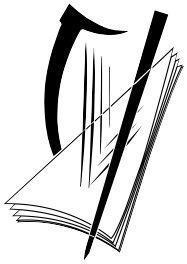


Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2018

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

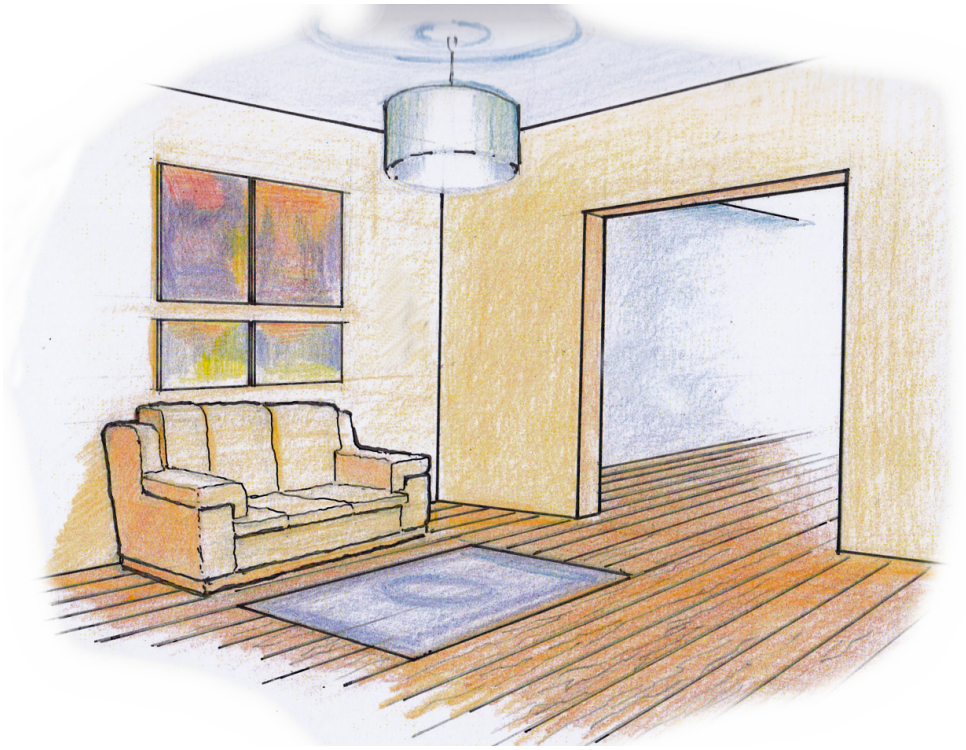
Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in 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 na hArdteistiméireachta

Staidéar Foirgníochta

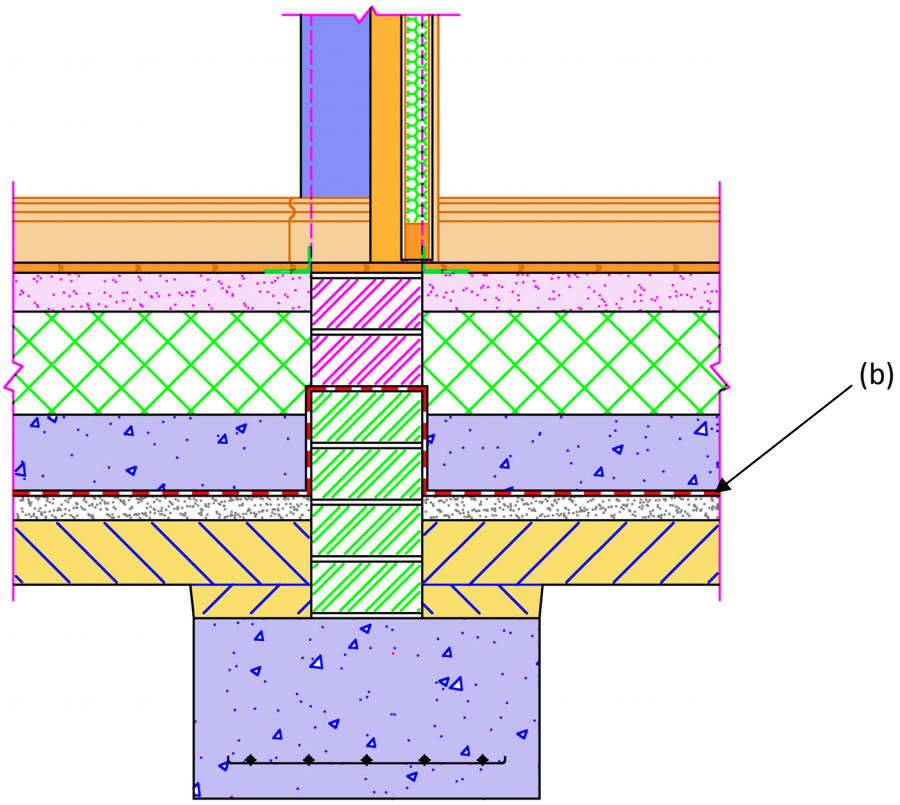
Teoiric – Gnáthleibhéal



Construction Studies

Theory – Ordinary Level

Ceist 1. Part (a)



Specification – typical details

- 15 mm internal plaster with skim coat
- 120 × 50 mm doorframe
- 60 mm flush panel door
- 65 × 15 mm architrave
- 100 × 15 mm skirting board
- 20 mm tongue and groove floating hardwood floor
- Airtightness tape/seal
- 100 mm smooth concrete floor
- 250 mm min insulation with 80 mm perimeter insulation
- 200 mm concrete sub-floor
- Radon barrier
- 30 mm sand blinding
- 200 mm hardcore
- Reinforced concrete foundation
- 215 mm solid concrete block wall
- Any **three** typical dimensions.

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

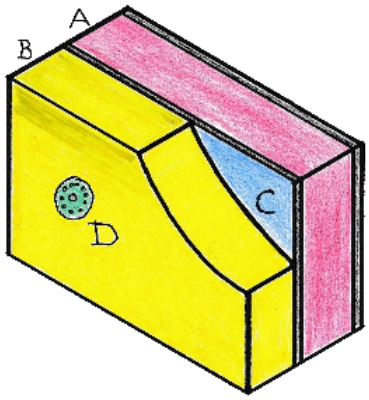
Part (b)

Show clearly on your drawing how to prevent radon gas from entering into the rooms

- Placing a continuous layer of impervious material underneath the floor
- This layer is called a radon barrier
- All joints are overlapped, taped and sealed.

Ceist 2
Part (a)

Show one suitable method of applying expanded polystyrene to external wall – notes and sketch

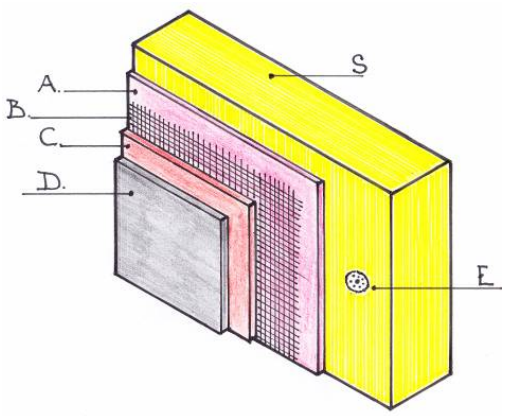


- A stainless-steel track is fitted to the external wall at DPC level
- The first row of insulation boards B is put in place resting on the track
- The boards are fixed in place using a special proprietary adhesive C
- The next rows of insulation are fixed in place in a staggered pattern
- All rows are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

Thickness of insulation

- Minimum thickness of insulation used is 200 mm.

Part (b)
Sketch showing how an external finish is applied to the insulation
The surface finish is applied as follows



- The heads of the fixings are filled with the base coat
- A base coat of acrylic plaster A is applied to the surface of the insulation S
- This coat is applied in the same way as traditional plaster
- A reinforcing mesh B is applied to the wet plaster
- Base coat and mesh is applied around window and door openings
- The next coat C is applied in preparation for the final coat
- The final acrylic coat D is then applied using a steel trowel
- The finish is available in a range of colours
- The new finish is maintenance free for 10-15 years
- Other proprietary finishes are available such as with a brick effect.

Part (c)
Discuss one advantage and one disadvantage of applying an external system of insulation to the wall

Advantage

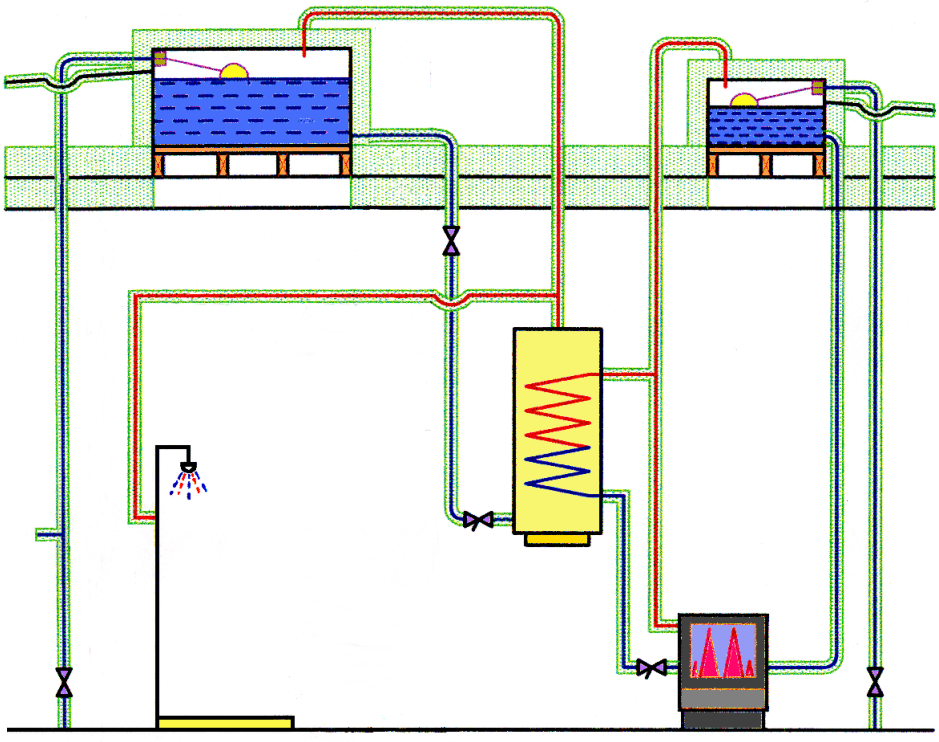
- Energy bills are reduced
- Heat loss through external walls is reduced
- Improves the BER rating
- Improves the U-value
- The house will be warmer
- No loss of internal floor area
- A range of colours available
- Improves the appearance of the house and looks well when complete
- The internal area of the house is not disturbed during the fitting of the insulation
- Less heating thus, lower CO_2 emissions, therefore better for the environment

Disadvantage

- It is an expensive method of adding insulation to a house
- The new finish projects out from existing walls
- Changes are made to window cills to avoid cold bridge effect
- Rainwater downpipes must be refitted
- Difficult to work with existing soffit board
- Fascia an soffit may need to be relocated
- Maintenance is needed.

