



**Coimisiún na Scrúduithe Stáit**  
**State Examinations Commission**

**Leaving Certificate 2014**

**Marking Scheme**

**Construction Studies**

**Ordinary Level**

### **Note to teachers and students on the use of published marking schemes**

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

### **Future Marking Schemes**

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

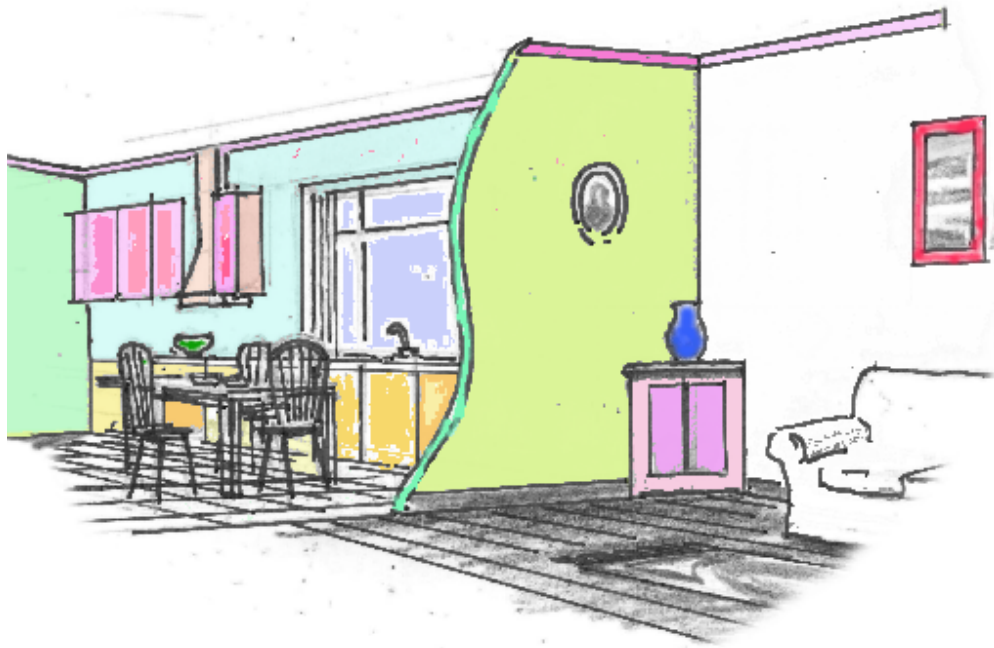


**Coimisiún na Scrúduithe Stáit**  
*State Examinations Commission*

*Scrúdú Ardteistiméireachta 2014*

# *Construction Studies*

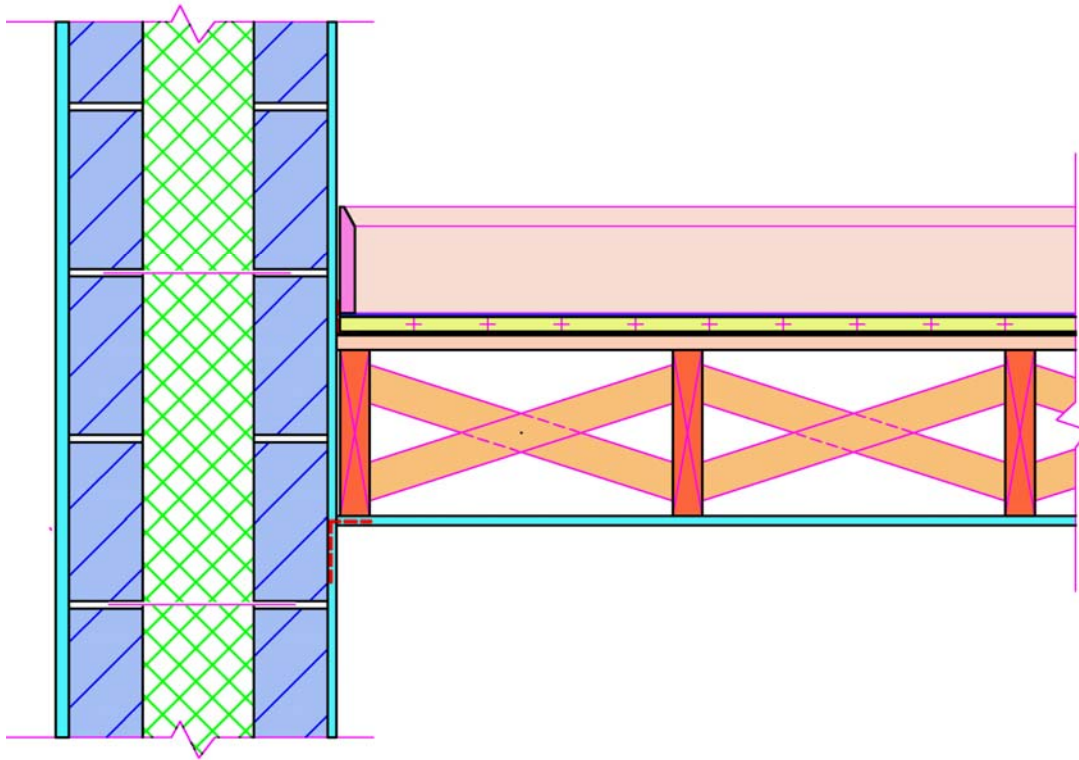
## *Theory – Ordinary Level*



*Staidéar Foirgníochta*  
*Teoiric – Gnáthleibhéal*

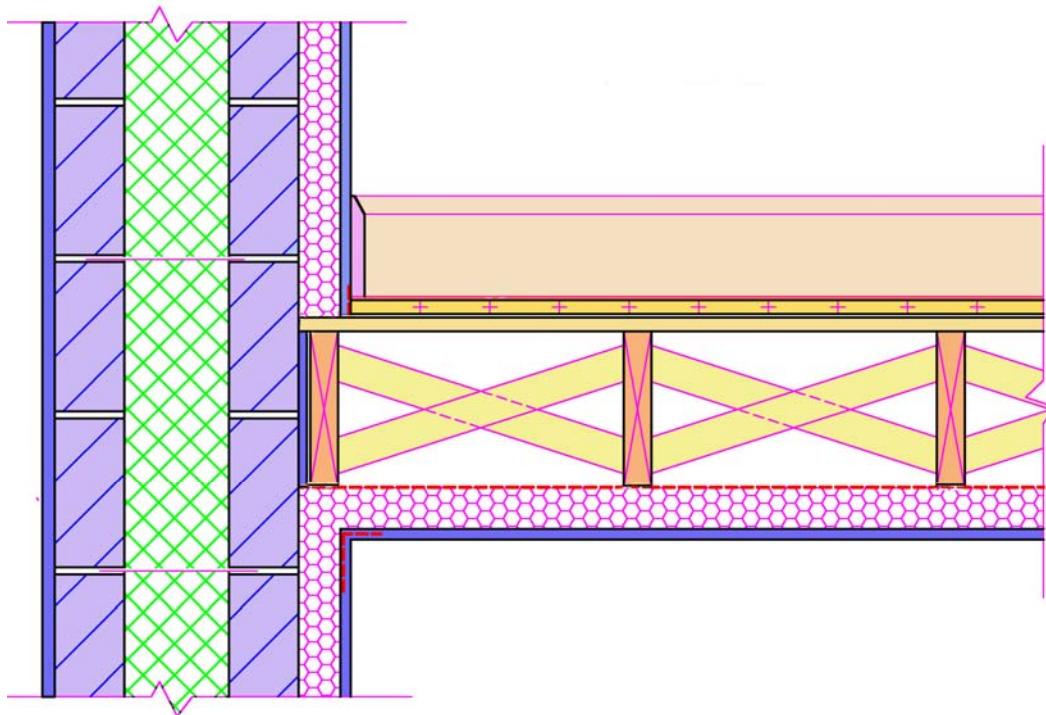
**Ceist 1(a) – Cavity wall and first floor joists – minimum standard**

*Note: Any alternative detailing which complies with current Building Regulations is accepted.*



