

LEAVING CERTIFICATE EXAMINATION, 1998

CONSTRUCTION STUDIES - PART I (THEORY)

HIGHER LEVEL

THURSDAY, 25 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. To a scale of 1:20 draw a vertical section through a traditional timber roof from fascia board to 100 mm beyond the ridge board. The section should show details at the eaves and at the top of the 300 mm cavity wall and should also include the first three rows of slates and the top 300 mm of the supporting wall. The span between the wall plates is 7.50 m. Give suitable sizes for all components.
 2. Heating in a small bungalow is provided by four radiators supplied from a central heating boiler. Domestic hot water is heated by the same boiler through an indirect cylinder. Using a detailed sketch, show the layout of the central heating system and the hot and cold water supply system. Name and give suitable dimensions for all component parts.
 3. (a) Show, with the aid of sketches, **two** different methods of fixing dry linings to the inside of an external block concrete wall. Pay particular attention to the top and bottom of the linings where they meet ceiling and floor respectively.
(b) Select **one** method of dry lining and explain the advantages and disadvantages it may have compared to traditional plastered wall finishes.
 4. With the aid of sketches, describe the principal components in a typical domestic consumer's electrical control unit at the intake position. The consumer wishes to have provision made for storage heating and for cooking as well as for all the normal household requirements. Explain the precepts that govern the safe distribution of electricity and with the aid of neat sketches describe three different outgoing distribution circuits.
 5. (a) Explain how you would seek planning approval from your local planning authority for the erection of a dwelling.
(b) Explain the purpose of each of **TWO** of the following building contract documents:
 - (i) Specification;
 - (ii) Bills of Quantities;
 - (iii) Contract drawings.

6. (a) From first principles, explain the reasoning behind the Units used to measure each of the following heat properties of building materials: resistivity, resistance, conductivity and "U-value".
- (b) Calculate the "U-value" of a cavity wall which has a 100 mm facing brick outer skin, a 50 mm cavity and a 100 mm lightweight concrete block inner leaf. The wall is finished internally with a 12.7 mm plasterboard on 26 mm thick battens with an infilling of 25 mm expanded polystyrene.

Use the following data:

Facing brick	Resistivity	0.714 m°C/W
Lightweight concrete block	Resistivity	4.545 m°C/W
External surface resistance	Resistance	0.053 m²°C/W
Internal surface resistance	Resistance	0.123 m²°C/W
Cavity resistance	Resistance	0.176 m²°C/W
Plasterboard	Conductivity	0.016 W/m°C
Expanded polystyrene	Conductivity	0.033 W/m°C

Ignore the timber battens.

7. (a) To a scale of 1:5 draw or sketch a vertical section through the head of a timber window. Include details at the head and sash.
- (b) Average daylight illumination in a room in a house in Ireland is to be increased from 90 to 150 lux by fitting new windows on one of the long walls. Calculate, using the degree of efficiency method or any suitable method, the total area of windows required given that the room is 5.00 m long by 3.60 m wide.
8. Describe, with the aid of sketches, the separate and combined underground drainage systems. Discuss briefly the advantage and disadvantages of each system.

OR

Describe, with the aid of sketches, TWO methods of treating softwood timber so as to prevent its decay when it is used in building construction. Explain the advantages and disadvantages of each method.

9. Explain briefly, with the aid of sketches where necessary, the purpose and nature of any FIVE of the following:
- damp-proof membranes (D.P.M's);
 - vapour barriers;
 - hardcore;
 - lightweight aggregates;
 - concrete screeds;
 - rafters;
 - purlins;
10. The designer works with four main elements: materials which are modified by processes, according to formal concepts, to fulfill specific purposes. Discuss in relation to your Construction Studies Project.