Ceist 3 Part (a)

Show pipework required to supply hot water to a shower – typical sizes



Secondary circulation - typical

- 15 mm rising main
- Stop valve
- Insulated cold water storage tank and overflow 22 mm minimum
- Ball valve
- 22 mm cold feed from water storage tank to hot water cylinder
- Control stop valve
- Drain off valve
- Insulated hot water cylinder
- 22 mm expansion pipe from hot water cylinder
- 22 mm hot water supply to shower

Primary circulation - typical

- Wood-burning stove
- Drain off valve
- 28 mm primary flow from wood-burning stove to hot water cylinder
- 28 mm primary return from hot water cylinder to wood-burning stove
- 22 mm cold feed from expansion tank to wood-burning stove
- 22 mm expansion pipe
- Insulated expansion tank and overflow 22 mm minimum
- Ball valve.

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

Part (b)

Discuss one advantage of using a wood-burning stove to heat water for the house

- Wood is renewable and less expensive
- Modern wood burning stoves are highly efficient
- Stoves are designed to heat domestic hot water
- Trees will almost re-absorb as much CO_2 released by burning wood
- Wood burning stoves can supplement other forms of central heating
- The world supply of fossil fuels is dwindling making wood burning stoves a viable option
- Wood logs are essentially made from waste wood – inexpensive, recycled, carbon neutral
- Homes with wood burning stoves feel warm and inviting
- Grow your own, fast growing species e.g. willow.

Ceist 4

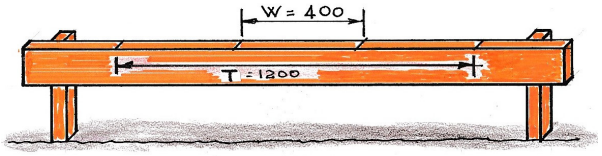
Part (a)

Discuss one environmental reason why a strip foundation is considered the most suitable for this house – Notes

- The foundation uses minimum ground area
- Minimum excavation needed
- Less machinery used. Less fuel used
- Minimum amount of concrete, aggregate and steel used
- The strip foundation is widely used
- Easy to set out
- This form of foundation has proved successful over many years
- Relatively easily constructed
- Easily filled and levelled
- This contributes to making strip foundations easy on the environment.

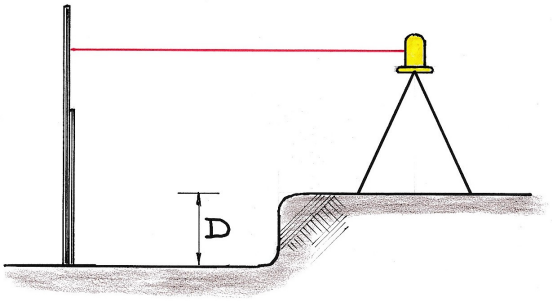
Part (b)
How to set out the foundation trench under the following headings – Notes and Sketches

Profiles – Notes and sketches



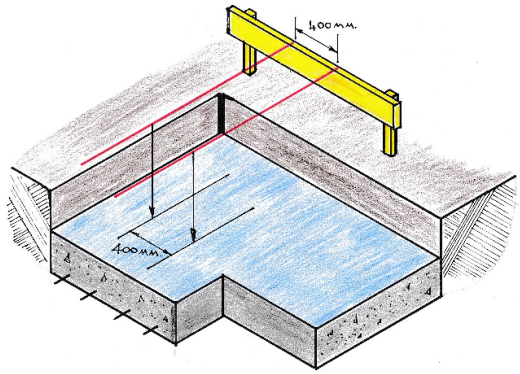
- Profiles consist of two upright members with a horizontal cross rail
- The setting out of the foundation is carried out on the formation level of the site
- The datum point is located and secured
- All levels for the building are then taken from this point
- A laser or optical level is the most accurate way of doing this
- The top of the profile may be the finished floor level
- Other profiles are then levelled from this.

Width and depth of trench – Notes and sketches



- The outline rectangle of the building is located on the profiles
- The width of the trench T = 1200mm is then marked on the profiles
- The width of the wall W = 400mm is then marked on the profile
- The top of the foundation level is usually set out using a laser level and levelling staff
- This will set the minimum depth of trench D
- Depth of foundation is 500mm minimum
- The depth of the foundation depends on the type of soil
- The bottom of the trench must be below the frost line as freezing and thawing causes problems, rusts the steel and eventual cracking of the strip foundations.

Position of wall on strip foundation – Notes and sketches

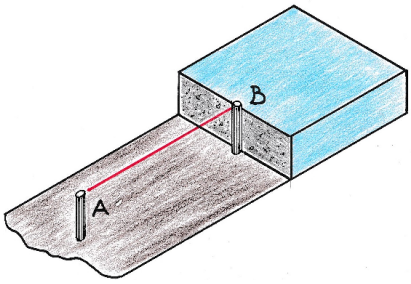


- The width and position of the walls is set on the profiles
- Lines are stretched from the profiles
- Position of wall may then be plumbed on to the level foundation
- The width 400mm is then checked
- The wall must be positioned in the centre of the foundation
- The projections on both sides of the wall must be equal.

Part (c)

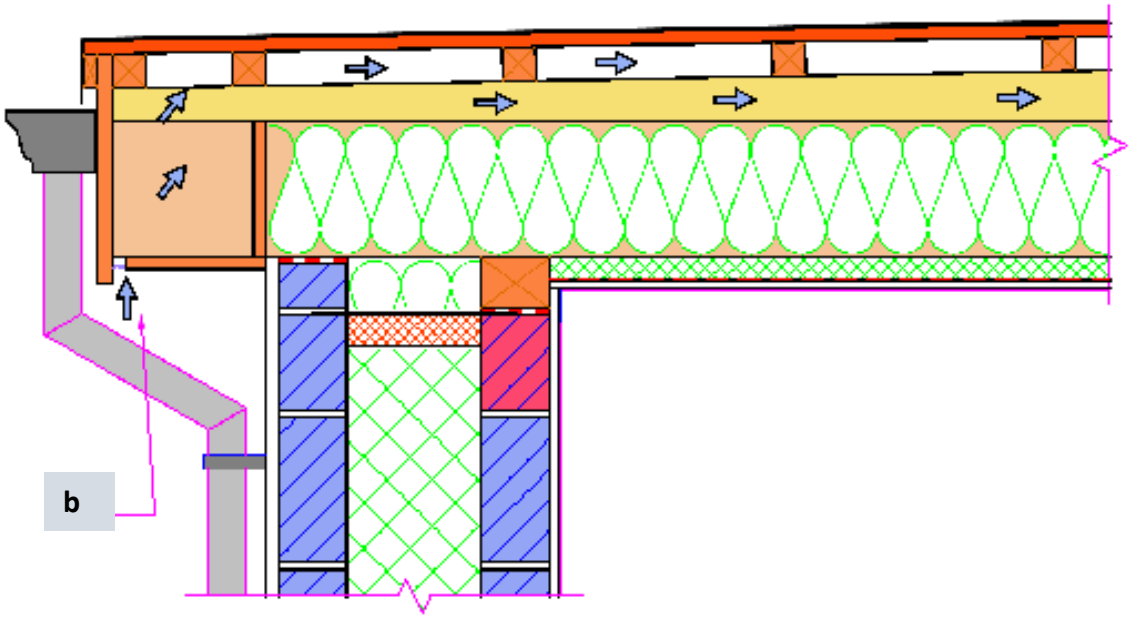
Show how to determine the top surface of the foundation prior to placing the concrete to ensure that the foundation is level throughout – Notes and sketches

- A series of pegs is driven into the base of the excavated trench
- The top of the pegs A and B are set at the required level of the foundation
- Other pegs are used as needed around the location of the foundation
- The top position of the pegs is set using a laser level.

