



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2014**

**CIVIL TECHNOLOGY  
MEMORANDUM**

**MARKS: 200**

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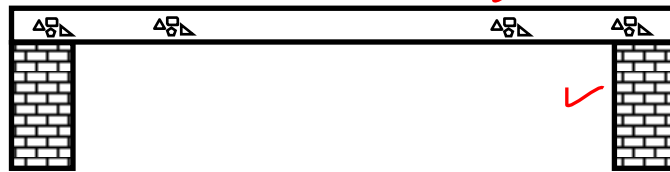
This memorandum consists of 13 pages.

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**QUESTION 1: CONSTRUCTION PROCESSES**

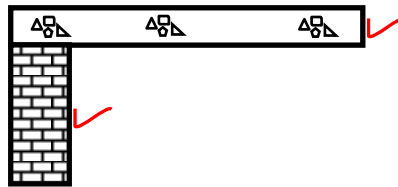
1.1 Make neat line sketches of the following beams:

1.1.1 Simple supported beam;



(2)

1.1.2 Cantilever beam.



(2)

1.2 (1) Concrete is weak (2) under tensile stress, therefore it must be (3) reinforced with steel which (4) is strong under tensile stress.

(4)

1.3 Any FOUR requirements for good steel reinforcement.

- High tensile force
- Ability to be bent into any shape
- Surface should bond adequately with concrete
- Rust free
- Surface must be clean/not contaminated

(4 x 1) (4)

1.4 (1) Loss of concrete leads (2) to honeycombing

(2)

1.5 Prevent concrete to grip onto formwork.

(1)

1.6 1.6.1 FALSE

(1)

1.6.2 FALSE

(1)

1.6.3 FALSE

(1)

1.6.4 TRUE

(1)

1.6.5 TRUE

(1)

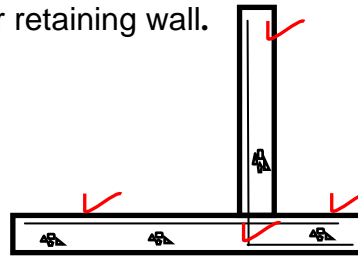
1.7 Any FOUR factors considered when retaining walls are designed.

- Pressure exerted by the soil
- Type of soil on which the wall must be build
- Material available
- Degree of sliding response
- Water filtering through

(4 x 1) (4)

1.8 (1) Triangular counter forts/butresses (2) which anchor the vertical wall on the foundation. (2)

1.9 Make a neat sketch of a concrete cantilever retaining wall.



(4)  
[30]

**QUESTION 2: ADVANCED CONSTRUCTION PROCESSES**

- 2.1 2.1.1 A – Scaffold tubing/pipe/standards  
B – Scaffold board/platform  
C – Baseplate (3)
- 2.1.2 Any TWO parts that are missing in the scaffolding.
- Cross bracing
  - Safety rails (2 x 1) (2)
- 2.1.3 Any FOUR safety measures for scaffolding.
- Vertical standards inclined towards the building
  - Must have baseplates
  - Putlogs and transforms be fixed securely
  - Tied to building at 10 m intervals
  - Diagonal braces
  - Span between standards not less than 2 400 mm
  - Trained people to erect scaffolds
  - No components removed whilst people working on scaffold
  - Scaffold planks at least 228 x 38 mm
  - Scaffold planks securely fastened (4 x 1) (4)
- 2.2 Dry chemical/ CO<sub>2</sub>
- 2.3 2.3.1 FALSE (1)  
2.3.2 FALSE (1)  
2.3.3 TRUE (1)  
2.3.4 TRUE (1)  
2.3.5 TRUE (1)
- 2.4 Any TWO requirements for the wall construction for a dwelling.
- Strength to resist (2) downwards forces
  - Stability to high insulation against (2) rain, cold, heat an noise
  - Stability during (2) fires
  - (1) Enough openings for (2) light and ventilation (2 x 2) (4)
- 2.5 10 mm (1)
- 2.6 2.6.1 Stretcher bond (1)  
2.6.2 220 mm (1)  
2.6.3 Brick force (1)  
2.6.4 (1) Strengthen (2) walls/prevent cracking (2)

- 2.7 Any TWO functions of the cavity between two leaves of a cavity wall.
- Damp proofing
  - Temperature insulation
  - Noise insulation (2 x 1) (2)
- 2.8 2.8.1 oxide (1)
- 2.8.2 cleats (1)
- 2.8.3 Galvanised (1)
- 2.8.4 lintels (1)
- 2.8.5 factory (1)
- 2.9 Any ONE use of each of the following tools.
- 2.9.1 Straight edge
- Finishing off plaster work
  - Guide to plaster reveals (1)
- 2.9.2 Hand hawk
- Carry plaster
  - Mixing small quantities of filler (1)
- 2.9.3 Portable electrical router
- Profiles
  - Intricate joints
  - Decorative cuts
  - Inlays
  - Dovetail joints (1)
- 2.9.4 Band saw
- Cross cutting
  - Ripping
  - Tracery
  - Curves
  - Circles (1)
- 2.10 2.10.1 Skirting/Quarter round (1)
- 2.10.2 Dado rail (1)
- 2.10.3 Architrave (1)
- 2.10.4 Cornice (1)
- [40]**

