



**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2022

**CIVIL TECHNOLOGY: WOODWORKING
MARKING GUIDELINE
(EXEMPLAR)**

MARKS: 200

This marking guideline consist of 17 pages, including 2 answer sheets.

INSTRUCTIONS FOR THE MARKERS**1. Markers should:**

- Familiarise themselves with the question and answer before evaluating the responses of candidates.
- Always interpret the responses of the candidates within the context of the question.
- Consider any relevant and acceptable answer during pre-marking but should strictly adhere to the answers after finalisation of the marking guideline.
- There are two approaches to answering questions, these are (1) to describe and (2) to explain.
- If a candidate is required to explain e.g., a process in 4 steps, only the first 4 responses should be considered.
- If, however a candidate is required to e.g., explain or describe how to transfer heights from one point to another using a transparent pipe level we need to consider that candidates may write a long description not necessarily well organised as an intellectual response may do. In this case the marker needs to evaluate the complete statement to judge if the candidate explained the required outcome satisfactorily and allocate marks on merit. The marker should apply his/her professional judgement with these types of questions.
- Mark what the candidate wrote and do not award marks for answers that the marker thinks the candidate meant with what was written.
- Indicate the tick or cross right at the position where the mark needs to be awarded or where the candidate made the error.
- Accept the letter corresponding with the correct answer as well as the answer written in full in multiple-choice questions.
- Accept incorrect spelling in one-word answers unless the spelling changes the meaning of the answer.

2. For calculations:

- A mark is only awarded if the correct unit is written next to the answer.
- If TWO marks are awarded ONE mark is awarded for the answer and ONE mark for the correct unit.
- Where the candidate made a principle error e.g. added instead of multiplying, no marks will be awarded for the steps. If the answer is correct according to what the candidate did, the mark for the answer can be awarded for the application of skills.
- Where an incorrect answer could be carried over to the next step, the first answer will be deemed incorrect. However, should the incorrect answer be carried over correctly, the marker has to recalculate the values, using the incorrect answer from the first calculation. If correctly used, the candidate should receive the full marks for subsequent calculations.
- Markers should consider when and where a candidate has rounded off in a calculation, as well as the subsequent effect it has on the final answer obtained. The calculation should therefore be awarded marks on merit.
- Alternative methods of calculations must be considered, provided that the correct answer is obtained.

3. When marking drawings:

- The member for which the mark should be awarded should be drawn correctly in the correct position to receive a mark.
- A member incorrectly drawn but wrongfully repeated in another position will be awarded the mark for the repeated incorrect member provided that the marking guideline provide for TWO or more marks for that member (positive marking).
- Marks can only be awarded for a label if the label is correctly indicating the correct member.
- Scale drawings should always be marked using an appropriate mask.

When a candidate drew the wrong drawing e.g.:

- A horizontal section instead of a vertical section, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- An orthographic view instead of sectional view, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- An orthographic view instead of an isometric view, no marks will be allocated to the drawing as the candidate did not respond to the expected outcome.
- If the incorrect drawing was drawn, the candidate can be awarded for only what was asked but mark/s for the correctness of the drawing will not be awarded e.g., if a King Post roof truss was asked in the question, and candidate drew SA-Howe Truss.

QUESTION 1: SAFETY AND MATERIALS (GENERIC)

- 1.1 Gum boots (1)
- 1.2 Under what circumstances will the following personal protective equipment be used?
- 1.2.1 Safety glasses
When working with bench grinders, drills, electrical saws, etc. or any electrical equipment. (1)
- 1.2.2 Earplugs
When noise levels are high. (1)
- 1.3 Loose clothing can be pulled (1) into the machine by its moving parts (1). (2)
- 1.4 Describe the safety precaution that is applicable with the following hand tools:
- 1.4.1 Hammer heads
Should fit snugly into the handle and be wedged in properly. (1)
- 1.4.2 Sawing equipment
Should be sharp and clean / Handles should be properly attached. (1)
- 1.4.3 When carrying chisels.
Carry the blade facing downwards. (1)
- 1.5 The petrol fumes can be harmful (1), when inhaled (1).
(Similar answer.) (2)
- 1.6 Any TWO requirements for the storing of cement:
- Store on a pallet / planks / damp proof course or similar answer.
 - Store under cover / inside a building.
 - No contact with water. (Any 2 x 1) (2)
- 1.7 Any ONE similar answer:
- Warning people against overhead work / dangers.
 - To show that the wearing of a hard hat is compulsory. (1)
- 1.8 Any FOUR requirements for storing hazardous material in the workplace:
- The room must be well ventilated.
 - The door must have a threshold.
 - Material that may cause a spark must not be stored here.
 - Liquids that may interact chemically must be stored in close proximity.
 - Containers must always be sealed or properly closed.
 - Never store other flammable material with hazardous material. (Any 4 x 1) (4)