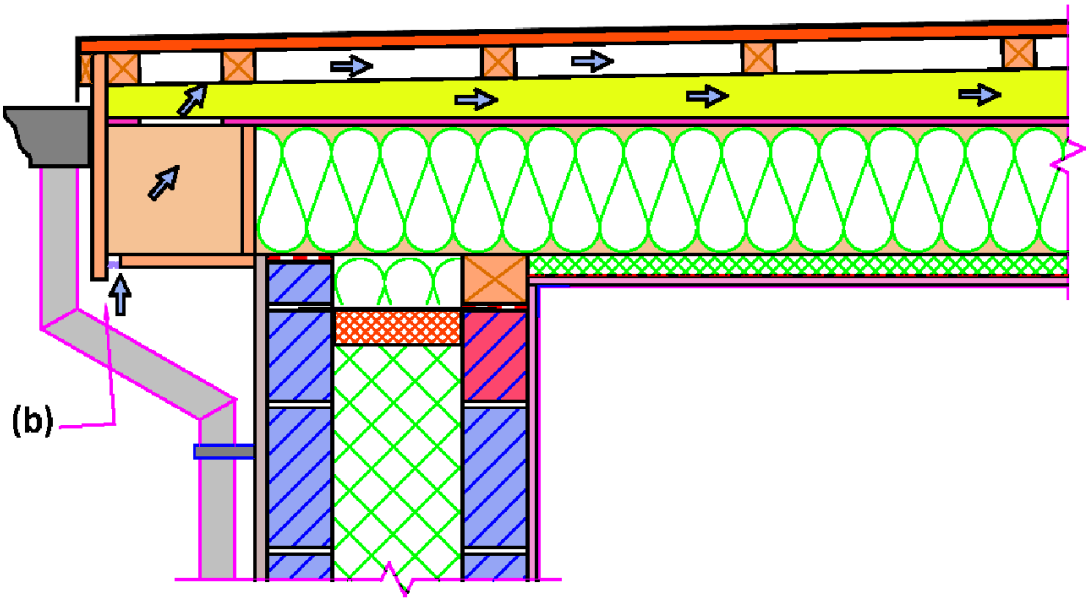


Ceist 5 Part (a)

Draw a vertical section through the eaves of the flat roof and the external wall – typical details



- Weather proofing with 3 layers of bituminous felt
- Marine plywood decking 18 - 25 mm
- Battens 50 × 50 mm on
- Firring piece to 1:40 slope
- Breathable roofing membrane
- Roof / ceiling joists 200 mm × 50 mm
- Roof insulation min 200 mm to comply with current Building Regulations
- 12.5 mm insulated plasterboard with skim coat
- Air tightness barrier taped to plasterboard and masonry
- Wallplate 100 mm × 75 mm tied to blockwork with wallplate straps
- Cavity closed with fire stopping insulation or proprietary cavity barrier or non-combustible tile or slate
- 15 mm internal plaster
- Concrete block inner leaf 100 mm
- Full-fill cavity insulation
- Concrete block outer leaf 100 mm
- 19 mm external render
- Soffit 12 mm
- Fascia 25 mm
- Eaves gutter 100 mm.



Alternative details showing airtightness on the inside and wind tightness on the outside

- Weather proofing 3 layers bituminous felt
- Marine plywood decking 18 - 25 mm
- Battens 50 × 50 mm
- Firring piece to 1:40 slope
- Breathable roofing membrane on
- 10 mm OSB board
- Roof / ceiling joists 200 mm × 50 mm.

Note: Any alternative detailing which complies with current Building Regulations is acceptable

Part (b) – Show on your drawing how the flat roof is ventilated

- Vents are incorporated in the soffit to allow air flow into flat roof space
- Cross battens allow air to circulate freely between joists.

Ceist 6 Part (a)

Draw a large freehand sketch of the safety sign for each of the items of personal protective equipment *(PPE)* listed – Sketches

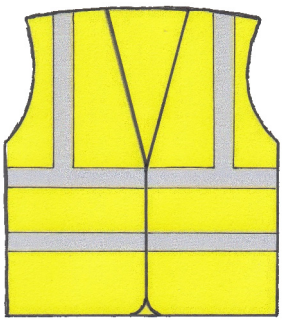
High-visibility vest

Protective footwear

Safety helmet

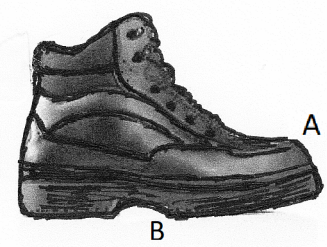
Part (b)
Describe one design feature of each safety items that protects the worker from injury – Notes and Sketches

High-visibility vest



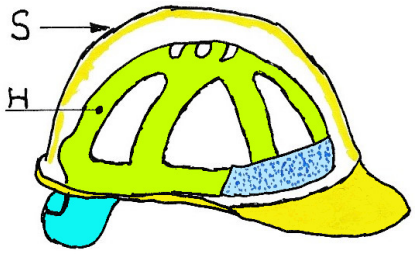
- The high visibility vest is made of a bright colour
- The colour gives easy recognition
- Fluorescent/bright orange and fluorescent/bright yellow are the traditional colours for high-visibility vest
- The fluorescent material achieves visibility during the brighter part of the day
- It has vertical and horizontal reflective strips
- The reflective strips are designed to be seen during the darker hours of the day
- To be effective the strips require some form of artificial light
- This creates a retro-reflection.

Protective footwear



- The safety boots provide extra safety for workers on the site
- They are of sturdy, durable construction
- This helps protect the foot
- The steel toe cap A protects the toes from falling objects
- Steel, aluminium and plastic toe caps are currently used
- A mid sole plate B is used to protect the sole from punctures below
- The material of the sole protects from corrosive substances
- The heel is further strengthened for added protection
- Heel caps are made from card, bonded leather, thermoplastic foil or thermoplastic rubber
- The heel cap offers protection against turning on the ankle
- The inside of the footwear is padded to give comfort to wearer's feet.

Safety helmet



- The helmet is made of sturdy material and protects the head from falling objects
- The helmet also protects the head from protruding objects
- The shell S of the helmet is usually made from high density polyethylene, thermoplastic or fibreglass
- The nylon harness H is the assembly that provides a means of maintaining the helmet in position on the user's head
- The harness absorbs the kinetic energy within the shell during impact
- This spreads the force evenly over the head
- Some helmets have a sweatband.

Part (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.

Eye protection
Reason

- This is to protect the eyes from sharp objects
- To protect the eyes from grit and dust
- To protect the eyes when cutting concrete or steel
- Protects the eyes when using an angle grinder or when welding.

Ear protection
Reason

- To protect the ears from constant loud noise
- Protect the ears when using drilling equipment
- Protect the ears when noise is continuous at level 85-90 decibels.

Safety gloves
Reason

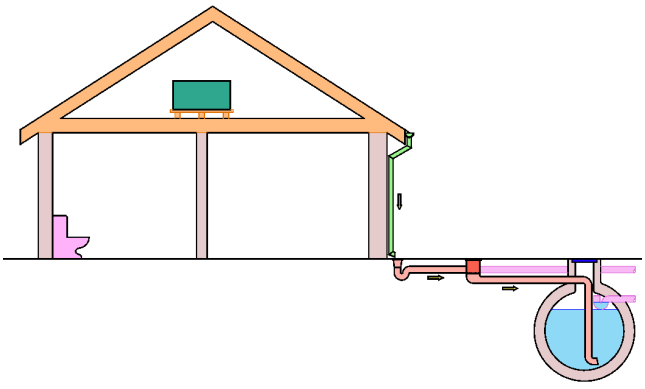
- Working with sharp edges e.g. glass
- Working with hot bitumen on flat roofs
- Working with pneumatic drills or vibrating machinery
- Working with corrosive or toxic equipment.

Any other suitable equipment will be accepted

Ceist 7

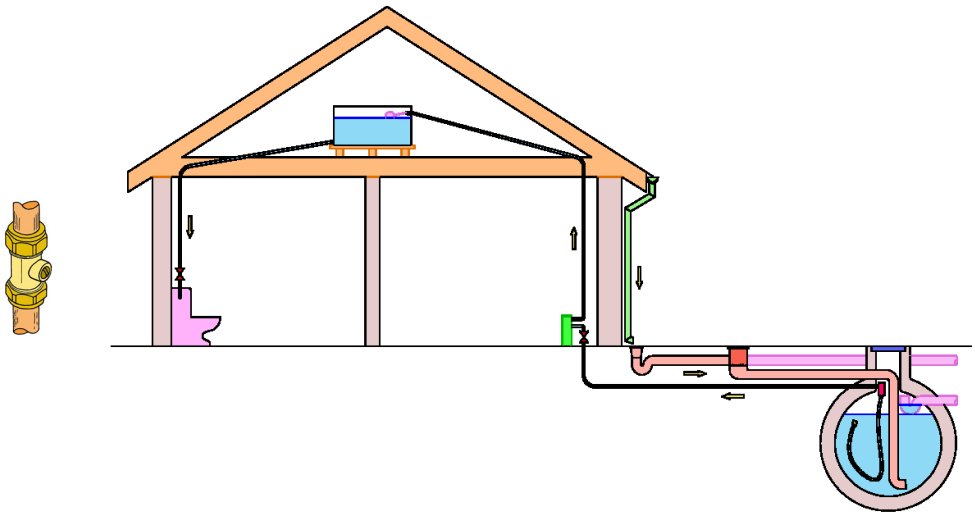
Part (a)
Show pipework necessary to collect the rainwater from the roof and to convey it to the underground tank. Label the main components and give their typical sizes
Typical detailing - notes and sketches - *such as*

- 125 mm eaves gutter
- 65 mm offset bends
- 65 mm downpipe
- Gully trap with filter for leaves
- 100 mm underground pipe to filter
- Filter with overflow pipe
- 100 mm underground pipe from filter to underground tank
- Underground tank
- Overflow pipe.



Part (b)

Pipework and pump necessary to take the rainwater to a storage tank in the attic. Show how to connect the toilet cistern – Typical detailing - notes and sketch - *such as*



- 12 mm suction pipe with floating filter
- Pump, with power supply, to pump rainwater from underground tank to storage tank in the attic
- 12 mm pipe with rainwater to filter
- Stop valve
- Filter
- 12 mm pipe with rainwater from filter to 230 litres minimum tank in the attic
- 12 mm pipe to toilet cistern
- Control valve
- Toilet cistern
- Typical sizes of components.

Part (c)

Discuss one advantage of storing rainwater in an underground tank – Notes - *such as*

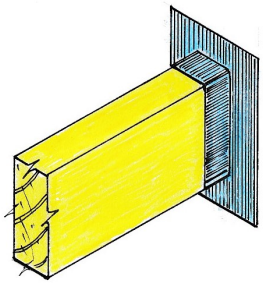
- Underground tanks take up no space in small sites
- They can be placed under lawns or driveways
- These tanks reduce the risk of algae growth caused by daylight and fluctuations in temperature
- Aboveground rainwater tanks can be look unsightly
- Underground water is at a constant temperature and will not freeze in cold weather
- Underground tanks are usually larger and store more water.

