



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2017

**CIVIL TECHNOLOGY
MARKING GUIDELINE**

MARKS: 200

This marking guideline consists of 26 pages.

SECTION A: GENERIC (COMPULSORY)**QUESTION 1: SAFETY AND MATERIAL**

- 1.1 Rubber footgear (1)
- 1.2 Any THREE requirements for footgear on a building site.
 - Sturdy
 - Non-slip
 - Metal reinforcements in toes (3 x 1) (3)
- 1.3 1.3.1 Can drop and injure (1)
- 1.3.2 Workers can knock each other / attention diverted (1)
- 1.3.3 Can bump into moving parts (1)
- 1.3.4 Fumes from petrol engines are dangerous
 Any similar answer (1)
- 1.4 Any TWO types of protective clothing - angle grinder
 - Safety Ear plugs/Ear muffs glasses/Face shield
 - Gloves
 - Overall/Apron
 - Safety boots (2 x 1) (2)
- 1.5 1.5.1 Base underneath the material – Strong/Firm/ Watertight (2)
- 1.5.2 Maximum height of a stack – Not higher than 3x the width (2)
- 1.5.3 Firefighting equipment – Not to obstruct (2)
- 1.6 Unreinforced concrete – Without steel /Not subjected to tensile/bending stress
 Reinforced concrete – With steel/Subjected to tensile/bending stress (2)
- 1.7 - Cement - Sand - Lime (3)
- 1.8 (1) Paste/Give workability to mix
 (2) For hydration process/Development of strength (2)
- 1.9 Any TWO uses of each of the following board products:
- 1.9.1 Plywood.
 - Bottoms of drawers
 - Wall panelling
 - Door panels
 - Cupboard panels
 - Interior balustrade/railings
 - Floors
 - Framing (2 x 1) (2)

- 1.9.2 Hardboard (Masonite)
- Bottom of drawers
 - Panelling
 - Decorative
 - Floors
 - Back of cupboards
 - Furniture
- (2 x 1) (2)
- 1.10 Iron/Carbon (1)
- 1.11 Any ONE property of safety glass
- (1) Does not break easily (2) under normal impact
 - (1) If it breaks (2) thin plastic veneer keeps parts together/does not shatter
- (2)
- [30]**

QUESTION 2: EQUIPMENT, TOOLS AND GRAPHICS

- 2.1 Identify the following tools and name ONE use of each:
- 2.1.1 Plastering trowel – Smooth surface to plastering and floors (2)
- 2.1.2 Claw hammer – General carpentry/Nailing/Remove nails (2)
- 2.1.3 Angle grinder – Cutting steel/stone/concrete/metals/slate (2)
- 2.1.4 Steel square – Tests squareness/straightness of surfaces (2)
- 2.2 Floor plan of a bathroom in FIGURE 2.2 on ANSWER SHEET A:
Complete the floor plan by drawing in the following symbols on scale 1 : 50:
- 2.2.1 Door at 2.2.A. (2)
- 2.2.2 Window at 2.2.B. (2)
- 2.2.3 Shower at 2.2.C. (2)
- 2.2.4 Water closet at 2.2.D. (2)
- 2.2.5 Gully and abbreviation at 2.2.E. (2)
- 2.2.6 Rodding eye and abbreviation at 2.2.F. (2)
- 2.2.7 Vent pipe and abbreviation at 2.2.G. (2)
- 2.2.8 Use the information on sheet A and do the measurements of the west view according to building drawing practice. (8)

2.3 Identify FOUR of the following requirements that are applicable to section views.

2.3.1 The width and thickness of the foundations

2.3.2 The roof construction

2.3.3 ~~Access to the site~~

2.3.4 ~~Number of the site~~

2.3.5 Location of damp-proofing

2.3.6 Ceilings and bandering

2.3.7 ~~Building lines~~

2.3.8 ~~North arrow~~

(4)

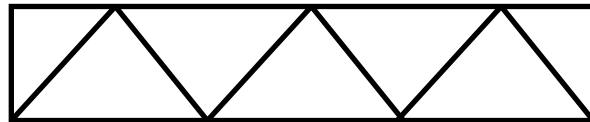
2.4 Make a neat sketch to illustrate each of the following symbols:

2.4.1 Concrete



(2)

2.4.2 Hardcore



(2)

