



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2014

CIVIL TECHNOLOGY

MARKS: 200

TIME: 3 hours



This question paper consists of 15 pages, including 3 answer sheets.

REQUIREMENTS

1. ANSWER BOOK
2. Drawing instruments
3. A non-programmable pocket calculator

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX questions.
2. ALL questions are COMPULSORY.
3. Answer each question as a whole. DO NOT separate sub-questions.
4. Start EACH question on a NEW page.
5. Sketches may be used to illustrate your answers.
6. ALL calculations and written answers must be done in the ANSWER BOOK or on the attached ANSWER SHEETS.
7. Use the mark allocation as a guide to the length of your answers.
8. Drawings and sketches must be done in pencil, fully dimensioned and neatly finished off with descriptive titles and notes to conform to the SANS/SABS Recommended Code of Practice for Building Drawings.
9. Use your discretion where dimensions and/or details have been omitted.
10. Answer QUESTIONS 5.2, 5.4 and 6.1 on the ANSWER SHEETS provided.

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 Describe the purpose of steel reinforcement in a concrete beam by referring to the properties of steel and concrete. (4)
- 1.3 Name FOUR requirements for good steel reinforcement. (4 x 1) (4)
- 1.4 Fully motivate why the joints of concrete formwork must be sealed thoroughly. (2)
- 1.5 What is the purpose of formwork oil which is applied to the inside of the formwork? (1)
- 1.6 Indicate whether the following statements with regard to concrete construction are TRUE or FALSE. Write only the word 'true' or 'false' next to the question number in the ANSWER BOOK.
- 1.6.1 Metal is the only material used for the formwork of concrete columns. (1)
 - 1.6.2 Blowholes in concrete occur when old and new timber is used together during the construction of the formwork. (1)
 - 1.6.3 Concrete is more durable when the formwork is stripped fast. (1)
 - 1.6.4 Pre-stressed concrete lintels are manufactured under controlled conditions. (1)
 - 1.6.5 Pre-stressed concrete lintels are reinforced with steel wires. (1)
- 1.7 Name FOUR factors which must be considered when retaining walls are designed. (4 x 1) (4)
- 1.8 Briefly describe what a buttress in a buttress retaining wall is. (2)
- 1.9 Make a neat sketch of a concrete cantilever retaining wall. (4)

