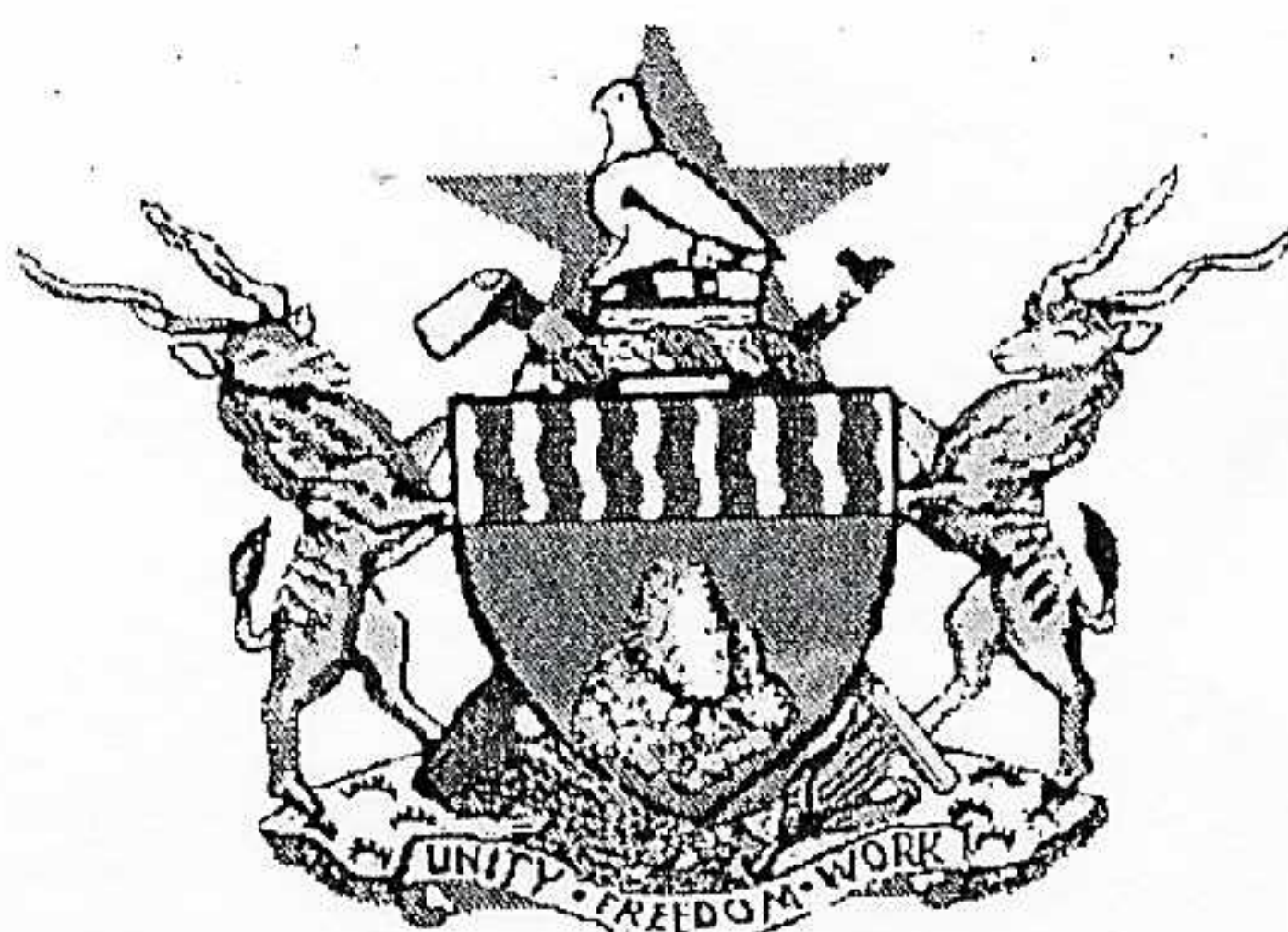




ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

CONSTRUCTION ENGINEERING

MODULE: Product Design

PAPER NO: 527/23/M01

DURATION: 4 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

- 1) Answer booklet
- 2) Computer loaded with AutoCAD
- 3) CD disk
- 4) Scientific calculator

INSTRUCTIONS TO CANDIDATE

- 1) Section A is compulsory.
- 2) Choose one (1) question in section B.
- 3) Choose one question in section C.
- 4) Make sure your work is saved on the CD disk and on flash disk.
- 5) Print your work and submit it together with the CD disk.
- 6) Only your candidate number should appear on the CD disk, printout and on the answer booklet.

