



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2015

**CIVIL TECHNOLOGY
MEMORANDUM**

MARKS: 200

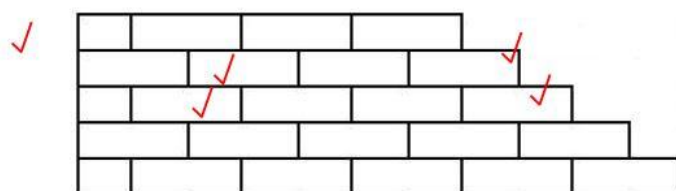
This memorandum consists of 9 pages.

QUESTION 1: CONSTRUCTION PROCESSES

- 1.1 1.1.1 Resist tensile force (1)
- 1.1.2 Resist compressive force (1)
- 1.1.3 Resist shear force (1)
- 1.1.4 Bind main bars
Resist shear force (2 x 1) (2)
- 1.2 Supply the steel supplier (1) the drawing/shape code (2) for sizes/bending of the bar. (2)
- 1.3 (1) Are the correct (2) bars/shapes used
(1) Are the bars (2) the correct thickness
(1) Are the bars (2) fixed as prescribed
(1) Are the correct spacers used for (2) the specified concrete cover
(1) Check that at least two stirrups (2) cross the failure/shear line
(1) Angles of the shear bar must (2) cross the failure line at 45°. (Any 4 x 2) (8)
- 1.4 Downward load (1)
- 1.5 Last longer than wood
Can be used over and over
Obtains a smooth surface (Any 2 x 1) (2)
- 1.6 1.6.1 Tie (1)
- 1.6.2 Strut (1)
- 1.6.3 Bearer (1)
- 1.6.4 Brace (1)
- 1.6.5 Prop (1)
- 1.6.6 Sole plate (1)
- 1.7 (1) Steel is tensioned in the formwork, (2) then the concrete is cast. (3) When the concrete has hardened, the steel is released from the tension. (3)
- 1.8 Time-saving
Mechanisation during manufacturing
Do not use space and resources on site
Manufactured under controlled conditions (Any 3 x 1) (3)

[30]**QUESTION 2: ADVANCED CONSTRUCTION PROCESSES**

- 2.1 2.1.1 FIVE brick layers (1)
- 2.1.2 Stretcher bond (1)
- 2.1.3 Dead end at the left hand-side (1)
- 2.1.4 Raking back at the right hand-side (2)



- 2.2 (1) Set building lines from corner to corner (2) to build brick work on an even (2)

height/straight.

- 2.3 (1) Roof trusses are fixed on it (2) to spread the load of the trusses evenly. (2)
- 2.4 2.4.1 TRUE (1)
 2.4.2 TRUE (1)
 2.3.3 FALSE (1)
 2.4.4 FALSE (1)
 2.4.5 FALSE (1)
- 2.5 Any similar answer:
 (1) Damp penetrates through the outer wall and runs down to the DPC (2) and must then run out at the weep-holes to prevent damming. (Any 2 x 1) (2)
- 2.6 It relies on:
 (1) mass and (2) interlocking/friction to perform the retaining function. (2)
- 2.7 2.7.1 Offers an open working space underneath the shoring. (1)
- 2.7.2 Any FIVE factors which will influence the type of design for the shoring.
 Nature of the soil
 Depth of the excavation
 Weather conditions
 Duration of project
 Presence of water in soil
 Availability of material
 Cost
 Individual preference (Any 5 x 1) (5)
- 2.7.3 2.7.A – Shutter board
 2.7.B – Strut (2)
- 2.8 2.8.1 Level (1)
 2.8.2 Hand hawk (1)
 2.8.3 Granolithic groover (1)
 2.8.4 Block brush (1)
 2.8.5 Electric router (1)
- 2.9 Any THREE safety measures:
 (1) Cutter blocks should be (2) covered with a machine guard
 (1) Beware of kick-backs, (2) stand aside the machine
 (1) Avoid timber with (2) too many knots
 (1) Avoid timber which is (2) wrapped and twisted too much (Any 3 x 2) (6)
- 2.10 Any THREE measures:
 Keep neck straight/not bent
 Move patient as little as possible
 Move patient as a unit
 When doing rescue breathing, pull the jaw forward – do not bend the neck (Any 3 x 1) (3)