**QUESTION 3: CIVIL SERVICES**

3.1 (1) Control (2) water temperature (2)

3.2 3.2.1 200 mm (1)

3.2.2 300 mm (1)

3.3 Any TWO functions of vacuum breakers for a geyser.

- Protect cylinder (2) from vacuum collapse
- Vents the system (2) when draining
- Prevents siphoning (2) and damage to the cylinder (2 x 2) (4)

3.4 Any TWO requirements for the drip tray for a geyser.

- Under each geyser
- Large enough
- 50 mm discharge pipe (2 x 1) (2)

3.5 Any FOUR advantages of copper water pipes.

- Corrosion resistant
- Warm and cold water
- Easy to work with
- Easy to bend
- Low maintenance
- No heavy equipment for piping (4 x 1) (4)

3.6 P-trap.



(3)

3.7 3.7.1 Watertight (1)

3.7.2 Solids (1)

3.7.3 100 mm (1)

3.7.4 6 m (1)

3.7.5 1 m (1)

3.8 Calculate the top invert level for a 110 mm drain pipeline.

300 mm

+ 110 mm

410 mm

(3)

- 3.9 (1) Water flow faster (2) than the solids and (3) create blockage (3)
- 3.10 Any TWO methods to test drains.
- Mirror check
  - Ball check
  - Hydraulic test
  - Air test
  - Smoke test
- (2 x 1) (2)  
[30]

#### QUESTION 4: MATERIALS AND QUANTITIES

- 4.1 4.1.1 Measurement column (1)
- 4.1.2 16 (1)
- 4.1.3 (1) Each item in column A, B and C (2) are described (1)
- 4.2 
$$\begin{array}{r} 10\ 000 \times 2 \\ + 6\ 000 \times 2 \\ \hline 32\ 000 \\ - 600 \times 4 \\ \hline 29\ 000 \end{array}$$
 (4)
- 4.3 Any FOUR properties of mild steel.
- 0,1 – 0,33% carbon
  - Ferrous metal
  - Can corrode
  - Must be protected
  - Soft
  - Easy usable
  - Easy obtainable
- (4 x 1) (4)
- 4.4 (1) Coastal areas subjected to rust as a result of weather conditions.  
(2) Aluminium has a high resistance to rust. (2)
- 4.5 Any TWO factors that determine the thickness of a window pane.
- Height of pane
  - Width of pane
  - Possible wind pressure
- (2 x 1) (2)
- 4.6 Briefly describe the reaction of armoured glass when it breaks.  
(1) Disintegrates in (2) small cubes. (2)
- 4.7 4.7.1 Concrete/hollow brick (1)
- 4.7.2 Concrete (1)

4.7.3 Any TWO advantages of this type of brick.

- Cheaper
- Build faster (2 x 1) (2)

4.7.4 (1) Brick are porous/not water tight (2) plaster offers resistance to damp/Strengthen walls (2)

4.7.5 Any ONE purpose of the openings in the brick.

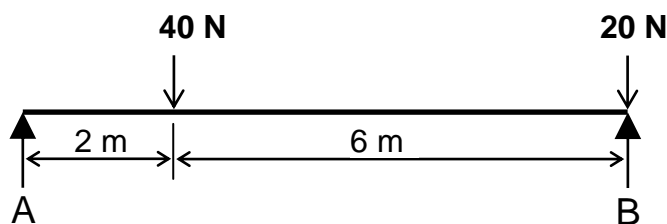
- Lighter
- Insolation
- Cheaper/Less concrete (1 x 1) (1)

4.8 (1) Wood is placed in pressure chamber (2) and chemicals are (3) forced into the wood (4) by raising the pressure inside the tank (4)

4.9 Corrugated/IBR-plate (1) [30]

### QUESTION 5: APPLIED MECHANICS

5.1 FIGURE 5.1 shows a beam which is supported by supports A and B. Calculate the reaction force of support B.



$$\begin{aligned}
 &\text{Om A} \\
 &\text{LOM} = \text{ROM} \\
 &B \times 8 = (40 \times 2) + (20 \times 8) \\
 &B \times 8 = 80 + 160 \\
 &B = \frac{240}{8} \\
 &= 30 \text{ N}
 \end{aligned}
 \tag{5}$$

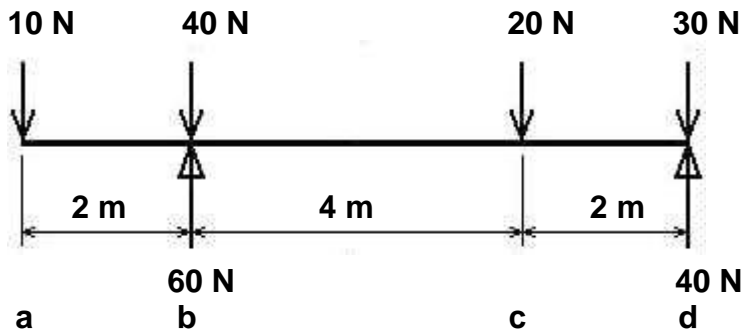
5.2 FIGURE 5.2 on sheet A shows a beam with pointed loads. Calculate on sheet A the following.