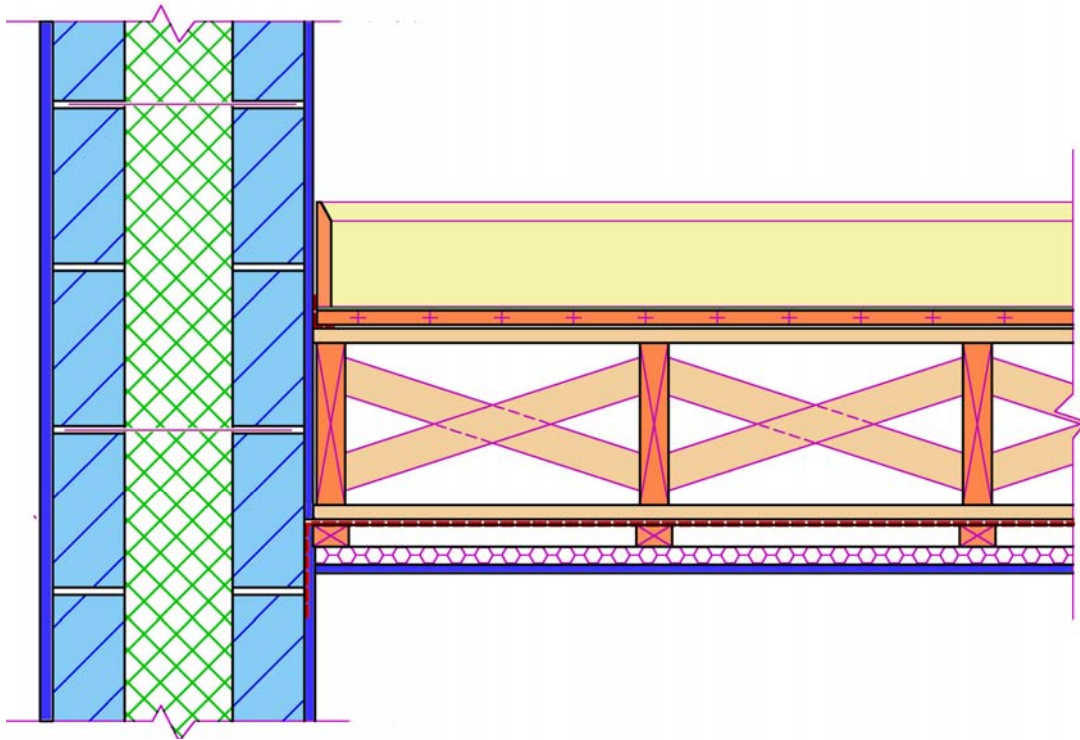
**Ceist 1(a) – Cavity wall and first floor joists with service cavities – best practice**

*Note – plaster layer to blocks at joist level for airtightness*



### Ceist 1(a) – Cavity wall and first floor joists with service cavities – best practice

Note position of vapour barrier for continuity which is not punctured by electrical services



#### 1(a) - Design details of wall and floor – typical sizes

- External render – 19 mm
- External leaf 100 mm solid block
- Internal leaf 100 mm solid block
- 150 mm cavity – full-fill insulation
- Cavity ties – arcon, basalt low conductivity
- Internal plaster – 15 mm
- Floor joists 225 × 40 mm @ 400 mm centres
- Plywood deck 20 mm
- Adhesive tape to wall and plywood to prevent air leakage
- Acoustic layer or adhesive layer for fixing floor boards
- Floating tongue and groove hardwood floor 100 × 20 mm
- 150 × 15 mm skirting fixed to wall
- Skirting fixed on flexible sealant to provide airtight seal with floor
- Ceiling 12.5 mm plasterboard
- Ceiling taped to wall, or scrim for airtightness
- Plaster skim

#### Best practice details

- Service cavity to walls to improve airtightness
- Service cavity to ceiling to improve airtightness
- Vapour barrier fixed to OSB to joists, taped for airtightness.

#### 1(b) Design details to prevent floor joists twisting

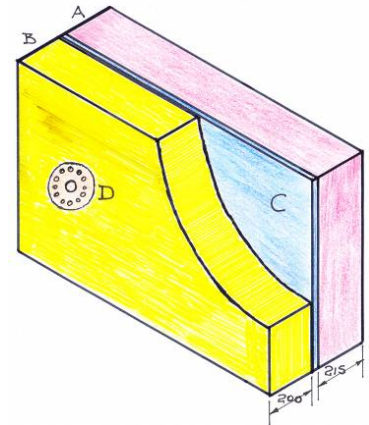
- Herringbone bridging – 50 × 40 mm typical or proprietary metal bridging
- Solid bridging – 225 × 40 mm - typical.

*N.B. Any alternative detailing which complies with current Building Regulations is acceptable.*

## Ceist 2(a)

### Fixing insulating to the outside of the wall

- A base stainless steel track to carry the slabs is fixed to the wall A at DPC level
- The first row of insulation boards B is fixed in place resting on the track
- The boards are fixed in position using a special adhesive C
- The next rows of insulation are fixed in staggered pattern
- All rows are fixed in place and the adhesive allowed set
- Mechanical fixings D are used to fix each board in place
- The number of fixings is typically seven per square metre
- Special longer fixings are available for thicker insulation boards
- The fixings are installed by drilling through the insulation and into the wall
- The fixings are then hammered into place
- Insulation materials: such as - polystyrene, mineral fibre board and phenolic foam.

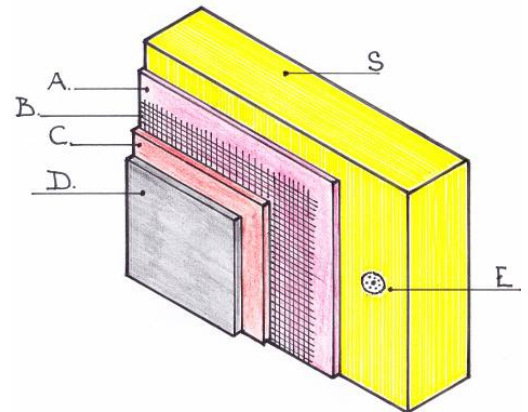


## 2(b)

### Applying a surface finish to the external insulation

The surface finish is typically applied as follows:

- The indent at each fixing E is filled with the base coat
- A base coat of acrylic plaster A is applied to the surface of the insulation S
- The base coat is applied using the same methods as for traditional plastering
- While the base coat is still wet a reinforcing mesh B is fixed to it
- Base coat and mesh are then applied around window and door openings
- The next base coat or primer C is applied in preparation for the finish coating
- Once this coat has dried the final acrylic finish D is applied
- The finish is applied using a steel trowel covering a complete area
- No breaks or stops should appear on the finished surface
- The finish is available in a wide range of colours
- The new surface finish should be maintenance free for 10-15 years
- Other proprietary surface finishes are also available.



## 2(c)

### Advantages of improving the insulation properties of external walls – such as

- Insulation of the external walls reduces the heat loss
- Energy bills are reduced
- Lower CO<sub>2</sub> emissions, therefore better for the environment
- It improves the U-value rating
- It improves the BER rating
- The house will be warmer
- No loss of internal floor area
- The household is not disturbed while the work is taking place – work done outside.

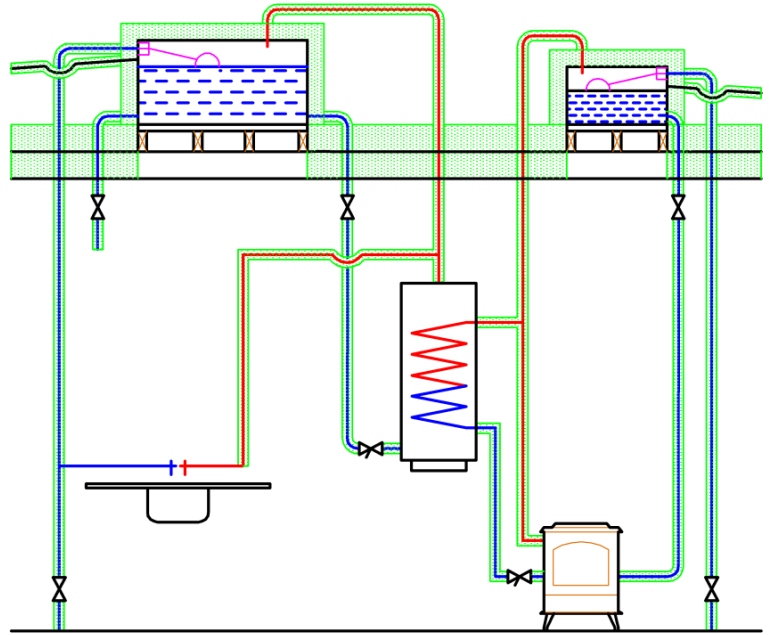
### Ceist 3(a)

#### Domestic hot water to sink - Secondary circulation – typical sizes

- 15 mm rising main with stop valve
- Storage tank and ball valve
- 22 mm min overflow
- 22 mm cold feed from storage tank to indirect hot water cylinder
- Indirect hot water cylinder
- 22 mm expansion pipe from indirect hot water cylinder
- 15 - 22 mm hot water supply to sink.

#### Primary circulation - typical sizes

- 15 mm water supply to expansion tank
- Expansion tank with ball valve
- 22 mm overflow min
- 22 mm cold feed from expansion tank
- 28 mm primary return
- Wood burning stove
- 28 mm primary flow
- 22 mm expansion pipe
- Valves
- Insulation to storage tank, cylinder and pipework
- Labelling.