[40]

QUESTION 3: CIVIL SERVICES

3.1 (1) Controls the incoming water supply (2) by reducing it to an acceptable pressure and (3) forwarding a constant downstream pressure into the installation. (3)

3.2 Vacuum breaker (1)

3.3 (1) To catch water leaks/drained water (2) and lead it outside/not to damage the ceiling. (2)

3.4 3.4.1 FALSE (1)

3.4.2 TRUE (1)

3.4.3 FALSE (1)

3.4.4 FALSE (1)

3.4.5 TRUE (1)

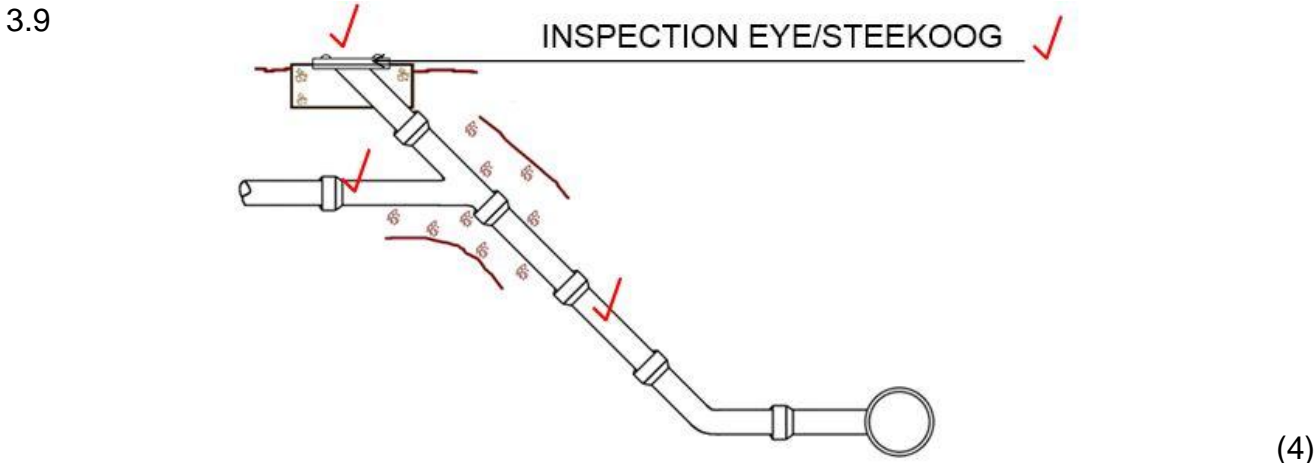
3.4.6 FALSE (1)

3.5 (1) Controls the water level (2) in water closets/water tanks. (2)

3.6 Any FOUR:
 Where two or more drain lines converge
 Where the main drain changes direction
 Within 1,5 m of the servitude boundary before the main public sewer connection
 Every 25 m (Any 4 x 1) (4)

3.7 Access opening/Cleaning (1)

3.8 (1) Prevent blockages (2) at change in direction. (2)





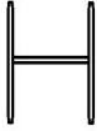
3.10 1 : 60 (1)

3.11 3.11.1  (2)

3.11.2  (2)

[30]

