

UNIVERSITY OF BOLTON

**SCHOOL OF THE BUILT ENVIRONMENT &
ENGINEERING**

**BSc(HONS) ARCHITECTURAL TECHNOLOGY
BSc(HONS) BUILDING SURVEYING & PROPERTY
MANAGEMENT**

SEMESTER TWO EXAMINATION 2009/2010

**ARCHITECTURAL DESIGN STUDIO
BUILDING SURVEYING STUDIO**

MODULE NO: BLT2001/BLT2003

Date: Thursday 3 June 2010

Time: 2.00 pm – 3.30 pm

INSTRUCTIONS TO CANDIDATES:

There are **THREE** questions.

Answer **TWO** questions.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

This examination paper carries a total of 50 marks.

All working must be shown. A numerical solution to a question obtained by programming an electronic calculator will not be accepted.

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Question 1

- a) State the three equations of static equilibrium? (3 marks)
- b) Explain the term 'statically indeterminate beam'
Give an example of a statically indeterminate beam. (5 marks)
- (c) Figure Q1 shows a simply supported beam with a span of 6.0m, carrying partial length uniformly distributed load between A and B.
- (i) Determine the value of the support reactions at A and C. (5 marks)
- (ii) Calculate the values of shear forces at A, B, and C.
Draw the shear force diagram (SFD), showing all important values. (5 marks)
- (iii) Calculate the values of bending moment at A, B, and C.
What is the value of the bending moment at a point located 2 m from support A.
Draw the bending moment diagram (BMD). (7 marks)

Total 25 marks

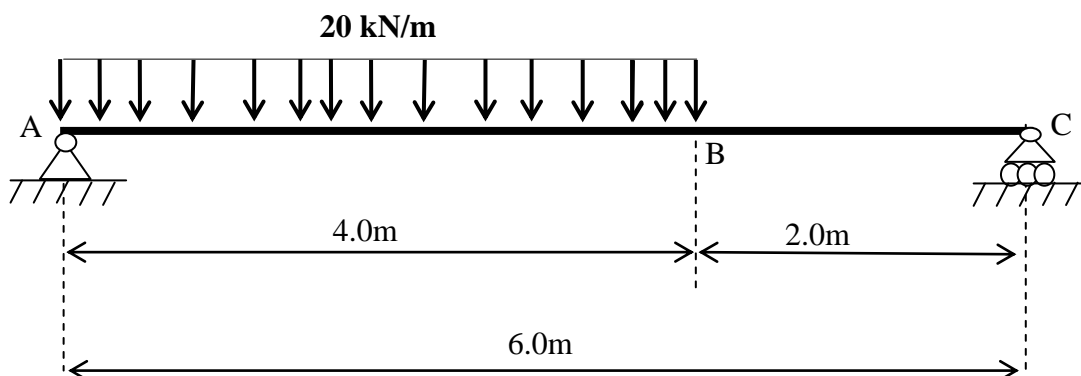


FIGURE Q1

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Question 2

- (a) Calculations show that a concrete pad foundation is subject to uplift. Explain how uplift could be eliminated without changing the value of applied load or the eccentricity of the applied load. (5 marks)

- (b) A square pad foundation is shown in Figure Q2, carrying a single point load of 90 kN. The pad foundation has a self-weight of 70 kN.

Carry out the necessary calculations to answer the following:

- (i) What is the value of maximum compression stress?
- (ii) On which corner does the maximum compression stress occur?
- (iii) What is the value of minimum compression?
- (iv) On which corner does the minimum compressive stress occur?
- (v) Does tension occur?

Give your answers in terms of kN/m².

