GX 511

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

SUMMER EXAMINATIONS 2000

FIRST ENVIRONMENTAL ENGINEERING EXAMINATIONS

FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING

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Time allowed: **two** hours

Answer **4** Questions

1. What are the main features of a pin-jointed truss and describe the possible support conditions (6 marks).
Find the forces in the members of the pin-jointed truss shown in Figure 1 (14 marks).

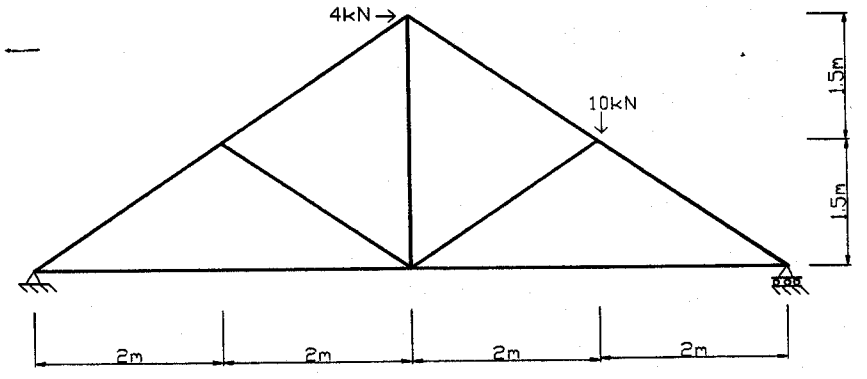

Figure 1

2. Distinguish between
   (i) Dead load and Live load (4 marks)
   (ii) Static loads and Dynamic loads (4 marks)
   (iii) Point loads and distributed loads (4 marks)
   (iv) Stress and strain (4 marks)
   (v) Laminar flow and Turbulent flow (4 marks)

3. A small rectangular plate, 1 m high and 0.25 m wide, is used to dam an irrigation stream. A layer of silt, 0.25 m deep with a specific weight twice that of water, has accumulated at the bottom (Figure 2). Determine the magnitude and line of action of the resultant force exerted on the plate by both the silt and the water when the water is level with the top of the plate (20 marks).

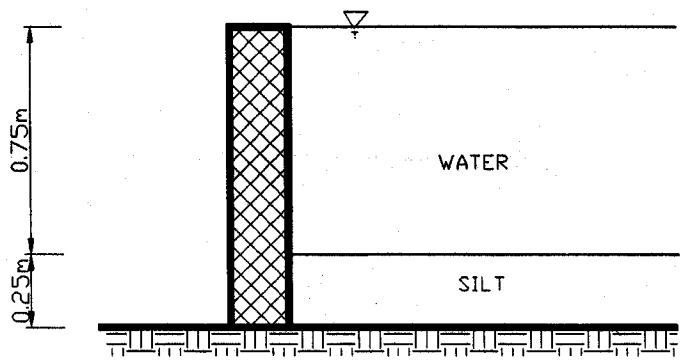

Figure 2

4. Discuss the role of the transportation engineer in relation to providing a transport network to meet the demands of modern society (20 marks).

5. (a) Discuss the role the environmental engineer plays with respect to protecting the natural environment and the skills necessary for him/her to carry out this role successfully (8 marks).

(b) Draw a schematic diagram of a typical secondary waste water treatment plant. Briefly describe the main functions of each of the processes and operations of the plant (12 marks).