

## LEAVING CERTIFICATE EXAMINATION, 1999

## CONSTRUCTION STUDIES - PART I (THEORY)

## HIGHER LEVEL

THURSDAY, 24 JUNE - AFTERNOON 2.00 p.m. to 5.00 p.m.

*(300 marks are allotted to this paper.)*

- (a) Answer Question 1 and four other questions.  
 (b) Answer must be written in ink; drawings and sketches to be made in pencil.  
 (c) Write the number of the question distinctly in the margin of the paper before each answer.  
 (d) Freehand sketches or diagrams to illustrate written descriptions should be made.  
 (e) The name, sizes, dimensions and other necessary particulars of each material indicated must be noted on the drawing.  
 (f) *All questions carry equal marks.*

1. An external timber door, with glazed upper panel and solid lower panel, is to be fixed in a 300 mm insulated cavity wall which is rendered externally and has hardwall plaster inside. Draw, to a scale of 1:5, a vertical section through the door from 300 mm above the doorhead to 500 mm below the threshold showing all relevant construction details and surrounding structure.

2. (a) Calculate the 'U' value of a cavity wall which has a 100 mm facing brick outer skin, a 100 mm cavity partially filled with 35 mm thick urethane insulation boards and a 100 mm aerated concrete block inner leaf. The wall is finished internally with lightweight plaster 15 mm thick.

Use the following data:

Facing brick	Conductivity	1.400 W/m°C
Aerated concrete block	Conductivity	0.220 W/m°C
External surface resistance	Resistance	0.053 m <sup>2</sup> °C/W
Internal surface resistance	Resistance	0.123m <sup>2</sup> °C/W
Cavity resistance	Resistance	0.176m <sup>2</sup> °C/W
Lightweight plaster	Conductivity	0.160 W/m°C
Urethane boards	Conductivity	0.033 W/m°C

- (b) What will be the effect on the 'U' value of the wall if the urethane insulation board is removed and the cavity is completely filled with blown fibre insulation having a Resistivity of 35.714m<sup>2</sup>°C/W?
3. (a) Explain how damp penetration occurs and discuss ways by which it can damage the fabric of a building.
- (b) With the aid of neat freehand sketches show FOUR different places where damp-proof courses should be located in a two-storey dwelling.

4. (a) Explain, with the aid of sketches where necessary, factors which influence the reduction of airborne sound and structure-borne sound in buildings.
- (b) Write notes on TWO of the following:
- (i) resonance;
  - (ii) reverberation;
  - (iii) sound waves.
5. Draw, to a scale of 1:10, a vertical section through a cold water cistern placed above a ceiling in a pitched roof bungalow. Show details of tank supports, service pipes, ball valve, control valves and appropriate insulation. (Bungalow roof details are not required.)
6. Discuss typical functional requirements of stud partitions suitable for a dwelling and indicate how these requirements are met. Illustrate your answer with examples of stud partition construction.
7. Describe, with the aid of sketches, the method of construction and waterproofing you would use for a flat roof spanning five metres. Give reasons for your choice.
8. (a) Discuss the problem of condensation in modern houses. What causes it and how can it be cured?
- (b) Describe measures that can be taken at the design stage to reduce the risk of condensation.
9. Draw or sketch, to a scale of 1:10, a plan and longitudinal section through an inspection chamber/manhole. The internal size is 900 mm x 900 mm and the depth from the top of the cover to the invert level is 1500 mm. Show a 150 mm diameter channel through the chamber and one 100 mm branch entering from one side. All pipes are uPVC.
10. "The form, material and construction methods of older buildings illustrate the ecological adaptation of rural society to its varied environments and closely reflect traditional economic and social structures. Newer buildings reflect the rapid pace of recent social change in the countryside, many showing a sharp break with earlier forms and building materials and lacking regional distinctiveness."

*"Atlas of the Irish Rural Landscape."* Discuss.

OR

"Nature, time, incompetence, human folly and greed conspire to tear down structures mankind has spent so much time, love, thought and energy to put up."  
Levy and Salvadori, *"Why Buildings Fall Down"*. Discuss.