2.4.3 Distribution board

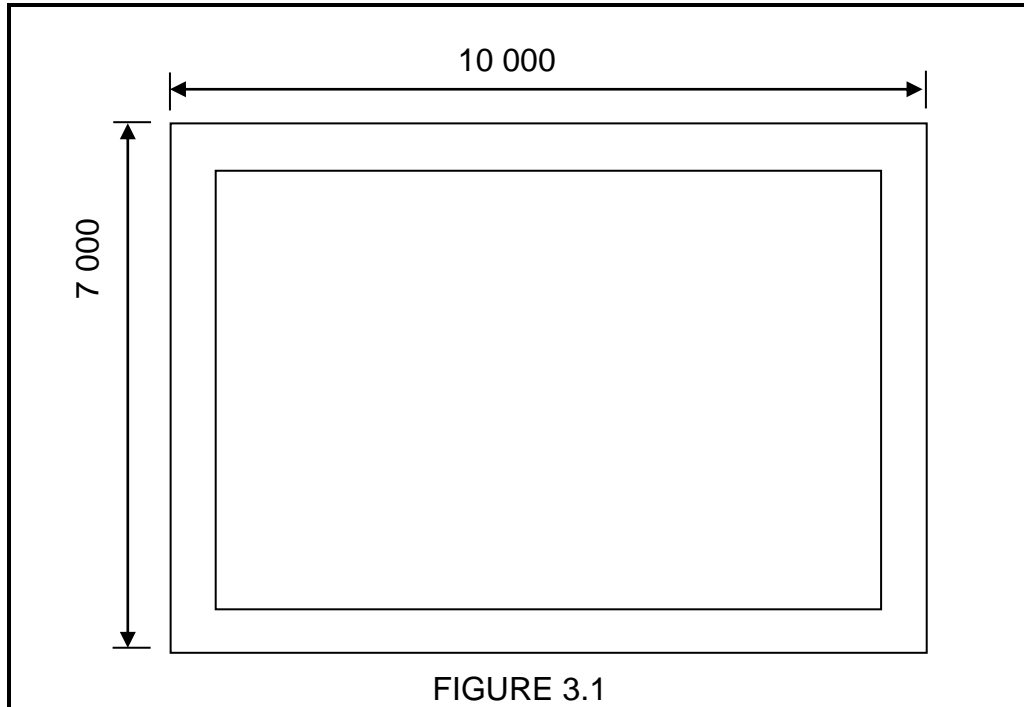


(2)

[40]

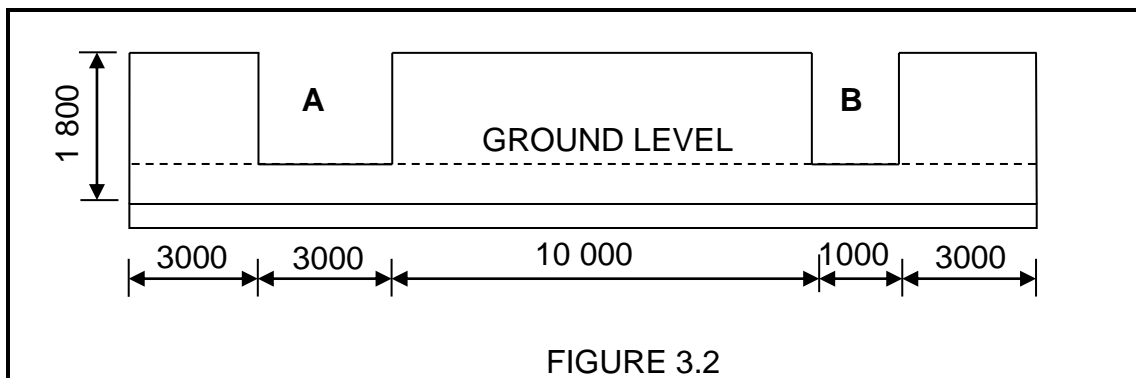
QUESTION 3: QUANTITIES AND JOINING

3.1 FIGURE 3.1 shows the foundation strips for a building. The foundations are 600 mm wide and 200 mm thick.
Use the quantity list on ANSWER SHEET B and determine the following:



- 3.1.1 Calculate the centre line of the foundation. (5)
- 3.1.2 Calculate the volume concrete needed for the foundation. (3)

3.2 Figure 3.2 shows the front elevation of a boundary wall with two openings. The following measurements are applicable to the wall:
Length = 20 m.
Height from the foundation = 1.8 m.
Opening A = 3 m x 1.6 m.
Opening B = 1 m x 1.6 m.
Wall thickness = 220 mm.
Use the quantity list on sheet B and calculate the number of bricks needed to build the wall. (14)



- 3.3 PVC adhesive (1)
- 3.4 (1) Apply to both sides of material to be bonded
(2) When almost dry, press parts together (2)
- 3.5 Any THREE properties of PVA wood glue.
- Water-based
- Interior/Exterior use
- White/Yellowish colour
- Clear when dry
- Strong on wood
- Dries quickly
- Not expansive (3 x 1) (3)
- 3.6 Any TWO precaution measures when epoxy is used.
- Apply with care, difficult to clean excess
- Fumes may be toxic
- Press surfaces firmly together (2 x 1) (2)
- [30]**

TOTAL SECTION A: 100

SECTION B: CONSTRUCTION**QUESTION 4: MATERIAL, EQUIPMENT AND JOINING**

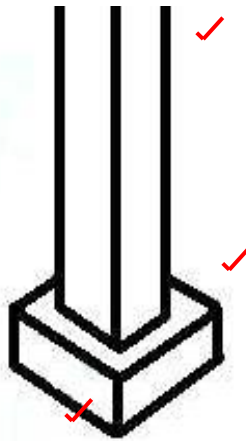
- 4.1 Any THREE properties of face bricks.
- Decorative/Aesthetic
 - Harder
 - Strong
 - Durable
 - Low absorbency
 - No need for plastering
- (3 x 1) (3)
- 4.2 Why clay stock brick must be plastered.
- Is soft
 - Porous
 - Prevents water permeation
 - Neater finish
- (1)
- 4.3 Any THREE advantages of concrete paving bricks for parking areas.
- Aesthetic
 - Durable
 - Withstands extreme weather conditions
 - Can withstand heavy loads
 - Will not become brittle or crack
 - Non-slip
 - Easy to replace/lay
 - Little maintenance
 - Can be laid without mortar
- (3 x 1) (3)
- 4.4 4.4.1 Hollow concrete block
- (1)
- 4.4.2 Any TWO advantages of the cavities
- Less material for manufacturing
 - Lighter
 - Better isolation of heat/sound/damp
- (2 x 1) (2)
- 4.4.3 Any TWO disadvantages of the structure.
- Brittle
 - Breaks easily
 - Tends to crack
- (2 x 1) (2)
- 4.5 Firing process: Hardens/strengthens clay bricks
- (1)
- 4.6 (1) Lime stone (2) Clay
- (2)
- 4.7 4.7.1 Dumpy level
- (1)

