



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

*Pre-Leaving Certificate Examination 2007*

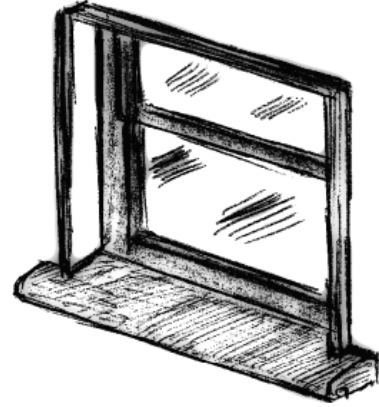
***Construction Studies  
Theory – Higher Level***

*(300 marks)*

***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. To a scale of 1:5, draw a vertical section through a timber window frame fixed in a 300 mm insulated cavity wall. The window has an outward opening single glazed sash. The wall is externally rendered and finished with hard wall plaster inside. Show all relevant constructional details from below the cill to 300 mm above the window head.



2. (a) Using *notes and a neat freehand sketch*, show the layout of all pipe work necessary for the installation of a domestic central heating system to serve four radiators. Indicate the location of all necessary valves and give the sizes of all pipes.
- (b) Describe **two** renewable forms of heat energy that could be used to supplement the heating system. Give an advantage and disadvantage of each.
3. A proposed extension to a single storey dwelling is to include a bathroom measuring 3m × 3m. The bathroom is to be suitable for a wheelchair user.
- (a) Using a well proportioned *line diagram or freehand sketch*, propose a design layout for this space, indicating the location for each of the following:
- Wash Hand Basin
  - Water Closet (WC)
  - Bath/Shower Facility
  - Window
  - Door
- (b) In the case of each item listed above discuss in detail reasons for the chosen location.
- (c) Using *notes and detailed freehand sketches*, outline **two** design considerations that would make the bathroom space more user friendly for a person in a wheelchair.
4. Draw to a scale of 1:10 a vertical section through a cold water cistern placed in the ceiling of a dwelling house. Show details of the tank supports, pipes, valves and appropriate insulation. Roof details are not required.

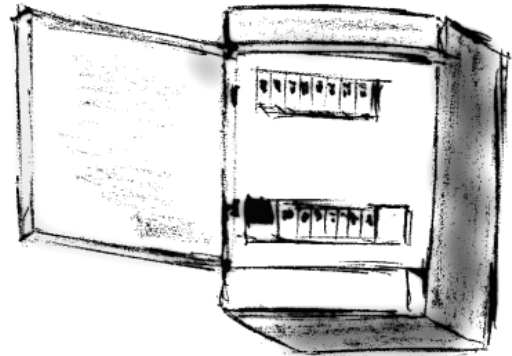
5. (a) Calculate the u value of an external cavity wall which is constructed of 100 mm thick brick outer leaf rendered 20 mm thick, a 100 mm thick concrete block inner leaf plastered 12 mm thick and a 100 mm wide cavity.

Use the following data:

- External surface resistance 0.53 m<sup>2</sup>C/W
- Internal surface resistance 0.123 m<sup>2</sup>C/W
- Cavity resistance 0.176 m<sup>2</sup>C/W
- Conductivity of brick 0.84 W/m°C
- Conductivity of concrete block 1.44 W/m°C
- Resistivity of plaster/render 2.08 m°C/W

- (b) What thickness of expanded polystyrene should be added in order to satisfy building regulation requirements of 0.40 W/m<sup>2</sup>C the resistivity of the expanded polystyrene is 29.6 m°C/W.

6. (a) Using *notes and freehand sketches*, show the correct wiring for **three** sockets in a ring main circuit of a domestic electrical insulation.



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

7. (a) Explain the following terms which relate to the illumination of buildings:

- Standard overcast sky
- The working plane
- The window factor

- (b) Average daylight illumination in a room is to be increased from 85 to 150 lux by fitting a window in one wall. Calculate, using the degree of efficiency method or any suitable method, the area of the window required given that the room is 6.00 m long by 3.00 m wide.

8. (a) Explain how damp penetration can cause deterioration of the fabric of a building.

- (b) Use *notes and freehand sketches*, to show **four** places where damp proofing should be located in a dwelling house.

9. (a) Explain each of the following terms:

- Reverberation time
- Isolation
- Completeness

(b) A bedroom is located on the first floor of a new house, directly above the kitchen. The floor is constructed using tongued and grooved floorboards on wooden joists with a plasterboard ceiling beneath. Using *notes and freehand sketches*, show **two** design details that will increase the sound insulation properties of the floor and minimise the transmission of noise from the kitchen to the bedroom above.

10. A building of historical importance to a local community is threatened with destruction to be replaced with a shopping complex.

(a) What arguments might be presented

- i. in favour of it's preservation
- ii. against it's preservation



(b) Make a recommendation to planning authority on this proposal and discuss in detail **three** reasons in support of your recommendation.