

**AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA**  
**LEAVING CERTIFICATE EXAMINATION, 2001**

**CONSTRUCTION STUDIES - PART I (THEORY)**

**HIGHER LEVEL**

**WEDNESDAY, 20 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. A single-storey dwelling house has a 300mm external concrete block wall with insulated cavity, which includes an opening for a window. The dwelling has a suspended timber floor. To a scale of 1:5, draw a vertical section through the wall and floor showing all the details from the bottom of the foundation to the top of the concrete cill.
  
2. Preliminary design sketches of a house show the locations of the main living, dining, sleeping and circulation areas.
  - (a) Draw a neat single line diagram of the plan of a single storey dwelling showing the location of the entrance, living area, kitchen and dining room, bedrooms, bathroom and other areas. Indicate on the diagram the position of the windows and doors.  
*Dimensioning of spaces is not necessary.*
  - (b) Explain in detail the design considerations that influence the choice of location of each area indicated on the diagram.
  
3. Explain in detail, using notes and where necessary sketches, **each** of the following terms as they apply to building technology:
  - (i) Interstitial Condensation;
  - (ii) Dew Point;
  - (iii) Relative Humidity;
  - (iv) Cavity Insulation;
  - (v) Cold Bridge;
  - (vi) Vapour Barrier.
  
4.
  - (a) To a scale of 1:5, draw a vertical section through the bottom three steps of a closed-string timber stairs suitable for a domestic dwelling. Show the newel, handrail and balusters.
  - (b) Indicate, using notes and freehand sketches, **three** design considerations that would ensure that a stairs is safe for all users.
  
5.
  - (a) Using a neat single line diagrammatic sketch, show the layout of the pipework necessary for the installation of a domestic central heating system to serve at least three radiators. Show the location of all the necessary valves.
  - (b) Using notes and sketches, indicate **three** features that could be incorporated into the design of a central heating system for a two-storey house to improve its efficiency and ensure the economical use of fuel.
  
6.
  - (a) Using notes and sketches, explain the following:
    - (i) Sound Absorption;
    - (ii) Sound Reflection;
    - (iii) Reverberation Time.
  - (b) An upstairs bedroom equipped with a music system is being renovated. Using notes and sketches, show **three** design details that would improve the sound insulation properties of this room.

7. In a dwelling house it is proposed to replace the existing 4mm single glazing with double glazed units. The double glazed units consist of two 4mm panes of glass with a 12mm air space.

- (a) Using the data given below calculate:  
(i) The U value of the single glazing.  
(ii) The U value of the double-glazing.

Data:

Thickness of Glass	4mm
Conductivity of Glass	1.02 W/m °C
Resistance of 12mm air space	0.17m <sup>2</sup> °C/W
Internal surface resistance	0.12m <sup>2</sup> °C/W
External surface resistance	0.08m <sup>2</sup> °C/W

- (iii) If the dwelling house has 20m<sup>2</sup> window area and the average air temperature difference across the windows is 8°C, calculate the daily savings in fuel costs resulting from the installation of double glazing, given the following:

Calorific Value of Oil	37350 kJ per Litre
Cost of Oil	40p per Litre

- (b) Discuss in detail the merits of installing double glazing in a dwelling house.

8. A single-storey traditional dwelling house, over 100 years old, has thick stone walls, a slate roof, wooden doors and windows and solid floors. The house is in need of repair and it has been decided to undertake essential renovations.

- (a) Make a checklist of **four** renovations you expect would be needed in a house of this age.  
(b) Describe, using notes and sketches, how **each** of these renovations could be carried out in a manner which would respect the age and character of the original house.

9. (a) Using notes and sketches, show the correct wiring for **two** sockets in a ring main circuit of a domestic electrical installation.

- (b) Describe, using notes and sketches, the principles of earthing in a domestic electrical installation.

- (c) List and explain **three** safety procedures regarding the use of electrical power tools out-of-doors.

10. “Our countryside buildings should not be taken for granted. They deserve far more study and their appropriate use of materials, their sympathy for the landscape and their human scale deserve appreciation, for they are distinctively Irish and a significant part of our architectural and cultural heritage”.

*Irish Countryside Buildings (1985) : P & M Shaffrey.*

Discuss.

**OR**

A listed building of unique architectural importance which was subject to a preservation order, has been demolished. The owner has offered to reconstruct the building as close as possible to the original, using some materials salvaged from the demolition.

What arguments might be presented:

- (a) in favour of the reconstruction of the building  
(b) in favour of an alternative approach, not involving the reconstruction of the building?