Ceist 8

Smart meter

- This meter is used to record the consumption of electricity
- It records the usage of electricity in a domestic property
- Provides greater awareness of energy use
- Promotes better energy management and efficiency in the home
- Smart meters will replace existing meters
- The meter also shows the cost of electricity being used
- Information on usage can be communicated to the supplier via mobile phone
- The smart meter gives the householder control of electricity use
- Smart meters may also be used to record the usage of water or gas.

Airtightness tape

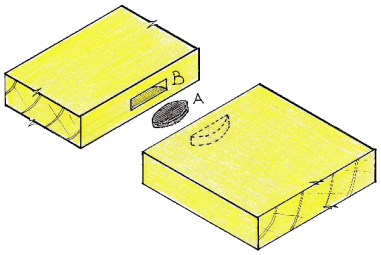


- This tape is used to form an airtight seal at joints in a structure
- The tape prevents draughts and reduces heat loss
- It is used to seal around windows, doors, floors, ceilings
- It is used at all areas where surfaces meet
- The tape is used to form an airtight seal around joists where they adjoin a wall
- Tape is also used around pipes and ducting
- The tape is available in rolls of various lengths and a range of widths.

Roof light window

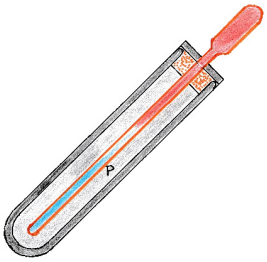
- This is a special form of opening window
- It used on sloping roof surfaces
- Special units may be used on flat and low-pitched roofs
- The units are fitted with double, triple or quadruple glazing
- Roof lights allow light into rooms spaces in attic development
- They form an important part of modern house design.

Biscuit joint



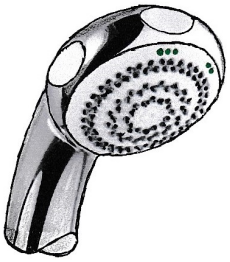
- This joint is widely used in the manufacture of modern furniture
- The joint is used to join boards of various width
- The main parts of the joint are the biscuit A and groove B
- The biscuit is made of pressed beech and available in different sizes
- Using a biscuit joiner, a groove is cut on the opposing edge of each board
- Glue is applied to the edge of the boards and to the groove
- Biscuits are then inserted
- The boards are cramped firmly together.

Evacuated tube



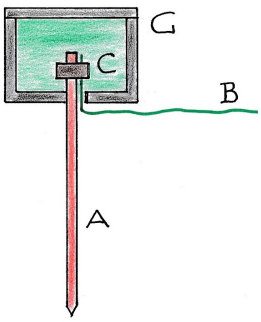
- This tube forms part of a solar panel
- The tube is made of strong heat resistant glass
- The air is removed from the tube giving a vacuum
- A copper heat pipe P runs through the centre of the tube
- The pipe contains an anti-freeze type liquid - glycol
- As the heat rises, hot vapour rises to the top of the heat pipe
- The top of the heat pipe connects with a header section
- The hot fluid flows from the panel to the coil in the hot water cylinder
- This in turn produces domestic hot water
- It is environmentally friendly and helps reduce CO_2 emissions
- The tubes can be mounted to follow the path of the sun.

Aerated shower



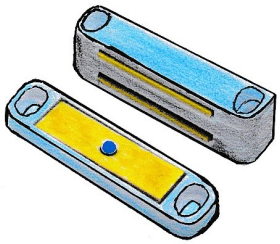
- With this type of shower air is mixed with the flow of water
- This reduces the amount of water used
- Water usage is reduced to about 7 litres per minute
- Traditional shower uses about 12 litres per minute
- Save on energy costs
- The water flow is comfortable in use
- It is environmentally friendly
- Special shower head is usually wider with more flow points.

Earth rod



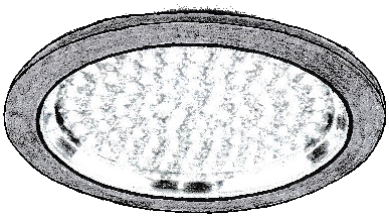
- An earth rod will redirect current from an electrical circuit
- It will take the electrical current into the ground
- This is vital for any home to prevent a short circuit and the possibility of an electrical fire
- If the electrical system malfunctions, the earth rod will dissipate all the released current away from the house and into the ground
- It will also conduct electrical current from a lightning strike
- The earth rod A is a long copper or steel bar and is fitted outside the building
- It is connected to the electrical system of the building through a grounding electrode conductor B
- The conductor is clamped to the rod at C
- The green box G shows the location of the earth rod
- Usual length of the rod is 1200 mm with a thickness of 15mm.

Magnetic catch



- This is a catch used for cabinet doors
- This catch is frequently used in kitchen and wardrobe furniture
- It consists of a base unit fitted to the main frame
- The base unit generally has two magnetised strips
- A striking plate is fitted to the door
- When door is closed the plate makes contact with the magnetic strips
- The base unit and strip need to be carefully aligned for best contact.

LED lighting



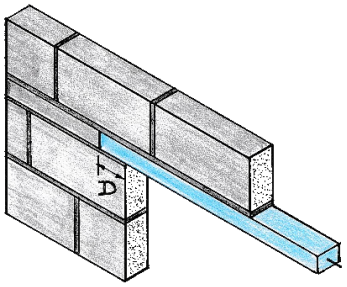
- This is a modern concept in lighting
- The term means Light Emitting Diodes
- Lights of this type are now available for domestic and commercial use
- Different fitting types are available for all situations
- They are used to replace all traditional bulbs
- LED lighting lasts longer
- LED lighting uses 90% less energy than halogen bulbs
- A 60watt standard bulb may be replaced by an 8watt LED bulb
- Initial cost is higher than that of traditional bulbs, but last far longer.

Ceist 9

Part (a)

Show how the blockwork over the opening is typically supported – Notes and sketch - *such as*

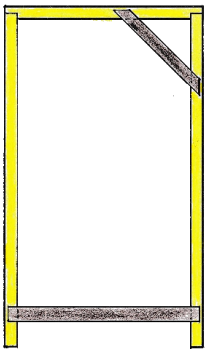
- The pre-stressed concrete lintel is a method used to support the blockwork
- The concrete lintel rests on opposite sides of the opening
- The concrete lintel projects inwards over the supporting walls for a distance D of 100mm
- The width of the lintel is 100mm with a thickness of 65mm
- The lintel is set on mortar at both ends
- Blockwork is built in at either end and then on top of the lintel
- Smaller blocks are used to bring the levels in line
- A reinforced concrete lintel may be used
- Steel lintel may be used to support the blockwork.



Part (b)

Show how the doorframe is held square while it is being fitted – Notes and sketches - *such as*

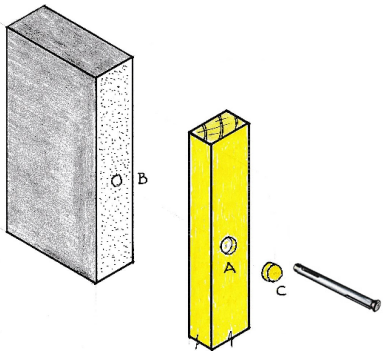
- Temporary wooden strip is fixed diagonally at one or both corners
- The corners are checked for square
- A strip is fixed at the bottom of the frame to keep the uprights parallel and the correct distance apart
- The frame is now ready for fitting
- These temporary fixtures can be removed when the frame is fixed in place.



Show one method of fixing the doorframe to the wall – Notes and sketches - *such as*

- Suitable screws are used to fix the doorframe to the wall
- The position for the screws is marked on the frame
- A larger hole is drilled
- The hole for the screws is then drilled through the centre
- The exact position for the screws is then marked on the wall
- Holes are drilled in concrete for the plastic plugs B
- Frame is put back in position
- Screws are then inserted
- Metal frame fixings are also used
- Wooden covers are inserted over the screw heads
- Special steel fixing plates may be used instead.

Any other suitable method will be accepted



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

Advantage

- The double doors open up the area
- More space available
- Make the rooms feel bigger
- They create a private area when needed
- They create a quiet area as required
- People arriving into one section will be visible
- Allows sunlight / daylight into the both rooms
- Allows wheelchair accessibility between both rooms.

Disadvantage

- Glazed areas can be dangerous
- It creates a huge area
- Difficult to heat
- Not private
- Reduces space for wall fittings
- Reduces floor space for furniture.

Question 1 – Section through concrete block wall, strip foundation, ground floor and door	
Details - typical sizes	**Marks**
Part (a)	
15 mm internal plaster with skim coat	**5**
120 × 50 mm doorframe	**5**
60 mm flush panel door	**5**
65 × 15 mm architrave and 100 × 15 mm skirting board	**5**
20 mm tongue and groove floating hardwood floor	**5**
100 mm smooth concrete floor	**5**
250 mm floor insulation with thermal blocks	**5**
200 mm concrete sub-floor	**5**
Radon barrier	**5**
30 mm sand blinding	**5**
200 mm hardcore	**5**
Reinforced concrete foundation	**5**
215 mm concrete block wall	**5**
Any 7 of the above details (5 marks each) **Sub-total**	**35**
Any three typical dimensions	**3**
Part (b)	
Show clearly on your drawing how to prevent radon gas from entering into the rooms	
Radon barrier overlapped, taped and sealed	**4**
Draughting, accuracy and scale ***(excellent, good, fair)*** ***8 6 4***	**8**
Total	**50 marks**

Question 2 – Applying expanded polystyrene to the external wall	
Details	**Marks**
Part (a)	
Suitable method of applying insulation to the wall - Notes	
Valid description one	**4**
Valid description two	**4**
Thickness of insulation	**4**
One suitable method of applying insulation to the wall - Sketches	
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (b)	
Steps involved in applying external surface finish to the insulation - Notes	
Valid step one	**4**
Valid step two	**4**
Surface finish	**4**
Steps involved in applying external surface finish to the insulation - Sketches	
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (c)	
Advantage and Disadvantage of applying an external insulation	
Advantage	**5**
Disadvantage	**5**
Total	**50 marks**