1.9 THREE ingredients to mix screed:

- Cement (1)
 - Sand (1)
 - Water (1)
- (3 x 1) (3)

1.10 Any THREE uses for screed:

- Finish for floors and walls.
 - Facing material
 - Levelling layer for suspended floors
 - Levelling layer for floor covering
 - Infill to accommodate various levels
 - Insulated roof screed
- (Any 3 x 1) (3)

- 1.11
- Aggregate is too coarse.
 - Aggregate too big for a mortar joint.
 - Rough parts will give a weak finish.
 - Similar answer.

(Any 1 x 1) (1)

1.12 Identify the type of board products that will be used for the following work:1.12.1 Backs of cupboards

Hard board or plywood. (1)

1.12.2 Formwork for concrete

Shutter board (1)

1.13 Stock bricks:

No attractive appearance / Must be plastered / Not good quality (1)

Face bricks:

Attractive appearance / Require no plaster / Good quality (1) (2)

1.14 Any TWO uses of cast iron:

- Manhole covers
 - Sewerage pipes and fittings
 - Baths
 - Wash basins
 - Tools
 - Hinges
 - Similar answer
- (Any 2 x 1) (2)

[30]

QUESTION 2: EQUIPMENT, TOOLS AND GRAPHICS (GENERIC)

- 2.1 Round shovel cannot shape the corners / square edges / straight lines (similar answer). (1)
- 2.2 Any THREE hand tools that can be used to dress / cut bricks:
- Comb hammer
 - Cold chisel
 - Bolster
 - Club hammer
 - Brick hammer (3 x 1) (3)
- 2.3 2.3.1 Hand hawk (1)
- 2.3.2 Straight edge (1)
- 2.3.3 External corner trowel (1)
- 2.3.4 Nose trowel (1)
- 2.4 The rip saw is used for cutting with the grain of the wood. (1)
The cross-cut saw is used for cutting across the grain of wood. (1) (2)
- 2.5 2.5.1 Sliding bevel (1) (1)
- Any ONE use:
- Drawing inclined / oblique lines.
 - Drawing angles other than 90°.
 - Copying angles to transfer them to other surfaces. (1 x 1) (1)
- 2.5.2 Bench grinder (1) (1)
- Any ONE use:
- Sharpening tools.
 - Grinding
 - Wire brush attachments can be installed. (1 x 1) (1)
- 2.5.3 Electrical drill (1) (1)
- Any ONE use:
- Drilling holes.
 - Can be used as a screwdriver.
 - Sanding / buffing / cutting accessories attached to drill. (1 x 1) (1)
- 2.6 2.6.1 Plate compactor (1)
- 2.6.2 Any ONE use:
- Compacting disturbed or loose soil up to 150 mm.
 - Tamping fillings for a hard-core layer under concrete floors.
 - Compacting soil before paving bricks are laid.
 - Similar answer. (1)

2.7 See ANSWER SHEET 1. (13)

2.8 Part of the structure is enlarged (1) to include more information to the drawing. (1) (2)

2.9 Any THREE particulars of a site plan:

- Boundaries of property.
- Building line.
- Erf numbers of plot and adjacent plots.
- Services and connections
- Name of street
- Driveway
- Trees / boulders
- Measurements
- Existing buildings
- Contours
- North arrow
- Scale

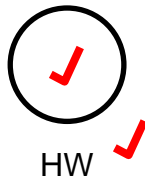
(3 x 1) (3)

2.10 2.10.1 Water closet



(2)

