



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2020**

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

**MARKS: 200**

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This marking guideline consists of 15 pages.

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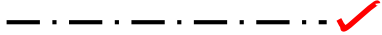
**QUESTION 1: SAFETY AND MATERIALS (GENERIC)**

- 1.1 Hard hat (1)
- 1.2 A tie can get stuck in the moving parts and cause injuries (1)
- 1.3 1.3.1 False (1)
- 1.3.2 False (1)
- 1.3.3 True (1)
- 1.3.4 True (1)
- 1.4 Storing of materials on site.
- 1.4.1 Any ONE area on which materials can be placed.  
  - Shelves
  - Pallets (1 x 1) (1)
- 1.4.2 Any ONE reason why heaps of sand and stone should be covered with plastic.  
  - To keep it clean
  - To prevent being washed away during rainfalls (Similar answer) (1 x 1) (1)
- 1.4.3 To prevent the materials from mixing (1)
- 1.5  $1\ 800\ \text{mm} \div 3\ (1) = 600\ \text{mm}\ (1)$  (2)
- 1.6 Reinforced concrete contains steel reinforcement bars (1)
- 1.7 Any ONE purpose of coarse aggregate in a concrete mixture:  
  - Provides volume stability to the concrete
  - Economical – forms the bulk of the mixture
  - Lowers the shrinkage potential of the concrete (1 x 1) (1)
- 1.8 Lime (1)
- 1.9 Screed (1)
- 1.10 Hardwood (1) and softwood (1) (2)
- 1.11 Any ONE use of plywood:  
  - Bottoms of drawers
  - Wall panelling
  - Door panels
  - Cupboard panels
  - Interior balustrades / railings
  - Framing (1 x 1) (1)

- 1.12 1.12.1 Non-ferrous metal (1)
- 1.12.2 Ferrous metal (1)
- 1.13 Any ONE use of lead in the building environment:
- Batteries
  - Cable sheaths
  - Lead pipes
- (Similar answer) (1 x 1) (1)
- 1.14 Any ONE use of stainless steel in the building environment:
- Sinks
  - Wash tubs / baths
  - Water taps
  - Water traps
  - Extractor fans
- (Similar answer) (1 x 1) (1)
- 1.15
- Dry-fit the parts to make sure the pipes are fitted in the right direction (1)
  - Apply a light coat of PVC glue to the fitting and the pipe (1)
  - Slightly twist and push parts into position (1)
- (3)
- 1.16 3 mm (1)
- 1.17 Any TWO uses of translucent glass:
- Bathroom / toilet windowpanes
  - Glass bricks for walls
  - Doors
  - Urban furniture and appliances
- (2 x 1) (2)
- 1.18 Thermoplastic (1) and thermosetting plastic (1) (2)
- [30]**

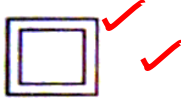
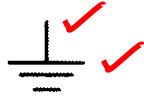

**QUESTION 2: EQUIPMENT, TOOLS AND GRAPHICS (GENERIC)**

- 2.1 Prevent rust (1)
- 2.2 Cold chisel is used to cut holes / grooves in concrete / brickwork / metal (1)  
Bolster is used to cut bricks (1) (2)
- 2.3 Name the tools in FIGURES 2.3.1 to 2.3.3 and name ONE use of each.
- 2.3.1 Pick (1)
- Any ONE use (1):
- Loosening hard ground during excavations
  - Breaking up rock (2)
- 2.3.2 Block brush (1)
- Any ONE use (1):
- Moistening plaster
  - Dampening surfaces / concrete (2)
- 2.3.3 Plane (1)
- Any ONE use (1):
- Planing timber
  - Smoothing rough surfaces on timber (2)
- 2.4 2.4.1 Spirit level (1)
- 2.4.2 Test if the head is horizontal (1) and if the stiles are installed vertically (1) (2)
- 2.4.3 Any TWO precautions for the spirit level:
- Wipe clean after use
  - Not allow plaster / cement to dry on it
  - Store in a dry place (2 x 1) (2)
- 2.5 2.5.1 Portable circular saw (1)
- 2.5.2 Any TWO uses:
- Cutting wood
  - Cutting other materials with specific blades
  - Cutting rebates (2 x 1) (2)
- 2.6 2.6.1 To include more information (1)
- 2.6.2 To highlight details (1) that may not be clearly understood (1) (2)
- 2.6.3 Open eave (1)

