



# TECHNICAL UNIVERSITY OF MOMBASA

## FACULTY OF ENGINEERING AND TECHNOLOGY

### DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

#### UNIVERSITY EXAMINATION FOR:

#### DIPLOMA IN MARINE ENGINEERING

#### EMR 2216: SHIP CONSTRUCTION & NAVAL ARCHITECTURE IV

#### END OF SEMESTER EXAMINATION

**SERIES:** APRIL 2016

**TIME:** 2 HOURS

**DATE:** Pick Date May 2016

#### 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 any **THREE** questions.

**Do not write on the question paper.**

#### Question ONE

- a) Sketch a metacentric diagram for vessel of constant triangular cross section (5marks)
- b) A vessel of constant triangular cross section has a depth of 12 m and a breadth at the deck of 15m. Calculate the draught at which the vessel will become unstable if the centre of gravity is 6.675 m above the keel (15marks)

#### Question TWO

- a) Sketch a curve of statical stability and show the following features: (12marks)
- (i) Range of stability
  - (ii) Angle of vanishing stability
  - (iii) Maximum GM
  - (iv) Maximum GZ
- b) Define and explain the conditions of the following terms: (8marks)
- (i) Angle of loll
  - (ii) Trim

### Question THREE

A fore peak bulkhead is 4.8m deep and 5.5m wide at the deck. At regular intervals of 1.2m below deck, the horizontal widths are 5.0, 4.0, 2.5, 0.5 m respectively. The bulkhead is flooded to the top edge with sea water on one side only. Calculate:

- a) area of the bulkhead
- b) Load on the bulkhead
- c) Position of centre of pressure **(20marks)**

### Question FOUR

- a) Discuss the defects that are likely to occur on a fixed pitch propeller and suggest the methods that are recommended as a remedy **(10marks)**
- b) Sketch a suitable seal that is fitted outboard on propeller shafts to prevent oil leakage into the sea from the stern tube. **(10marks)**

### Question FIVE

With reference to ship construction discuss why the following features are incorporated in the design of some ships:

- a. Bilge keel **(5marks)**
- b. Bulbous bow **(10marks)**
- c. Kort Nozzles **(5marks)**