

BUILDING STRUCTURES 5

EXAM, June 2000

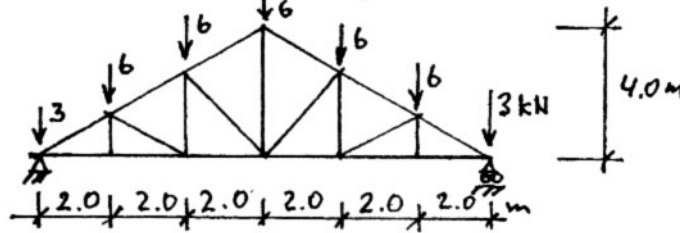
Time: 3 Hours

Instructions to candidates

- Attempt all questions.
- All questions are of equal value
- Any references are allowed
- State any assumptions made

**Question 1.**

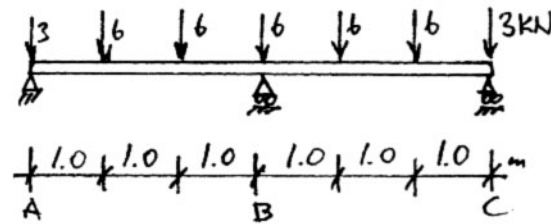
Calculate the forces in all members of this loaded, pin-connected, truss.



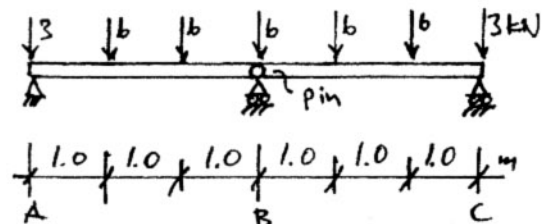
**Question 2**

The sketches below illustrate two alternative structural solutions. In a) the beam is continuous over the three support points, A, B and C, whilst in b) there are two separate beams A-B and B-C. You are asked to determine the required depth of each beam if the beam width is to be 70 mm, based on bending stress only. Use  $F_b = 11 \text{ MPa}$ .

a)

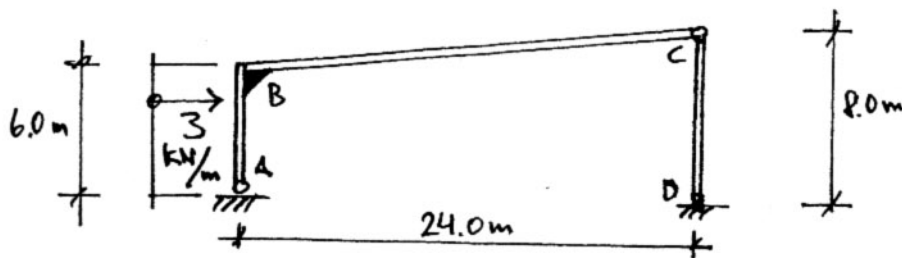


b)



**Question 3**

- a) Calculate and draw the bending moment diagram for this loaded 3-pin frame (pin-connections at A, C and D), including all maximum values, any points of contra-flexure etc.
- b) If the frame was modified by replacing the pin connection at C with a rigid connection, and thereby transforming the frame to a statically indeterminate 2-pin frame, how would that affect the bending moment diagram? Sketch the new BMD and highlight the differences. No calculations are required.



END OF QUESTIONS