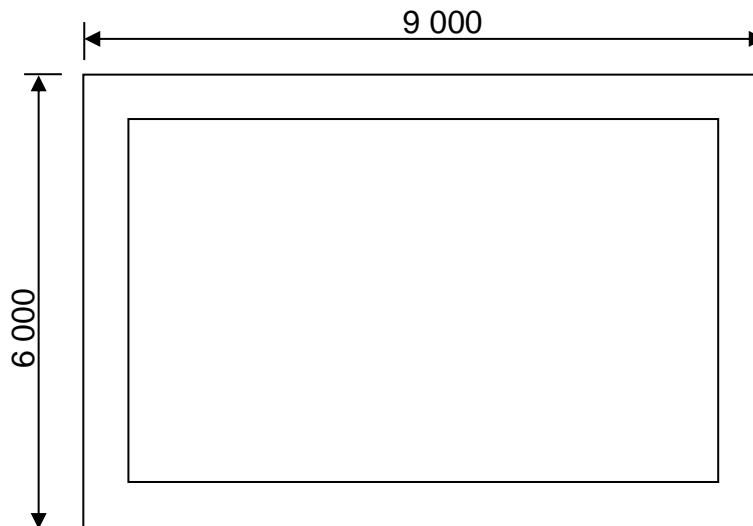
2.10.2 Hot-water cylinder



(2)
[40]

QUESTION 3: QUANTITIES, JOINING AND GRAPHICS

- 3.1 FIGURE 3.1 shows a foundation strip for a building.
The foundation is 600 mm wide and 200 mm thick.
A concrete mix of 1 : 4 : 4 is used.



- 3.1.1 Determine the centre line of the foundation:

$$\begin{array}{rcl}
 2 \times 9\,000 & = & 18\,000 \\
 2 \times 6\,000 & = & 12\,000 \\
 \hline
 & & 20\,000 \\
 4 \times 600 & - & 2\,400 \\
 \hline
 17\,600 & = & 17,6\text{m}
 \end{array}$$

(5)

- 3.1.2 Determine the volume of concrete needed:

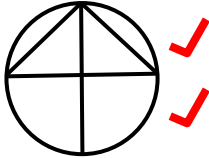
$$17,6 \times 0,6 \times 0,2 = 2,112 \text{ m}^3$$

- 3.2 A one brick wall of 1,2 m high and 12 m long.
Determine the number of bricks needed:

(5)

Area of wall:

$$\begin{array}{rcl}
 12 & \times & 1,2 \\
 \hline
 & = & 14,4 \text{ m}^2 \\
 14,4 \text{ m}^2 & \times & 2 \\
 \hline
 & = & 28,8 \text{ m}^2 \\
 28,8 \text{ m}^2 & \times & 50 \\
 \hline
 & = & 1\,440 \text{ bricks}
 \end{array}$$

- 3.3 Apply a thin layer of PVC glue (1) to the fitting and the pipe. (1)
Push the parts into position (1), while twisting slightly. (1) (4)
- 3.4 3.4.1 True (1)
- 3.4.2 False (1)
- 3.4.3 False (1)
- 3.4.4 True (1)
- 3.4.5 True (1)
- 3.5 Any TWO safety precautions when using epoxy:
- Apply with care – cleaning excess/overruns is difficult once dry.
 - Be careful not to inhale – the fumes may be toxic.
 - Press parts tightly together
 - Join surfaces firmly together, before the compound dry (Any 2 x 1) (2)
- 3.6  (2)
- 3.7 Bottom (1) right-hand corner (1) of the drawing page. (2)
- 3.8 3.8.1 Fluorescent light (1)
- 3.8.2 Wall light (1)
- [30]**

TOTAL SECTION A: 100

QUESTION 4: CASEMENTS, DOORS, WALL PANELLING AND JOINING (SPECIFIC)