5.2.1 The shear force values, (4)

5.2.2 and complete the shear force diagram according to the shear force values. (5)



5.3 FIGURE 5.3 shows a beam with pointed loads. Calculate the bending moment values from point a to d. (5)


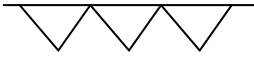




$a = 0 \text{ N}$  ✓  
 $b = (-10 \times 2) = -20 \text{ NN}$  ✓      Units (N) indicated: ✓  
 $c = (-10 \times 6) + (-40 \times 4) + (60 \times 4) = 20 \text{ N}$  ✓  
 $d = (-10 \times 8) + (-40 \times 6) + (60 \times 6) + (-20 \times 2) = 0$  ✓

5.4 Make use of the information on answer sheet B and calculate on answer sheet B the centroid of FIGURE 5.4 by completing the table. Calculate the centroid from point P and show all the calculations and formulas.

(11)  
[30]

**QUESTION 6: GRAPHICS AND COMMUNICATION**

- 6.1 Answer the following questions with regard to the floor plan of the bathroom in figure 6.1 on sheet C. Complete the floor plan by drawing in the following symbols on scale 1 : 50.
- 6.1.1 Door at 6.1 A (2)
- 6.1.2 Window at by 6.1 B (3)
- 6.1.3 Shower at 6.1 C (2)
- 6.1.4 Toilet at 6.1 D (2)
- 6.1.5 Gully and abbreviation at 6.1 E (2)
- 6.1.6 Rodding eye and abbreviation at 6.1 F (2)
- 6.1.7 Use the information on sheet C and do the measurement writing of the west elevation according to standard building drawing practice. (11)
- 6.2 (1) Describe the type, size and nature of window/door for  
(2) reference by contractor
- 6.3 6.3.1 Concrete  (2)
- 6.3.2 Hardcore filling  (2)
- 6.3.3 Undisturbed earth  (2)
- 6.3.4 Glass.  (2)
- 6.4 220 x 110 x 75 mm (3)
- 6.5 Any THREE of the following requirements which must be indicated in a section elevation.
- 6.5.1 Foundation sizes
- 6.5.2 Foundation walls
- 6.5.3 Gutters (3)
- [40]**

**TOTAL: 200**

ANTWOORDBLAD	<b>A</b>	SIVIELE TEGNOLOGIE	NAAM:
ANSWER SHEET		CIVIL TECHNOLOGY	NAME:

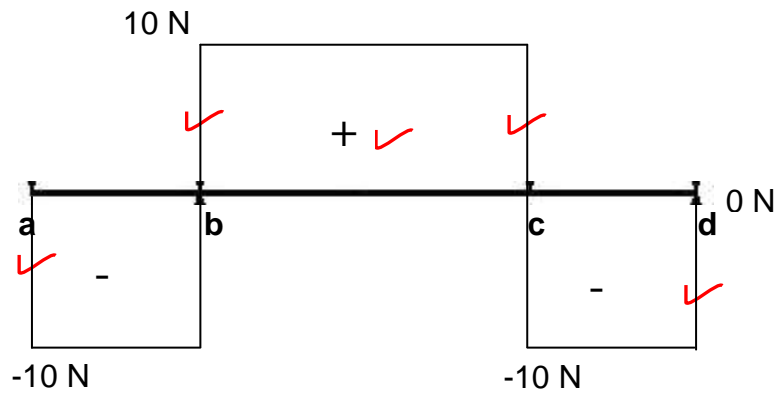
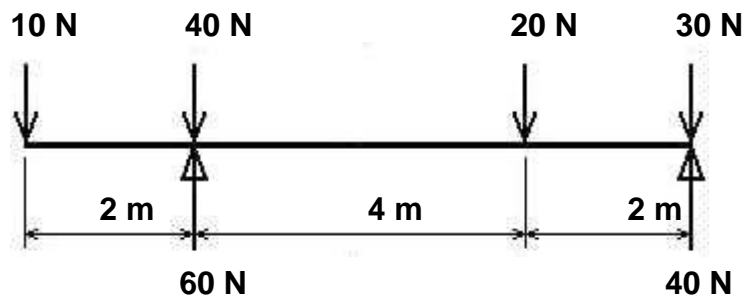
VRAAG/QUESTION 5.2

5.2 5.2.1 Die skuifkragwaardes/The shear force values

$a = \dots -10..$  ✓  
 $b = \dots -10 - 40 + 60 = 10 \text{ N}..$  ✓ Units (N) not indicated: -1  
 $c = \dots 10 - 20 = -10 \text{ N}..$  ✓  
 $d = \dots -10 - 30 + 40 = 0..$  ✓

