



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2510: HARBOUR ENGINEERING

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: SEPTEMBER 2018
TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (COMPULSORY) 20 Marks

- a) State the factors that influence the following:-
- i. Location of a Harbour
 - ii. Decision to build a Harbour **(12 Marks)**
- b) Describe the four main types of Harbour **(8 Marks)**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 MARKS)

- a) Define the following terms as used in Harbour design: -
- i. Displacement Tonnage
 - ii. Deadweight Tonnage
 - iii. Gross Registered Tonnage **(8 Marks)**

- b) Sketch a typical minimum sized artificial Harbour showing its dimensions **(12 Marks)**

QUESTION THREE (20 MARKS)

- a) State the factors that influence the choice between Open and Solid berth designs **(6 Marks)**
- b) Sketch the following berth structures:-
- i. Jetty in plan showing the dolphins **(6 Marks)**
 - ii. Blockwork Wharf **(8 Marks)**

QUESTION FOUR (20 MARKS)

- a) State the procedure of design of breakwaters **(8 Marks)**
- b) Sketch typical examples of the following breakwaters:-
- i. Concrete block type sloping breakwater
 - ii. Concrete block type upright breakwater **(12 Marks)**

QUESTION FIVE (20 MARKS)

- a) Define the wave heights that should be recorded in a Harbour for use in design **(6 Marks)**
- b) i) State the factors that affect the choice of dredger for a dredging operation
- ii) Sketch any three types of dredgers **(14 Marks)**