*N.B. Any alternative detailing which complies with current Building Regulations is acceptable.*

### 3(b)

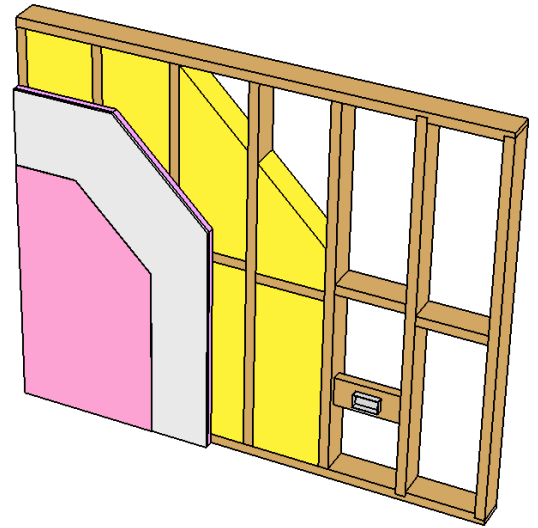
#### Two advantages of adding a solar panel to supply hot water to a dwelling house

- Solar panels reduce the cost of heating water
- Solar energy is free although there is a cost in buying and installing the panels
- Solar panels are environmentally friendly. However, solar panels cause some pollution when in use and also in the manufacture of the panels in factories
- There is less use of the boiler as the water in the cylinder is not being heated from cold
- Solar energy is sustainable while it is estimated that the world's oil reserves will last for another 30 to 40 years
- Solar panels can be used in remote areas where it is too expensive to extend the electricity power grid, or for people who wish to live off grid.

#### Ceist 4(a)

##### A non-bearing timber stud partition - typical sizes

- Sole piece or baseplate - 75 mm × 50 mm or 100 mm × 50 mm
- Studs - 75 mm × 50 mm or 100 mm × 50 mm @ 400 mm centres
- Nogging or bridging for stability - 75 mm × 50 mm or 100 mm × 50 mm
- Head plate - 75 mm × 50 mm or 100 mm × 50 mm
- Fixing piece for electrical services - 100 mm × 50 mm
- Insulation fitted between joists
- Plasterboard - 2400 mm × 1200 mm × 12.5 mm - fixed to studs with zinc coated nails or screws
- Plaster skim.

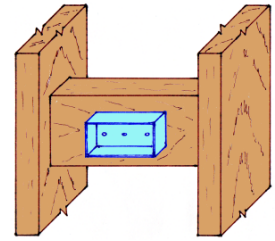


#### 4(b)

##### One method of fixing a double electrical socket in stud partition

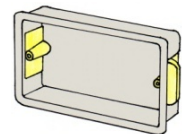
###### Metal socket box

- Locate the position of the socket on the timber studs
- Fit fixing batten between the studs
- Set the fixing batten back from the edge of the studs
- The front of the gang box should be flush with the front edge of the studs
- Fix the socket box to the fixing batten
- Mark the position of the socket on the plasterboard
- Cut out with a pad or plasterboard saw.



###### Dry lining back box

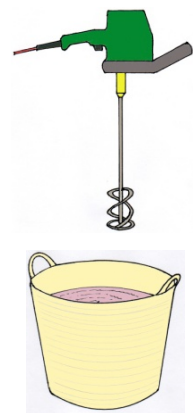
- Mark the position of dry lining back box on the plasterboard
- Cut around the rectangle using a pad or plasterboard saw
- Fit the box into the opening
- Ensure that the side clips grip the plasterboard
- When the fixing screws of the socket are tightened, the side clips will grip the plasterboard.



#### 4(c)

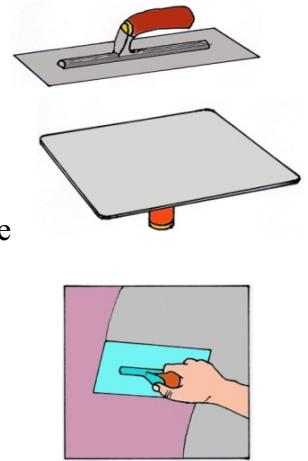
##### Applying a plaster skim finish to the side of the stud partition

- Spread sheeting over the floor
- Tape over all the joints and seal the partition to the existing walls and ceiling
- Dampen the wall with a large paintbrush
- Always add plaster to the water and use a clean mixing bucket
- Use a power or hand mixer to mix the plaster
- Mix the powder and water thoroughly until the mixture is free from lumps
- Pour the plaster on to a mortar board
- Cut away a section of the plaster with the plastering trowel and put on a plastering hawk
- Using smooth strokes spread the plaster over the wall to a thickness of 1 to 2 mm moving from left to right
- Work quickly to cover the whole area
- Level and smooth the surface when the plaster is still soft

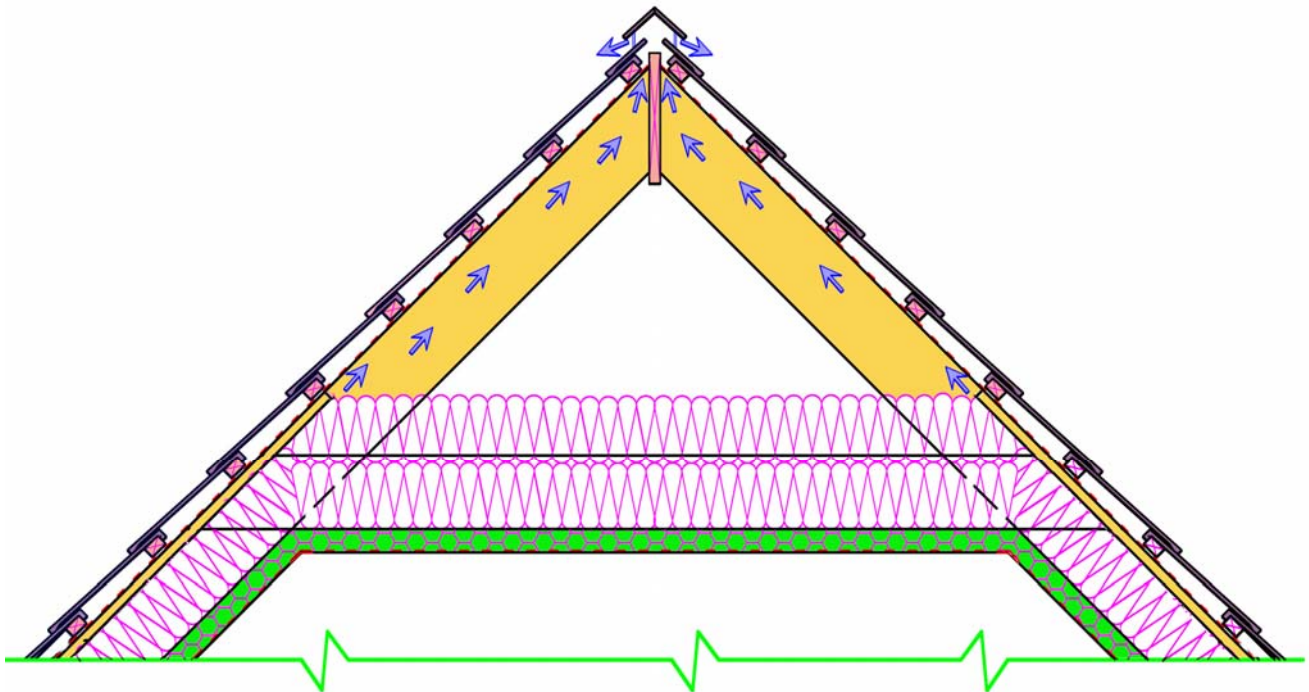




- Apply a second coat similar to the first coat
- When the surface is covered, even out the surface
- Leave the plaster to dry until the surface is firm to touch
- The plaster can now be polished
- Wet the trowel and flick water over the surface with a large paintbrush
- Float the trowel over the surface working in sweeping strokes to get a fine finish
- Wash the bucket and all the tools immediately.