(20 marks)

Moment of inertia, $I = \frac{b \times h^3}{12}$

Total 25 marks

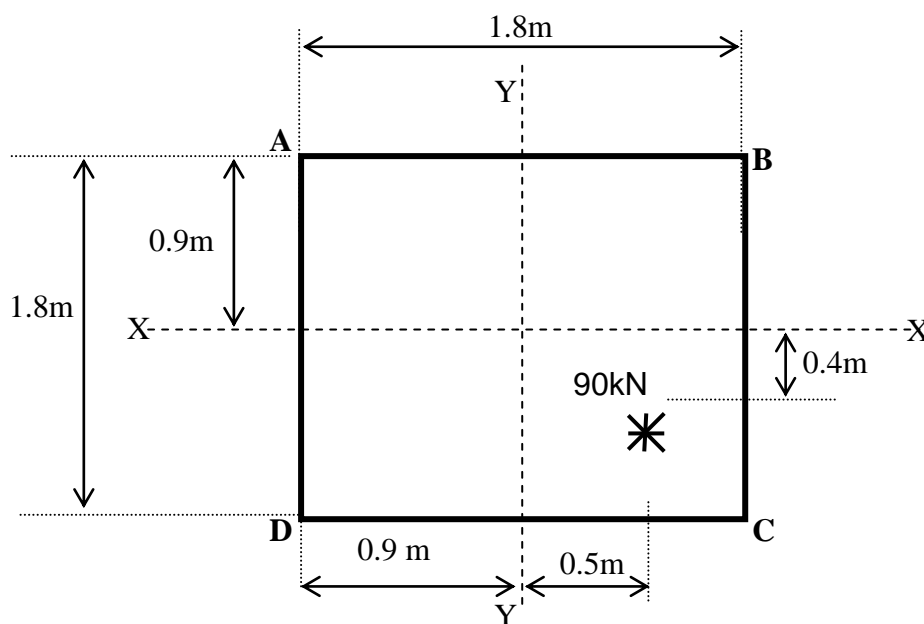


FIGURE Q2

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Question 3

1. Explain why the truss shown in Figure Q3(a) is externally unstable. (5 marks)

2. A pin jointed truss is shown in Figure Q3(b):
 - a. Use the formula $(M + R = 2J)$ to check that the truss is statically determinate. (5 marks)
 - b. Calculate the value of the support reactions at A and B (7 marks)
 - c. Using the “method of joints” determine the magnitude and type of axial force in the truss members shown in Figure Q3(b). (8 marks)

Total 25 marks

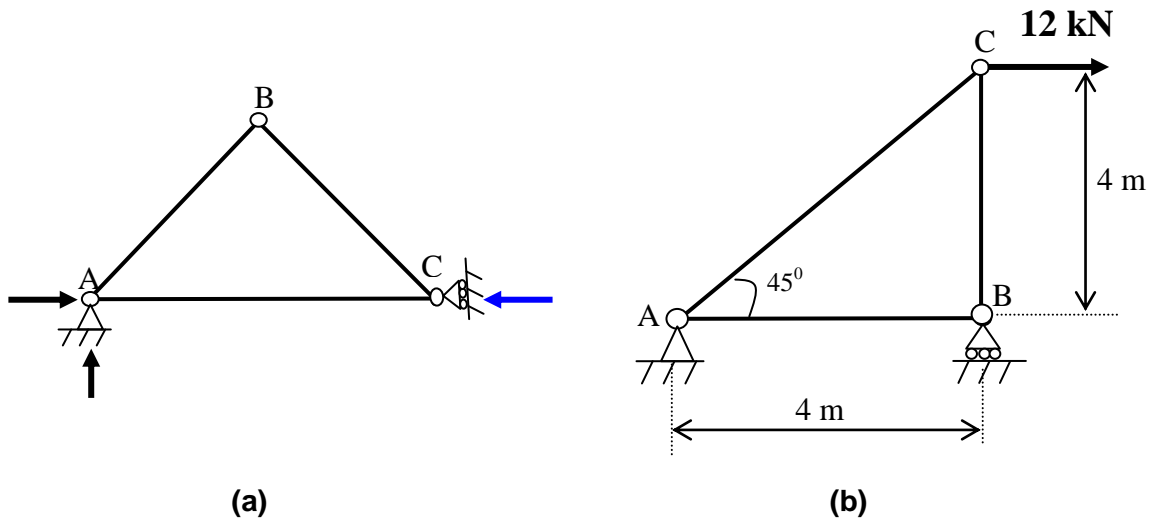


FIGURE Q3

END OF QUESTIONS