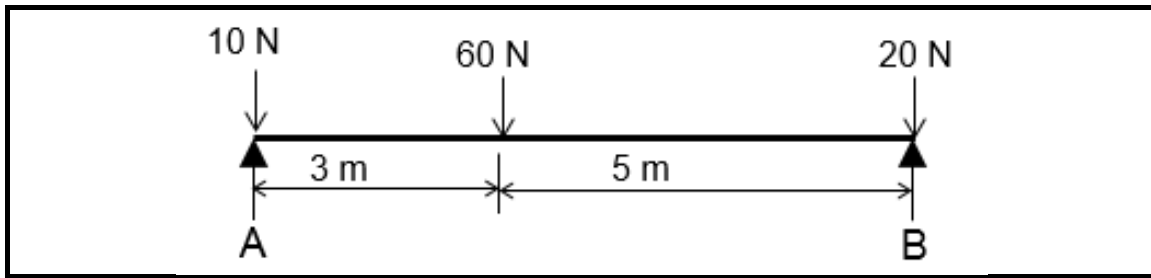
QUESTION 4: MATERIALS AND QUANTITIES

- 4.1 4.1.1  (2)
- 4.1.2  (2)
- 4.1.3  (2)
- 4.2 Any FIVE properties:
Oily; Dark colour; Durable; Resistance to leaching of water; Does not cause corrosion of metals in wood; Does not change the dimensions of the timber; Timber treated with it cannot be painted; Offensive smell; Only for exterior use (Any 5 x (5)
- 4.3 (1) To protect wood against (2) rotting/pests/insect bores, etc. (Any 2 x (2)
- 4.4 Aluminium is resistant to corrosion. (1)
- 4.5 Corrosion (1)
- 4.6 (1) Designer can then choose the correct material (2) for the specific work. (2)
- 4.7 Any FIVE properties of glass.
Solid and hard
Disordered and amorphous structure
Fragile
Transparent
Biologically inactive
100% recyclable
Does not fade, corrode, stain or deteriorate (Any 5 x (5)
- 4.8 (1) Silver metal coating is (2) applied to a flat glass surface. The silver coating is covered with (3) a layer of copper and (4) a base paint. (4)
- 4.9 A – Multiplication column
B – Measurement column
C – Result column
D – Description column (4)

[30]

QUESTION 5: APPLIED MECHANICS

5.1



	Around A		Around B
L.O.M. ✓ =	R.O.M. ✓	R.O.M. ✓ =	L.O.M. ✓
Bx8 =	(60x3)+(20x8)	(Ax8) =	(60x5)+(10x8)
B6 =	180 + 160	A6 =	300 + 80
B =	$\frac{340}{8}$ ✓	A =	$\frac{380}{8}$ ✓
=	8	=	47,5 N ✓
=	42,5 N ✓		

(10)

