Assignment 3

Due on 29-10-2023, 23:59 EET.

Question 1

A) Given a uniform beam AB of length L and constant cross-section, determine the neutral axis depth z.

B) A rectangular beam of width b and height h is loaded with a uniform load q. Calculate the bending moment M at a distance x from the left end.

C) A cantilever beam is fixed at one end and free at the other end. The beam is loaded with a concentrated load P at the free end. Calculate the deflection at the free end.

Question 2

A) A column is being designed to carry an axial load P. The column is made of a material with a yield strength of f_y. The column has a cross-sectional area A and a moment of inertia I. Calculate the maximum compressive stress and the maximum bending moment.

B) A beam is supported at both ends and subjected to a uniform load q. Calculate the maximum deflection at the center of the beam.

C) A circular ring is subjected to an external pressure P. Calculate the maximum hoop stress and the maximum bending stress.

Question 3

A) A plate is subjected to a uniform load q. Calculate the maximum shear stress and the maximum normal stress.

B) A beam is subjected to a transverse load P at its midspan. Calculate the maximum bending moment and the maximum shear force.

C) A column is being designed to carry an axial load P. The column is made of a material with a yield strength of f_y. The column has a cross-sectional area A and a moment of inertia I. Calculate the maximum compressive stress and the maximum bending moment.

Question 4

A) A beam is subjected to a uniform load q. Calculate the maximum shear stress and the maximum normal stress.

B) A plate is subjected to an external pressure P. Calculate the maximum hoop stress and the maximum bending stress.

C) A column is being designed to carry an axial load P. The column is made of a material with a yield strength of f_y. The column has a cross-sectional area A and a moment of inertia I. Calculate the maximum compressive stress and the maximum bending moment.