- 2.6.4 A – DPC (1)  
B – Beam filling / half brick wall (1)  
C – Facia board / plank (1)  
D – Single brick wall (1)  
E – Ceiling / Cornice (1) (5)
- 2.6.5 Prevents dust / vermin / etc. from entering underneath the roof (1)
- 2.6.6 Fixing gutters (1)
- 2.7 To ensure that the horizontal and vertical external measurements (1)  
correspond with the individually internal measurements (1) (2)
- 2.8 Bottom (1) on the right-hand side of drawing sheet (1) (2)
- 2.9 1 : 100 (1)
- 2.10 2.10.1 Natural ground level (1)
- 2.10.2 Finished floor level (1)
- 2.11 2.11.1  (2)
- 2.11.2  (2)
- 2.11.3  (1)

**[40]**

**QUESTION 3: QUANTITIES, JOINING AND GRAPHICS (GENERIC)**

- 3.1 3.1.1 Site plan (1)
- 3.1.2 123 (1)
- 3.1.3 Boundary wall (1)
- 3.1.4 B – Manhole C – Rodding eye (2)
- 3.2 ONE use of PVC glue:  
 • To bond PVC pipes (1 x 1) (1)
- 3.3 PVC adhesive (1)
- 3.4 3.4.1  (2)
- 3.4.2  (2)
- 3.4.3  (2)
- 3.5 The application steps for PVA adhesive:  
 (1) Dry-fit parts to make sure the pipes are fitted in the right direction  
 (2) Apply a light coat of PVC glue to the fitting and the pipe  
 (3) Slightly twist and push parts into position (3)
- 3.6 Any THREE precautions when using contact glue:  
 • Be careful not to allow the adhesive to dry fully before assembly  
 • Do not wait too long before assembling the parts  
 • The glue should not be applied too quickly (3 x 1) (3)
- 3.7 Any FIVE uses of silicone:  
 • Basic sealant against air and water leakage  
 • Textile uses  
 • Enhances materials  
 • Used in aviation  
 • Construction repairs  
 • Electronics (5 x 1) (5)

3.8 Any TWO properties of EACH of the following adhesives.

3.8.1 Silicone

- Heat resistant
- Conductive or insulating
- Rubbery
- Low heat conductivity
- Resist chemicals / low chemical reaction
- Low toxicity
- Waterproof / repels water (2 x 1) (2)

3.8.2 Contact glue

- Adheres well to most materials (plastics, rubber, paper, wood, etc.)
- Sticks to most non-porous materials
- Rubbery and has a creamy colour
- Flammable
- Water resistant
- Dries quickly and adheres / sticks immediately (2 x 1) (2)

3.8.3 PVA glue

- Water-based
- For interior and exterior use
- White or yellowish colour before it dries, clear when dry
- Yellow PVA is not completely clear on drying
- Super strong when used on wood
- Dries quickly
- Inexpensive (2 x 1) (2)

**[30]**

**QUESTION 4: MATERIALS, EQUIPMENT AND JOINING (SPECIFIC)**

- 4.1 4.1.1 True (1)
- 4.1.2 True (1)
- 4.1.3 False (1)
- 4.1.4 False (1)
- 4.1.5 True (1)
- 4.1.6 True (1)
- 4.2 220 mm (1)
- 4.3 English bond (1)
- 4.4 Clay / shale (1), sand (1) and lime (1) (3)
- 4.5 4.5.1 E (resistant against environmental factors) (1)
- 4.5.2 G (foundations) (1)
- 4.5.3 F (can return to its original shape) (1)
- 4.5.4 A (lintels) (1)
- 4.5.5 B (resistant against scratching and scouring) (1)
- 4.6 4.6.1 Concrete mixer (1)
- 4.6.2 Mixing large amounts of concrete, screed or mortar (1)
- 4.7 4.7.1 Any ONE purpose of the kickboard on scaffolding:  
  - Prevent tools from falling off
  - Prevents material from falling off
  - Prevent workers from slipping and injuring themselves (1 x 1) (1)
- 4.7.2 Prevent the scaffolding standards from sagging into the ground. (1)
- 4.7.3 Horizontal transoms (1)
- 4.7.4 Builder's trestle (1)
- 4.7.5 Mobile scaffolding (1)
- 4.8 Any TWO ways to fix wooden door and window frames to brickwork:  
  - Hoop iron ties
  - Long nails
  - Fixing lug / metal straps (2 x 1) (2)



