



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2018

Construction Studies

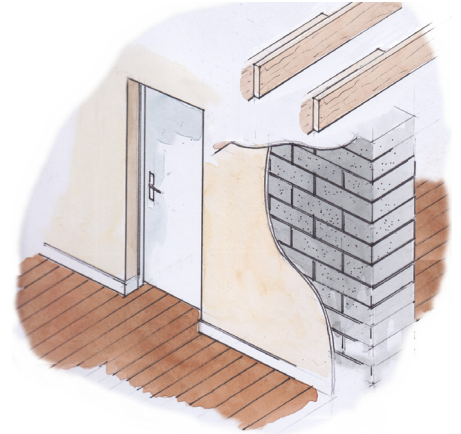
Theory - Ordinary Level

(200 marks)

Friday, 15 June
Afternoon, 2:00 to 4:30

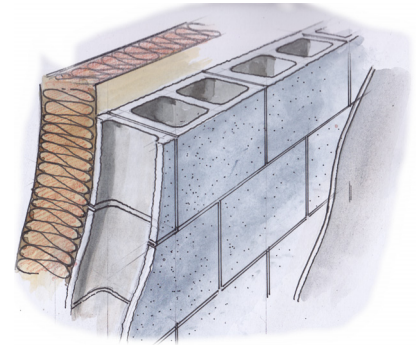
- (a)*** Answer **Question 1** and **three** other questions.
- (b)*** All questions carry equal marks.
- (c)*** Answers must be written in ink.
- (d)*** Drawings and sketches are to be made in pencil.
- (e)*** Write the number of the question distinctly before each answer.
- (f)*** Neat freehand sketches 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. A 215 mm solid concrete block wall separates two rooms on the ground floor of a dwelling house, as shown. A strip foundation supports the wall, which is plastered on both sides. A flush panel door, 60 mm in thickness, is fixed in the wall. The doorframe is 120 mm × 50 mm. The insulated concrete ground floor is finished with a 20 mm tongue and groove floating hardwood floor.



- (a) To a scale of 1:5 draw a vertical section through the strip foundation, the 215 mm wall, the ground floor and the centre of the door up to a point 500 mm above finished floor level. Show 600 mm width of floor on each side of the wall and include **three** typical dimensions on your drawing.
- (b) Show on your drawing the typical design detailing to prevent radon gas from entering the rooms through the floor.

2. The external wall of a house built in the 1960s is of 215 mm single-leaf hollow block construction. The wall is plastered on both sides, as shown. It is proposed to improve the insulation properties of the house by fixing an external system of expanded polystyrene to the wall.

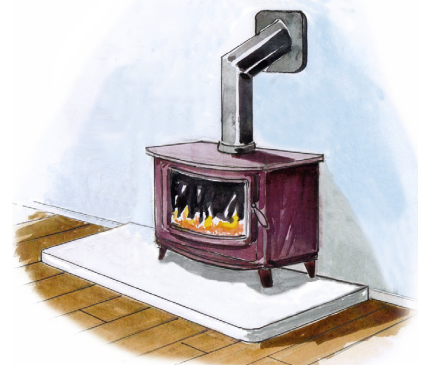


- (a) Using notes and freehand sketches show **one** suitable method of applying an external insulation system to the wall. Specify the typical thickness of the insulation.
- (b) On your sketch show clearly the steps to be followed in applying a surface finish to the insulation. Specify the materials to be used for the surface finish.
- (c) Discuss **one** advantage and **one** disadvantage of applying an external system of insulation to the walls of a house.

3. (a) A wood-burning stove with a back boiler, as shown, is used to heat water for a dwelling house. Using a single-line labelled diagram, show the pipework required to supply **hot water** to a shower.

Include the following in your diagram:

- wood-burning stove
- rising main and cold water storage tank
- hot water cylinder and expansion tank
- pipework to shower and all necessary valves.



- (b) Discuss **one** advantage of using a wood-burning stove to heat water for the house.

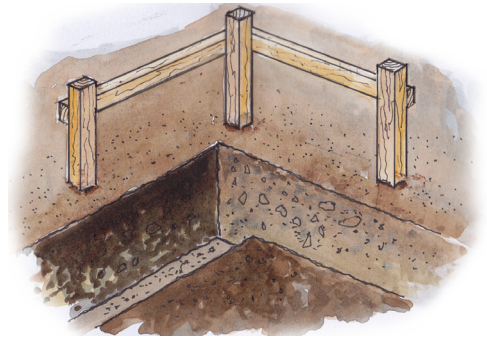
4. The sketch shows one corner of a strip foundation for the external wall of a dwelling house. The external wall is to be a 400 mm concrete block wall with a full-fill insulated cavity.