- 4.1 4.1.1 A – Brace
B – V-tongue-and-groove battens
C – Stile (3 x 1) (3)
- 4.1.2 What is the purpose of the two braces on the door?
To prevent the sagging of the door. (2)
- 4.1.3 Give a reason why the stub mortise and tenon joints are preferred on the frame members of the door.
They give a better/neat appearance at the outside edges of the frame members. (1)
- 4.2 Safety goggles or safety glasses (1)
- 4.3 Stub mortise and ten joints or continuous mortise and tenon joints (1)
- 4.1 4.4.1 To prevent rainwater from being blown into the casement and penetrating the room. (2)
- 4.4.2 A – Mullion
B – Stile
C – Ovolo moulding
D – Windowpane/glass
E – Putty (5 x 1) (5)
- 4.5
- It gives a pleasing, decorative and durable appearance.
 - It conceals cracks in walls.
 - Does not require the entire wall to be plastered prior to installation.
 - Does not expand and shrink as solid timber do
 - Provides good isolation – keeping the room cool in the summer and warm in the winter
 - Requires no framework. (Any 3 x 1) (3)
- 4.6 A – Skirtings
B – Cornice
C – Rebate (3)
- 4.7
- Brackets
 - Fischer plugs
 - Steel rails (Any 1 x 1) (1)
- 4.8 Doorframes are joined to bricks by means of lugs. (2)

- 4.9
- Braces are screwed onto the V-tongue-and-groove battens.
 - Braces increase the rigidity of the door and prevent it from coming out of square.
 - Braces must incline upwards from the hang stile.
 - If it is not located in this position, the door will sag at the lock stile and will close with difficulty because it is no longer square.
 - For a neat appearance, braces must have the same inclination.
 - Braces can be replaced with sheets or boards covering the complete sections between the ledges on the internal side. This will also prevent the door from sagging.

(6 x 1)

(6)

[30]

QUESTION 5: CENTERING, FORMWORK AND SHORING (SPECIFIC)

- 5.1 5.1.1 A – Sides
B – Sides
C – Cleats/clamps
D – Yokes (4 x 1) (4)
- 5.1.2 Wedges to tighten the formwork securely. (1)
- 5.1.3 Steel rod: both ends are threaded to hold nuts and to keep the formwork in place. (2)
- 5.2 5.2.1
- To provide stability to a wall or to prevent it from total collapse during construction
 - To ensure a safe work environment for workers
 - To protect workers and the public from injuries
 - To support unstable walls and columns
 - To transfer additional weight from the raking strut/raker to the ground and away from the wall. (5)
- 5.2.2
- Raking shores are placed at an angle against walls to provide temporary lateral support. (1)
- 5.3 5.3.1
- These are located under the horizontal strut to keep it in position and rigid. (1)
- 5.3.2
- Raking struts (inclined struts) are supported by needles and cleats at the top of the wall plate and by folding wedges at the horizontal strut.
 - The raking struts transfer the weight from one wall plate to other. (1)
- 5.4 5.4.1 A – Ribs
B – Bearer
C – Folding wedges
D – Prop (4 x 1) (4)
- 5.4.2 The top part of the centre is formed to conform to the soffit of the arch. (1)
- 5.5
- Temporary framework, normally made of timber, is needed to support a stone, brick or concrete arch during construction until the arch is able to stand by itself.
 - The timber framework used to support an arch, is called centring. (2 x 2) (4)

- 5.6
- The top shape of the framework must be the same as the underside of the arch.
 - Centres must support the weight of the wet masonry or brickwork until the cement between the voussoirs has set.
 - Centres must be rigid and strong enough to support the weight of the brickwork of the arch.
 - Centres must be easy to remove after the binding time of the arches.
 - They must be secured with round wire nails for strength.
 - The size of the members is determined by the design and construction of the centre.

(6 x 1)

(6)

[30]

