

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

SUMMER EXAMINATIONS 1999

**FIRST CIVIL ENGINEERING EXAMINATIONS
FIRST UNDENOMINATED ENGINEERING EXAMINATIONS**

FUNDAMENTALS OF CIVIL ENGINEERING

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Time allowed: two hours

Answer 5 Questions

1. Tank A is 120 mm in radius and is filled with water is fitted with a piston of negligible weight as shown in Figure 1. A force F , of magnitude 250 N is applied to the piston. Tank B contains water and is open to the atmosphere. The tanks are attached through a manometer which is filled with mercury, (specific gravity 13.57). Determine the depth of water in Tank B above the inlet.

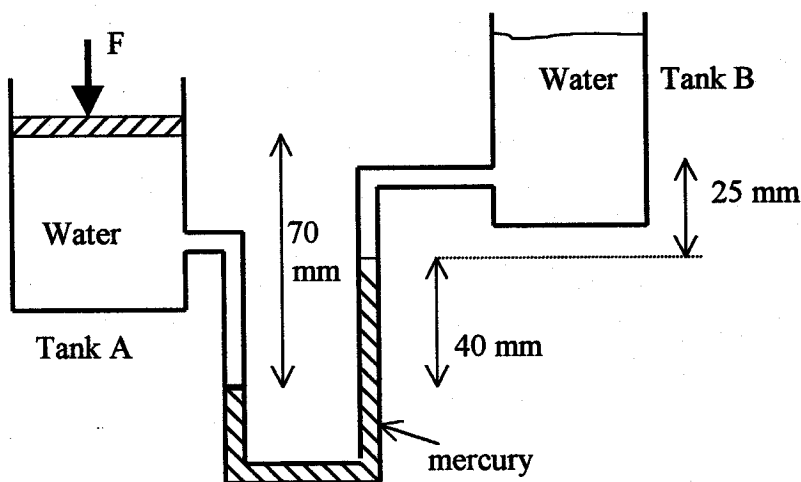


Figure 1

2. Write a short note on the importance of Water Treatment and mention some of the main components of a water treatment plant. Illustrate with the aid of a diagram.
3. Find the forces in the members of the pin-jointed truss shown in Figure 2.

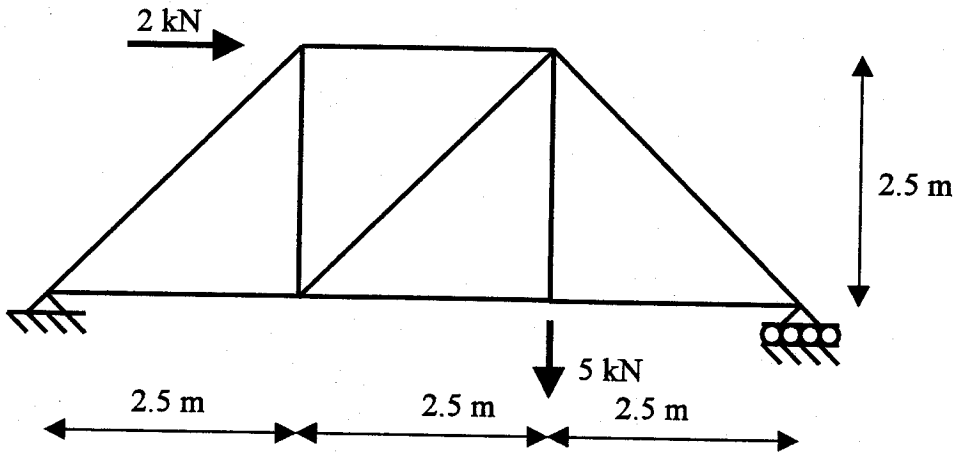


Figure 2

4. In relation to loads on structures, define the following:
 Dead Load
 Live Load
 Point Load
 Distributed Load
 Factor of Safety

Mention some of the idealisations that are frequently used for boundary conditions in structural analysis.

5. (a) Find the moment at A due to the applied load for the beam in Figure 3a.
 (b) Determine the resultant force acting on the wall (4 m wide) that supports water to a depth of 5 m as shown in Figure 3b. Find the resultant moment due to the water about point C.

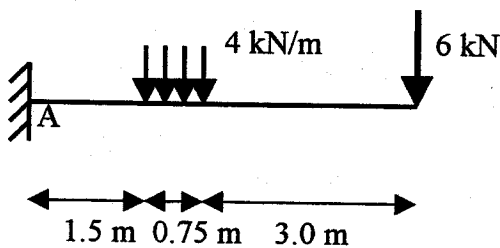


Figure 3a

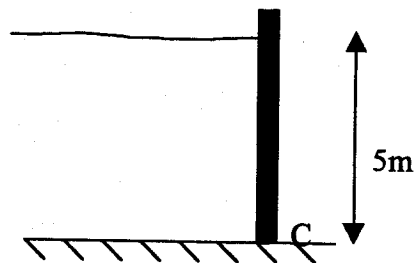


Figure 3b

6. In relation to material behaviour, write short notes on each of the following and indicate which are material properties:

Homogenous

Isotropic

Strength

Stiffness

Stress

Coefficient of Thermal Expansion