5.2 FIGURE 5.2 on sheet A shows a frame structure with pointed loads. Complete the following on sheet A:

5.2.1 The force diagram on scale 1 N = 1 mm (8)

5.2.2 The table by indicating the size and nature of the forces (8)

5.3

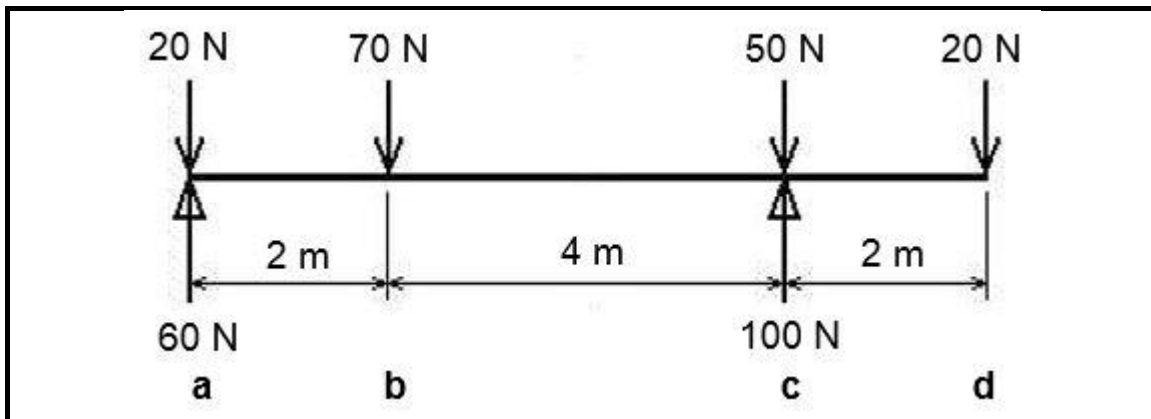


FIGURE 5.3

$$\begin{aligned}
 a &= 0 \quad \checkmark \\
 b &= (60 \times 2) + (-20 \times 2) = 80 \text{ N} \quad \checkmark \\
 c &= (60 \times 6) + (-20 \times 6) + (-70 \times 4) = -40 \text{ N} \quad \checkmark \\
 d &= (-10 \times 8) + (-40 \times 6) + (60 \times 6) + (-20 \times 2) = 0 \quad \checkmark
 \end{aligned}$$

(4)
[30]

QUESTION 6: GRAPHICS AND COMMUNICATION

6.1 SHEET C indicates the natural ground level for a section view through a wall construction with a window. Use SHEET C and draw to scale 1 : 50 the section drawing of one wall construction of a dwelling.

The following information must be indicated:

- 6.1.1 Scale 1 : 50 (2)
- 6.1.2 600 mm x 200 mm concrete foundation with the concrete symbol (3)
- 6.1.3 Undisturbed ground symbol (1)
- 6.1.4 Foundation wall (1)
- 6.1.5 100 mm Ground filling with the symbol (2)
- 6.1.6 100 mm Concrete floor with the symbol (2)
- 6.1.7 Damp-proof layer under the floor (1)
- 6.1.8 Cavity wall with hatching (3)
- 6.1.9 Damp proof layer in the cavity wall (2)
- 6.1.10 2,6 m Wall height from floor level to the ceiling (1)
- 6.1.11 Window sill (1)
- 6.1.12 900 mm window (1)
- 6.1.13 Window lintel (1)
- 6.1.14 Window damp-proof layer (1)
- 6.1.15 Beam filling (1)
- 6.1.16 114 x 38 mm Wall plate (1)
- 6.1.17 114 mm Tie beam and rafter with a 30° roof pitch (2)
- 6.1.18 Bottom two 38 x 38 mm purlines with tiles (2)
- 6.1.19 Line work and neatness (2)

6.2 Make neat sketches to illustrate each of the following symbols:



[40]