**Ceist 5(a) Vertical section through the portion of the roof at the ridge – typical details**

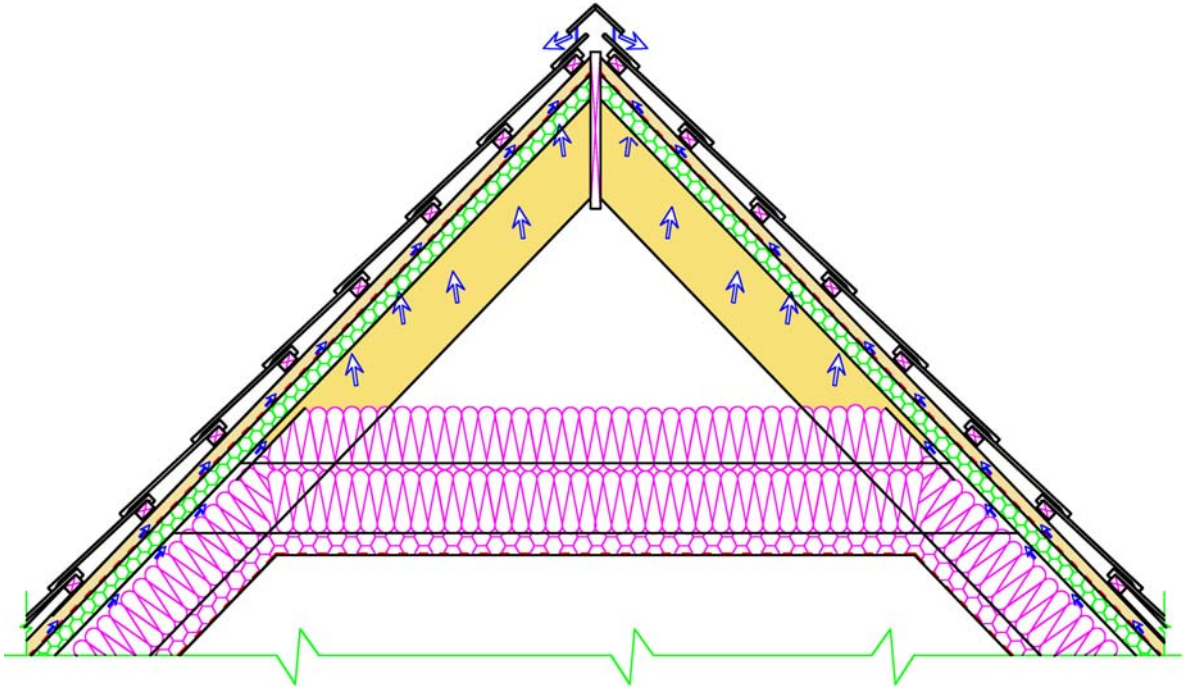


*Specifications*

- Ridge tile
- Ridge vent
- Ridge board - 300 mm × 32 mm
- Tiles
- Battens - 50 mm × 30 mm
- Breather membrane/vapour diffuse membrane
- Rafters - 200 mm × 50 mm
- Collar ties – 125/150 mm × 50 mm
- Insulation between rafters
- Plasterboard with bonded insulation
- Plaster skim.

*N.B. Any alternative detailing which complies with current Building Regulations is acceptable*

**Ceist 5(a) Vertical section through the portion of the roof at the ridge - best practice details**  
external insulation, vapour diffuse layer, counter battens and battens



5 (b)

- Fitting ridge vents on the ridge
- Fitting vent tiles near the ridge.

**Ceist 6(a)**  
**Safety signs for a construction site**



Safety helmet



High visibility vest



Safety boots

6(b)

**Reason why personal protection equipment must be worn on a building site**

**Safety helmet**

- It protects the head from falling objects
- It protects the worker if you hit your head against a solid object
- The helmet provides extra safety for workers
- The colour of the helmet ensures that workers are visible
- The wearing of helmets is mandatory for workers and visitors to a site
- It protects the worker if he/she slips or falls.

### High visibility vest

- Workers must be visible on the building site
- Workers wearing the high visibility vest are clearly visible on a site
- High visibility vest is very important when machinery is being used on the site
- Operators of machinery can easily see the workers on site
- The high visibility vest provides extra safety for workers and visitors on a site
- The wearing of a high visibility vest is mandatory for workers and visitors on a site.

### Safety boots

- Protect the feet from falling objects
- The boots have a steel cap giving added protection
- The safety boots provide extra safety for workers on the site
- The wearing of safety boots is mandatory for workers and visitors on a site.

### 6(c)

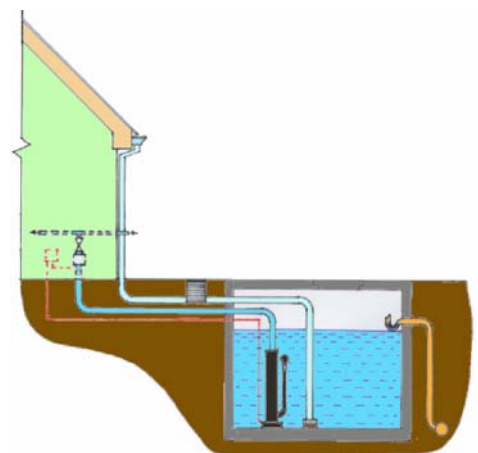
#### Two reasons why visitors must report to the site office on entering a construction site

- Management on site needs to know who is on site at any one time
- In case of an accident on site, details of all personnel on site are important
- Visitors must obey the safety signs displayed
- It is part of health and safety requirements
- Details of visitor arrival and departure must be recorded
- Collect high visibility vest, safety helmet and safety boots
- Management must ensure that visitors wear the correct personal protective equipment
- Management has to inform visitors of the safety requirements when visiting a site
- Visitors must be visible on site
- Visitors must not wander around a site
- A guide or person in authority will take the visitor around the site
- Visitors must follow the instructions given by the guide
- Parts of a site may not be accessible to visitors.

### Ceist 7(a) - How rainwater could be collected from the roof and stored for reuse

#### Underground storage tank

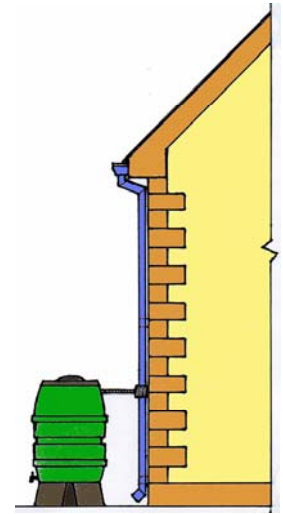
- Rainwater is collected from sloping roof and flows into the gutter
- Rainwater flows from the gutter down the downpipe to the gully or back inlet gully
- Rainwater is conveyed from gully to storage tank
- A filter between the gully trap and the storage tank traps any sediment
- The filter can be accessed from the top for maintenance and cleaning
- Filtered water flows into storage tank
- The stored rainwater can be re-used as grey water only
- The rainwater is pumped into the house by a submersible pump
- A system control unit regulates the flow of rainwater to the tank in the attic
- Water from the mains tops up the tank in the attic when rainwater is low in the underground storage tank.



*Other systems may have the control unit connected to the tank in the attic.*

### **Water butt**

- Rainwater is collected from sloping roof and flows into the gutter
- Rainwater flows from the gutter down the downpipe
- The rainwater is diverted into the connector and then into the water butt
- When the water butt is full the diverter directs the rainwater down the downpipe and into the gully
- A tap is fitted close to the bottom of the water butt
- The water butt sits on a stand
- It is easy to place a container under the tap.



### **7(b)**

#### **Two advantages of storing rainwater**

- Reduces water bills where water meters are installed
- Rain water is free from many chemicals found in ground water
- Independent water supply
- Supplement main water supply
- Can be built to suit demand for water
- Most roof tops act as collection systems requiring no new system of collection
- Provides water when there is drought
- Large storage units can reduce flooding in low lying areas
- Reduces demand on wells which may help to maintain ground water levels
- The overall cost of installing and operating stored water system can be less than a pumping system
- Can be used for certain tasks only without purification, is not potable.

#### **Two suitable uses for the stored rainwater**

- Used for flushing toilets, washing clothes and washing cars
- Ideal for garden purposes, agriculture and livestock, dust control and construction activity
- Used for irrigation, landscape, public parks and artificial lakes and any use where non-drinking water is suitable.

### **7(c)**

#### **One advantage of fitting a water meter**

- Water meters encourage users to conserve water
- They help to detect water leaks in the system
- Water meters can encourage users to install water saving devices in their homes
- Installation of water meters can bring a reduction in the consumption of domestic water
- People pay for the exact amount of water they use.

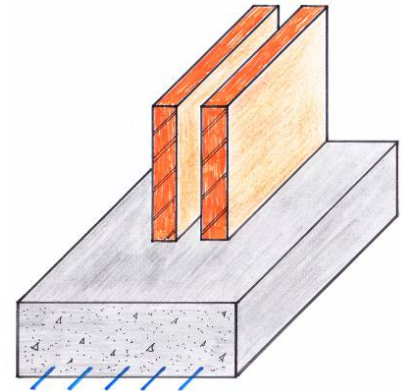
#### **One disadvantage of fitting a water meter**

- People pay for water that was once free
- Water meters require maintenance
- Sometimes the installation of a separate water meter to each apartment in existing multi-apartment buildings may be difficult
- A single water meter for multi-storey apartment blocks could be unfair to some occupants
- There is a cost involved in the purchase and installation of water meters.

## Ceist 8

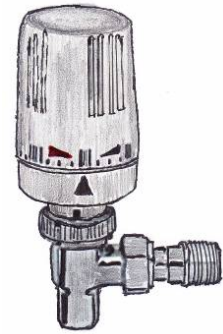
### Strip Foundation

- This is a simple form of concrete foundation
- It is a very common type of foundation
- It is economical in the use of concrete - sustainable
- It may support a solid or cavity wall
- It may support an internal or external wall
- The concrete is reinforced using steel bars
- The total width of the foundation is typically three times the thickness of the wall
- The thickness of the foundation is generally the same as the width of the wall
- This foundation may be stepped, wide or deep
- The wall rests centrally on the foundation
- The load is transmitted at 45 degrees from the base of the wall to the supporting ground.