- 4.7.2 Any THREE uses.
 - Determines relative levels/vertical heights
 - Determines distances
 - Determines levels and slopes
 - Setting out of buildings
 - Transferring levels/heights (3 x 1) (3)
- 4.8 4.8.1 4.8.A – Vertical standard
 4.8.B – Horizontal transoms
 4.8.C – Guard rail
 4.8.D – Board platform
 4.8.E – Diagonal brace (5)
- 4.8.2 Similar answer:
 (1) Safe/Won't collapse. Able (2) to carry persons/material (2)
- 4.8.3 Prevent bricks/material/tools from falling (1)
- 4.9 4.9.A – Bracing
 4.9.B – Fixing lug
 4.9.C – Scaffold/strut plank (3)
- [30]**

QUESTION 5: EXCAVATIONS, FOUNDATIONS AND STEEL

- 5.1 Any TWO methods to determine the depth of foundation excavations.
 - Spirit level
 - Boning rod
 - Dumpy level (2 x 1) (2)
- 5.2 (1) Uneven/inaccurate excavations must be filled/compensated by (2) filling/extra work to get it accurate – thus more expensive (2)
- 5.3 (1) All heights and excavations (2) are determined from a fixed height/datum peg (2)
- 5.4 Any THREE causes of excavation accidents.
 - Excavated earth on edge of trench
 - Weak soil condition
 - Buildings/traffic/vibration next to excavation
 - Old/disturbed soil excavations
 - Nearness of streams/sewers/underground cables
 - No protective equipment/struts (3 x 1) (3)

5.6 Make a neat isometric view of a block foundation with a pier.



(3)

5.7 Similar answer

(1) Concrete is weak under tensile/bending stress

(2) Withstand tensile stress of downward force of wall

(2)

5.8 5.8.1 Pile foundation

(1)

5.8.2 Any THREE circumstances where this foundation should be used.

- Poor soil
- In water
- Poor weather conditions
- Moving soil

(3 x 1) (3)

5.9 5.9.1 5.9.A – Web/Rib
5.9.B – Root radius
5.9.C - Flange

(3)

5.9.2 Any TWO uses of this type of beam

- Construction/Civil structures
- Bridges
- Shipbuilding
- Conveying machinery
- Equipment foundations
- Steel structures/constructions

(2 x 1) (2)

[30]

QUESTION 6: TOOLS, CONCRETE, FORMWORK AND ROOF COVERING

- 6.1 Portable circular saw (1)
- 6.2 Any THREE properties of steel reinforcement for concrete structures.
- Free of salt spray/mud/rust/splinters/oiliness
- Resistant to tensile stress
- Easy to bend into shape
- Binds firmly with concrete
- Limited expansion ability
- Readily available/affordable (3 x 1) (3)
- 6.3 6.3.1 Twisted, ribbed bar (1)
- 6.3.2 Better binding to concrete (1)
- 6.3.3 High tensile steel (Y) (1)
- 6.3.4 16 mm (1)
- 6.4 Name the THREE types of forces exerted onto concrete columns.
- Compressive stress
- Tensile stress
- Lateral force (3 x 1) (3)
- 6.5 Any TWO disadvantages of steel reinforcement in concrete.
- Time-consuming
- More expensive (2 x 1) (2)
- 6.6 TWO purposes of stirrups in a concrete beam.
- Bind main bars
- Resist sheer stress (2 x 1) (2)
- 6.7 6.7.1 True (1)
- 6.7.2 False (1)
- 6.7.3 False (1)
- 6.7.4 True (1)
- 6.8 (1) Steel deep enough to protect against (2) rust/fire (2)
- 6.9 TWO requirements of emulsions for steel formwork.
- Must contain anti-rust agent
- Free of water (2 x 1) (2)

- 6.10 Any THREE requirements for good formwork.
- Sturdy enough
 - Not deflect
 - Easily repairable on site
 - Erected accurate
 - Sealed properly
 - Free of dirt
 - Easily erected
 - Correct measurements
 - Easily removable
 - Close fitting along joints/seams
 - Recyclable components
- (3 x 2) (6)
- 6.11 6.11.A – Shutter boards/planks
6.11.B – Yoke
6.11.C – Wedge
6.11.D – Clamp
- (4)
- 6.12 Briefly describe what a gauged arch is.
(1) Special, wedge-shape bricks (2) with uniform mortar joints and (3) not plastered
- (3)
- 6.13 (1) Rigid binding (2) to mortar
- (2)
- 6.14 Any TWO disadvantages of corrugated iron sheeting.
- Not much thermal insulation
 - Not much noise insulation
 - Vulnerable to wind pressure/suction
 - Rust when damaged/not treated
- (2 x 1) (2)
- [40]**