Question 3 –Pipework necessary to supply hot water to a shower	
Details – typical sizes	**Marks**
Part (a)	
Secondary circulation	
15 mm rising main	**5**
Water storage tank and overflow 22 mm min	**5**
22 mm cold feed from water storage tank to hot water cylinder	**5**
Hot water cylinder	**5**
22 mm expansion pipe from hot water cylinder	**5**
22 mm hot water supply to shower	**5**
Primary circulation	
Wood-burning stove	**5**
28 mm primary flow and return to and from wood-burning stove and hot water cylinder	**5**
22 mm cold feed from expansion tank and 22 mm expansion pipe	**5**
Expansion tank and overflow 22 mm min	**5**
Valves	**5**
Any 7 of the above details (5 marks each) **Sub-total**	**35**
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (b)	
Discuss one advantage of using a wood-burning stove to heat water for the house	
Advantage	**7**
Total	**50 marks**

Question 4 – Strip foundation	
Details	**Marks**
Part (a)	
Discuss one environmental reason why a strip foundation is considered the most suitable for this house - Notes	
Valid detail one	**5**
Valid detail two	**5**
Part (b)	
Describe how to set out the foundation trench under the followings – Notes and sketches	
Profiles	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Width and depth of trench	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Position of wall on strip foundation	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Part (c)	
Show how to determine the top surface of the foundation prior to placing the concrete – Notes and sketches	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Total	**50 marks**

Question 5 – Vertical section through eaves of flat roof	
Details - typical sizes	**Marks**
Part (a)	
Weather proofing three layers of bituminous felt	**5**
Marine plywood decking 18 to 25 mm	**5**
Battens/counter battens 50 mm × 50 mm and firring piece	**5**
Roof/ceiling joists 200 mm × 50 mm	**5**
Roof insulation min 200 mm	**5**
12.5 mm insulated plasterboard with skim coat	**5**
100 × 75 mm wallplate and wallplate straps	**5**
Concrete block inner leaf 100 mm	**5**
Full-fill cavity insulation and cavity closer with fire stopping insulation	**5**
Concrete block outer leaf 100 mm	**5**
15 mm internal plaster and 19 mm external render	**5**
Fascia 25 mm, soffit 12 mm and eaves gutter 100 mm	**5**
Any 7 of the above details (5 marks each) **Sub-total**	**35**
Any **three** typical dimensions	**3**
Part (b)	
Show on drawing how the roof is ventilated	
Vents in soffit and air circulates through battens and counter battens	**4**
Draughting, accuracy and scale ***(excellent, good, fair)*** ***8 6 4***	**8**
Total	**50 marks**

Question 6 - Safety	
Details	**Marks**
Part (a)	
Draw a large freehand sketch of the safety sign for each of the items of personal protective equipment	
High-visibility vest	
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Protective footwear	
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Safety helmet	
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (b)	
Describe one design feature for each – Notes and sketches	
High-visibility vest	
Design feature	**3**
Protective footwear	
Design feature	**3**
Safety helmet	
Design feature	**3**
Quality of sketches ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (c)	
Recommend one other item of PPE and give reason	
Other item of personal protection equipment *(PPE)*	**4**
Reason	**5**
Total	**50 marks**

Question 7 – Rainwater Harvesting	
Details	**Marks**
Part (a)	
Show the pipework from the roof to the underground tank - Sketch	
Draw given sketch	**4**
Necessary pipework on sketch	**4**
Labels and typical sizes	**4**
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (b)	
Pipework from underground tank to storage in the attic **Also connect to the toilet cistern - Notes**	
Valid detail one	**4**
Valid detail two	**4**
Pipework from underground tank to storage in the attic **Also connect to the toilet cistern - Sketch**	
Pipework and pump on sketch	**4**
Valves shown on sketch	**4**
Quality of sketch ***(excellent, good, fair)*** ***8 6 4***	**8**
Part (c)	
One advantage of storing rainwater in an underground tank	
Advantage	**6**
Total	**50 marks**

Question 8 - Terms	
Details	**Marks**
Item one	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Item two	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Item three	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Item four	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Item five	
Primary communication of relevant information	**6**
Other communication of relevant information	**4**
Total	**50 marks**

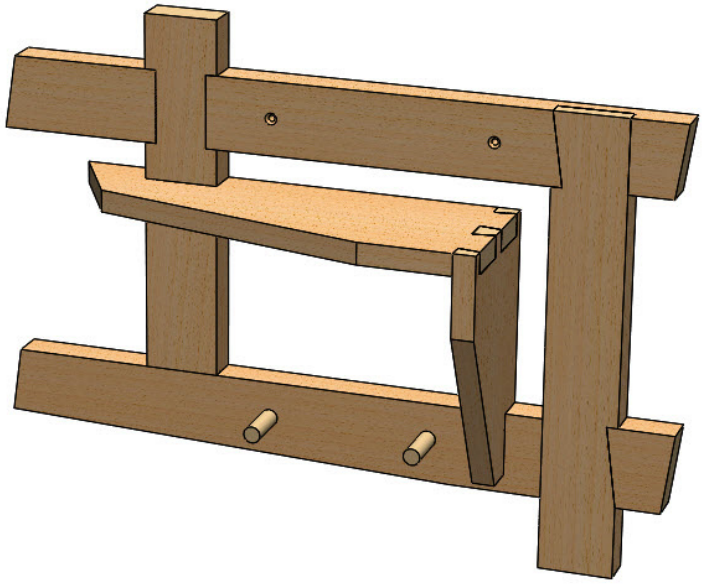
Question 9 – To fit a doorframe and glazed wooden doors in an opening	
Details	**Marks**
Part (a)	
Show how the blockwork over the opening is typically supported - Notes and sketches	
Valid detail one	**4**
Valid detail two	**4**
Quality of sketches ***(excellent, good, fair)*** ***6 4 2***	**6**
Part (b)	
How the doorframe is held square while it is being fitted – Notes and sketches	
Valid detail one	**4**
Valid detail two	**4**
Quality of sketches ***(excellent, good, fair)*** ***6 4 2***	**6**
One method of fixing the doorframe to the wall - Notes and sketches	
Valid detail one	**4**
Valid detail two	**4**
Quality of sketches ***(excellent, good, fair)*** ***6 4 2***	**6**
Part (c)	
Discuss one advantage and one disadvantage of fitting glazed double doors	
Advantage	**4**
Disadvantage	**4**
Total	**50 marks**

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scrúdú na hArdteistiméireachta 2018
Leaving Certificate Examination 2018

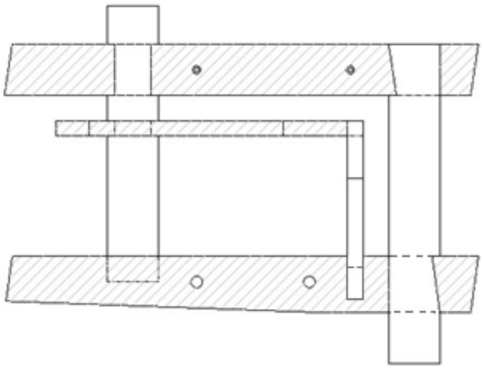
Scéim Mharcála – Lá 1
Marking Scheme – Day 1

(150 marks)



Staidéar Foirgníochta
Triail Phraticiúil

Construction Studies
Practical Test



Construction Studies 2018
Marking Scheme – Practical Test

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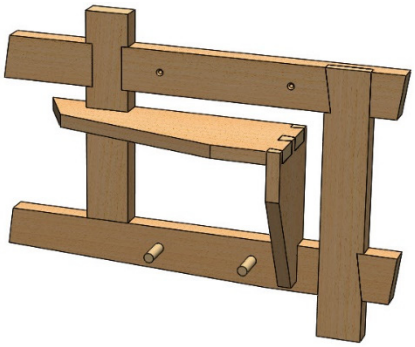
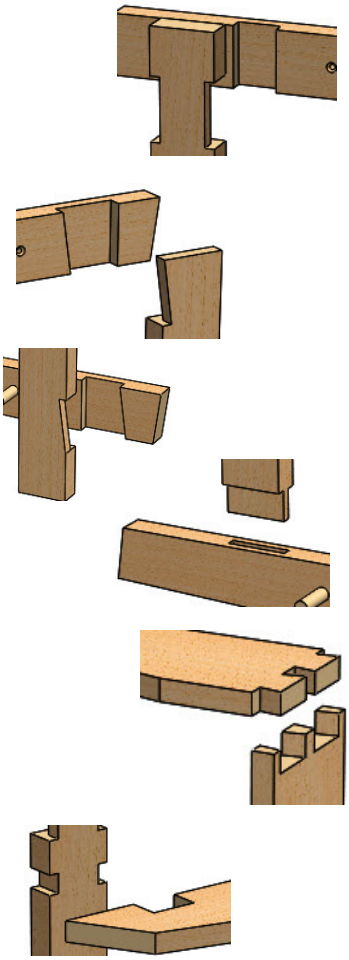
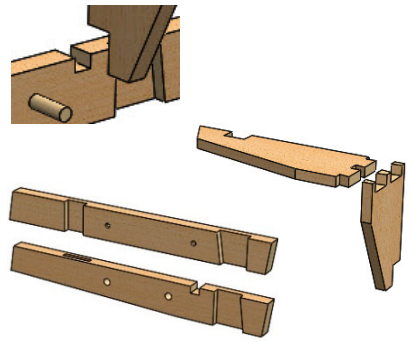
Component is marked out of 50% of the marks available for that procedure.