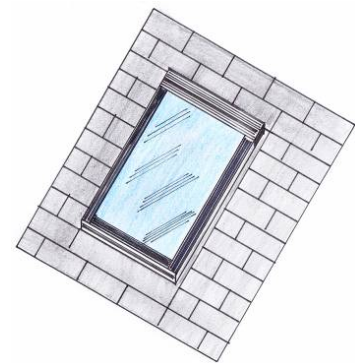
### Thermostatic Valve

- This is a special valve (TCV) fitted to the radiator as part of a central heating system
- The valve controls the heat output from the radiator
- It may be set to control the temperature in a room
- It regulates the flow to give the desired room temperature
- The valves are not expensive and can help reduce the cost of central heating
- The valves help reduce CO<sub>2</sub> emissions.



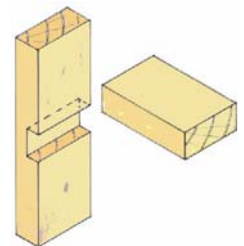
### Roof-light window

- This is a special form of window fitted on a sloping roof surface
- Special roof light for flat roofs
- They allow light into an attic space
- They provide ventilation to the attic area
- The window may be fitted on existing roofs
- The glass panel is double or triple glazed
- The total unit is highly insulated to reduce heat loss
- The roof light fits neatly into the roof surface
- The window may be top or pivot hinged.



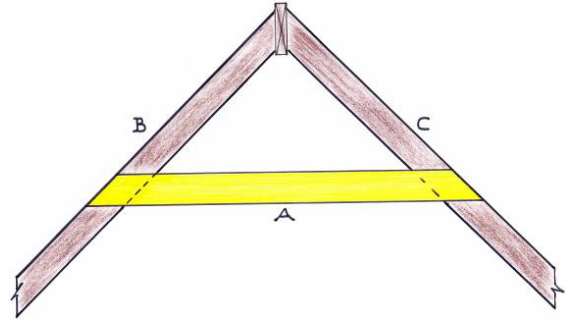
### Housing joint

- This is a basic joint used in woodworking
- It is a simple method used to join two pieces of wood at right angles
- A trench is removed from one piece
- The other piece is fitted into the trench
- Glue is used to give a stronger joint
- The joint is used in the manufacture of cabinets, bookcases and shelving
- The advantages of this joint are that it is simple, strong and easy to make.



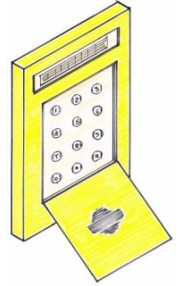
### Collar tie

- This is the solid piece A stretching from rafter B to rafter C
- The collar ties the rafters together forming the triangular shape – triangulation – to give structural stability to the roof
- The collar is in tension as part of the roof structure
- The collar improves the strength and stability of the roof
- The purlins may rest on the collars
- Collar ties vary in section size - 200 × 50mm is typical
- Collar ties may form the ceiling for attic development.



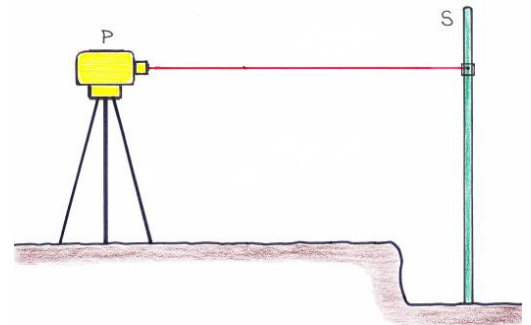
### Smart meter

- This is a device that records the consumption of electricity
- It records the usage of electricity in a home
- A meter is installed in the home and may be topped up with credit as needed
- The meter indicates how much electricity is being used
- The homeowner can see how much electricity is being used
- It also shows the cost of electricity at any one time
- It allows the householder take control of electricity costs
- Smart meters may also be used to record the usage of gas or water.



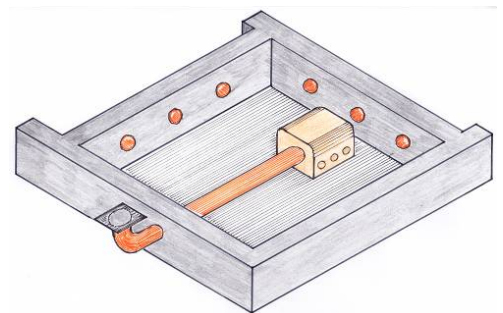
### Laser beam

- This is a light beam used in many industries
- It is used in printers, cutting equipment and barcode scanning
- It is used in cutting or welding of materials
- It is used to locate levels on construction sites
- It is used to locate levels on internal walls
- A laser projector P is used to send out the laser beam
- A staff S with adjustable sensor is used to detect the beam
- This will give levels at different points on the site.



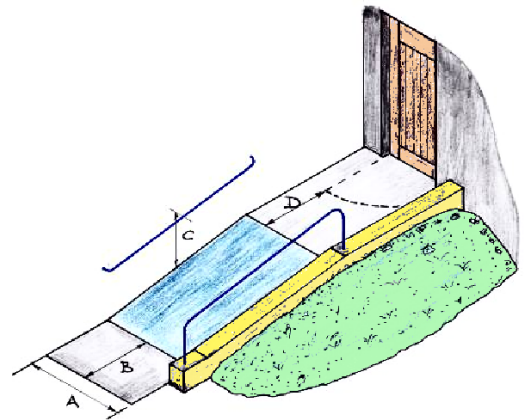
### Radon sump

- This is a compartment placed centrally in the hardcore supporting the ground floor of a dwelling house
- It is used to collect the radon gas within the building
- Radon gas collects into the sump
- Gaps are formed in the surrounding walls to allow the gas flow to the sump
- The sump is fitted with pipe connectors
- Pipes are connected to the sump to convey the radon gas to the outside of the building where it dissipates into the air.



## External ramp

- This is a sloping path designed for ease of access to a dwelling
- May be used by people with restricted mobility and people in wheelchairs
- The ramp is also of assistance to people using prams, buggies or pushchairs
- The ramp is of assistance to people having difficulty walking
- The gradient of the ramp should be as shallow as possible
- The recommended gradient is 1:20
- Individual sections should not exceed 9.0 metres in length
- The ramp should have a minimum clear width of 1200 mm
- The ramp should have a non-slip surface
- Lighting should be from the sides to avoid shadow
- A is 1200 mm clear width minimum
- B is 1800 mm minimum
- C is 900 mm -1000 mm
- D is 1800 mm minimum.



## Ceist 9 (a)

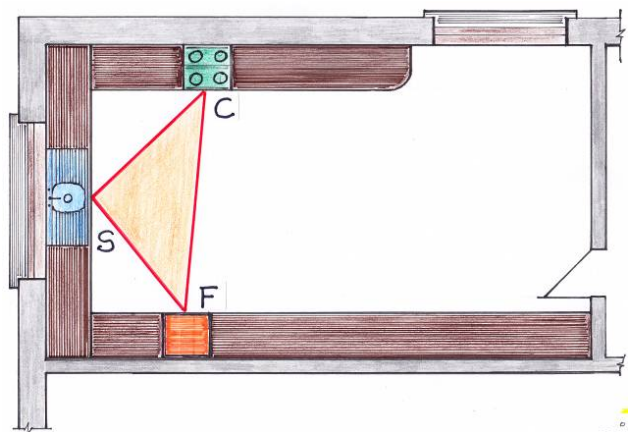
### Reasons for selecting each location

#### Sink

- Natural light is available to the person at the sink S, through the window
- It is pleasant for the person using the sink
- It is close to the cooker, less than 2.0 metres
- It is good to have a view to the garden or lawn
- It forms part of the triangle design for kitchens
- There is ample worktop space at either side.

#### Cooker

- There is worktop space at either side of the cooker C
- It forms part of the triangle for kitchen layout
- It avoids crossing the kitchen with hot pots
- It is a safe location in relation to the door opening
- It is within easy reach of the sink
- Extractor fan may be fitted on external wall.



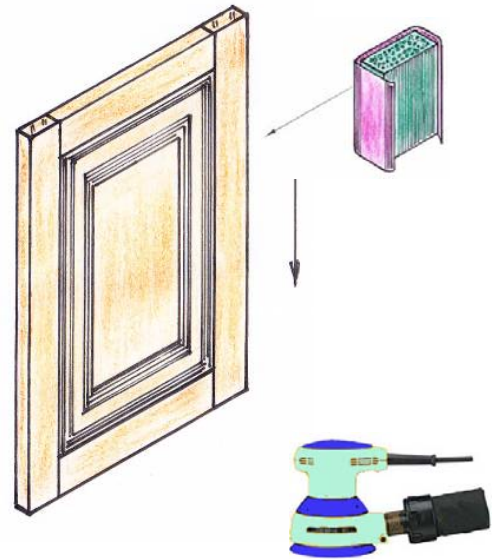
#### Fridge

- The fridge F is close to the sink for food preparation
- It forms part of the working triangle
- It has worktop space at either side
- The worktop provides space to unpack shopping
- The length of each side of the triangle must typically not exceed 6.0 metres.