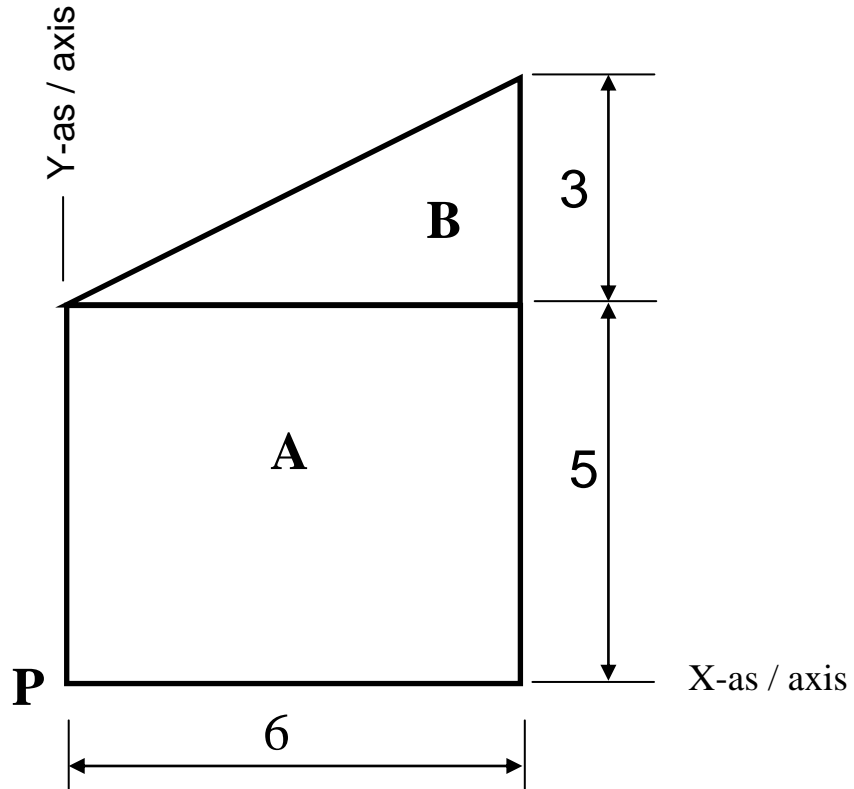
5.2.2 Die skuifkrag diagram/The shear force diagram

**SCALE/SKAAL: 1 N = 2 mm**



ANTWOORDBLAD	<b>B</b>	SIVIELE TEGNOLOGIE	NAAM:
ANSWER SHEET		CIVIL TECHNOLOGY	NAME:

VRAAG/QUESTION 5.4

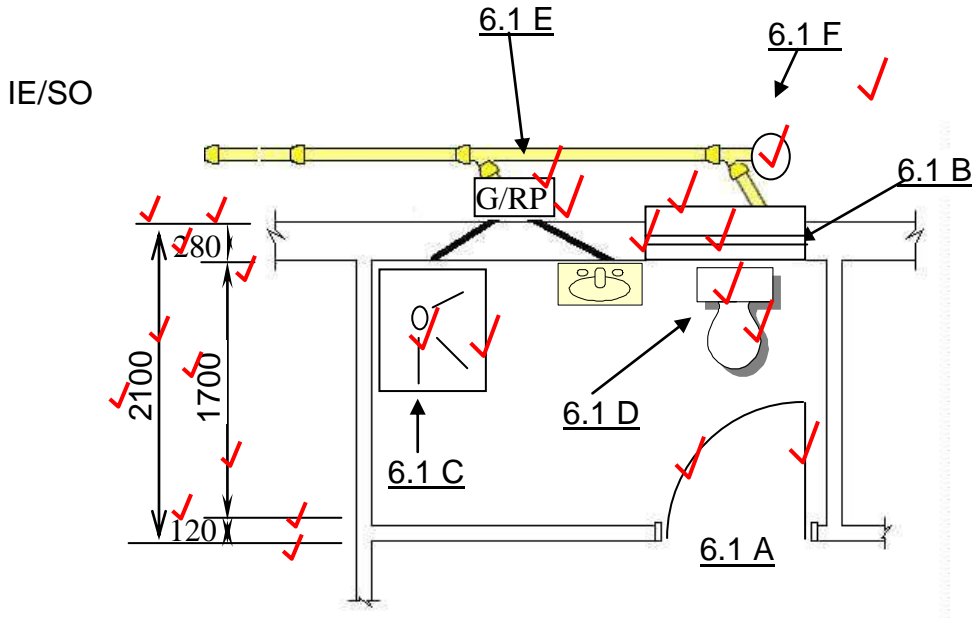


Form	Area	X	AX	Y	AY
A 	$l \times b$ $6 \times 5$ $= 30$ (1)	$\frac{b}{2}$ $\frac{6}{2} = 3$ (1)	90 (1)	$\frac{h}{2}$ $\frac{5}{2} = 2\frac{1}{2}$ (1)	= 75 (1)
B 	$\frac{1}{2}bh$ $\frac{1}{2}6 \times 3$ $= 9$ (1)	$\frac{b}{3}$ $\frac{6}{3} = 2$ $= 6 - 2 = 4$ (1)	36 (1)	$\frac{h}{3}$ $\frac{3}{3} = 1$ $= 1 + 5 = 6$ (1)	= 54 (1)
<b>Total</b>	<b>39</b> (1)		<b>126</b> (1)		<b>129</b> (1)

$$X = \frac{126}{39} = 3,23 \dots (1) \quad Y = \frac{129}{39} = 3,31 \dots (1)$$

ANTWOORDBLAD	<b>C</b>	SIVIELE TEGNOLOGIE	NAAM:
ANSWER SHEET		CIVIL TECHNOLOGY	NAME:

**VRAAG/QUESTION 6.1**

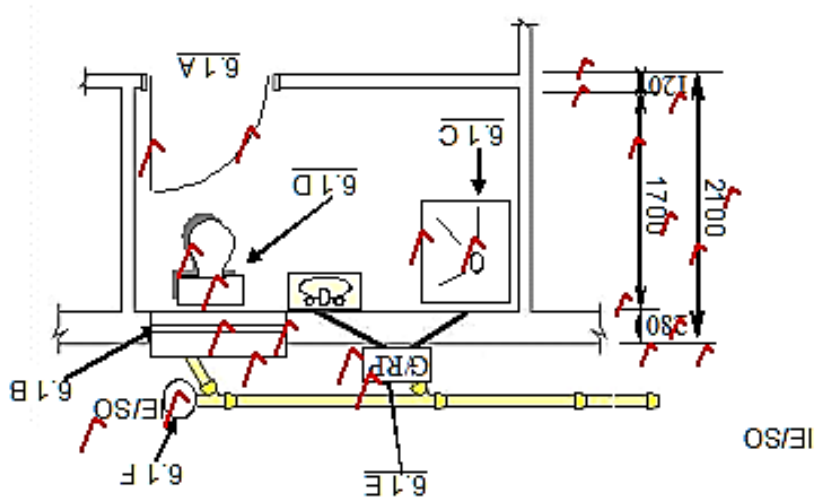


**BATHROOM FLOORPLAN  
SCALE 1 : 50**

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

BADKAMER BINNENMATE: 3 m x 1,7 m  
 BUITENMUUR DIKTE: 280 mm  
 BINNENMUUR DIKTE: 120 mm

**BADKAMERVLOERPLAN**  
 SKAAL 1 : 50

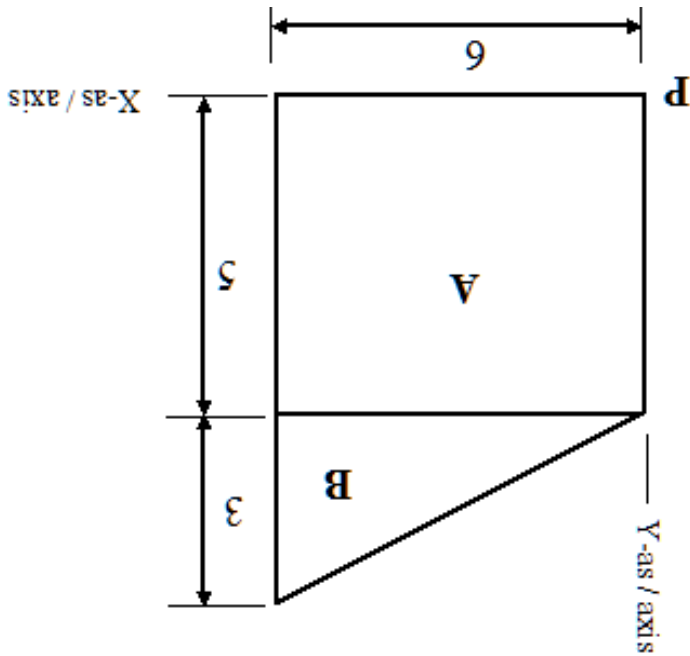


VRAAG/QUESTION 6.1

ANSWER SHEET	C	CIVIL TECHNOLOGY	NAME:	
ANTWOORDBLAD		SIVIELE TECHNOLOGIE	NAAM:	

ANTWOORDBLAD	<b>B</b>	SIVIELE TECHNOLOGIE	NAAM:	
ANSWER SHEET		CIVIL TECHNOLOGY	NAME:	

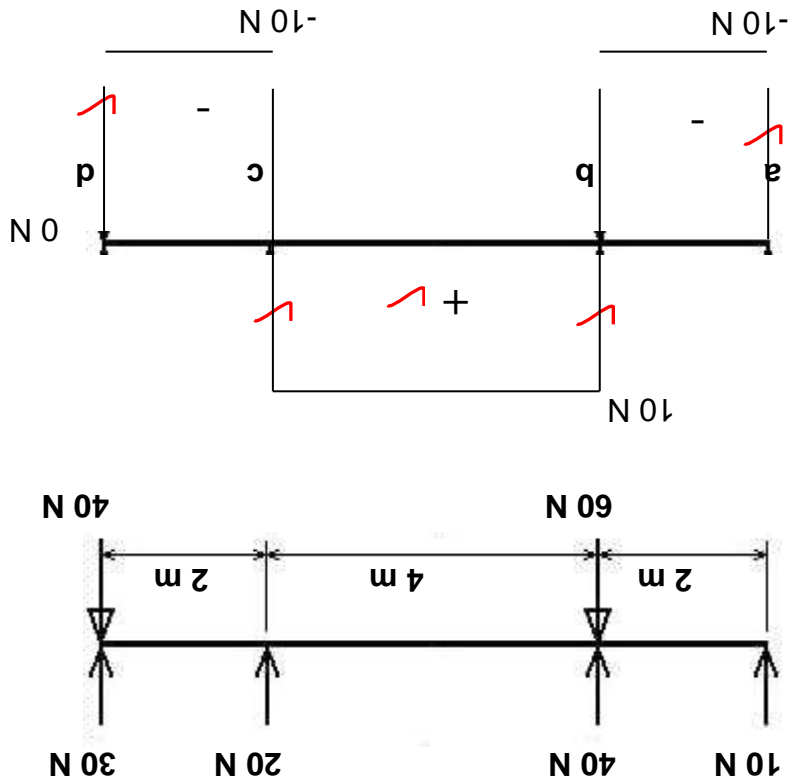
VRAAG/QUESTION 5.4



Form	Area	X	AX	Y	AY
A 6x5 lxh = 30	(1) $\frac{1}{2}bh$ = 9	$\frac{b}{6}$ = 2	90	$\frac{h}{5}$ = 2	= 75
B $\frac{1}{2} \times 6 \times 3$ = 9	(1) $\frac{3}{b6}$ = 3	$\frac{3}{6}$ = 2	36	$\frac{3}{h3}$ = 1 + 5	= 54
Total	(1) 39	(1)	126	(1)	129