TOTAL: 200

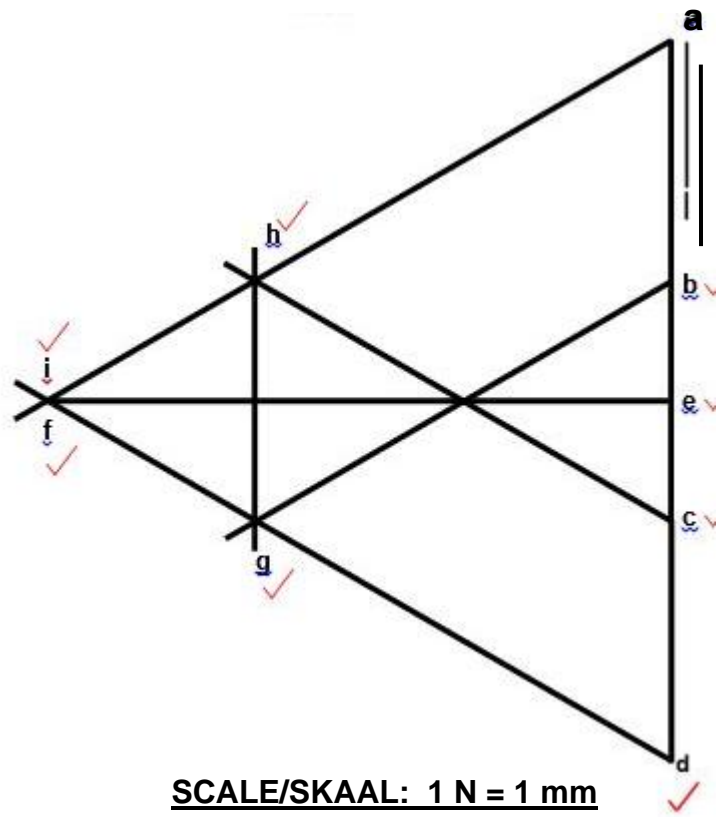
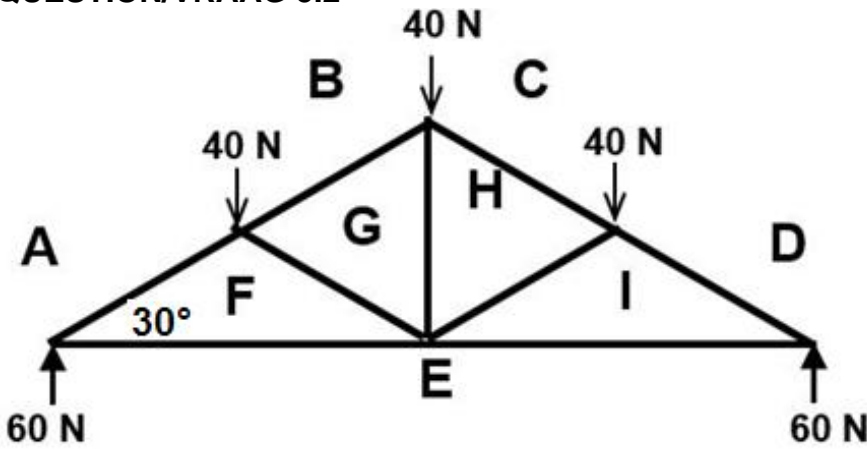
ANSWER SHEET
ANTWOORDBLAD

CIVIL TECHNOLOGY
SIVIELE TEGNOLOGIE

NAME:
NAAM: *Memorandum*

QUESTION/VRAAG 5.2

(16)



SCALE/SKAAL: 1 N = 1 mm

PART/DEEL	STRUT/STUT	TIE/STANG
AF	118 N	
BG	80 N	
CH	80 N	
DI	118 N	
EI		102 N
EF		102 N
FG	39 N	
GH		40 N
HI	39 N	

(4)

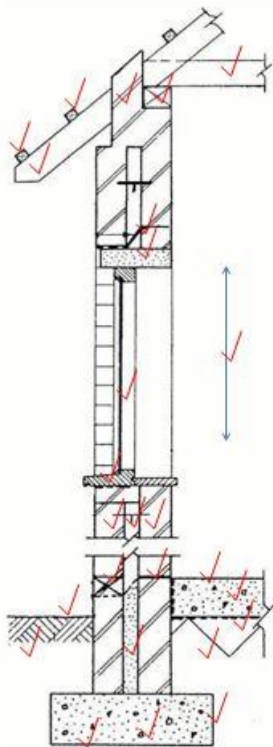
ANSWER SHEET
ANTWOORDBLAD **B**

CIVIL TECHNOLOGY
SIVIELE TEGNOLOGIE

NAME:
NAAM: *Memorandum*

QUESTION/VRAAG 6.1

(30)



Correct scale	2	
Foundation + Symbol	3	
Undisturbed ground symbol	1	
Foundation wall	1	
Ground filling symbol	2	
Concrete floor + Symbol	2	
Floor DPC	1	
Cavity wall + Hatching	3	
Wall DPC	2	
Wall height	1	
Window sill	1	
Window	1	
Window lintel	1	
Window DPC	1	
Beam filling	1	
Wall plate	1	
Tie beam + Rafter	2	
Purlines	2	
Line work/Neatness	2	
TOTAL	30	

NATURAL GROUND LEVEL



SECTION ELEVATION

SCALE 1:50