TOTAL SECTION B: 100






SECTION C: CIVIL SERVICES**QUESTION 4: SAFETY, MATERIAL, EQUIPMENT AND JOINING**

- 4.1 (1) Prevents persons from being exposed to (2) bacteria/viruses/parasites (2)
- 4.2 (1) Placed in container with a lid (2) and clearly labelled (2)
- 4.3 (1) Keeping head (2) left/right side of soldering work/ not directly above
Or: Good ventilation/mask (1)
- 4.4 Any THREE uses of ceramic.
- Floor tiles
- Wall tiles
- Baths/Basins/Water closets
- Where material must withstand high temperature (3 x 1) (3)
- 4.5 Prevents rust (1)
- 4.6 4.6.1 Cutting sheet metal – Tin snips/Guillotine (1)
4.6.2 Cutting threads in pipes – Pipe threader (1)
4.6.3 Forming the head of rivets – Ball-pen hammer (1)
4.6.4 Rolling a seam joint – Groover/Seaming tool (1)
- 4.7 4.7.1 Sheet-bending machine (1)
4.7.2 Bending sheet metal to shape (1)
4.7.3 Any THREE maintenance measures for this machine.
- Oil moving parts
- Maintain service program
- Do not overload jaws
- Do not bend round bars (3 x 1) (3)
- 4.8 Any THREE uses of polypropylene.
- Waterproofing
- Hot water pipes/fittings
- Sewerage pipes/fittings
- Water closet cistern
- Water closet seats (3 x 1) (3)
- 4.9 Any TWO advantages of stainless steel for kitchen sinks.
- Hygienic
- Rust free
- Easy to clean (2 x 1) (2)

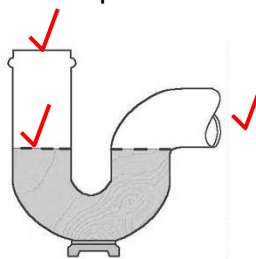
- 4.10 Forwards (1)
 - 4.11 4.11.1 Nut
 - 4.11.2 Body
 - 4.11.3 Gasket
 - 4.11.4 Grip ring
 - 4.11.5 Spring washer (5)
 - 4.12 Compression joint (1)
- [30]**

QUESTION 5: GRAPHICS AND CONSTRUCTION IN CIVIL SERVICES

5.2 Make neat sketches to indicate the following symbols on a floor plan:

- 5.2.1 Stop valve -  (2)
- 5.2.2 Water meter -  (2)
- 5.2.3 Water closet -  (2)
- 5.2.4 Rodding eye -  (2)
- 5.2.5 Gully -  (2)

5.3 Make a neat sketch of a P-trap and also indicate the water level inside the trap.



- (3)
- 5.4 (1) Serves as water seal (2) prevents bad smells entering house (2)
- 5.5 (1) Protects concrete against drying out (2) so that hydration process can take place/ strength development (2)
- 5.6 Any ONE method for curing of concrete.
 - Sprinkling
 - Water pond
 - Spraying
 - Covering
 - Curing compound painted on(1)

[30]

QUESTION 6: COLD AND HOT WATER SUPPLY, DRAINAGE AND SANITARY FITMENTS

- 6.1 THREE advantages and ONE disadvantage of the following water supply pipes:
- 6.1.1 Copper pipes.
- | | | |
|-----------------------------|---------------------------------|-----|
| Any THREE advantages | Any ONE disadvantage | |
| - Rust resistant | - Expensive | |
| - Easy to bend | - Not suitable for acidic water | |
| - Strong | | |
| - Do not fade in sun | | |
| - Easily and solidly joined | | |
| - Durable | | |
| - No growth of bacteria | | (4) |
- 6.1.2 Polyethylene pipes.
- | | | |
|----------------------------------|---------------------------------|-----|
| Any THREE advantages | Any ONE disadvantage | |
| - Extended service life | - Sharp objects can damage them | |
| - Light/easy to transport | - High fire hazard | |
| - Easy to handle/install | - Must be stored in shady area | |
| - Resistant to acids | | |
| - Can handle rough treatment | | |
| - Easy to join | | |
| - High rigidity/tensile strength | | |
| - No cracking/deformation | | |
| - Elastic | | (4) |
- 6.2 (1) Controls (2) water level in cistern/water tank (2)
- 6.3 6.3.1 Stopcock (1)
- 6.3.2 6.3.A – Shank
6.3.B – Gland nut
6.3.C – Housing
6.3.D – Jumper (4)
- 6.3.3 9.3.E (1)
- 6.4 6.4.1 True (1)
- 6.4.2 False (1)
- 6.4.3 True (1)
- 6.5 Any TWO reasons why underground pipes must be protected.
- To be protected against freezing
 - To be protected direct imposed loads
 - To be protected against garden work
- (2 x 1) (2)

- 6.6 6.6.1 6.6.A – Vacuum breaker
 6.6.B – Thermostat
 6.6.C – Pressure reducing valve
 6.6.D – 300 mm
 6.6.E – 200 mm
 6.6.F – 300 mm
 6.6.G – Overflow pipe
 6.6 H – Geyser tray (8)
- 6.6.2 (1) Controls municipal pressure to (2) geyser/prevents too much pressure in geyser (2)
- 6.7 (1) Heat of sun will heat water, (2) hot water rises to water tank/ intake of cold water at the bottom (2)
- 6.8 Any THREE factors which influence the optimal operation of the solar hot water geyser.
 - Latitude
 - Time of day
 - Vapour
 - Season
 - Atmospheric conditions
 - Angle of panel
 - Height of roof (3 x 1) (3)
- 6.9 Wastewater – Water from basin/bath/shower/sink/washing machine
 Soil water – Water from water closet/human excreta (2)
- 6.10 Any TWO advantages of a single-stack drainage system.
 - Fewer connections
 - Only one gully
 - Fewer vent pipes
 - Simplified pipe work arrangement
 - No unnecessary pipes (2 x 1) (2)