$$X = \frac{126}{39} = 3,23$$

$$Y = \frac{129}{39} = 3,31$$



SCALE/SKAAL: 1 N = 2 mm

5.2.2 Die skuitkrag diagram/The shear force diagram

$a = \dots -10 \dots$   
 $b = \dots -10 - 40 + 60 = 10 \text{ N} \dots$   
 $c = \dots 10 - 20 = -10 \text{ N} \dots$   
 $d = \dots -10 - 30 + 40 = 0 \dots$

Eenhede (N) nie aangedui: - 1

5.2 5.2.1 Die skuitkragwaardes/The shear force values

VRAAG/QUESTION 5.2

ANTWOORDBLAD	<b>A</b>	CIVIL TECHNOLOGY	NAME:
SIVIELE TEGNOLOGIE		SIVIELE TEGNOLOGIE	NAAM:



## VRAAG 6: GRAFIKA EN KOMMUNIKASIE

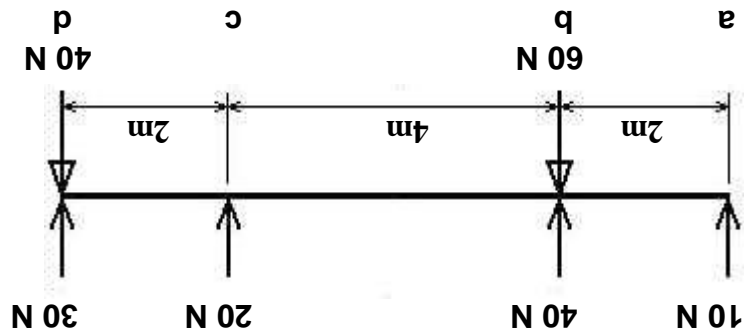
6.1 Beantwoord die volgende vrae ten opsigte van die vloerplan van 'n badkamer in FIGUR 6.1 op vel C. Voltooi die vloerplan deur die volgende simbole op skaal 1 : 50 in te teken:

- 6.1.1 Deur by 6.1 A (2)
- 6.1.2 Venster by 6.1 B (3)
- 6.1.3 Stort by 6.1 C (2)
- 6.1.4 Toilet by 6.1 D (2)
- 6.1.5 Riepout en afkorting by 6.1 E (2)
- 6.1.6 Steekoog en afkorting by 6.1 F (2)
- 6.1.7 Gebruik die inligting op vel C en doen die maatskrywing van die wes-aansig volgens standaard boutekenpraktyk. (11)
- 6.2 (1) Beskrywing van tipe, grootte en aard van venster/deur vir (2) verwysing vir kontrakteur (2)
- 6.3 6.3.1 Beton (2)
- 6.3.2 Puinvulling (2)
- 6.3.3 Ongesteurde grond (2)
- 6.3.4 Glas. (2)
- 6.4 220 x 110 x 75 mm (3)
- 6.5 Identifiseer DRIE van die volgende vereistes wat deursnee-aansigte aangedui moet word.
- 6.5.1 Fondament groottes
- 6.5.2 Fondament mure
- 6.5.3 Geute (3)

[40]

(3)

TOTAAL: 200



5.3 FIGUR 5.3 op toon 'n balk met puntbelasting. Bereken die buigmomentwaardes van punt a tot d. (5)

Eenhede (N) aangedui:

$$a = 0 \text{ N}$$

$$b = (-10 \times 2) = -20 \text{ NN}$$

$$c = (-10 \times 6) + (-40 \times 4) + (60 \times 4) = 20 \text{ N}$$

$$d = (-10 \times 8) + (-40 \times 6) + (60 \times 6) + (-20 \times 2) = 0$$

5.4 Maak gebruik van die inligting op antwoordblad B en bereken op antwoordblad B, deur die tabel te voltooi, die sentroïed van FIGUR 5.4. Bereken die sentroïed vanaf punt P en toon alle berekeninge en formules. (11)

[30]

4.7.3 Enige TWEE voordele van die tipe steen.

- Goedkoper
- Bou vinnig

(2) (2 x 1)

4.7.4 (1) Steen is poreus/nie waterdig (2) pleister bied beskerming teen vog/Mure te versterk

(2)

4.7.5 Enige EEN doel van die openinge in die steen.

- Ligter
- Isolasië
- Goedkoper/Minder beton

(1) (1 x 1)

4.8 (1) Hout word in drukkamer geplaas (2) en chemikalieë word in hout (3) gedwing deur (4) druk in die tenk te verhoog.

