TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BSC IN CIVIL ENGINEERING

ECE 2312: HYDRAULICS II

END OF SEMESTER EXAMINATION

SERIES:APRIL2016

TIME:2HOURS

DATE:11May2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, Drawing Instruments, Scientific calculator, examination pass and student ID

This paper consists of five questions. Attemptquestion ONE (Compulsory) and any other TWO questions.

Question One (Compulsory)

a) Describe the tangential water wheel if it has to give good efficiency in its running **(5 marks)**

b) Describe the power transmitted from the water to the buckets in an impulse turbine **(5 marks)**

c) A pelton wheel develops 2000KN under a head of 100metres and with overall efficiency of 85%.find the diameter of the nozzle if the efficient velocity for the nozzle is 0.98 **(10 marks)**

d) A pelton wheel is required to generate 3750kW under an effective depth of 400M. Calculate the total flow in l/s and size of the jet.
Assume generator efficiency of 95%, overall efficiency of 80% coefficient of velocity0.97, speed ratio 0.46. If the jet ratio is 10, calculate the mean diameter of the runner. **(10 marks)**

Question Two

a) Outline three assumptions made in developing the linear wave theory **(8 marks)**

b) A pelton wheel is supplied water under a head of 200m through a 100mm diameter pipe. If the quantity of water supplied to the wheel is 1.25m^3/s. Calculate the number of jets. Assume C_v =0.97 **(12 marks)**

Question Three

a) Outline three factors that influence the formation of wind waves **(3 marks)**

b) What are waves characterized by **(4 marks)**

c) Describe the current challenges in coastal management **(13 marks)**

Question Four

a) Describe "managed retreat" in generic strategies for coastal defense or general coastal management strategies **(8 marks)**

b)

i. Enumerate two examples of event warning systems in coastal management

ii. What are they used for **(3 marks)**

c) A pelton wheel develops 1750kW under a head of 100m while running at 200r.p.m and discharging 2500litres of water per second. Calculate

i. The unit power **(3 marks)**

ii. The unit speed **(3 marks)**

iii. Unit discharges of the wheel **(3 marks)**

Question Five

a) Describe how the minimum value of a cavitation parameter can be determined experimentally for a given machine or model turbine **(6 marks)**

b) Define the overall efficiency e of a reaction turbine and explain the terms **(6 marks)**

c) Derive the formula for the greatest hydraulic efficiency for a given turbine **(8 marks)**