbine (8 marks)

QUESTION TWO (20 MARKS)

- a) What is a hydraulic turbine (2 marks)
- b) Give with explanations the different classifications of hydraulic turbines (8 marks)
- c) What do you mean by critical flow? Derive an expression for critical depth and Froude number for triangular channel. (12 marks)

QUESTION THREE (20 MARKS)

- a) With illustrations describe the working principle of a hydraulic pump. (10 marks)
- b) Explain the difference between a centrifugal pump and a positive displacement pump (4 marks)
- c) Give three differences between impulse and reaction turbines. (6 marks)

QUESTION FOUR (20 MARKS)

- a) Differentiate between
 - i. Steady and unsteady flow
 - ii. Uniform and non-uniform flow (8 marks)
- b) Explain the construction features of a hydraulic pump (8 marks)
- c) Define most economical section (4 marks)

QUESTION FIVE (20 MARKS)

- a) A circular pipe tapered in section is 100mm diameter at one end which is 2m above datum and 250mm diameter at other end which is 6m above datum. The pressure and velocity of water flowing at lower end is 200 KN/m² and 10m/sec respectively. Determine the pressure at the other end. (10 marks)
- b) State FIVE types of channels and their definitions. (10 marks)