[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

2.1 FIGURE 2.1 shows incomplete scaffolding.
Answer the following questions with regard to the scaffolding.

2.1.1 Name the parts 2.1 A to 2.1 C. (3)

2.1.2 Identify TWO parts that are missing in the scaffolding. (2 x 1) (2)

2.1.3 Name FOUR safety measures which are applicable to scaffolding. (4 x 1) (4)

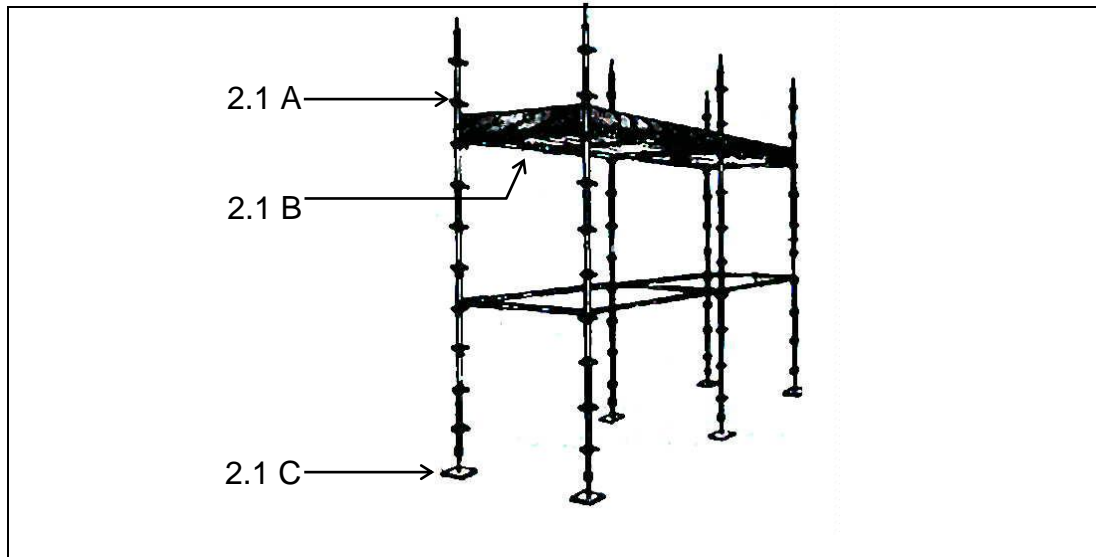


FIGURE 2.1

2.2 Which type of fire extinguisher is used to extinguish an electrical fire? (1)

2.3 Indicate whether the following statements with regard to safety are TRUE or FALSE. Write only the word 'true' or 'false' next to the question number in the answer book.

2.3.1 Only two persons may work on a machine at a time. (1)

2.3.2 Safety boots must be worn when working with hand tools. (1)

2.3.3 Excavations must be protected with a fence. (1)

2.3.4 Trenches deeper than 1 500 mm must be braced. (1)

2.3.5 Stacks should not be more than three times higher as its width. (1)

2.4 Describe TWO requirements for the wall construction of a dwelling. (2 x 2) (4)

2.5 What is the average thickness of the mortar joints in brickwork? (1)

2.6 Answer the following questions with regard to the wall construction in FIGURE 2.6.

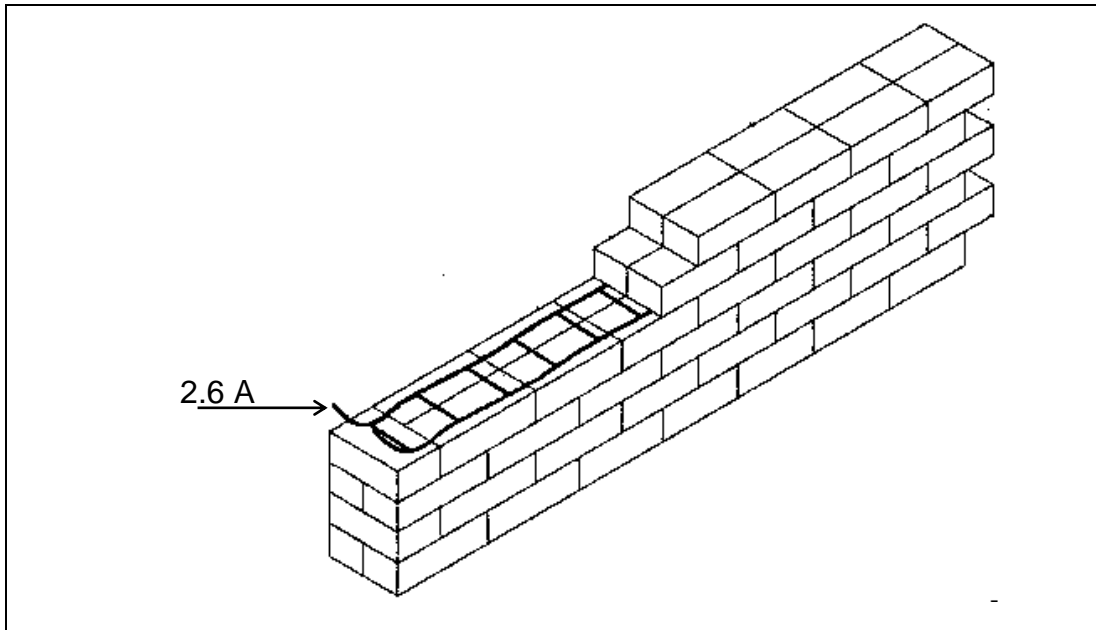


FIGURE 2.6

- 2.6.1 In which brick course is the wall built? (1)
- 2.6.2 What is the thickness of the wall? (1)
- 2.6.3 What is part 2.6 A called? (1)
- 2.6.4 Describe the purpose of part 2.6 A. (2)
- 2.7 Name TWO functions of the cavity between the two leaves of a cavity wall. (2 x 1) (2)
- 2.8 Identify the correct word in the following descriptions. Write only the correct word next to the question number in the answer book.
 - 2.8.1 Steel door frames should be treated with **oxide/varnish** to prevent it from rusting. (1)
 - 2.8.2 Wood frames should be supported with **gusset plates/cleats** to keep the frames square. (1)
 - 2.8.3 **Galvanised/high tensile steel** hoop irons can be used as frame ties. (1)
 - 2.8.4 Wall openings for windows must be spanned with **scaffold boards/lintels**. (1)
 - 2.8.5 Pre-stressed concrete lintels are manufactured in **a factory/in situ**. (1)