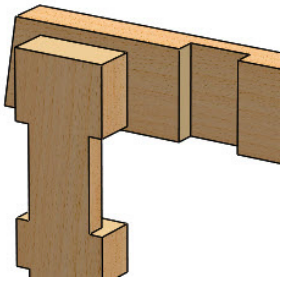


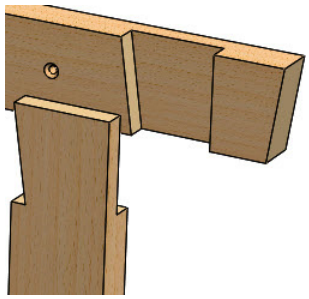
(i)	OVERALL ASSEMBLY	MARKS
1	Overall quality of assembled artefact	**10**
2	Design and applied shaping to edges • design ***(3 marks)*** • shaping ***(3 marks)***	**6**
	Total	**16**

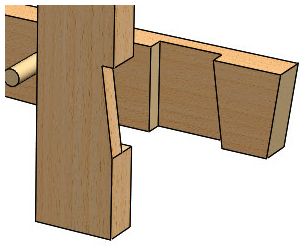


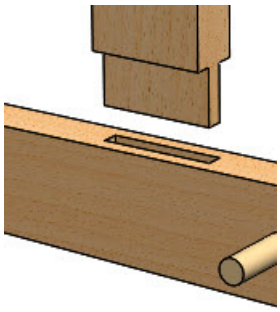
(ii)	MARKING OUT	Marks
1	Notched Cross Halving • Trench - horizontal piece ***(2 marks)*** • Trenches - vertical piece ***(4 marks)***	**6**
2	Dovetailed Tee Halving • Trench - horizontal piece ***(2 marks)*** • Dovetail ***(4 marks)***	**6**
3	Dovetailed Cross Halving • Trench - horizontal piece ***(2 marks)*** • Trenches - vertical piece ***(4 marks)***	**6**
4	Stopped Mortice • Mortice ***(2 marks)*** • Stub Tenon ***(2 marks)***	**4**
5	Box Dovetail • Tails ***(2 × 2 marks)*** • Pins ***(2 × 2 marks)***	**8**
6	Notched housing - double Notch – horizontal piece ***(2 marks)*** Trenches – vertical piece ***(2 × 2 marks)***	**6**

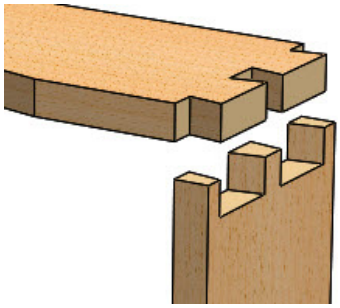
	7	Notched housing- single • Trench – horizontal piece ***(2 marks)*** • Notch – vertical piece ***(2 marks)***	**4**
	8	Slopes ***(8 × 1 mark)***	**8**
		Total	**48**

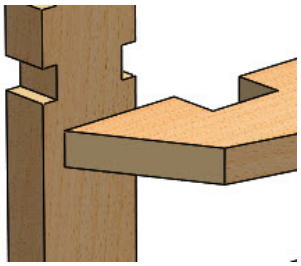
Notched Cross Halving	**(iii)**	**PROCESSING**	**Marks**
	1	Trench - horizontal piece • Sawing across the grain ***(2 × 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Trenches – vertical piece • Trenches back ***(4 marks)*** • Front trenches ***(2 × 3 marks)***	**10**
		Total	**14**

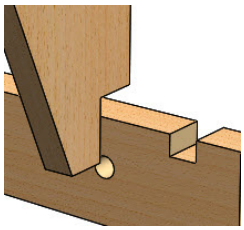
Dovetail Tee Halving	**(iv)**	**PROCESSING**	**Marks**
	1	Trench – horizontal piece • Sawing across the grain ***(2 × 1 mark)*** • Paring Trench ***(2 marks)*** •	**4**
	2	Dovetail • Sawing across the grain ***(2 × 1 mark)*** • Sawing with the grain ***(2 marks)*** • Paring Dovetail ***(2 marks)***	**6**
		Total	**10**

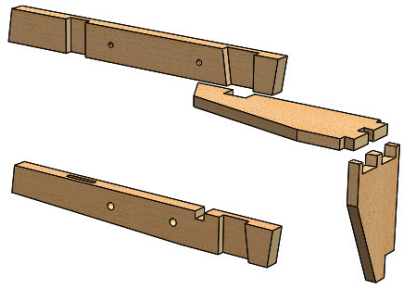
Dovetail Cross Halving	**(v)**	**PROCESSING**	**Marks**
	1	Trench – horizontal piece • Sawing across the grain ***(2 × 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Trench – vertical piece • Sawing across the grain ***(3 × 1 mark)*** • Paring Trench ***(2 marks)*** • Paring dovetail ***(2 marks)***	**7**
		Total	**11**

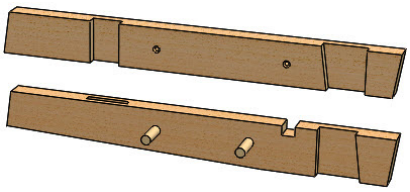
Stopped Mortice	(vi)	PROCESSING	Marks
	1	Stopped Mortice • mortice *(2 marks)*	**2**
	2	Tenon • sawing with the grain *(2 × 1 mark)* • sawing across the grain *(2 × 1 mark)*	**4**
		Total	**6**

Box Dovetail	(vii)	PROCESSING	Marks
	1	Tails *(2 × 4 marks)*	**8**
	2	Pins • sawing with the grain *(4 × 1 mark)* • sawing across the grain *(2 × 2 marks)*	**8**
		Total	**16**

Notched Housing - Double	(viii)	PROCESSING	Marks
	1	Notch - horizontal piece • sawing across the grain *(2 × 1 mark)* • paring trench *(2 marks)*	**4**
	2	Trenches - vertical piece - • trenches *(2 × 2 marks)*	**4**
		Total	**8**

Notched Housing - Single	(ix)	PROCESSING	Marks
	1	Trench • trench *(2 marks)*	**2**
	2	Notch • Sawing *(2 × 1 mark)*	**2**
		Total	**4**

Shaping	(x)	PROCESSING	Marks
	1	Short slopes *(5 × 1 mark)*	**5**
	2	Long slopes *(3 × 2 marks)*	**6**
		Total	**11**

Drilling	(xi)	PROCESSING	Marks
	1	Dowels located and fitted correctly *(2 × 2 marks)*	**4**
	2	Drilling and countersinking holes accurately *(2 × 1 mark)*	**2**
		Total	**6**

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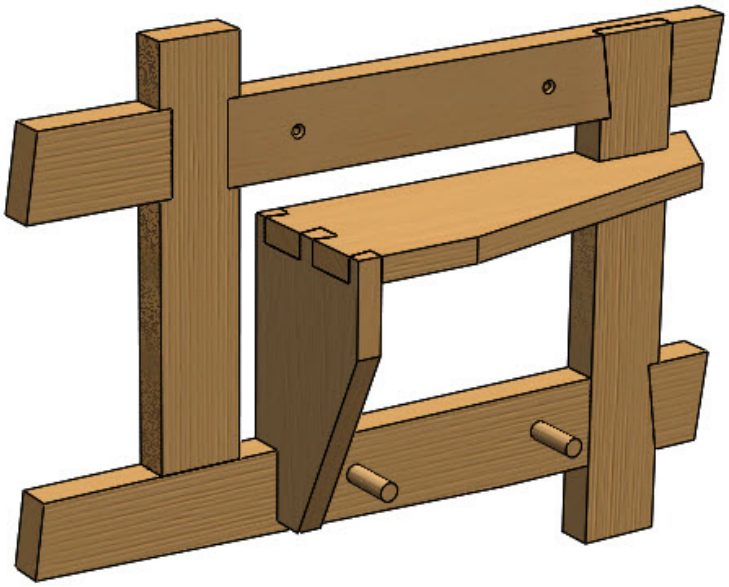
Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scrúdú na hArdteistiméireachta 2018
Leaving Certificate Examination 2018

Scéim Mharcála - Lá 2
Marking Scheme - Day 2

(150 marks)



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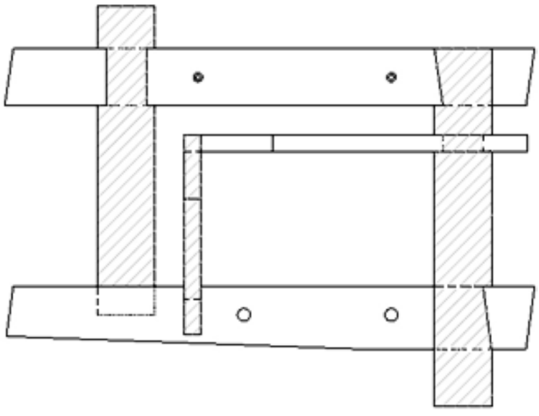
Triail Phraticiúil

Construction Studies
Practical Test



Construction Studies 2018
Marking Scheme – Practical Test

Note:

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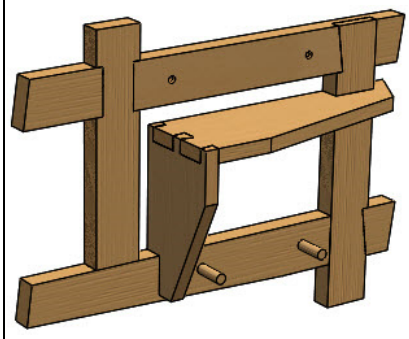
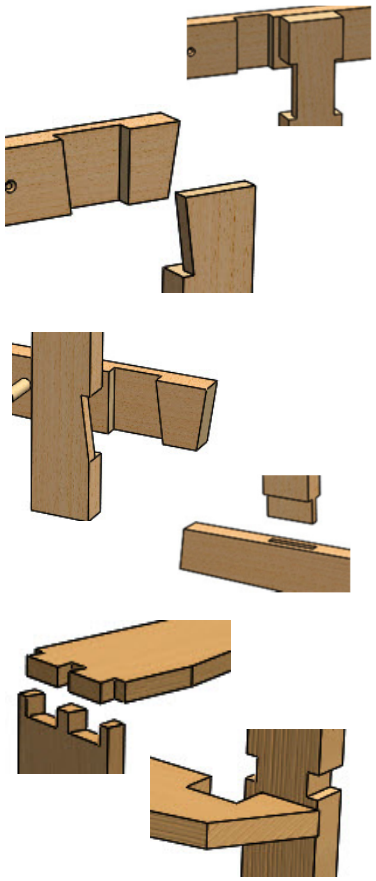
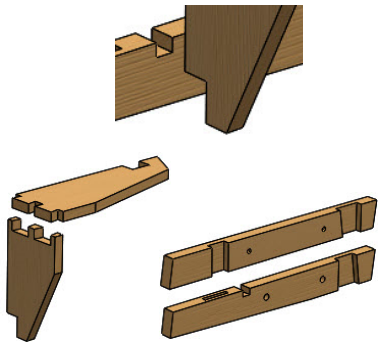
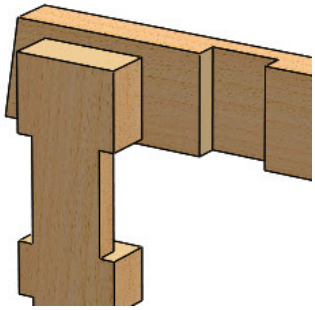
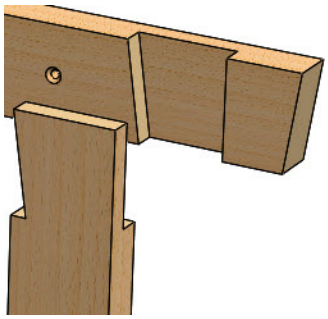
Component is marked out of 50% of the marks available for that procedure.