- 4.9 Any TWO types of wall ties:
- Stainless steel wall tie
  - Butterfly pattern
  - Nylon wall tie
  - Twisted pattern
  - Double triangle (2 x 1) (2)
- 4.10 4.10.1 As an outlet for water inside the wall / provide air to the inside of the wall to help it drying out (1)
- 4.10.2 Eight metres (1)
- 4.10.3 Very wet regions (1)
- [30]**

**QUESTION 5: EXCAVATIONS, FOUNDATIONS AND STEEL (SPECIFIC)**

- 5.1 5.1.1 A – Sighting line (1)
- B – Boning / measuring stick (1)
- C – Profile board / profile plank (1)
- 5.1.2 150 mm (1)
- 5.1.3 Top of peg is to where the foundation must be poured (1)
- 5.1.4 Any TWO types of equipment that can be used to ensure that the  
pegs are level:  
• Spirit level / spirit level with straight edge  
• Dumpy level  
• Pipe level (2 x 1) (2)
- 5.2 Scooping water with a bucket (1)
- 5.3 5.3.1 True (1)
- 5.3.2 True (1)
- 5.3.3 True (1)
- 5.4 Identify and choose THREE of the statements below that could cause trench  
accidents:
- 5.4.2 Excavated earth is less than 600 mm from the edge of the trench (1)
- 5.4.3 Changing ground conditions, especially after rainfalls (1)
- 5.4.5 Near streams, old sewers and underground cables (1)
- 5.5 See ANSWER SHEET A. (6)
- 5.6 5.6.1 B (enlarge concrete base) (1)
- 5.6.2 D (concrete pile with a steel tip) (1)
- 5.6.3 C (maximum depth of 15 metres) (1)

5.7 Any THREE advantages of piles:

- Can be used in poor soil
- Can be used anywhere, even in water
- Larger base ensures stability
- Relatively quick and easy to install, if equipment is available
- If prefabricated piles are used, much time is saved
- Resists tensile stress well
- Quick and less expensive to produce
- Can be manufactured elsewhere beforehand
- Installation can continue, even in poor weather conditions
- Length of piles can easily be adjusted, depending on circumstances
- Offers sound resistance against moving soil (3 x 1) (3)

5.8 5.8.1 Lip channel (are sometimes referred to as purlins) (1)

5.8.2 I-beam (the flanges and web differ in size) (1)

5.8.3 U-channel (metal rail that fits over shower glass panels) (1)

5.8.4 H-beam (the flanges and web are the same in size) (1)

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**QUESTION 6: FORMWORK, BRICKWORK, STAIRS AND QUANTITIES (SPECIFIC)**