- 2.9 Name ONE use of each of the following tools.
- 2.9.1 Straight edge (1)
 - 2.9.2 Hand hawk (1)
 - 2.9.3 Portable electrical router (1)
 - 2.9.4 Band saw (1)
- 2.10 Which type of mould will be used for the following type of finishing?
- 2.10.1 It is used to finish off the joint between the wall and the floor. (1)
 - 2.10.2 It is fixed against the wall to protect the wall paint from being damaged by furniture. (1)
 - 2.10.3 It is used to finish off the joint between the wall and the timber door frame. (1)
 - 2.10.4 It is used to finish off between the ceiling and the wall. (1)
- [40]**

QUESTION 3: CIVIL SERVICES

- 3.1 Describe the purpose of the thermostat in an electric geyser. (2)
- 3.2 State the minimum measurement of the following fittings above the geyser:
- 3.2.1 The incoming water supply pipes (1)
- 3.2.2 Vacuum breakers (1)
- 3.3 Describe TWO functions of vacuum breakers for a geyser. (2 x 2) (4)
- 3.4 Name TWO requirements for the drip tray for a geyser. (2 x 1) (2)
- 3.5 Name FOUR advantages of copper water pipes. (4 x 1) (4)
- 3.6 Make a neat sketch of a P-trap. (3)
- 3.7 Complete the following sentences by supplying the omitted word or measurement next to the number in the answer book.
- 3.7.1 Drain pipes must be ... to prevent leakages. (1)
- 3.7.2 Lay the drain pipe on an even gradient to ensure that the water carries the ... matter away. (1)
- 3.7.3 Drain pipes should be at least ... mm in diameter. (1)
- 3.7.4 Branch drains longer than ... metre should also have a vent pipe. (1)
- 3.7.5 Vent pipes must extend at least ... meter above the lowest point of the roof. (1)
- 3.8 Calculate the top invert level for a 110 mm drain pipeline. Show all calculations. (3)
- 3.9 Describe the reaction of the water and the solids in a drain pipe when the slope is too steep. (3)
- 3.10 Name TWO methods of testing drains. (2)

[30]

