



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
Department of BUILDING & Civil engineering
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECV 4517: STRUCURAL DESIGN IV

END OF SEMESTER EXAMINATION
SERIES: JAN 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **five** questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (COMPULSORY) 30 Marks

The plan and elevation of a three-storey reinforced concrete school building is as shown in Figure Q1. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a steel special moment resisting frame. The intensity of dead load is 15kN/m^2 and the floors are to cater for an imposed load of 3kN/m^2 . Determine the design seismic loads on the structure by static analysis. (30 Marks)

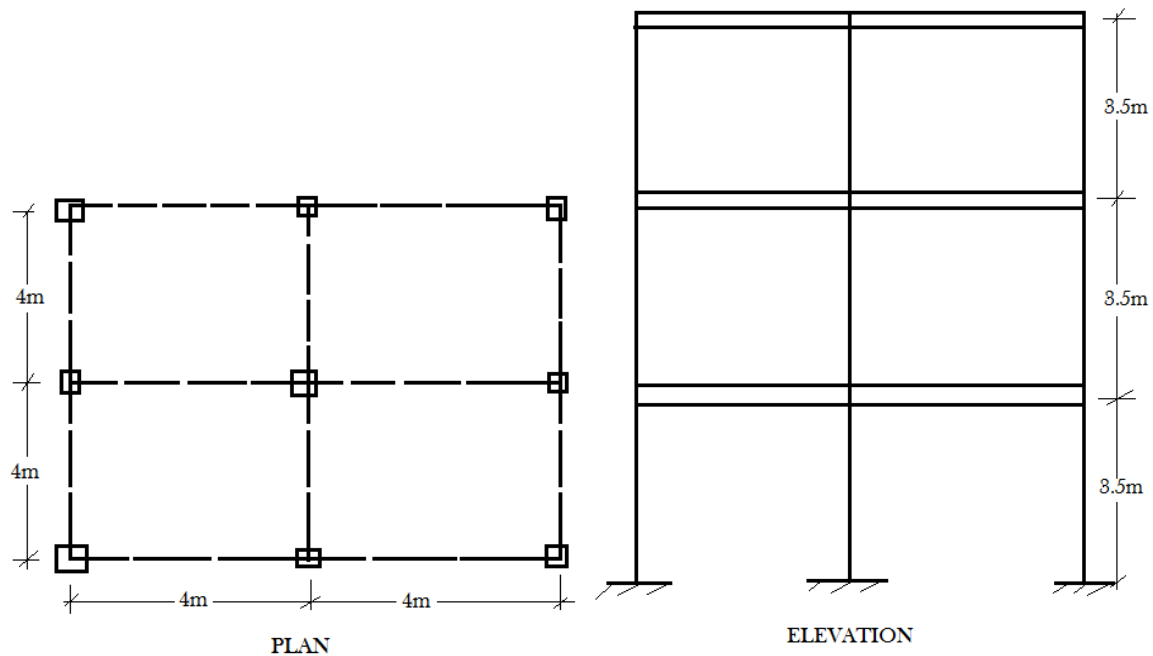


Figure Q1

ANSWER ANY TWO QUESTIONS FROM THIS SECTION
QUESTION TWO (20 Marks)

Analyze the two-storey two-bay multi-storey frame subjected to lateral loads as shown in Figure Q2.

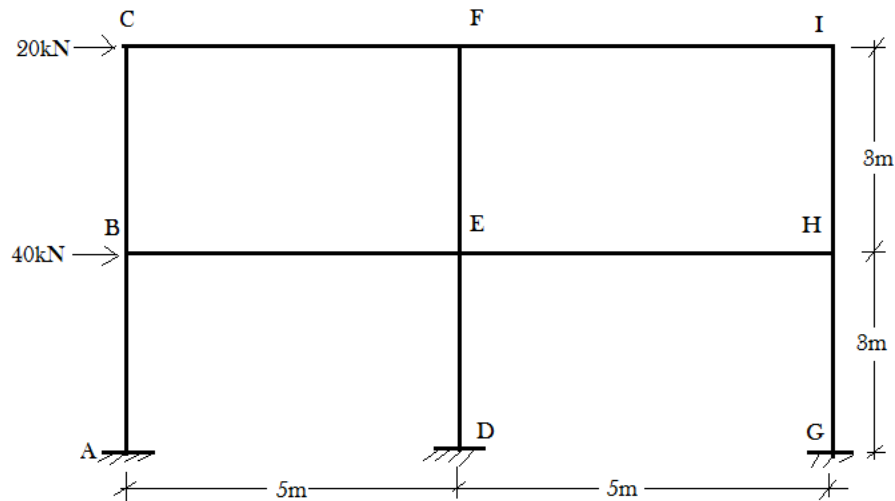


Figure Q2

QUESTION THREE (20 Marks)

Determine the design moment for a reinforced concrete bridge deck slab that has 6m wide carriageway and the deck spans 34m center to center of bearings. The deck should be designed to carry 30 units of HB load. (20 Marks)

QUESTION FOUR (20 Marks)

- Clearly discuss three seismic structural systems that are normally used in earthquake prone zones (9 Marks)
- Briefly discuss five steps that are normally considered in the process of designing new bridges. (11 Marks)

QUESTION FIVE (20 Marks)

Analyze the building frame subjected to horizontal forces as shown in Fig Q5 by cantilever method assuming that all the columns have the same area of cross-section (0.6m^2).

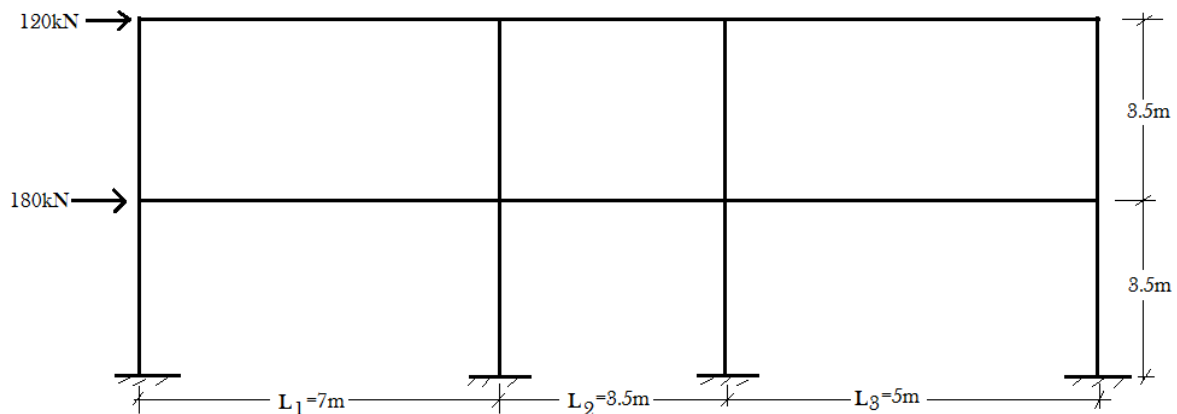


Fig Q5