

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

**DEPARTMENT OF CIVIL ENGINEERING – 2nd YEAR DEGREE
SECOND SEMESTER FINAL EXAMINATIONS - 2023**

CE 222 – Structural Analysis

DATE: WEDNESDAY, 25th OCTOBER 2023 – 8:20 A.M

VENUE: COO4/5

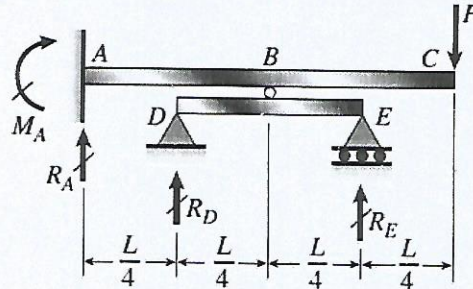
TIME ALLOWED: 3 HOURS

INFORMATION FOR CANDIDATES

1. You have 10 minutes to read the paper before the examination starts. You must not begin writing during this time.
2. **Answer any 5 questions out of 6. All questions are of equal marks.**
3. Use only ink. Do not use pencils for writing except for drawings and sketches.
4. Only Calculator is allowed in the examination room. **MOBILE PHONE** is not allowed (**Switch your Mobile Phones OFF**). Notes and textbooks are not allowed.
5. Start each question on a new page and show all your calculations in the answer book provided. No other material will be accepted.
6. Any missing data can be suitably assumed clearly stating the same.
7. **Write your NAME and clearly on the front page. Do it now.**

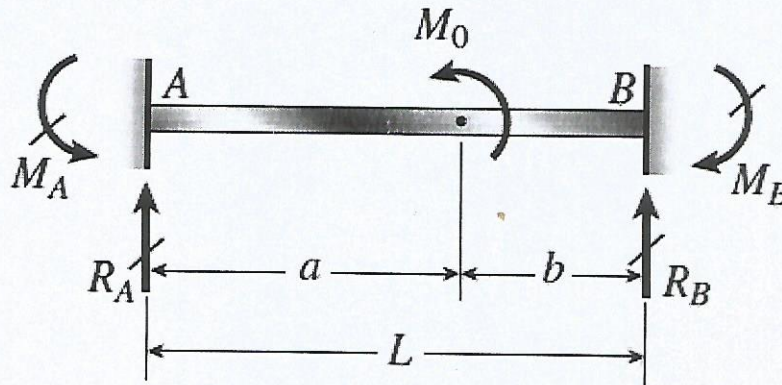
QUESTION 1:

- (a) What is the formula for static indeterminacy of a beam? 2 Marks
- (b) What is the static indeterminacy of fixed beam? 3 Marks
- (b) A beam ABC is fixed at end A and supported by beam DE at point B. Both beams have the same cross-section and are made of the same material. Solve for all reactions. What is the value of M_A ? 15 Marks



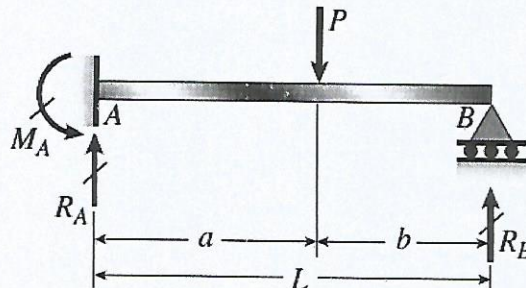
QUESTION 2:

- (a) What do you mean by **degree** of static indeterminacies? Explain with examples. 5 Marks
- (b) A fixed-end beam AB of length L is subjected to moment M_0 acting at the position shown in the figure. Solve for all reactions. What is the value of M_A ? 15 Marks



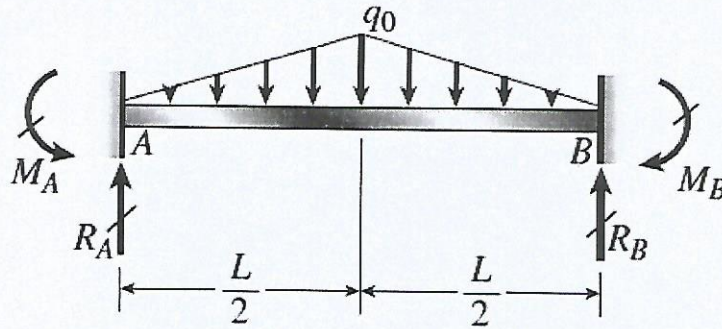
QUESTION-3:

- A propped cantilever beam AB of length L carries a concentrated load P acting at the position shown in the figure. Solve for all reactions. Determine Shear Force and Bending Moment diagram for the beam shown in figure? 20 Marks



QUESTION-4:

The fixed beam shown supports a triangular load of maximum intensity q_0 . Solve for all reactions. What is the value of M_B ? 20 Marks

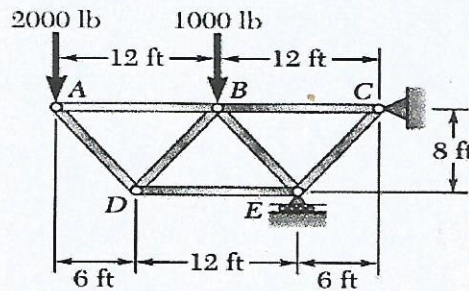


QUESTION 5:

- a) What are the compatibility conditions in structural analysis? 3 Marks
- b) What does a compatibility equation mean in structural analysis? 4 Marks
- c) Which methods of structural analysis are force methods? 4 Marks
- d) What is compatibility equation in structural analysis? 3 Marks
- e) Write the compatibility conditions used in the flexibility method for a 2 degree framed structure. 6 Marks

QUESTION 6:

Using the method of joints, determine the force in each member of the truss given below. 20Marks



END