



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
Department of BUILDING & Civil engineering
UNIVERSITY EXAMINATION FOR:

DIPLOMA IN CIVIL ENGINEERING

DCE 2207: STRUCTURES111

END OF SEMESTER EXAMINATION

SERIES: Aug 2024

TIME: 2 HOURS

DATE: Pick Date Aug 2024

Instructions to Candidates

You should have the following for this examination

- *Answer Booklet*
- *examination pass*
- *student ID*
- *Scientific Calculator*

This paper consists of five questions.

Attempt any THREE questions.

Do not write on the question paper.



QUESTION ONE(20Marks)

(a) State the area-moment theorems relating to the angles of slope and displacements of points in a loaded beam (5

Marks)

(b) Find the end moments, centre Moment and maximum deflection for a fixed-ended beam, span L, with a point load W at the Centre (15

Marks)

QUESTION TWO (20 Marks)

(a) Draw neat sketches of Kernel of (i) rectangular section 200 x300 mm

(ii) Square with 400 cm² area (8Marks)

(b) A short column of rectangular cross-section 80mm by 60mm carries a load of 40 kN at a point 20mm from the longer side and 35mm from the shorter side as shown in Fig 1. Determine the maximum compressive and tensile stresses in the section (12Marks)

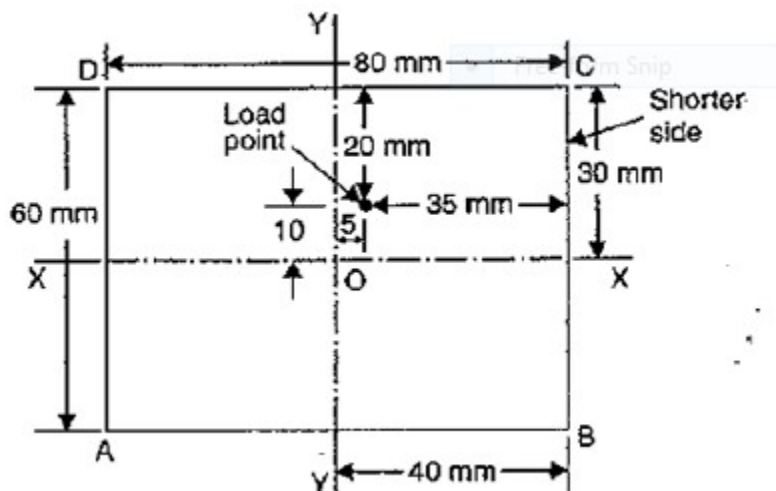


Figure 1

QUESTION THREE (20 Marks)

A concrete dam of trapezoidal section having water on the vertical face is 14m high. The base of the dam is 8 m wide and top is 3m wide.

Determine;-

(i) The resultant thrust on the base per meter length of the dam.

- (ii) The point where the resultant thrust cuts the base
- (iii) The intensities of the maximum and minimum stresses across the base
- (iv) Draw the stress distribution at the base of the wall

QUESTION FOUR (20 Marks)

(a) Find expressions for: (i) Shear Force (ii) Bending moment (iii) Slope (iv) Deflection at a point distance x from left support of a simply supported beam, span L , carrying a uniformly distributed load w **(14 Marks)**

(b) Determine maximum shear force, bending moment, slope and deflection in 2 (a) given w is 2 kN , Length 8 m , I for the beam is 10^8 mm^4 and $E = 210\text{ KN/mm}^2$ **(6 Marks)**

QUESTION FIVE (20 Marks)

A simply supported beam, 20 m long, carries two concentrated loads of 5 kN and 20 kN at distances 8 m and 12 m from the left end, respectively.

Calculate ;

- (a) The slopes at the ends and deflection under each load. $E = 2.0 \times 10^5\text{ N/mm}^2$ and $I = 10^9\text{ mm}^4$ **(12 Marks)**
- (b) The maximum deflection **(8 Marks)**