(4)

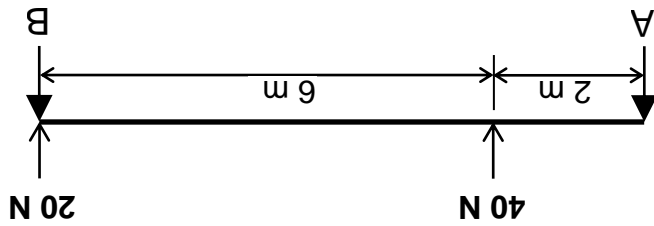
4.9 Golfyster/IBR-plate

(1)

[30]

**VRAAG 5: TOEGEPASTE MEGANIKA**

5.1 FIGUR 5.1 toon 'n balk wat ondersteun word deur steunpunte A en B. Bereken die reaksiekrag van steunpunt B.



Om A

$$\sum M = 0$$

$$B \times 8 = (40 \times 2) + (20 \times 8)$$

$$B \times 8 = 80 + 160$$

$$B = \frac{240}{8}$$

$$B = 30 \text{ N}$$

(5)

5.2 FIGUR 5.2 op vel A toon 'n balk met puntbelasting. Bereken op vel A die volgende.

5.2.1 Die skuifkragwaarde,

(4)

5.2.2 en voltooi die skuifkragdiagram volgens die skuifkragwaardes.

(5)

4.1	4.1.1	Matekolom	(1)
	4.1.2	16	(1)
	4.1.3	Elke item in kolom A, B en C (2) word beskryf	(2)
4.2		$  \begin{array}{r}  10\ 000 \times 2 \\  + 6\ 000 \times 2 \\  \hline  32\ 000 \\  - 600 \times 4 \\  \hline  29\ 000  \end{array}  $	(4)
4.3		Enige VIER eienskappe van weekstaal.	
		<ul style="list-style-type: none"> <li>• 0,1 – 0,33% koolstof</li> <li>• Ysterhoudend</li> <li>• Verweer maklik</li> <li>• Moet beskerm word</li> <li>• Sag</li> <li>• Maklik om te verwerk</li> <li>• Maklik bekombaar</li> </ul>	(4 x 1)
4.4	(1)	Kusgebiede onderhewig aan roes a.g.v. weerstoestande.	
	(2)	Aluminium bied hoe weerstand teen roes.	(2)
4.5		Enige TWEE faktore wat die dikte van 'n ruit bepaal.	
		<ul style="list-style-type: none"> <li>• Hoogte van ruit</li> <li>• Wydte van ruit</li> <li>• Moontlike winddruk</li> </ul>	(2 x 1)
4.6		Beskryf kortliks die reaksie van gepantserde glas wanneer dit breek.	
	(1)	Disintegreer in (2) klein blokkies.	(2)
4.7	4.7.1	Betonsteen/Hol steen	(1)
	4.7.2	Beton	(1)

**VRAAG 4: MATERIALE EN HOEVEELHEDE****[30]**

3.9	(1)	Water vloei vinniger (2) vaste stowwe en (3) veroorsaak blokkasies	(3)
3.10		Enige TWEE metodes om riele te toets.	
		<ul style="list-style-type: none"> <li>• Spieëlkontrolle</li> <li>• Balkontrolle</li> <li>• Hidrouliese toets</li> <li>• Lugtoets</li> <li>• Rooktoets</li> </ul>	(2 x 1)

## VRAAG 3: SIVIELE DIENSTE

3.1 (1) Kontroleer (2) watertemperatuur (2)

3.2 3.2.1 200 mm (1)

3.2 3.2.2 300 mm (1)

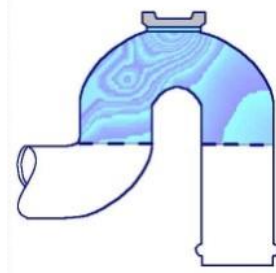
3.3 Enige TWEE funksies van vakuumkleppe vir 'n geiser

- 3.4 Enige TWEE vereistes vir die oorlooppan vir 'n geiser.
- (1) Beskerm silinder (2) teen vakuuminstorting
  - (1) Ventileer stelsel (2) wanneer dit gedreineer word
  - Voorkom beskadiging aan (2) silinder a.g.v. terugsyfering
- (4) (2 x 2)

3.5 Enige VIER voordele van koper watertype.

- Korrosiewerend
  - Warm- en kouewater
  - Maklik om mee te werk
  - Maklik om te buig
  - Lae instandhouding
  - Geen swaar toerusting vir pypwerk
- (4) (2 x 1) (2)

3.6 P-spender.



(3)

3.7 3.7.1 Waterdig (1)

3.7.2 Soliede (1)

3.7.3 100 mm (1)

3.7.4 6 m (1)

3.7.5 1 m (1)

3.8 Bereken die top bodemvlak vir 'n 110 mm rioolpyplyn

300 mm

+ 110 mm

410 mm

(3)