[40]**TOTAL SECTION C: 100**

SECTION D: WOODWORKING**QUESTION 4: MATERIAL, TOOLS, GRAPHICS AND WINDOWS**

- 4.1 (1) Newly felled timber contains too much water/damp (2) will crack/bend/steel fixing will rust/poor glue (2)
- 4.2 (1) Stacks in kiln
(2) By means of hot air
(3) By means of fans (3)
- 4.3 4.3.1 Quarter-sawn conversion (1)
- 4.3.2 Any TWO disadvantages of this conversion method.
- More expensive
- Must be handled more frequently during process
- More waste (2)
- 4.4 4.4.1 Sawing along curved lines - Bandsaw (1)
4.4.2 Planing of wood to the specific thickness - Thicknesser (1)
4.4.3 Planing of wood to obtain a true edge – Surface saw (1)

- 4.5 4.5.1 Dressed wood



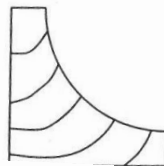
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- 4.5.2 Plywood



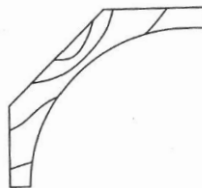
(2)

- 4.6 4.6.1 Scotia



(2)

- 4.6.2 Cornice



(2)

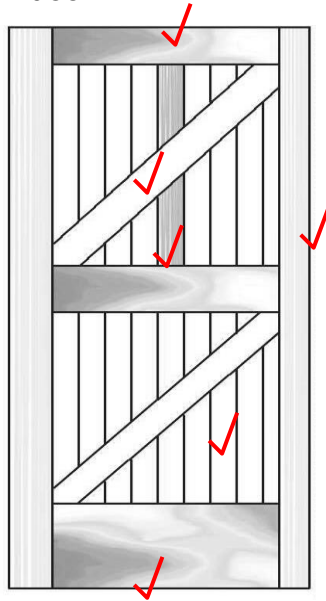
[30]

QUESTION 5: WINDOWS, DOORS AND WALL PANELLING

- 5.1 5.1.A – Frame head
- 5.1.B – Top rail
- 5.1.C – Frame stile/jambs
- 5.1.D – 76 x 110 mm
- 5.1.E – Glazing bar
- 5.1.F – Casement stile
- 5.1.G – 60 x 44 mm
- 5.1.H – Sill

(8)

5.3 Ledged and braced batten door



(6)

5.4 Any FOUR advantages of plywood wall panelling.

- Decorative
- Durable
- Conceals cracks
- Good insulation
- Wall does not require painting
- Can be fixed directly to wall
- Expansion/shrinkage minimal
- No need for framework to be fixed

(4 x 1) (4)

5.5 Fixed to wall to receive panelling

(1)

5.6 Screws/wall plugs

(1)

5.7 Any THREE reasons why board products are ideal for built-in cupboards.

- Available in various finishes
- Large sizes available
- Resemble solid timber
- Durable/strong

(3 x 1) (3)

[30]

QUESTION 6: CENTRING, FORMWORK, SHORING AND SUSPENDED FLOORS

6.1 Any FOUR factors which determine the design of arch centres.

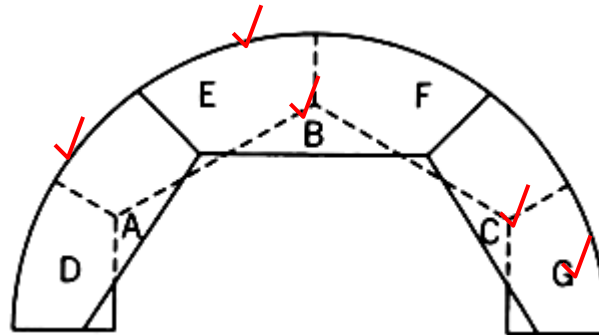
- Span of opening
- Width of arch/soffit
- Shape of arch
- Weight of brickwork
- Type of voussoir

(4 x 1) (4)

6.2 Supports arch centre/determines height (1)

6.3 Rib for a semi-circular arch centre.

Indicate the back segments with dotted lines.



(5)

6.4 Any THREE requirements for good formwork.

- (1) Easy (2) to assemble
- (1) Accurate (2) according to dimensions
- (1) Able to support mass of (2) people/equipment
- (1) Strong enough (2) to support wet concrete
- (1) Handle compression of (2) tamping/vibrating
- (1) Watertight so that (2) concrete does not leak
- (1) Easy to remove (2) without damage

(3 x 2) (6)

6.5 So that concrete does not bind to formwork (1)

6.6 (1) Concrete work (2) will be uneven/inaccurate (2)

6.7 6.7.A – Shutter boards/planks

6.7.B – Yoke

6.7.C – Wedge

6.7.D – Clamp

(4)

6.8 (1) Temporary horizontal supports to two parallel walls (2) where walls tend to fail (2)

6.9 Moving space underneath shore (1)

- 6.10 6.10.1 True (1)
- 6.10 6.10.2 False (1)
- 6.11 Answer the following questions with regard to the shoring in figure 6.11:
 - 6.11.1 Raking shore (1)
 - 6.11.2 (1) At angle against wall to (2) support walls which tend to fail/lean (2)
 - 6.11.3 6.11.A – Wall plate
6.11.B – Needle
6.11.C – Boriti/Raking shore
6.11.D – Bracing/Strut
6.11.E – Sole plate (5)
- 6.12 6.12.A – Floor joist
6.12.B – 450–600 mm
6.12.C – VWL
6.12.D – Wall plate/bearers (4)