**QUESTION 6: CENTERING, FORMWORK, SHORING, CEILINGS,
IRONMONGERY AND SUSPENDED FLOORS (SPECIFIC)**

- 6.1
- Formwork refers to a temporary framework, normally made of timber or steel, which is ideal for in-situ casting of concrete and provides support until the concrete has set.
 - Striking can be defined as the dismantling of formwork once the concrete has cured and sufficiently hard. (2 x 1) (2)
- 6.2
- The inside faces of timber should be treated with mould oil or releasing oil to prevent the concrete from sticking to the surface of the timber.
 - The thickness of the matching members of the formwork should be uniform to ensure that the surface of the column is even.
 - Bolts should be greased to ease assembling and dismantling of formwork. (3 x 2) (6)
- 6.3
- Shutter board
 - Plywood
 - Blockboard (Any 2 x 1) (2)
- 6.4
- 6.4.1 Ceiling boards are nailed to the branders (1)
- 6.4.2 To close the gap between two ceiling boards. (1)
- 6.5
- The minimum height for all rooms, from the finished floor level to the underside of the ceiling, is 2,4 m.
 - The minimum height for entrance halls, passages and bathrooms is 2,1 m.
 - Ceiling boards are always installed in the direction of the roof trusses or tie beams.
 - At least one trapdoor measuring 650 mm x 650 mm must provide access to the roof space to allow the installation of the geyser or other electrical work. (Any 3 x 1) (3)
- 6.6
- FIGURE 6.6 on ANSWER SHEET B shows the vertical view of a wall, sole plate and soffit shutter board for a floor slab.
Complete the drawing and show all the different parts on a scale 1 : 20. (10)
- 6.7
- To make provision for raising or lowering the formwork to the required height.
 - To ease the removal of the formwork after completion of the floor slab. (2 x 1) (2)
- 6.8
- Made of wood and metals and used to pull together the box of a square column by means of nuts and bolts. (2)

- | | | | | |
|------|--|-------|--|-----------------|
| 6.9 | 6.9.1 | False | | (1) |
| | 6.9.2 | False | | (1) |
| | 6.9.3 | True | | (1) |
| | 6.9.4 | False | | (1) |
| 6.10 | <u>Tee hinge</u> | | | |
| | A – Butt leaf | | | |
| | B – Knuckle | | | |
| | C – Tapered strap leaf | | | |
| | D – Height of hinge | | | |
| | E – Length of hinge | | | (1 + 5 x 1) (6) |
| 6.11 | To provide sufficient underground ventilation. | | | (1) |
| | | | | [40] |