*Other suitable locations acceptable.*

### 9 (b) Applying a high quality paint finish to a cabinet door

- The surface is cleaned and sanded using fine sand/glass paper – hand or machine
- The dust is then removed using a clean cloth and white spirits
- Using a good quality brush a coat of primer is applied to the door surface
- The primer is allowed to dry and is then given a light sanding
- A suitable undercoat is then applied
- The surface is lightly sanded
- The final coat is applied
- A second coat may be applied.



### The doors may be painted using water based paint

- The paint is available as an all in one primer and undercoat
- The surface is cleaned and sanded
- Dust must be removed before painting begins
- Dampen the surface lightly before painting as this allows the paint to flow easily
- Using a good quality brush, apply the paint evenly
- Do not over brush the paint
- Allow to dry
- Sand the surface
- Apply a suitable gloss or satin finish coat
- A wide range of colours is available.



### 9(c)

#### Advantages of a polished granite worktop

- It is a natural material and looks elegant in a kitchen
- Does not fade or age with time
- Low maintenance
- It is hard wearing
- Wide variety of colours and designs available
- Granite is heat and waterproof.

#### Disadvantages of a polished granite worktop

- Polished granite is expensive
- It is expensive to install
- The worktop is heavy and needs solid support from the cabinets underneath
- Sharp heavy objects may chip the surface
- Needs constant cleaning
- The surface can crack if heavy objects are placed on the surface
- The surface has to be sealed regularly
- High embodied energy – mining, cutting, shaping, polishing, transporting.



**Advantages of a solid wood worktop**

- Solid wood looks well – visually attractive
- It is a natural material and has a natural warmth
- It absorbs the sound of heavy objects being placed on it
- Oiled wood is tough and resistant to heat marks
- It can be cut, shaped and replaced easily
- It will not crack or chip
- Has low embodied energy, easy to cut, form, shape and finish.

**Disadvantages of a solid wood worktop**

- It can stain easily
- Stains must be removed promptly
- Wood worktops must be oiled carefully before installation
- Wooden worktops need constant maintenance
- The surface needs protection from really hot cooking items
- Constant wet and damp will cause staining.

**Preferred worktop giving any two reasons for recommendation**

- Selection of preferred worktop – granite or wood
- Any **two** reasons.

| <b>Question 1 – Section through first floor</b>                  |  |                 |
|--|--|-----------------|
| <b>Details – typical sizes</b>                                   |  | <b>Marks</b>    |
| <b>Part (a)</b>  |  |                 |
| External render – 19 mm  |  | <b>4</b>        |
| External leaf solid block – 100 mm                               |  | <b>4</b>        |
| 150 cavity full fill insulation                                  |  | <b>4</b>        |
| Cavity ties  |  | <b>4</b>        |
| Internal leaf solid block – 100 mm                               |  | <b>4</b>        |
| Internal plaster – 15 mm   |  | <b>4</b>        |
| Skirting board   |  | <b>4</b>        |
| Floating tongued and grooved hardwood floor                      |  | <b>4</b>        |
| Acoustic layer or adhesive layer for fixing floor boards         |  | <b>4</b>        |
| Plywood deck – 20 mm   |  | <b>4</b>        |
| Adhesive tape to wall and plywood                                |  | <b>4</b>        |
| Floor joists 225 × 40 mm   |  | <b>4</b>        |
| Plasterboard taped to wall                                       |  | <b>4</b>        |
| Plaster skim   |  | <b>4</b>        |
| <i>Any 9 of the above details ( 4 marks each)</i>                | <b>Sub-total</b>                                     | <b>36</b>       |
| <b>Four typical dimensions</b>                                   |  | <b>4</b>        |
| <b>Part (b)</b>  |  |                 |
| <b>Show one method to prevent the floor joists from twisting</b> |  |                 |
| Bridging   |  | <b>2</b>        |
| <b>Draughting, accuracy and scale</b>                            | <i>(excellent, good, fair)</i><br><b>8    6    4</b> | <b>8</b>        |
|  | <b>Total</b>   | <b>50 marks</b> |

| <b>Question 2 – External insulation</b>   |   |                 |
|---|---|-----------------|
| <b>Details</b>  |   | <b>Marks</b>    |
| <b>Part (a)</b>   |   |                 |
| <b>Fixing insulation to the solid block wall – Notes</b>  |   |                 |
| Valid description one   |   | <b>4</b>        |
| Valid description two   |   | <b>4</b>        |
| Type of insulation  |   | <b>4</b>        |
| <b>Fixing insulation to the solid block wall – Sketches</b>   |   |                 |
| <b>Quality of sketches</b>  | <i>(excellent, good, fair)</i><br>8      6      4 | <b>8</b>        |
| <b>Part (b)</b>   |   |                 |
| <b>Steps involved in applying reinforced mesh and external surface finish to the insulation – Notes</b>         |   |                 |
| Valid step one  |   | <b>4</b>        |
| Valid step two  |   | <b>4</b>        |
| Valid finish  |   | <b>4</b>        |
| <b>Steps involved in applying mesh reinforced mesh and external surface finish to the insulation – Sketches</b> |   |                 |
| <b>Quality of sketches</b>  | <i>(excellent, good, fair)</i><br>8      6      4 | <b>8</b>        |
| <b>Part (c)</b>   |   |                 |
| <b>Two advantages of improving the insulation properties of the external wall</b>                               |   |                 |
| Advantage one   |   | <b>5</b>        |
| Advantage two   |   | <b>5</b>        |
| <b>Total</b>  |   | <b>50 marks</b> |

| <b>Question 3 – Supply of hot water to sink</b>                                       |   |                 |
|---|---|-----------------|
| <b>Details - typical dimensions</b>   |   | <b>Marks</b>    |
| <b>Part (a)</b>   |   |                 |
| <b>Secondary circulation</b>  |   |                 |
| Rising main   |   | <b>4</b>        |
| Cold water storage tank and ball valve  |   | <b>4</b>        |
| Overflow  |   | <b>4</b>        |
| Cold feed from storage to indirect hot water cylinder                                 |   | <b>4</b>        |
| Indirect hot water cylinder   |   | <b>4</b>        |
| Expansion pipe from cylinder  |   | <b>4</b>        |
| Supply to sink  |   | <b>4</b>        |
| <b>Primary circulation</b>  |   |                 |
| Supply to expansion tank  |   | <b>4</b>        |
| Expansion tank and ball valve   |   | <b>4</b>        |
| Overflow  |   | <b>4</b>        |
| Cold water feed and primary return  |   | <b>4</b>        |
| Wood burning stove / back boiler  |   | <b>4</b>        |
| Expansion pipe and primary flow   |   | <b>4</b>        |
| Valves  |   | <b>4</b>        |
| Insulation to water storage tank and pipework   |   | <b>4</b>        |
| Labelling   |   | <b>4</b>        |
| <i>Any 9 of the above details (4 marks each)</i>                                      | <b>Sub-total</b>                                  | <b>36</b>       |
| <b>Quality of sketch</b>  | <i>(excellent, good, fair)</i><br>8      6      4 | <b>8</b>        |
| <b>Part (b)</b>   |   |                 |
| <b>Two advantages of adding a solar panel to supply hot water to a dwelling house</b> |   |                 |
| Advantage one   |   | <b>3</b>        |
| Advantage two   |   | <b>3</b>        |
|   | <b>Total</b>                                      | <b>50 marks</b> |

| <b>Question 4 – Non load-bearing timber stud partition</b>         |   |                 |
|--|---|-----------------|
| <b>Details – typical dimensions</b>                                |   | <b>Marks</b>    |
| <b>Part (a)</b>  |   |                 |
| <b>Timber stud partition construction - Notes</b>                  |   |                 |
| Valid construction detail one                                      |   | <b>4</b>        |
| Valid construction detail two                                      |   | <b>4</b>        |
| Valid construction detail three                                    |   | <b>4</b>        |
| Typical dimensions   |   | <b>4</b>        |
| <b>Timber stud partition construction – Sketch</b>                 |   |                 |
| <b>Quality of sketch</b>   | <i>(excellent, good, fair)</i><br>8      6      4 | <b>8</b>        |
| <b>Part (b)</b>  |   |                 |
| <b>One method of fixing a double socket to the stud partition</b>  |   |                 |
| Valid detail   |   | <b>6</b>        |
| <b>Part (c)</b>  |   |                 |
| <b>Steps involved in applying a plaster skim finish – Notes</b>    |   |                 |
| Valid detail one   |   | <b>4</b>        |
| Valid detail two   |   | <b>4</b>        |
| Valid detail three   |   | <b>4</b>        |
| <b>Steps involved in applying a plaster skim finish – Sketches</b> |   |                 |
| <b>Quality of sketches</b>   | <i>(excellent good fair)</i><br>8      6      4   | <b>8</b>        |
|  | <b>Total</b>                                      | <b>50 marks</b> |