(a) Discuss **one** environmental reason why a strip foundation is considered the most suitable foundation for this house.

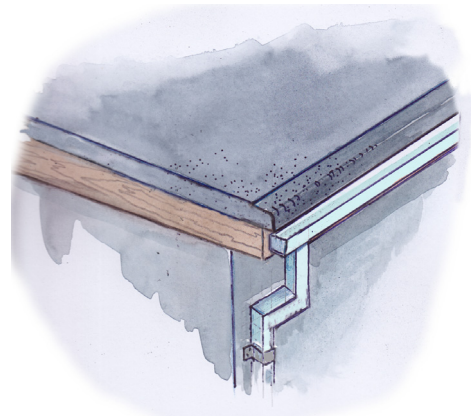
(b) Using notes and freehand sketches describe how to set out the foundation trench under the following headings:

- profiles
- width and depth of trench
- position of wall on strip foundation.

(c) Using notes and freehand sketches, show how to determine the top surface of the foundation prior to placing the concrete to ensure that the foundation is level throughout.



5. The sketch shows portion of the eaves of a flat roof. The roof is covered with layers of bituminous felt, on a 20 mm plywood deck, on battens, on sloping furring pieces, on 200 mm × 50 mm joists. The roof is highly insulated and there is an insulated plasterboard ceiling beneath. The external wall supporting the roof is a 400 mm concrete block wall with a full-fill insulated cavity. The wall is rendered on both sides.



(a) To a scale of 1:5, draw a vertical section through the eaves of the flat roof and through the external wall. Show the typical construction details from 500 mm below the roof joists, through the external wall, wallplate, fascia, soffit, and roof joists and include the roof surface. Show 1.5 metres length of roof joist and include **three** typical dimensions on your drawing.

(b) On your drawing show how the roof is ventilated at the eaves.

6. (a) Draw a large freehand sketch of the safety sign for **each** of the items of personal protective equipment (PPE) listed below:

- high-visibility vest
- protective footwear
- safety helmet.

(b) Using notes and freehand sketches, describe **one** design feature of **each** of the above safety items that helps to protect the worker from injury.

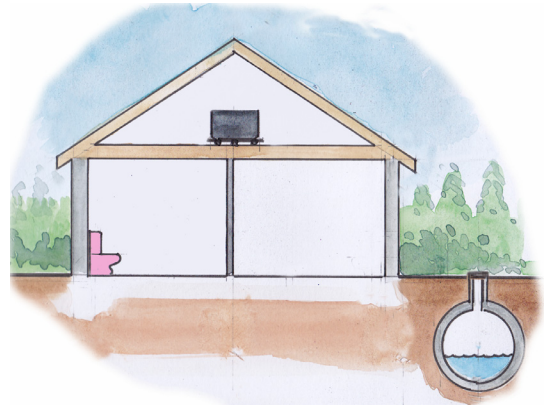


(c) Recommend **one** other item of personal protective equipment (PPE) which should be worn by workers on a construction site. Give **one** reason for your recommendation.

7. It is proposed to collect rainwater from the roof of a house and to store it in an underground tank as shown.

(a) Draw the given sketch and show the pipework necessary to collect the rainwater from the roof and to convey it to the underground storage tank. Label the main components and give their typical sizes.

(b) The stored rainwater is used for flushing a toilet. Show, using notes and freehand sketches, the pipework and pump necessary to take the water from the underground tank to a storage tank in the attic. Show also how to connect the toilet cistern to the storage tank in the attic. Include the necessary valves.



(c) Discuss **one** advantage of storing rainwater in an underground tank.

8. Explain, with the aid of notes and freehand sketches, any **five** of the following:

- smart meter
- biscuit joint
- earth rod
- airtightness tape
- evacuated tube
- magnetic catch
- roof-light window
- aerated shower
- LED lighting.

9. The sketch shows an existing opening in a 100 mm concrete block wall separating a sitting room and a dining room. It is proposed to fit a doorframe and glazed wooden double doors in this opening.

(a) Show, using notes and freehand sketches, how the blockwork over the opening is typically supported.

(b) Show, using notes and freehand sketches, how the doorframe is held square while it is being fitted and show **one** method of fixing the doorframe to the wall.

(c) Discuss **one** advantage and **one** disadvantage of fitting glazed double doors between the sitting room and the dining room.