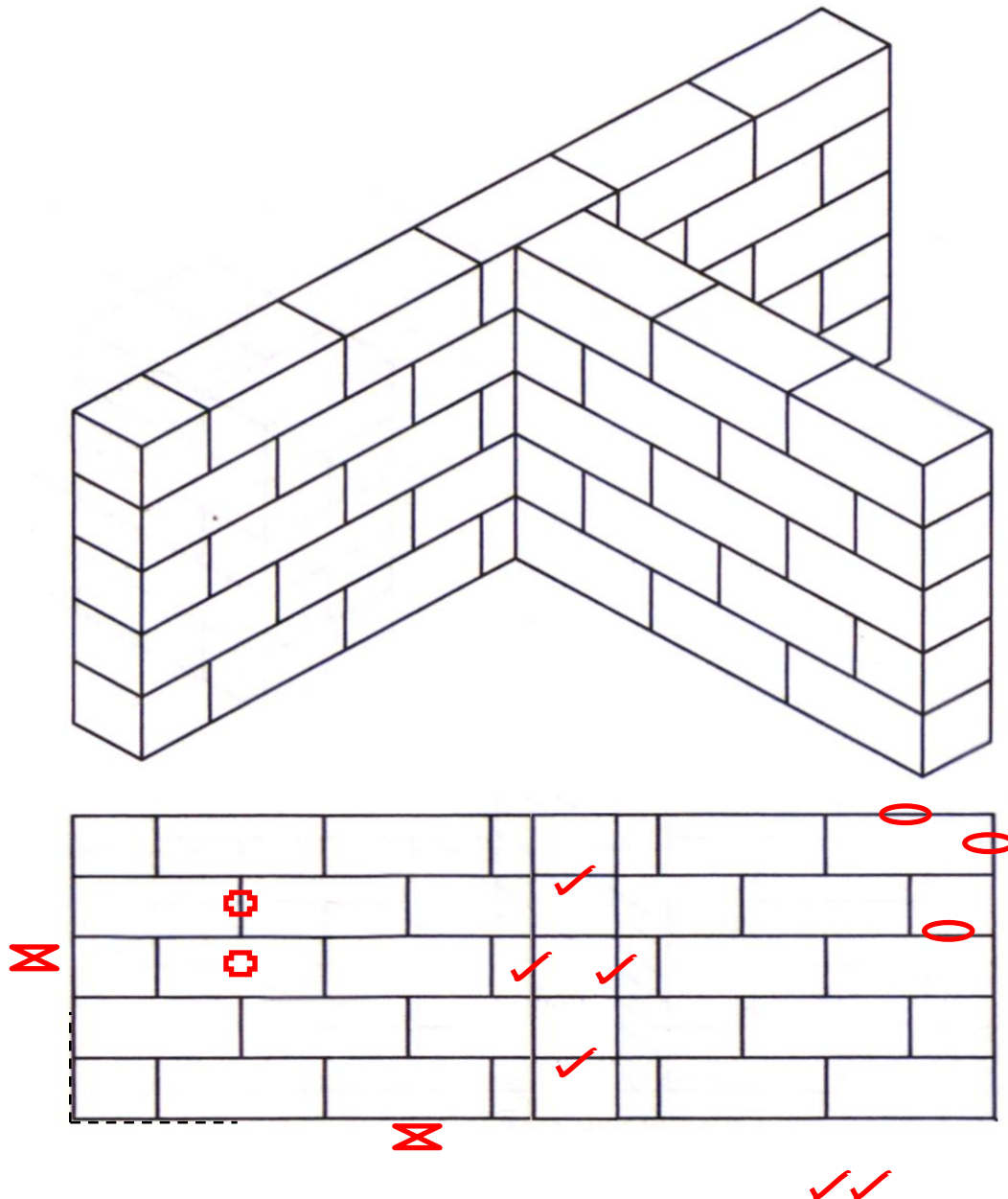
TOTAL: 200

ANSWER SHEET 1	CIVIL TECHNOLOGY CIVIL SERVICES	NAME: _____
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2.7 FIGURE 2.7 on ANSWER SHEET 1 shows the isometric view of a T-junction of a half brick wall in stretcher bond.

Draw the front view of the brick wall on scale 1 : 10.

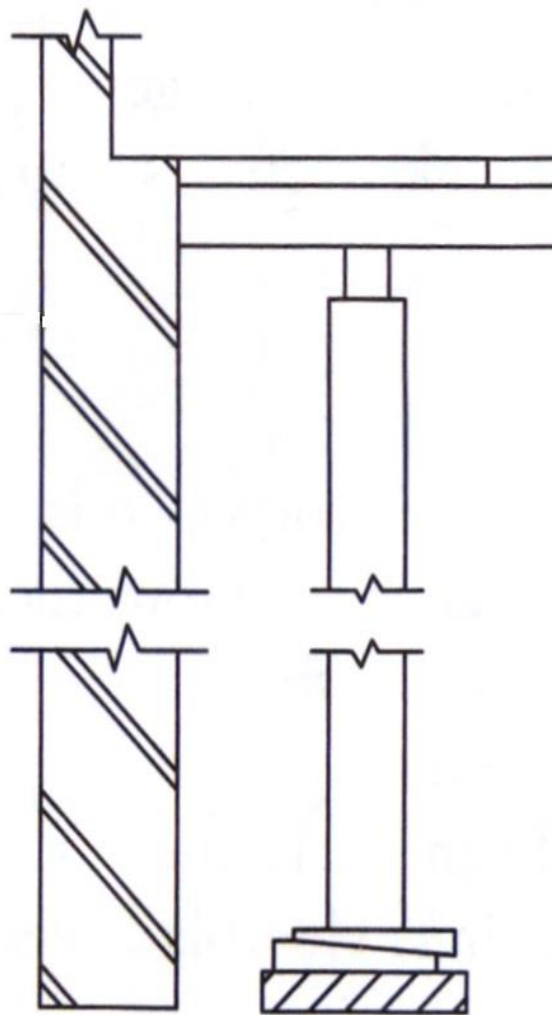
(13)



T-junction	4	✓
Brick sizes / Scale	3	0
Height and length	2	X
Stretcher bond	2	0
Line work / Neatness	2	✓
TOTAL:	13	

ANSWER SHEET 2	CIVIL TECHNOLOGY WOODWORKING	NAME: _____
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- 6.6 FIGURE 6.6 on this ANSWER SHEET 2 shows the vertical view of a wall, sole plate and soffit shutter board for a floor slab. Complete the drawing by and drawing all the parts for formwork supports on a scale 1 : 20. (10)



Wedges	2	
Props	2	
Cross-bearers	2	
Bearer	2	
Scale	2	
TOTAL:	10	