| <b>Question 5 – Roof at the ridge</b>            |                    |              |                  |                 |
|--|--------------------|--------------|------------------|-----------------|
| <b>Details - typical dimensions</b>              |                    |              |                  | <b>Marks</b>    |
| <b>Part (a)</b>                                  |                    |              |                  |                 |
| Ridge tile                                       |                    |              |                  | <b>6</b>        |
| Ridge vent                                       |                    |              |                  | <b>6</b>        |
| Ridge board – 300 mm × 32 mm                     |                    |              |                  | <b>6</b>        |
| Tiles  |                    |              |                  | <b>6</b>        |
| Battens – 50 mm × 30 mm                          |                    |              |                  | <b>6</b>        |
| Vapour barrier/vapour diffusion membrane         |                    |              |                  | <b>6</b>        |
| Rafters – 200 mm × 50 mm                         |                    |              |                  | <b>6</b>        |
| Collar tie – 150 - 200 mm × 50 mm                |                    |              |                  | <b>6</b>        |
| Insulation                                       |                    |              |                  | <b>6</b>        |
| Plasterboard                                     |                    |              |                  | <b>6</b>        |
| Labelling  |                    |              |                  | <b>6</b>        |
| <i>Any 6 of the above details (6 marks each)</i> |                    |              | <b>Sub-total</b> | <b>36</b>       |
| Three typical dimensions                         |                    |              |                  | <b>3</b>        |
| <b>Part (b)</b>                                  |                    |              |                  |                 |
| <b>Method of ventilating the roof structure</b>  |                    |              |                  |                 |
| Valid design detail                              |                    |              |                  | <b>3</b>        |
| <b>Draughting, accuracy and scale</b>            | <i>(excellent,</i> | <i>good,</i> | <i>fair)</i>     | <b>8</b>        |
|  | 8                  | 6            | 4                |                 |
|  |                    |              | <b>Total</b>     | <b>50 marks</b> |

| <b>Question 6 - Safety</b>   |                                       |                 |
|--|---------------------------------------|-----------------|
| <b>Details</b>   |                                       | <b>Marks</b>    |
| <b>Part (a)</b>  |                                       |                 |
| <b>Safety signs - Sketches</b>   |                                       |                 |
| Safety helmet  |                                       |                 |
| <b>Quality of sketch</b>   | <i>(excellent good fair)</i><br>8 6 4 | <b>8</b>        |
| High visibility vest   |                                       |                 |
| <b>Quality of sketch</b>   | <i>(excellent good fair)</i><br>8 6 4 | <b>8</b>        |
| Safety boots   |                                       |                 |
| <b>Quality of sketch</b>   | <i>(excellent good fair)</i><br>8 6 4 | <b>8</b>        |
| <b>Part (b)</b>  |                                       |                 |
| <b>One reason why each item must be worn on a building site</b>                                |                                       |                 |
| Safety helmet  |                                       | <b>4</b>        |
| High visibility vest   |                                       | <b>4</b>        |
| Safety boots   |                                       | <b>4</b>        |
| <b>Part (c)</b>  |                                       |                 |
| <b>Two reasons why visitors must report to the site office on entering a construction site</b> |                                       |                 |
| Valid reason one   |                                       | <b>7</b>        |
| Valid reason two   |                                       | <b>7</b>        |
|  | <b>Total</b>                          | <b>50 marks</b> |

| <b>Question 7 – Storage and collection of rainwater</b>  |                                    |
|--|------------------------------------|
| <b>Details</b>   | <b>Marks</b>                       |
| <b>Part (a)</b>  |                                    |
| <b>How the rainwater could be collected from the roof and stored for reuse<br/>- Notes</b>       |                                    |
| Valid detail one   | <b>6</b>                           |
| Valid detail two   | <b>6</b>                           |
| Valid detail three   | <b>6</b>                           |
| <b>How the rainwater could be collected from the roof and stored for reuse<br/>- Sketches</b>    |                                    |
| <b>Quality of sketches</b> <span style="float: right;"><i>(excellent    good    fair)</i></span> | <b>8</b>                           |
|  | <i>8            6            4</i> |
| <b>Part (b)</b>  |                                    |
| <b>Two advantages of storing rainwater</b>   |                                    |
| Advantage one  | <b>4</b>                           |
| Advantage two  | <b>4</b>                           |
| <b>Two suitable uses for the stored rainwater</b>  |                                    |
| Suitable use one   | <b>4</b>                           |
| Suitable use two   | <b>4</b>                           |
| <b>Part (c)</b>  |                                    |
| <b>Fitting a water meter to the mains water supply of a dwelling house</b>                       |                                    |
| One advantage  | <b>4</b>                           |
| One disadvantage   | <b>4</b>                           |
| <b>Total</b>   | <b>50 marks</b>                    |



| <b>Question 8 - Terms</b>                     |                 |
|---|-----------------|
| <b>Details</b>                                | <b>Marks</b>    |
| <b>Item one</b>                               |                 |
| Primary communication of relevant information | <b>6</b>        |
| Other communication of relevant information   | <b>4</b>        |
| <b>Item two</b>                               |                 |
| Primary communication of relevant information | <b>6</b>        |
| Other communication of relevant information   | <b>4</b>        |
| <b>Item three</b>                             |                 |
| Primary communication of relevant information | <b>6</b>        |
| Other communication of relevant information   | <b>4</b>        |
| <b>Item four</b>                              |                 |
| Primary communication of relevant information | <b>6</b>        |
| Other communication of relevant information   | <b>4</b>        |
| <b>Item five</b>                              |                 |
| Primary communication of relevant information | <b>6</b>        |
| Other communication of relevant information   | <b>4</b>        |
| <b>Total</b>                                  | <b>50 marks</b> |

| <b>Question 9 – Kitchen layout</b>                             |   |                 |
|--|---|-----------------|
| <b>Details</b>   |   | <b>Marks</b>    |
| <b>Part (a)</b>  |   |                 |
| <b>Location of sink, cooker and fridge - Sketch</b>            |   |                 |
| <b>Quality of sketch</b>                                       | <i>(excellent    good    fair)</i><br>8                  6                  4 | <b>8</b>        |
| <b>Reasons for location of sink, cooker and fridge - Notes</b> |   |                 |
| Sink   |   | <b>4</b>        |
| Cooker   |   | <b>4</b>        |
| Fridge   |   | <b>4</b>        |
| <b>Part (b)</b>  |   |                 |
| <b>Painting cabinet door – Notes</b>                           |   |                 |
| Valid detail one   |   | <b>4</b>        |
| Valid detail two   |   | <b>4</b>        |
| <b>Painting cabinet door – Sketches</b>                        |   |                 |
| <b>Quality of sketches</b>                                     | <i>(excellent    good    fair)</i><br>8                  6                  4 | <b>8</b>        |
| <b>Part (c)</b>  |   |                 |
| <b>Granite worktop</b>   |   |                 |
| Advantage and disadvantage                                     |   | <b>4</b>        |
| <b>Solid worktop</b>   |   |                 |
| Advantage and disadvantage                                     |   | <b>4</b>        |
| <b>Recommend a preferred worktop</b>                           |   |                 |
| Preferred worktop  |   | <b>2</b>        |
| Reason one   |   | <b>2</b>        |
| Reason two   |   | <b>2</b>        |
|  | <b>Total</b>  | <b>50 marks</b> |