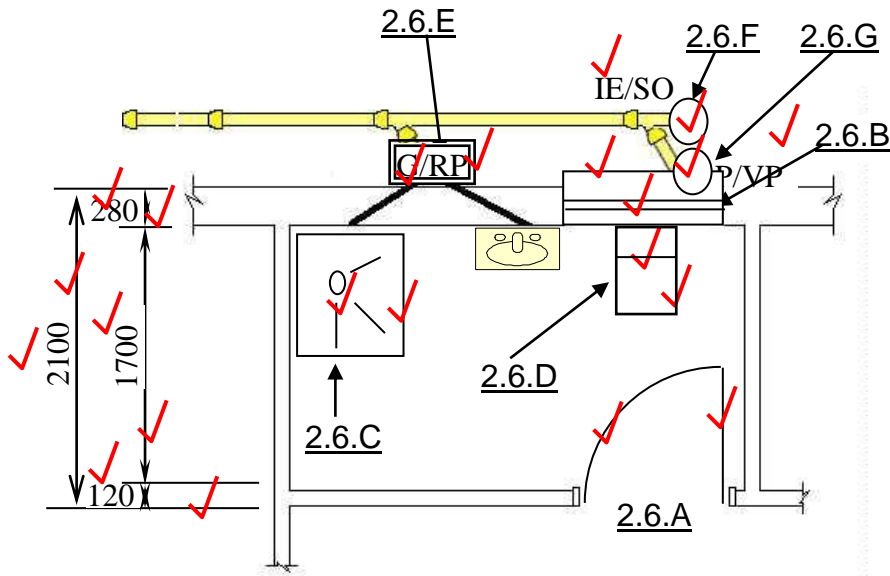
[40]

TOTAL SECTION D: 100
GRAND TOTAL: 200

ANTWOORDBLAD ANSWER SHEET	A	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____
			NAME: _____

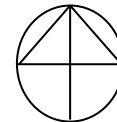
VRAAG / QUESTION 2.2

(22)



BATHROOM FLOOR PLAN

SCALE 1:50



BATHROOM INNER DIMENSIONS: 3m x 1,7m
 OUTER WALL THICKNESS: 280mm
 INNER WALL THICKNESS: 120mm

Door	2	
Window	2	
Shower	2	
Water closet	2	
Gully and abbreviation	2	
Rodding eye and abbreviation	2	
Vent pipe and abbreviation	2	
Measurements	8	
TOTAL	22	

ANTWOORDBLAD ANSWER SHEET	B	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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VRAAG / QUESTION 3.1

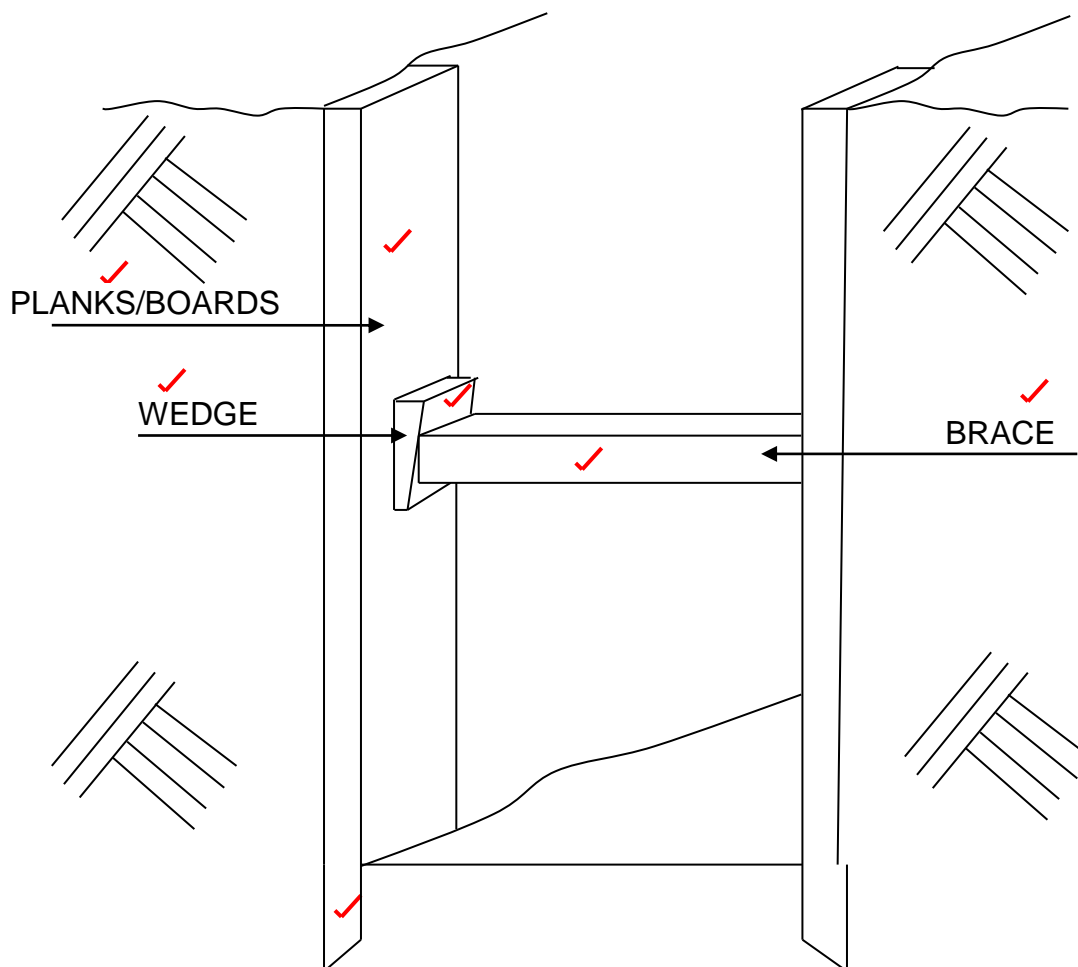
A	B	C	D
			3.1.1 CENTRE LINE: :
			✓
			10 m + 10 m + 7 m + 7 m = 34 m
			✓
			✓
			✓
			Minus: 4 x 0,6 m = 34 - 2,4 = 31,6 m
			3.1.2 VOLUME (3)
			✓
			✓
			✓
			31,6 x 0,6 x 0,2 = 3,792 m ²

