JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMIMATION FOR THE DEGREE IN SCIENCE IN CONSTRUCTION MANAGEMENT

2ND YEAR 2ND SEMESTER 2023/2024 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TCB 1204

COURSE TITLE: STRUCTURES I

EXAM VENUE: **STREAM: BSc. CONSTRUCTION MGT**

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

           DURATION: 2 HOURS


Instructions

1. **Answer question 1 (Compulsory) and ANY other two 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 (30 Marks) (COMPULSORY)

a. The successful design of any structure requires a satisfactory answer to TWO (2) fundamental questions. List them? (4 Marks).

b. Using an illustration explain the term engineering structure? (8 Marks).

c. There are four types of supports. These supports are determined according to the type of the analysis and construction. Describe them with sketches? (8 Marks).

d. For a plane structure laying in the x-y plane and subjected to a coplanar system of forces and couples, explain by giving three equations of the equilibrium of structures in the plane direction. ? (6 Marks).

e. It is customary to divide structures into statically determinate and statically indeterminate. What is a statically determinate structure? (4 Marks).
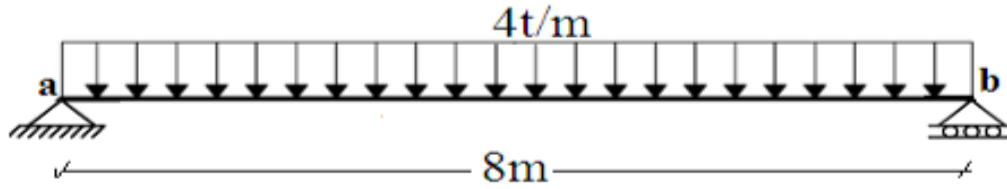
QUESTION TWO (20 Marks)

a. Figure next represents a continuous beam. This beam is considered to be supported on three columns at a, b & c. The three columns are simulated by three supports; one is hinged and the other is roller support. The beam has an intermediate hinge at joint d. Find the type of the structure: Is it statically determinate structure or statically indeterminate structure? (7 Marks)
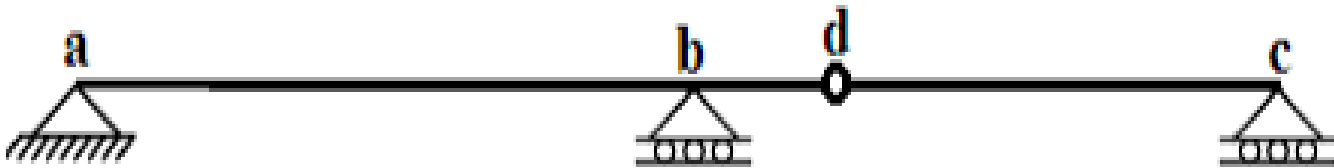
b. For simple beam (a-b) presented in the Figure next, calculate the reactions at the two supports under the applied load? (7 Marks).
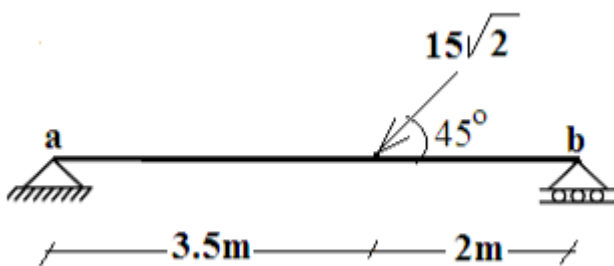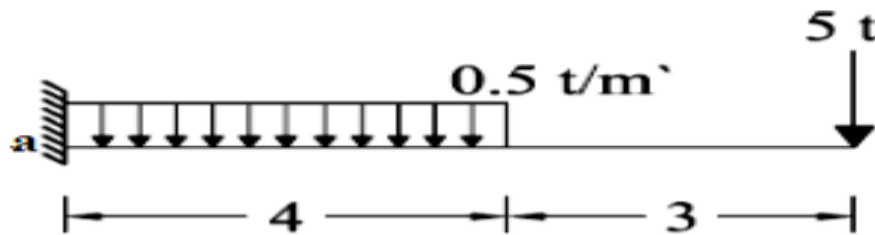
c.   For simple beam (a-b) presented in Figure next, calculate the reactions at the two supports under the applied load? (8 Marks)
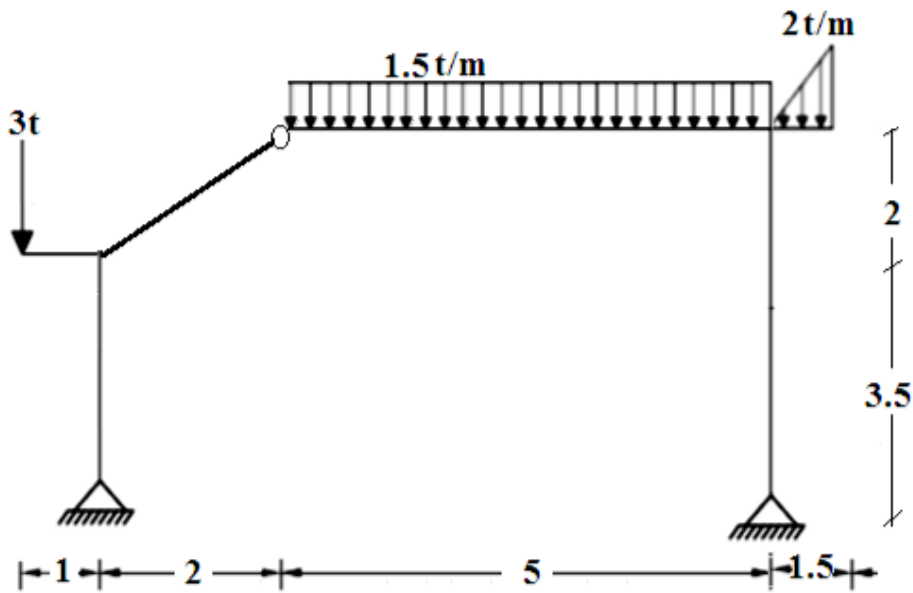
4t/m