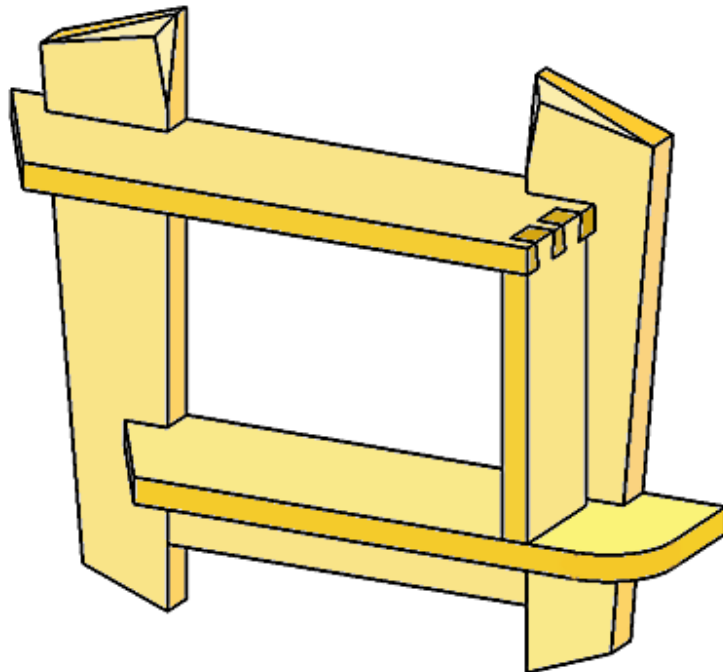


**Coimisiún na Scrúduithe Stáit**  
*State Examinations Commission*

*Scrúdú na hArdteistiméireachta 2014*  
*Leaving Certificate Examination 2014*

***Scéim Mharcála***  
***Marking Scheme***

*(150 marc)*



***Staidéar Foirgníochta***  
***Triail Phraticiúil***

***Construction Studies***  
***Practical Test***

# Construction Studies 2014

## Marking Scheme – Practical Test

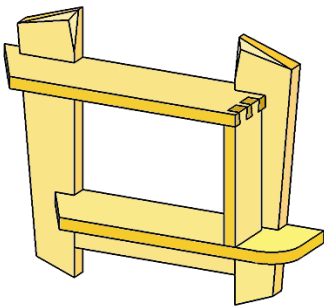
**Note:**

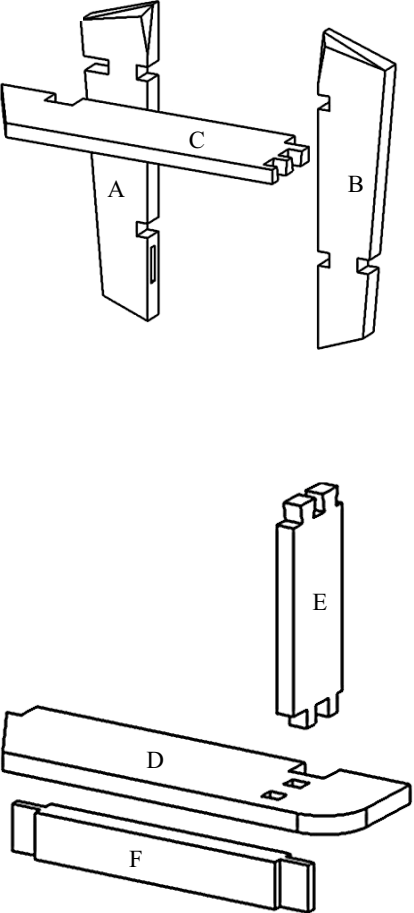
The artefact is to be hand produced by candidates without the assistance of machinery.

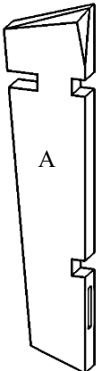
However the use of a battery powered screwdriver is allowed.

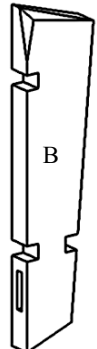
Where there is evidence of the use of machinery for a particular procedure a penalty applies.

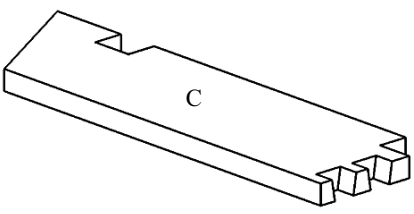
Component is marked out of 50% of the marks available for that procedure.

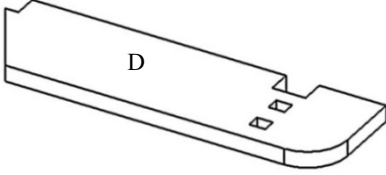
|   |              |   |              |
|---|--------------|---|--------------|
|  | <b>A</b>     | <b>OVERALL ASSEMBLY</b>   | <b>MARKS</b> |
|   | 1            | Overall quality of assembled artefact   | <b>10</b>    |
|   | 2            | Design and applied shaping to edges <ul style="list-style-type: none"> <li>• design <span style="float: right;"><i>(4 marks)</i></span></li> <li>• shaping <span style="float: right;"><i>(4 marks)</i></span></li> </ul> | <b>8</b>     |
|   | <b>Total</b> |   | <b>18</b>    |


|   |          |  |              |
|---|----------|--|--------------|
|  | <b>B</b> | <b>MARKING OUT</b>   | <b>Marks</b> |
|   | 1        | Piece <b>A</b> <ul style="list-style-type: none"> <li>• joints - trenches <span style="float: right;"><i>(3 × 2 marks)</i></span></li> <li style="padding-left: 40px;">- mortice <span style="float: right;"><i>(2 marks)</i></span></li> <li>• slopes and chamfers <span style="float: right;"><i>(5 × 1 mark)</i></span></li> </ul>  | <b>13</b>    |
|   | 2        | Piece <b>B</b> <ul style="list-style-type: none"> <li>• joints - trenches <span style="float: right;"><i>(3 × 2 marks)</i></span></li> <li style="padding-left: 40px;">- mortice <span style="float: right;"><i>(2 marks)</i></span></li> <li>• slopes and chamfers <span style="float: right;"><i>(5 × 1 mark)</i></span></li> </ul>  | <b>13</b>    |
|   | 3        | Piece <b>C</b> <ul style="list-style-type: none"> <li>• joints - dovetail pins <span style="float: right;"><i>(2 × 2 marks)</i></span></li> <li style="padding-left: 40px;">- trench <span style="float: right;"><i>(2 marks)</i></span></li> <li style="padding-left: 40px;">- notch <span style="float: right;"><i>(1 mark)</i></span></li> <li>• slope <span style="float: right;"><i>(1 mark)</i></span></li> </ul>            | <b>8</b>     |
|   | 4        | Piece <b>D</b> <ul style="list-style-type: none"> <li>• joints - trench <span style="float: right;"><i>(2 marks)</i></span></li> <li style="padding-left: 40px;">- notch <span style="float: right;"><i>(1 mark)</i></span></li> <li style="padding-left: 40px;">- mortices <span style="float: right;"><i>(2 × 2 marks)</i></span></li> <li>• slope &amp; curve <span style="float: right;"><i>(2 × 1 mark)</i></span></li> </ul> | <b>9</b>     |
|   | 5        | Piece <b>E</b> <ul style="list-style-type: none"> <li>• joints - dovetails <span style="float: right;"><i>(5 marks)</i></span></li> <li style="padding-left: 40px;">- tenons <span style="float: right;"><i>(2 × 2 marks)</i></span></li> </ul>  | <b>9</b>     |
|   | 6        | Piece <b>F</b> <ul style="list-style-type: none"> <li>• joints - tenons <span style="float: right;"><i>(2 × 2 marks)</i></span></li> </ul>   | <b>4</b>     |
| <b>Total</b>  |          | <b>56</b>  |              |

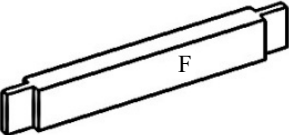
| PIECE A   | C | PROCESSING  | Marks     |
|---|---|---|-----------|
|  | 1 | Trenches <ul style="list-style-type: none"> <li>sawing across the grain (6 × 1 mark)</li> <li>paring trench (3 × 1 mark)</li> </ul> | 9         |
|   | 2 | Mortice (2 marks)   | 2         |
|   | 3 | Shaping <ul style="list-style-type: none"> <li>sloped edges (3 × 1 mark)</li> <li>chamfers (2 × 1 mark)</li> </ul>                  | 5         |
|   |   | <b>Total</b>  | <b>16</b> |

| PIECE B  | D | PROCESSING  | Marks     |
|--|---|---|-----------|
|  | 1 | Trenches <ul style="list-style-type: none"> <li>sawing across the grain (6 × 1 mark)</li> <li>paring trench (3 × 1 mark)</li> </ul> | 9         |
|  | 2 | Mortice (2 marks)   | 2         |
|  | 3 | Shaping <ul style="list-style-type: none"> <li>sloped edges (3 × 1 mark)</li> <li>chamfers (2 × 1 mark)</li> </ul>                  | 5         |
|  |   | <b>Total</b>  | <b>16</b> |

| PIECE C   | E | PROCESSING   | Marks     |
|---|---|--|-----------|
|  | 1 | Dovetail pins <ul style="list-style-type: none"> <li>vertical sawing (4 × 1 mark)</li> <li>cutting across grain (2 × 2 marks)</li> </ul> | 8         |
|   | 2 | Trench (3 marks)   | 3         |
|   | 3 | Notch (2 marks)  | 2         |
|   | 4 | Shaping (1 mark)   | 1         |
|   |   | <b>Total</b>   | <b>14</b> |

| PIECE D   | F | PROCESSING   | Marks        |
|---|---|--|--------------|
|  | 1 | Two mortices <i>(2 × 2 marks)</i>  | 4            |
|   | 2 | Trench <ul style="list-style-type: none"> <li>sawing shoulders <i>(2 × 1 mark)</i></li> <li>paring trench <i>(1 mark)</i></li> </ul> | 3            |
|   | 3 | Shaping <ul style="list-style-type: none"> <li>sloped edges <i>(1 mark)</i></li> <li>forming curve <i>(2 marks)</i></li> </ul>       | 3            |
|   | 4 | Notch <i>(2 marks)</i>   | 2            |
|   |   |  | <b>Total</b> |

| PIECE E   | G | PROCESSING                         | Marks        |
|---|---|------------------------------------|--------------|
|  | 1 | Two dovetails <i>(2 × 4 marks)</i> | 8            |
|   | 2 | Two tenons <i>(2 × 3 marks)</i>    | 6            |
|   |   |                                    | <b>Total</b> |

| PIECE F   | H | PROCESSING                  | Marks        |
|---|---|-----------------------------|--------------|
|  | 1 | Tenons <i>(2 × 2 marks)</i> | 4            |
|   |   |                             | <b>Total</b> |

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