

UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING

MEC 3351 – Strength of Materials I
Slope & Deflection Assignment

Due: 12th April 2024

Answer **ALL** questions but only two will be attempted and submitted on the due date upon advice by the course lecturer.

1. Horizontal pulls, P_1 and P_2 are applied to a vertical pole 4cm in diameter, as shown in Fig.Q1. If the deflection at the top of the pole is to be zero find the ratio of P_1 and P_2 .

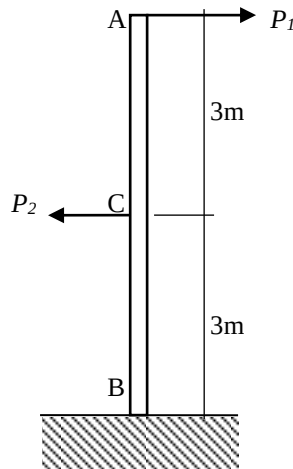


Figure Q1

2. The cantilever beam AB of length l is loaded by a linearly varying load as shown in Figure Q2. Calculate the slope and deflection at the free end.

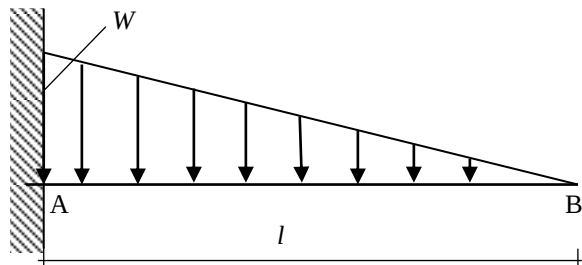


Figure Q2

3. Figure Q3 shows a horizontal beam ABC of uniform flexural EI (tm² units). The beam is simply supported at A and B. determine for the loading shown, the deflection of the free end C.

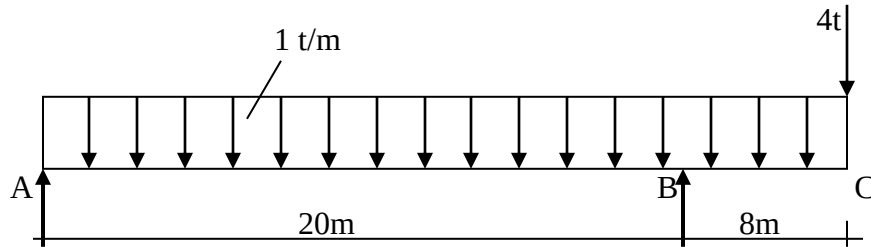


Figure Q3

4. A uniform supported beam is of 6m span. At the distance of 4m from the left hand support it carries a load of 10t on the bracket as shown in Figure Q4. Determine the deflection at point C. Take $E = 2 \times 10^6 \text{ kg.cm}^{-2}$ and I for the section $= 2 \times 10^3 \text{ kg.cm}^{-4}$.

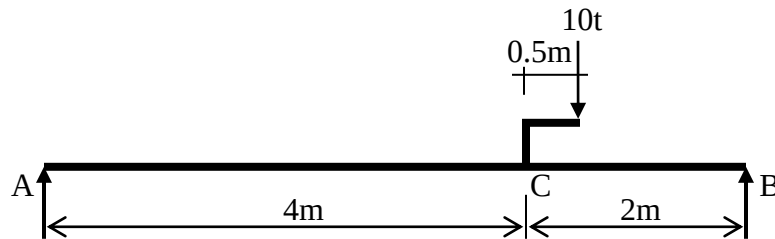


Figure Q4

5. For a beam carrying a point load W at the end of the overhang shown in Figure Q5, determine:
- Slope at the supports and at the end B of the overhang.
 - Deflection at B.
 - The maximum upward deflection between the supports.

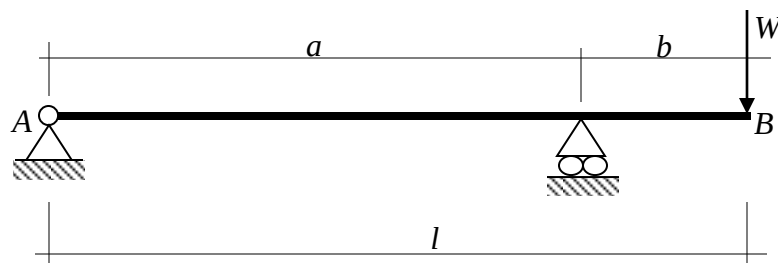


Figure Q5