SECTION A: COMPULSORY

QUESTION 1

Mr Mogu has just bought a 40m x 20m residential stand in Chirovakamwe growth point for the construction of a house for his family. The family consists of father, mother, a boy and a girl and a house maid.

- a) Use AutoCAD to produce Mr Mogu's house floor plan. (40 marks)
- b) Produce the elevations for the house plan. (20 marks)

SECTION B

CHOOSE ONE QUESTION FROM SECTION B

QUESTION 2

Outline the key stages of the design process in construction, explaining the objectives and activities associated with each stage. (20 marks)

QUESTION 3

How do soil properties influence the design of foundations for different types of structures? (20 marks)

SECTION C

CHOOSE ONE QUESTION FROM THIS SECTION

QUESTION 4

From diagram on fig Q4

- a) Calculate the resultant force using the triangle law of forces. (10 marks)
- b) Calculate the resultant force using the parallelogram law of forces.

(10 marks)

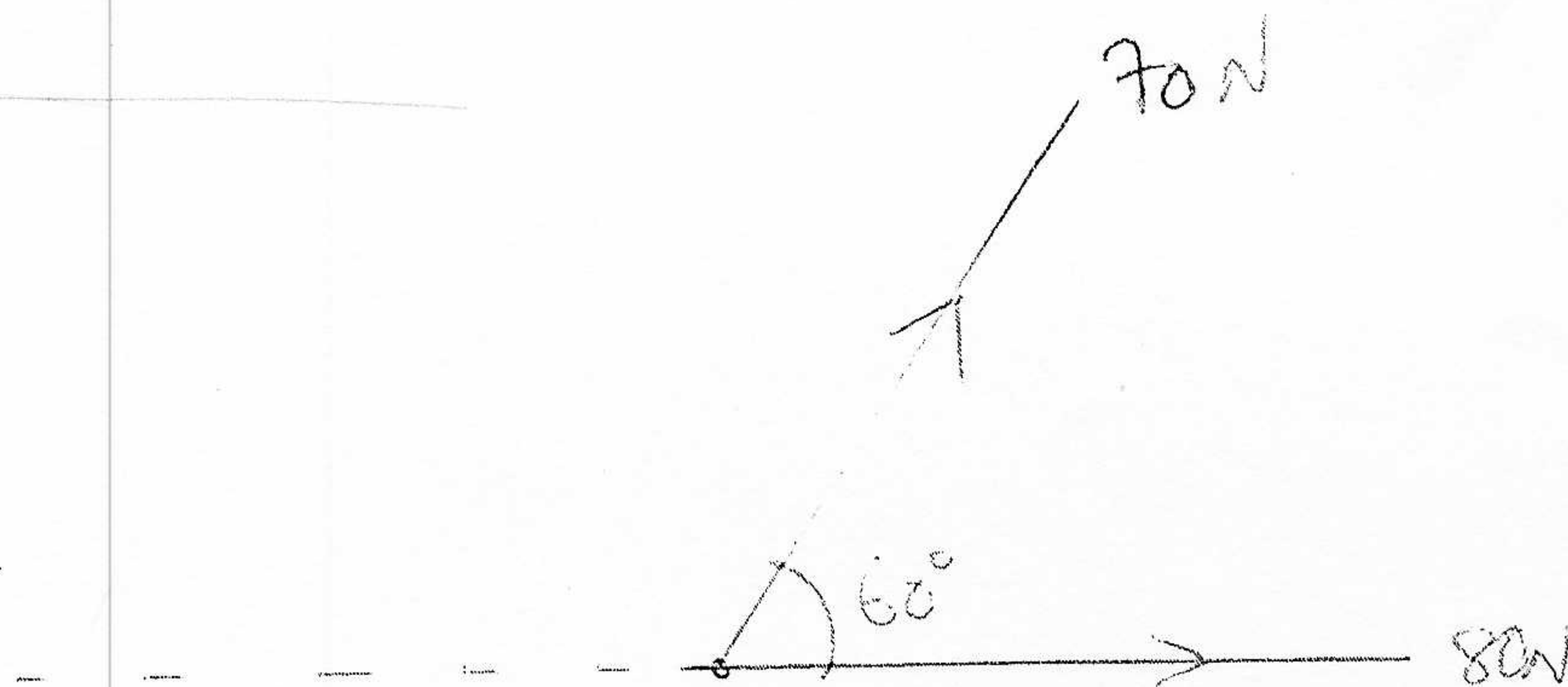


Fig Q4

QUESTION 5

From the diagram on fig Q5

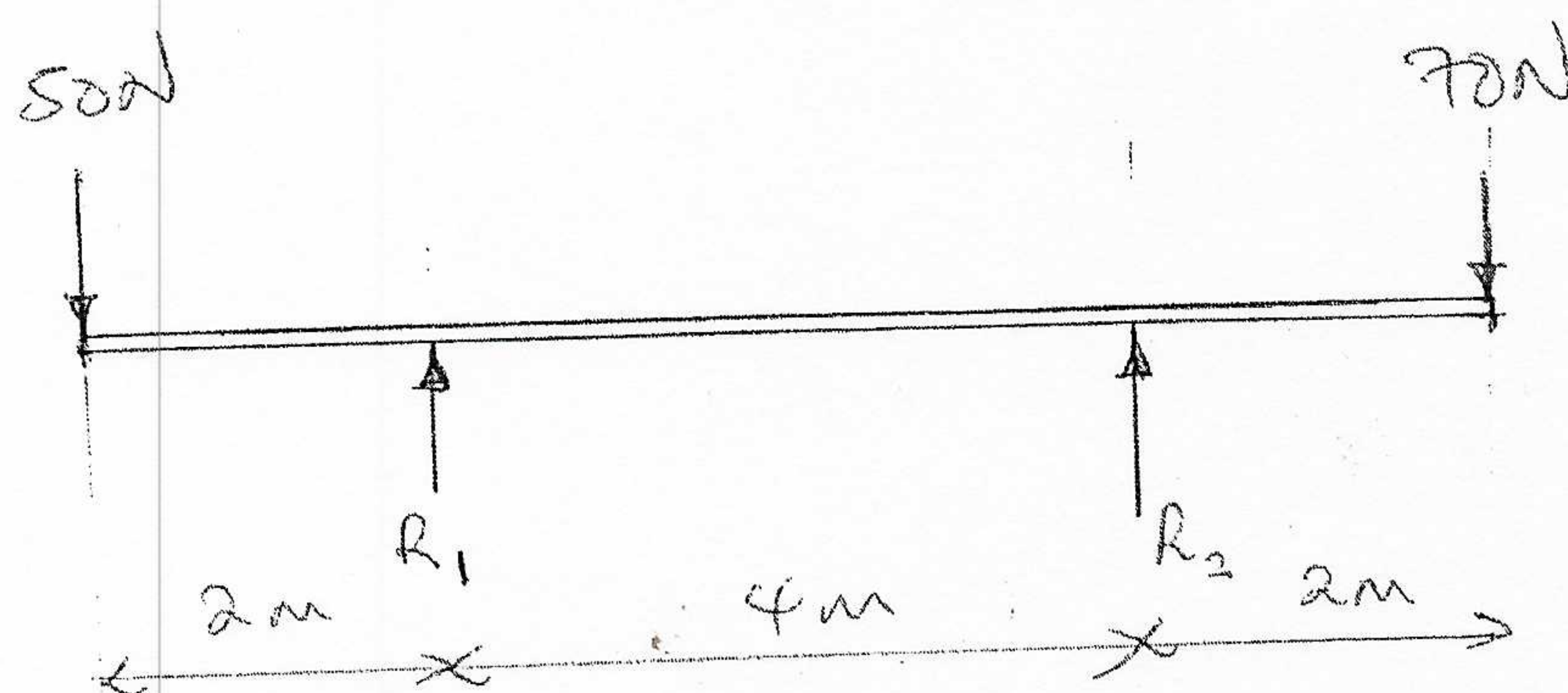


Fig Q5

- Calculate the reactional forces R_1 and R_2 . (6 marks)
- Draw the shear force diagram. (7 marks)
- Draw the bending moments diagram. (7 marks)

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