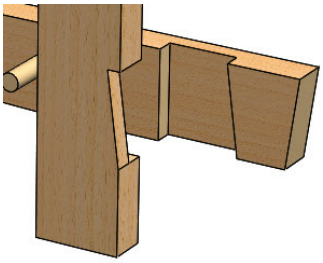
	(i)	OVERALL ASSEMBLY	MARKS
	1	Overall quality of assembled artefact	**10**
	2	Design and applied shaping to edges • design ***(3 marks)*** • shaping ***(3 marks)***	**6**
		Total	**16**

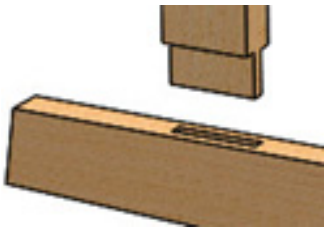
	(ii)	MARKING OUT	Marks
	1	Notched Cross Halving • Trench - horizontal piece ***(2 marks)*** • Trenches - vertical piece ***(4 marks)***	**6**
	2	Dovetailed Tee Halving • Trench - horizontal piece ***(2 marks)*** • Dovetail ***(4 marks)***	**6**
	3	Dovetailed Cross Halving • Trench - horizontal piece ***(2 marks)*** • Trenches - vertical piece ***(4 marks)***	**6**
	4	Stopped Mortice • Mortice ***(2 marks)*** • Stub Tenon ***(2 marks)***	**4**
	5	Box Dovetail • Tails ***(2 × 2 marks)*** • Pins ***(2 × 2 marks)***	**8**
	6	Notched housing - double Notch – horizontal piece ***(2 marks)*** Trenches – vertical piece ***(2 × 2 marks)***	**6**

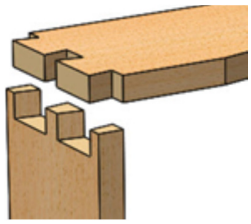
	7	Notched housing- single • Trench – horizontal piece ***(2 marks)*** • Notch – vertical piece ***(2 marks)***	**4**
	8	Slopes ***(8 ×1 mark)***	**8**
		Total	**48**

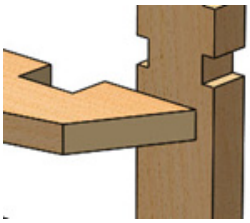
Notched Cross Halving	**(iii)**	**PROCESSING**	**Marks**
	1	Trench - horizontal piece • Sawing across the grain ***(2 x 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Trenches – vertical piece • Trenches back ***(4 marks)*** • Front trenches ***(2 x 3 marks)***	**10**
		Total	**14**

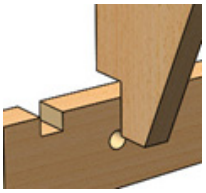
Dovetail Tee Halving	**(iv)**	**PROCESSING**	**Marks**
	1	Trench – horizontal piece • Sawing across the grain ***(2 x 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Dovetail • Sawing across the grain ***(2 x 1 mark)*** • Sawing with the grain ***(2 marks)*** • Paring Dovetail ***(2 marks)***	**6**
		Total	**10**

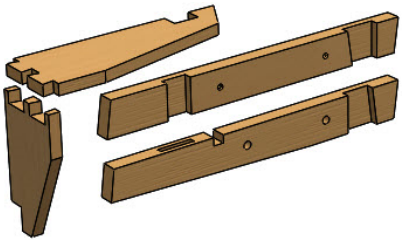
Dovetail Cross Halving	(v)	PROCESSING	Marks
	1	Trench – horizontal piece • Sawing across the grain ***(2 x 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Trench – vertical piece • Sawing across the grain ***(3 x 1 mark)*** • Paring Trench ***(2 marks)*** • Paring dovetail ***(2 marks)***	**7**
		Total	**11**

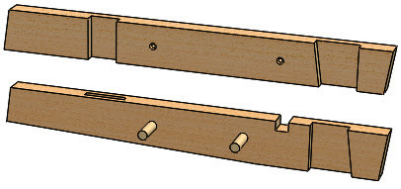
Stopped Mortice	(vi)	PROCESSING	Marks
	1	Stopped Mortice • mortice ***(2 marks)***	**2**
	2	Tenon • sawing with the grain ***(2 × 1 mark)*** • sawing across the grain ***(2 × 1 mark)***	**4**
		Total	**6**

Box Dovetail	(vii)	PROCESSING	Marks
	1	Tails ***(2 × 4 marks)***	**8**
	2	Pins • sawing with the grain ***(4 × 1 mark)*** • sawing across the grain ***(2 × 2 marks)***	**8**
		Total	**16**

Notched Housing - Double	(viii)	PROCESSING	Marks
	1	Notch - horizontal piece • sawing across the grain ***(2 × 1 mark)*** • paring trench ***(2 marks)***	**4**
	2	Trenches - vertical piece - • trenches (***2 × 2 marks)***	**4**
		Total	**8**

Notched Housing - Single	(ix)	PROCESSING	Marks
	1	Trench • trench ***(2 marks)***	**2**
	2	Notch • Sawing ***(2 × 1 mark)***	**2**
		Total	**4**

Shaping	(x)	PROCESSING	Marks
	1	Short slopes ***(5 × 1 mark)***	**5**
	2	Long slopes ***(3 × 2 marks)***	**6**
		Total	**11**

Drilling	(xi)	PROCESSING	Marks
	1	Dowels located and fitted correctly ***(2 × 2 marks)***	**4**
	2	Drilling and countersinking holes accurately ***(2 × 1 mark)***	**2**
		Total	**6**

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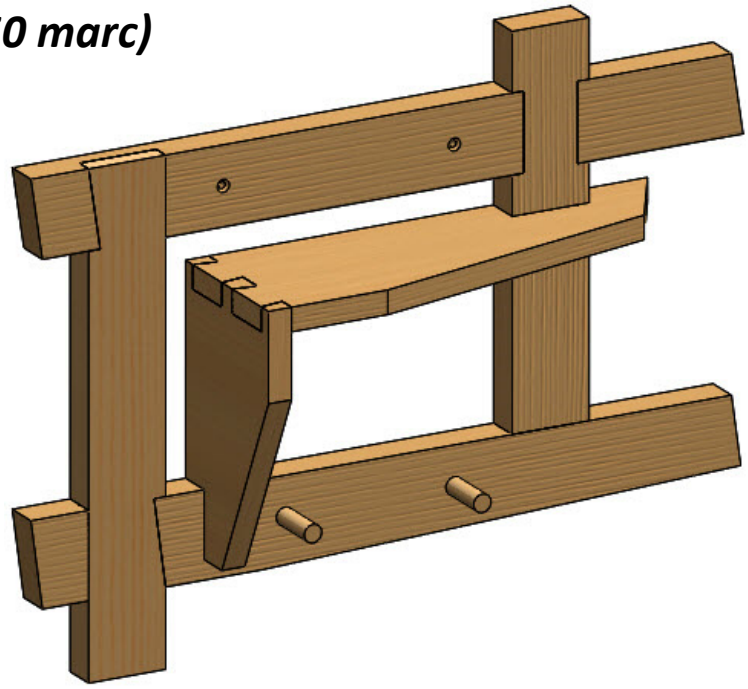
Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scrúdú na hArdteistiméireachta 2018
Leaving Certificate Examination 2018

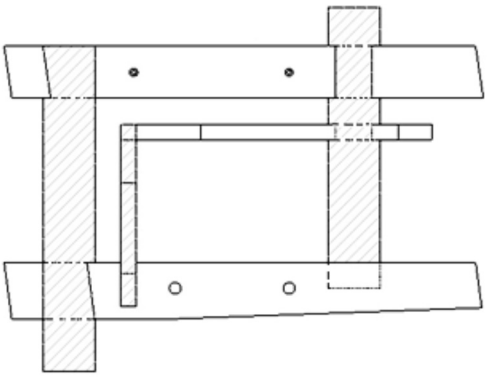
Scéim Mharcála - Lá 3
Marking Scheme - Day 3

(150 marc)



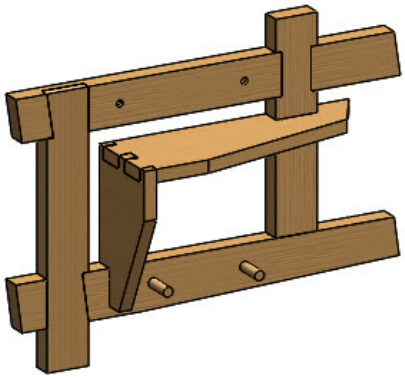
Staidéar Foirgníochta
Triail Phraticiúil

