JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR THE DIPLOMA IN MARINE ENGINEERING (TVET)

1ST YEAR 2ND SEMESTER 2023/2024 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TDM 2126

COURSE TITLE: SHIP CONSTRUCTION PRINCIPLES

EXAM VENUE: **STREAM: Dip Marine Eng**

DATE: ../04/2024 **EXAM SESSION:**

DURATION: 3 HOURS

Instructions

1. **Answer question 1 (Compulsory) and ANY other three questions**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE (40 Marks)

a) With aid of diagrams, describe the following principle dimensions of a ship (12 Marks)

i. Camber
ii. Length overall
iii. Forward perpendicular
iv. Aft perpendicular
v. Freeboard
vi. Beam
vii. Amidships
viii. Draft

b) Use diagrams to illustrate the difference between the following types of ships; (6 Marks)

i. Container carrier
ii. Oil tanker
iii. Bulk carrier

c) Ships have a standard pipe colour code system which depends on the fluid carried in a pipe. State the fluid represented by the following main colours. (6 Marks)

i. Green
ii. Blue
iii. Black
iv. Red
v. White
vi. Brown

d) With regards to electrical and machinery drawings, draw the symbols that represent the following; (12 Marks)

i. 3way valve
ii. gate valve
iii. check valve
iv. voltmeter
v. pump
vi. motor
vii. mudbox
viii. ohmmeter
ix. capacitor
x. resistor
xi. ammeter
xii. generator

e) With aid of diagrams, explain the following as found in ships

i. Scupper pipes (2 Marks)
ii. Coamings (2 Marks)

QUESTION TWO (20 Marks)

a) Describe the following structural components of a ship using clear sketches. (4 Marks)
   i) floors
   ii) brackets
b) Outline the various framing systems used in construction of ships. (4 Marks)
c) Using diagrams, differentiate between balanced and unbalanced rudders. (4 Marks)

d) With use of diagrams, illustrate three different types of keel construction employed in ships. (6 Marks)
e) Explain the purpose of double bottom tanks in as ship. (2 Marks)

QUESTION THREE (20 Marks)

a) Using clear sketches, illustrate how hogging and sagging of a ship's hull occurs and also explain the causes of each. (6 Marks)
b) Discuss three different materials employed in ship construction and their characteristics (one advantage and one disadvantage of each). (6 Marks)
d) Explain the following types of stresses as experienced in a ship. (6 Marks)
    i. Racking
    ii. Pounding
    iii. Panting
e) Explain any two factors to consider during installation of bow thrusters. (2 Marks)

QUESTION FOUR (20 Marks)

a) With aid of diagrams where necessary, briefly describe:
    i. Bottom shell plating (3 Marks)
    ii. Side shell plating (3 Marks)
b) Differentiate between longitudinal and transverse frames. (4 Marks)
c) Draw a well labelled midsection of a general cargo ship. (7 Marks)
d) Explain three functions of bulkheads. (3 Marks)

QUESTION FIVE (20 Marks)

a) Name five structures found at the bow and forecastle deck of a ship. (5 Marks)
b) Using well labelled diagrams, discuss the construction of the bow; forward of the collision bulkhead. (15 Marks)

QUESTION SIX (20 Marks)

You are required to prepare and dock a general cargo ship. Discuss the complete preparation and docking procedure and use clear diagrams where needed. (20 Marks)