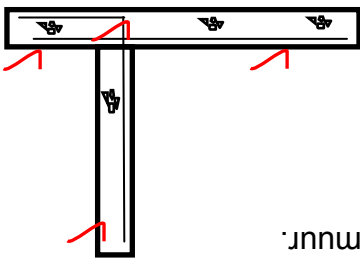
2.7	Enige TWEE funksies van holte tussen blaie van holmuur.	<ul style="list-style-type: none"> <li>• Waterdigting</li> <li>• Temperatuur isolasie</li> <li>• Klank isolasie</li> </ul>	(2 x 1)	(2)
2.8				(1)
2.8.1	oksied			(1)
2.8.2	verspanstukke			(1)
2.8.3	Gegalvaniseerde			(1)
2.8.4	lateie			(1)
2.8.5	fabriek			(1)
2.9	EEN gebruik van elkeen van die volgende gereedskapstukke.			
2.9.1	Reihout			
	<ul style="list-style-type: none"> <li>• Pleister afwerk</li> <li>• Gids om lyste te pleister</li> </ul>			(1)
2.9.2	Pleisterplank			
	<ul style="list-style-type: none"> <li>• Pleister op te hou</li> <li>• Klein hoeveelhede vuller te meng</li> </ul>			(1)
2.9.3	Dragbare elektriese rotor			
	<ul style="list-style-type: none"> <li>• Lysnywerk</li> <li>• Randsnywerk</li> <li>• Groefsnnywerk</li> <li>• Sponnings</li> <li>• Swaelstertvoë</li> </ul>			(1)
2.9.4	Bandsaag			
	<ul style="list-style-type: none"> <li>• Dwarssaagwerk</li> <li>• Klootsaagwerk</li> <li>• Sierroeiwerk</li> <li>• Krommings</li> <li>• Sirkels</li> </ul>			(1)
2.10				
2.10.1	Vloerlys/kwart rond			(1)
2.10.2	Dadoreling			(1)
2.10.3	Kosnylys			(1)
2.10.4	Kroonlys			(1)

[40]

## VRAAG 2: GEVORDERDE KONSTRUKSIEPROSESSE

2.1	2.1.1	A – Steiertyp/Staander B – Steierplanke/platvorm C – Voetplaat	(3)
	2.1.2	-Enige TWEE onderdele wat in die steierwerk ontbreek.	
	2.1.3	Enige VIER veiligheidsmaatreëls vir steierwerk. <ul style="list-style-type: none"> <li>• Kruisverspanstuk</li> <li>• Veiligheidsreëlings</li> </ul>	(2) (2 x 1)
	2.2	Droë chemikalieë/CO <sub>2</sub>	(1)
	2.3	2.3.1 ONWAAR 2.3.2 ONWAAR 2.3.3 WAAR 2.3.4 WAAR 2.3.5 WAAR	(1) (1) (1) (1) (1)
	2.4	Enige TWEE vereistes vir die muurkonstruksie van 'n woonhuis. <ul style="list-style-type: none"> <li>• Krag om weerstand te bied (2) teen afwaartse kragte</li> <li>• Stabiliteit vir hoë isolasie teen (2) reën, koue, hitte en geraas</li> <li>• Stabiliteit tydens (2) brand</li> <li>• (1) Genoegsame openinge vir (2) lig en ventilasie</li> </ul>	(4) (2 x 2)
2.5	10 mm		(1)
2.6	2.6.1	Stryksteen	(1)
	2.6.2	220 mm	(1)
	2.6.3	Steenversterking	(1)
	2.6.4	(1) Mure te (2) versterk/krake te voorkom	(2)

[30]  
(4)



1.9 Maak 'n netjiese skets van 'n kanteelbalk keermuur.

1.8 (1) Driehoekige been/stut (2) wat vertikale muur op fondament anker. (2)



## VRAAG 1: KONSTRUKTIEPROSESSE

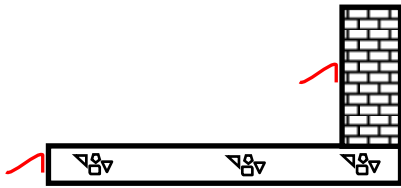
1.1 Maak netjiese lynsketse van die volgende balke:

1.1.1 Eenvoudige ondersteunde balk;



(2)

1.1.2 Kanteibalk



(2)

1.2 (1) Beton is swak (2) onder trekspanning daarom word dit (3) versterk deur staal wat (4) sterk is onder trekspanning.

(4)

1.3 Enige VIER vereistes vir goeie staalwapening.

- Hoe trekrag
- In enige vorm gebuig kan word
- Oppervlak moet goed met beton bind
- Roesvry wees
- Oppervlak moet skoon wees/nie besoedel wees

(4) (4 x 1)

1.4 (1) Verlies van beton lei (2) tot heuningkoek-vorming.

(2)

1.5 Voorkom dat beton aan bekisting kleef

(1)

1.6 1.6.1 ONWAAR

(1)

1.6.2 ONWAAR

(1)

1.6.3 ONWAAR

(1)

1.6.4 WAAR

(1)

1.6.5 WAAR

(1)

1.7 Enige VIER faktore wanneer keermure ontwerp word.

- Druk wat grond uitoefen
- Tipe grond waarop muur gebou word
- Materiaal beskikbaar
- Graad van skuifbedrag
- Water wat deurfiltereër

(4) (4 x 1)

Hierdie memorandum bestaan uit 13 bladsye.

PUNTE: 200

**SIVIELE TEGNOLOGIE  
MEMORANDUM**

**NOVEMBER 2014**

**GRAAD 11**

**NASIONALE  
SENIOR SERTIFIKAT**