Construction Studies
Practical Test

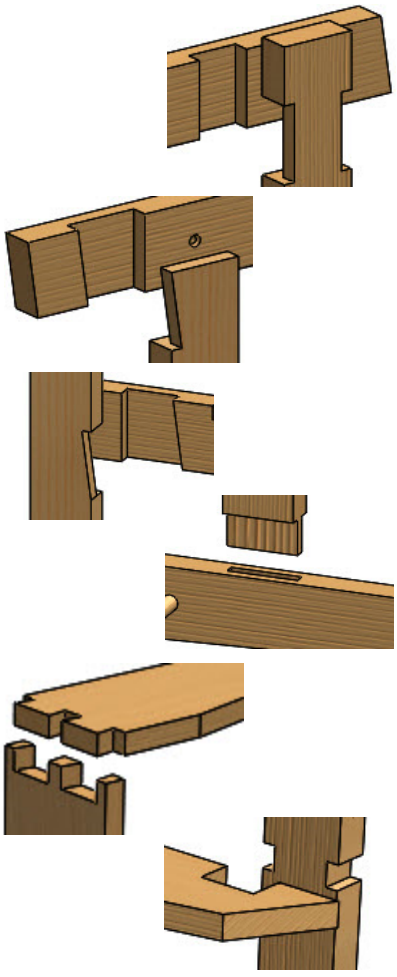


Construction Studies 2018
Marking Scheme – Practical Test

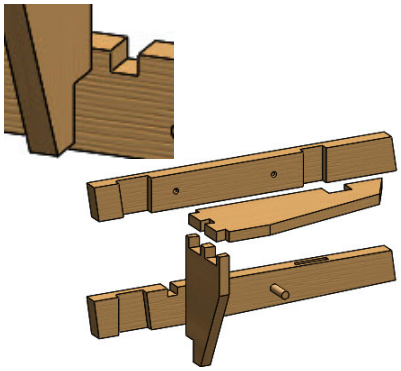
Note:
The artefact is to be hand produced by candidates without the assistance of machinery.
However the use of a battery powered screwdriver is allowed.
Where there is evidence of the use of machinery for a particular procedure a penalty applies.
Component is marked out of 50% of the marks available for that procedure.

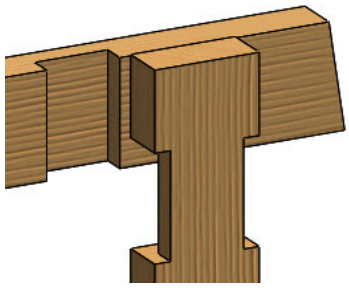


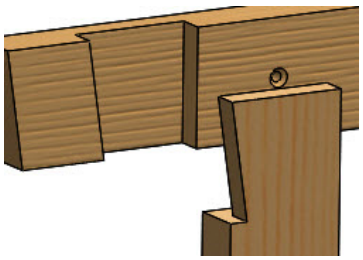
(i)	OVERALL ASSEMBLY	MARKS
1	Overall quality of assembled artefact	**10**
2	Design and applied shaping to edges • design ***(3 marks)*** • shaping ***(3 marks)***	**6**
	Total	**16**

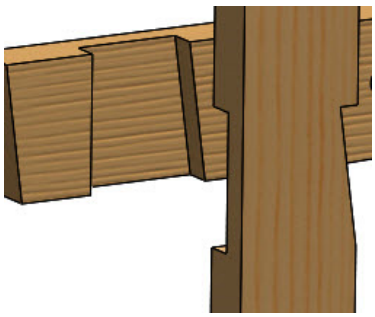


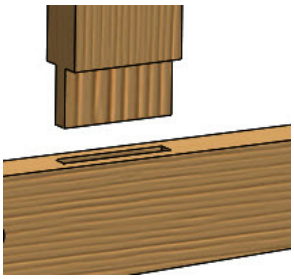
(ii)	MARKING OUT	Marks
1	Notched Cross Halving • Trench - horizontal piece ***(2 marks)*** • Trenches - vertical piece ***(4 marks)***	**6**
2	Dovetailed Tee Halving • Trench - horizontal piece ***(2 marks)*** • Dovetail ***(4 marks)***	**6**
3	Dovetailed Cross Halving • Trench - horizontal piece ***(2 marks)*** • Trenches - vertical piece ***(4 marks)***	**6**
4	Stopped Mortice • Mortice ***(2 marks)*** • Stub Tenon ***(2 marks)***	**4**
5	Box Dovetail • Tails ***(2 × 2 marks)*** • Pins ***(2 × 2 marks)***	**8**
6	Notched housing - double Notch – horizontal piece ***(2 marks)*** Trenches – vertical piece ***(2 × 2 marks)***	**6**

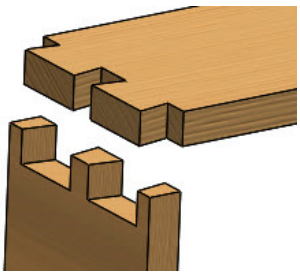
	7	Notched housing- single • Trench – horizontal piece ***(2 marks)*** • Notch – vertical piece ***(2 marks)***	**4**
	8	Slopes ***(8 × 1 mark)***	**8**
		Total	**48**

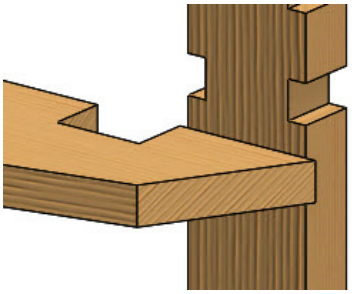
Notched Cross Halving	**(iii)**	**PROCESSING**	**Marks**
	1	Trench - horizontal piece • Sawing across the grain ***(2 × 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Trenches – vertical piece • Trenches back ***(4 marks)*** • Front trenches ***(2 × 3 marks)***	**10**
		Total	**14**

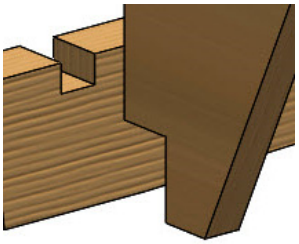
Dovetail Tee Halving	**(iv)**	**PROCESSING**	**Marks**
	1	Trench – horizontal piece • Sawing across the grain ***(2 × 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Dovetail • Sawing across the grain ***(2 × 1 mark)*** • Sawing with the grain ***(2 marks)*** • Paring Dovetail ***(2 marks)***	**6**
		Total	**10**

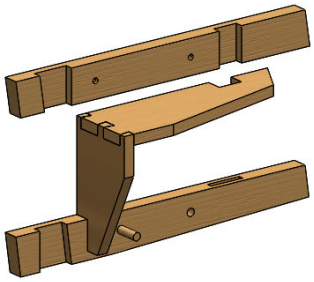
Dovetail Cross Halving	(v)	PROCESSING	Marks
	1	Trench – horizontal piece • Sawing across the grain ***(2 × 1 mark)*** • Paring Trench ***(2 marks)***	**4**
	2	Trench – vertical piece • Sawing across the grain ***(3 × 1 mark)*** • Paring Trench ***(2 marks)*** • Paring dovetail ***(2 marks)***	**7**
		Total	**11**

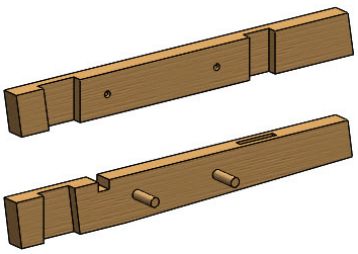
Stopped Mortice	(vi)	PROCESSING	Marks
	1	Stopped Mortice • mortice ***(2 marks)***	**2**
	2	Tenon • sawing with the grain ***(2 × 1 mark)*** • sawing across the grain ***(2 × 1 mark)***	**4**
		Total	**6**

Box Dovetail	(vii)	PROCESSING	Marks
	1	Tails ***(2 × 4 marks)***	**8**
	2	Pins • sawing with the grain ***(4 × 1 mark)*** • sawing across the grain ***(2 × 2 marks)***	**8**
		Total	**16**

Notched Housing - Double	(viii)	PROCESSING	Marks
	1	Notch - horizontal piece • sawing across the grain ***(2 × 1 mark)*** • paring trench ***(2 marks)***	**4**
	2	Trenches - vertical piece - • trenches (***2 × 2 marks)***	**4**
		Total	**8**

Notched Housing - Single	(ix)	PROCESSING	Marks
	1	Trench • trench ***(2 marks)***	**2**
	2	Notch • Sawing ***(2 × 1 mark)***	**2**
		Total	**4**

Shaping	(x)	PROCESSING	Marks
	1	Short slopes ***(5 × 1 mark)***	**5**
	2	Long slopes ***(3 × 2 marks)***	**6**
		Total	**11**

Drilling	(xi)	PROCESSING	Marks
	1	Dowels located and fitted correctly ***(2 × 2 marks)***	**4**
	2	Drilling and countersinking holes accurately ***(2 × 1 mark)***	**2**
		Total	**6**

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Form A

Leaving Certificate Examination 2018

Construction Studies

Assessment of Candidates' Practical Coursework

Examination Number:

Type of Project:

☐ Practical Craft ☐ Building Science

☐ Written/Drawn with Scale model ☐ Composite

	Marking Scheme		Maximum Marks	Marks Awarded
A	**Planning of Project** • Ability to design an appropriate plan of procedure • Evidence of research • Preparation of working drawings/use of models as graphic aids			
		Subtotal	**30**	
B	**Report Writing** • Design folio detailing planning, execution and evaluation of project • Critical appraisal of project for quality, function and finish • Conclusions from practical experience of project work			
		Subtotal	**30**	
C	**Manipulative Skills** • Skills in preparation and finishing of materials • Safe use of tools and machines - Hand/Power/CNC • Skills in assembly of materials			
		Subtotal	**30**	
D	**Presentation of Project** • Task completed to acceptable standard • Appropriate use of materials • Satisfactory knowledge of construction technology			
		Subtotal	**30**	
E	**Experiments** • Evidence of ability to plan and carry out **three** experiments *Experiments should be related to the project work or selected from the suggested experiments outlined in the syllabus for Construction Studies.*	Experiment **1** Experiment **2** Experiment **3**		
		Subtotal	**30**	
		Total:	**150**	

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