8m

QUESTION THREE (20 Marks)

a. For cantilever beam presented in Figure next, calculate the reactions at the fixed support under the applied load. (7 Marks).

5 t

0.5 t/m`

|← 4 →|← 3 →|

b. For frame presented in the Figure next, calculate the reactions at the two supports under the applied load? (8 Marks).
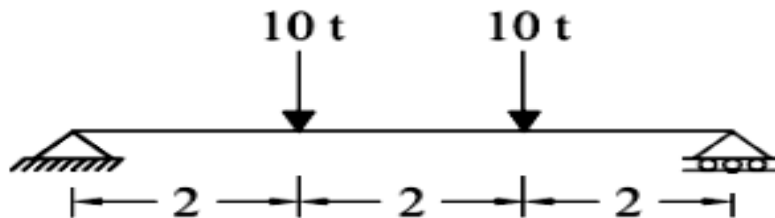
2 t/m
1.5 t/m
3t
2
3.5
|←1→|←—2—→|←————5————→|←1.5→|

c, Draw the normal force, shear force and bending moment diagrams due to the applied load for the given cantilever in the Figure next. ? (5 Marks).
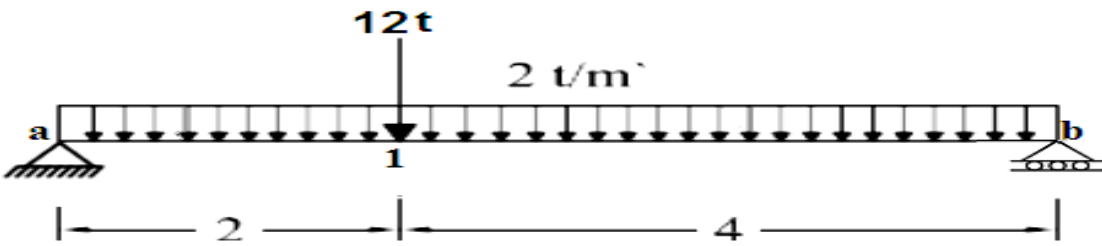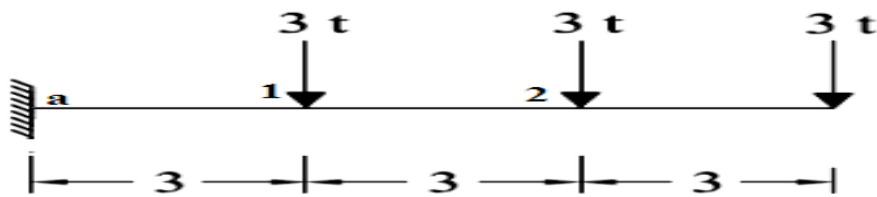

10t
a
3t
—3m—|—3m—
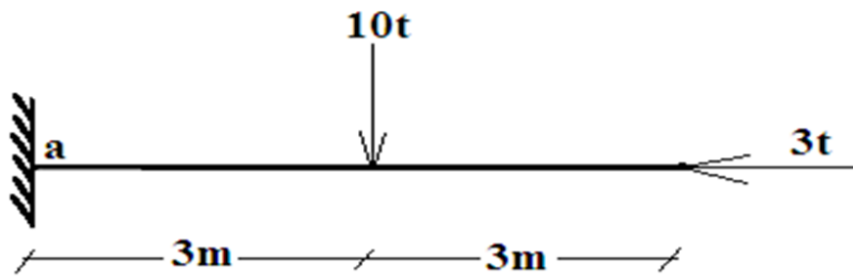
QUESTION FOUR (20 Marks)

a. Draw the normal force, shear force and bending moment diagrams due to the applied load for the given simple beam in the Figure next. (8 Marks).

10 t   10 t

|←2—|—2—|—2—|

b. For the given simple beam in the Figure next, draw the normal force, shear force and bending Moment diagram due to the applied load. ? (7 Marks).

12t

2 t/m

a

1

b

|—— 2 ——|—————— 4 ——————|

c. Draw the shear force and bending moment diagram due to the applied load for the given simple beam in the Figure next. ? (5 Marks).

3 t   **3 t**   **3 t**

a   1↓   2↓   ↓

|—— 3 ——|—— 3 ——|—— 3 ——|

END