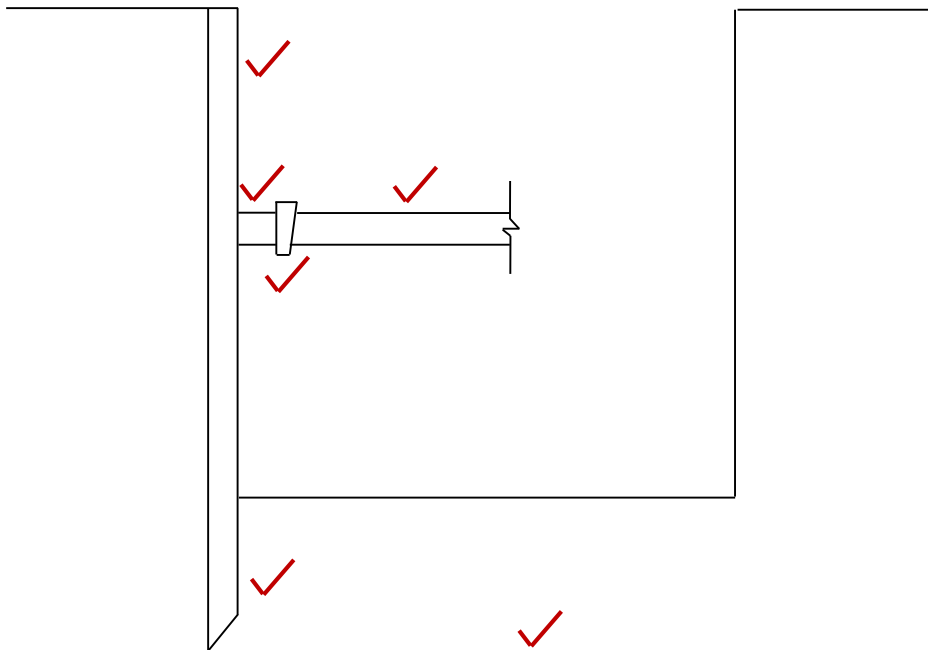
- 6.1 Any THREE requirements of good formwork:
- Sturdy enough to bear the mass of wet concrete without collapsing
  - Strong enough to provide sufficient support, without deflection
  - Easy to repair on site
  - Erected accurately
  - Sealed properly – no leaking and forming of honeycombing / fins
  - Free of dirt (sawdust / release agents)
  - Quick and simple to erect (hand / mechanical)
  - Correct depth for reinforcing – to prevent failure
  - Easy to remove
  - Close-fitting along joints and seams
  - Must be made of recyclable components (3 x 1) (3)
- 6.2 6.2.1 In-situ concrete: prepared / mixed concrete on site (1)
- 6.2.2 Formwork: a mould or structure into which wet concrete is poured to take the shape, (1) and to support until concrete has hardened and strengthened (1) (2)
- 6.3 Any TWO reasons for the cover depth of reinforcement in concrete:
- To protect steel against corrosion / rust
  - To provide adequate bonding between the steel and concrete
  - To ensure adequate protection of steel in an event of fire (2 x 1) (2)
- 6.4 75 mm (1)
- 6.5 Any TWO disadvantages of prefabricated lintels:
- Lintels are only available 28 days after casting – curing time
  - Trained workers are needed to make lintels
  - Shapes have to be strengthened by every means possible – e.g. camps
  - Must be designed by a capable designer (2 x 1) (2)
- 6.6 To make it easier to remove the lintel from the mould (1)
- 6.7 6.7.1 Gauged arch (1)
- 6.7.2 A – Extradados (1)
- B – Springer (1)
- C – Intrados (1)
- D – Key brick (1)
- 6.8 Any ONE type of material that can be used for the construction of stairs:
- Timber / wood
  - Steel
  - Concrete (1 x 1) (1)

6.9	6.9.1	Riser	(1)
	6.9.2	Tread / going	(1)
	6.9.3	Run	(1)
6.10		750 mm	(1)
6.11		See ANSWER SHEET B.	(18)
			<b>[40]</b>

**TOTAL: 200**

ANSWER SHEET	A	CIVIL TECHNOLOGY CONSTRUCTION	NAME AND SURNAME	

5.5 ANSWER SHEET A shows an incomplete vertical section of an excavation in loose, dry soil. Complete ANSWER SHEET A by drawing the necessary formwork parts on the **left-hand** side. (6)



Parts drawn in good proportion

Vertical plank	1	
Vertical plank - correct depth	1	
Yoke	1	
Wedge	1	
Strut	1	
Parts drawn in good proportion / scale	1	
<b>TOTAL</b>	<b>6</b>	

ANSWER SHEET	<b>B</b>	CIVIL TECHNOLOGY CONSTRUCTION	NAME AND SURNAME	

6.11 Calculate the amount of bricks required.

A	B	C	D
			<b>Centre line:</b>
			2 / 6 000 = 12 000 (1) ✓
			2 / 3 000 = <u>6 000</u> (1) ✓
			18 000 (1) ✓(3)
✓			<b>Area of wall:</b>
1 / (1)	18 m (1) ✓		Area = L x H
	<u>2,7 m</u> (1) ✓	<u>48,6 m<sup>2</sup></u> (1) ✓	(4)
✓			<b>Area of door:</b>
1 / (1)	2,4 m (1) ✓		Opp. = B x H
	<u>2,1 m</u> (1) ✓	<u>5,04 m<sup>2</sup></u> (1) ✓	(4)
			<b>True area of bricks:</b>
			= Area of wall - area of door
			= 48,6 m <sup>2</sup> (1) ✓ - 5,04 m <sup>2</sup> (1) ✓
			= 43,56 m <sup>2</sup> (1) ✓ (3)
✓			<b>Bricks:</b>
2 / (1)	43,56 m <sup>2</sup> (1) ✓		50 Bricks / m <sup>2</sup> (2 leaves)
	<u>50</u> (1) ✓	<u>4 356 bricks</u> (1) ✓	(4)
	<b>OR</b>		
1 /	43,56 m <sup>2</sup>		
	<u>100</u>	<u>4 356 bricks</u>	<b>[18]</b>