VRAAG / QUESTION 3.2 (14)

			<u>AREA:</u>
			<u>Total wall area</u>
1/	20		
	✓		
	<u>1.8</u>	<u>36</u>	Thus: Total wall area = 36 m ² ✓
			<u>TOTAL BRICKS</u>
			100 bricks/ m ² for single brick wall
✓ 1/	36		
	✓		
	<u>100</u>	<u>3 600</u>	Thus: 3 600 total bricks for wall ✓
			✓
			Subtract
			Opening A (3 m x 1,6 m)
1/	3		
	✓		
	<u>1.6</u>	<u>4.8</u>	Opening A area: = 4,8 m ² ✓
			Subtract
			Opening B (1 m x 1,6 m)
1/	1		
	✓		
	<u>1.6</u>	<u>1.6</u>	Opening B area: = 1,6. m ² ✓
			Subtract
			Thus: Subtract 480 bricks for opening A ✓
			Subtract
			Thus: Subtract 160 bricks for opening B ✓
			<u>TOTAL BRICKS :</u>
			3 600 - 480 - 160 = 2 960 total number bricks

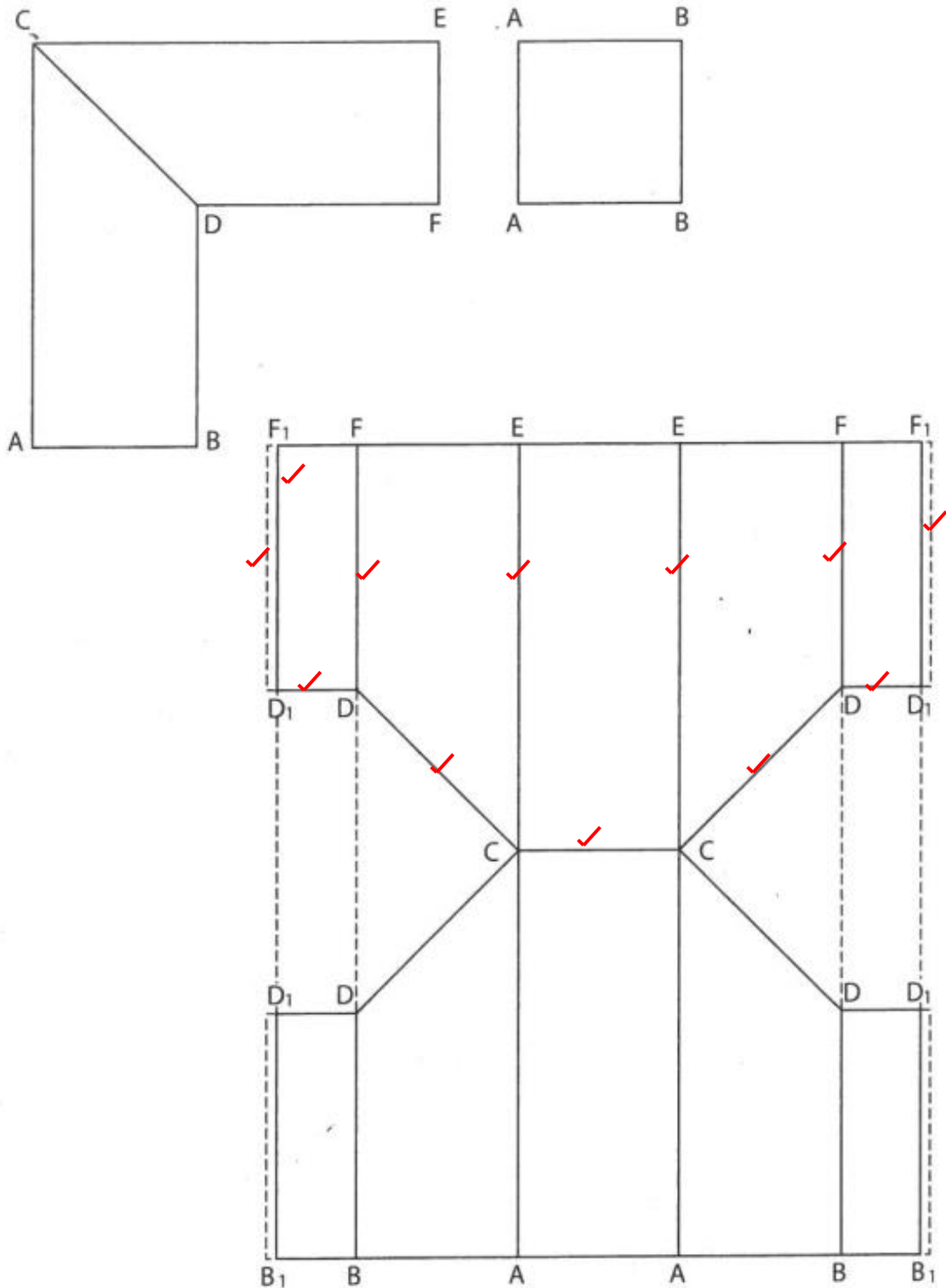
ANTWOORDBLAD ANSWER SHEET	C	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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- 5.5 FIGURE 5.5 on ANSWER SHEET C shows an excavation of 0,7 metre deep and 1 metre wide in firm soil. Draw in good ratio, the formwork for the excavation. Also show the labels of the THREE parts of the formwork. (7)



