



**Pre-Leaving Certificate Examination
Triailscrúdú na hArdteistiméireachta**

Pre-Leaving Certificate Examination 2008

Construction Studies

Theory – Higher Level

(300 Marks)

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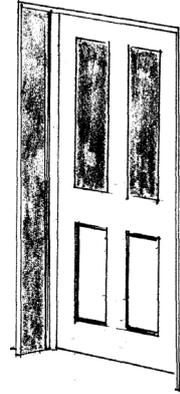
SAMPLE PAPER

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Time: 3 Hours

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

1. An external wooden door with **two** upper glazed panels and **two** lower solid panels is fixed in a standard 300 mm external concrete block wall with an insulated cavity. The house has a solid concrete ground floor.



- (a) To a scale of 1:5, draw a vertical section through the external wall and door, showing clearly the threshold, the door and doorframe. The section should show all constructional detail from 300 mm below the bottom of the door to 300 mm above the doorframe head.
- (b) Indicate on the drawing **two** design details that ensure that moisture does not penetrate to the inner surfaces surrounding the door.

2. Investigations on the subsoil of a site on which a single storey dwelling is to be built reveal a loose sand subsoil.

- (a) Using *notes and neat freehand sketches*, describe **two** methods that could have been used to investigate the subsoil composition.
- (b) Discuss in detail **three** considerations governing the choice of foundation for a house on this site.
- (c) Describe, with the aid of notes and dimensioned sketches, the type of foundation you consider most suitable for this house. Give **two** reasons why you consider the foundation suitable.

3. (a) Explain in detail how you would seek planning permission for a dwelling house from your local planning authority.

- (b) Explain the purpose of any **two** of the following building contract documents:
- i. Bill of Quantities;
 - ii. Specifications;
 - iii. Contract drawings.

4. (a) Using **notes and sketches**, explain the following:

- i. Reverberation Time;
- ii. Sound Absorption;
- iii. Flanking Transmission.

- (b) A spare room in a dwelling is being renovated with the intention of installing a home cinema system. Using **notes and sketches**, show **three** design details that would improve the sound insulation properties of the room.

5. The external wall of a timber framed house has the following specification:

External plaster	thickness 15 mm
Block outer leaf	thickness 100 mm
Timber stud inner leaf	thickness 125 mm
Urethane board insulation	thickness 100 mm
Plasterboard	thickness 12.5 mm

Thermal data of outer leaf:

Resistance of the external surface	(R)	0.048 m ² °C/W
Resistivity of the external plaster	(r)	2.170 m °C/W
Conductivity of block	(k)	1.320 W/m °C

Thermal data of inner leaf:

Conductivity of urethane board	(k)	0.023 W/m °C
Conductivity of plasterboard	(k)	0.160 W/m °C
Resistance of the internal surface	(R)	0.140 m ² °C/W
Resistance of the cavity	(R)	0.170 m ² °C/W

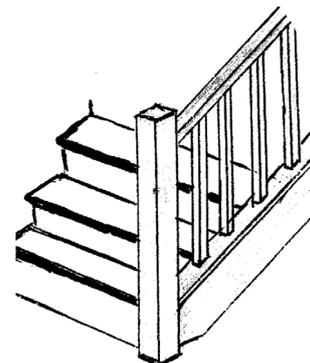
Ignore the timber studs of the inner leaf.

- (a) Calculate the U-value of the wall.
- (b) Calculate the annual cost of the heat loss through the external wall of the timber framed house outlined above, using the following data:

Total external wall area:	135 m ²
Average internal temperature:	19 °C
Average external temperature:	7 °C
U-value of wall:	as calculated at (a) above
Heating period:	12 hours per day for 40 weeks per annum
Calorific value of oil:	37350 kj per litre
Cost of heating oil:	78 cent per litre
1000 Watts =	1 kj per second.

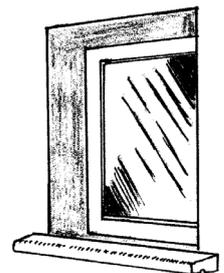
- (c) Show, with the aid of **notes and neat freehand sketches**, a design detail which will prevent moisture reaching the insulation from inside the building.

6. (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 neat freehand sketches**, **three** design details that would ensure the stairs are safe for all users.

7. (a) Determine by the degree of efficiency method, or by any other suitable method, the approximate size of a vertical window suitable for a kitchen 5.20 m long by 3.20 m wide requiring an average illumination of 150 lux on the working plane. Assume an unobstructed view and the illumination of a standard overcast sky to be 5000 lux.



- (b) PVC Windows have largely replaced timber windows as the choice of many home builders in recent years. Discuss the **two** materials in detail and give the advantages and disadvantages of each material for window frame manufacture.

8. The building of single dwellings in a rural location requires careful consideration regarding the disposal of sewage.
- (a) Discuss in detail **three** considerations that must be satisfied when choosing a suitable site so that impact to the environment from the treatment of sewage is minimised.
 - (b) Using *notes and neat freehand sketches*, explain in detail **three** considerations in the design of a septic tank that ensures its safe operation and effective treatment of sewage.
9. A single stack system is commonly used to discharge sewage from a domestic dwelling.
- (a) Show, with the aid of **notes and detailed sketches**, a typical layout of a single stack system for a bathroom situated on the first floor of a dwelling. Show typical locations of the bathroom fittings and indicate the sizes of all pipework.
 - (b) Using *notes and freehand sketches*, detail **two** tests that may be carried out on an underground drainage system to ensure it is watertight.
10. In recent years much debate has occurred on a local and national level concerning the building of single homes in the countryside.
- (a) What arguments might be presented by a person who:
 - i. intends to apply for planning permission to build a single house in the countryside.
 - ii. objects to the building of a single house in the countryside.
 - (b) Propose **three** guidelines that would help a planning authority control the development of single houses in the countryside.