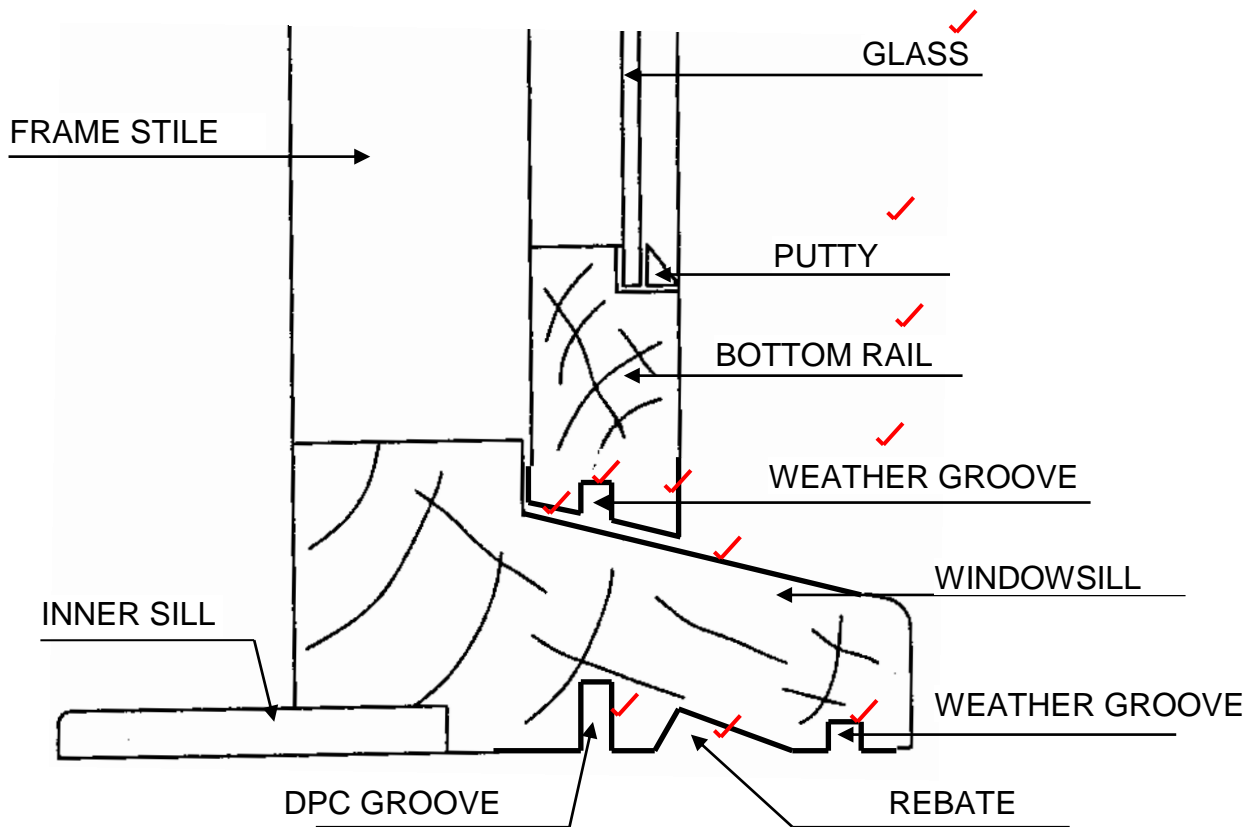
ANTWOORDBLAD ANSWER SHEET	D	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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5.1 FIGURE 5.1 on ANSWER SHEET D shows a square pipe elbow. Use ANSWER SHEET D and develop and draw the development of the pipe elbow on scale 1 : 1. Show 4 mm for the seam allowance on both side of the development. (12)



ANTWOORDBLAD	E	SIVIELE TEGNOLOGIE	NAAM: _____
ANSWER SHEET		CIVIL TECHNOLOGY	NAME: _____

- 4.7 4.7.1 Complete the view by drawing in the missing parts of the bottom rail and windowsill in good ratio (7)
- 4.7.2 Show any FOUR additional labels on the drawing. (4)



ANTWOORDBLAD ANSWER SHEET	F	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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- 5.2 5.2.1 Complete the section view AA by drawing in the bottom rail and the flat panel in good ratio. (6)
- 5.2.2 Also show the thickness of the panel on the drawing. (1)