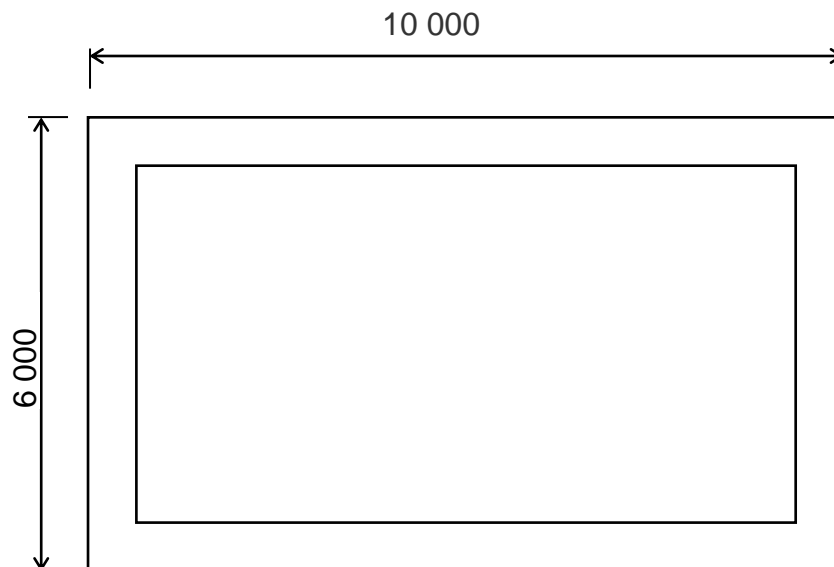
QUESTION 4: MATERIALS AND QUANTITIES

4.1 Answer the following questions with regard to the quantity list in FIGURE 4.1.

A	B	C	D
2/	4.00 <u>2.00</u>	<u>*****</u>	

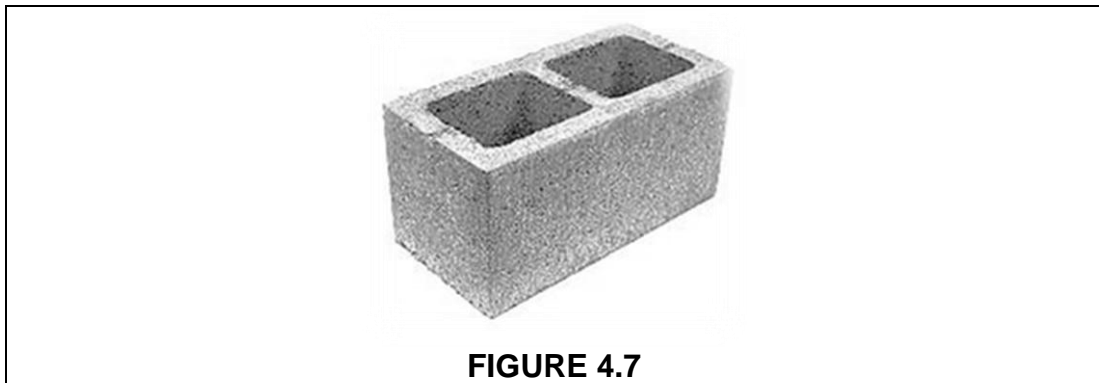
FIGURE 4.1

- 4.1.1 What is column B called? (1)
- 4.1.2 What is the result in column C? (1)
- 4.1.3 Explain the purpose of column D of the quantity list. (2)
- 4.2 FIGURE 4.2 shows a 600 mm wide strip foundation for a building. Calculate the centre line of the foundation. Show all calculations.

**FIGURE 4.2** (4)

- 4.3 Name FOUR properties of mild steel. (4 x 1) (4)
- 4.4 Briefly motivate why aluminium window frames will be used in coastal areas. (2)
- 4.5 Name TWO factors that determine the thickness of a window pane. (2 x 1) (2)
- 4.6 Briefly describe the reaction of armoured glass when it breaks. (2)

4.7 Answer the following questions with regard to the brick in FIGURE 4.7.



- 4.7.1 What is this type of brick called? (1)
 - 4.7.2 From which material is this type of brick manufactured? (1)
 - 4.7.3 Name TWO advantages of this type of brick. (2 x 1) (2)
 - 4.7.4 Briefly motivate why the walls which are built with this type of brick, should be plastered. (2)
 - 4.7.5 Name ONE purpose of the openings in the brick. (1 x 1) (1)
- 4.8 Describe the high-pressure-preserving-treatment process for wood. (4)
- 4.9 Which type of roof covering is mostly used in South Africa? (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.

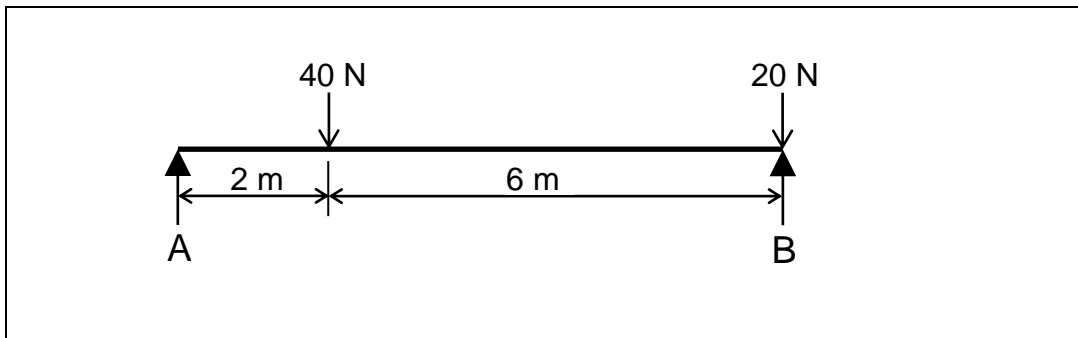


FIGURE 5.1

(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 a/c 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.

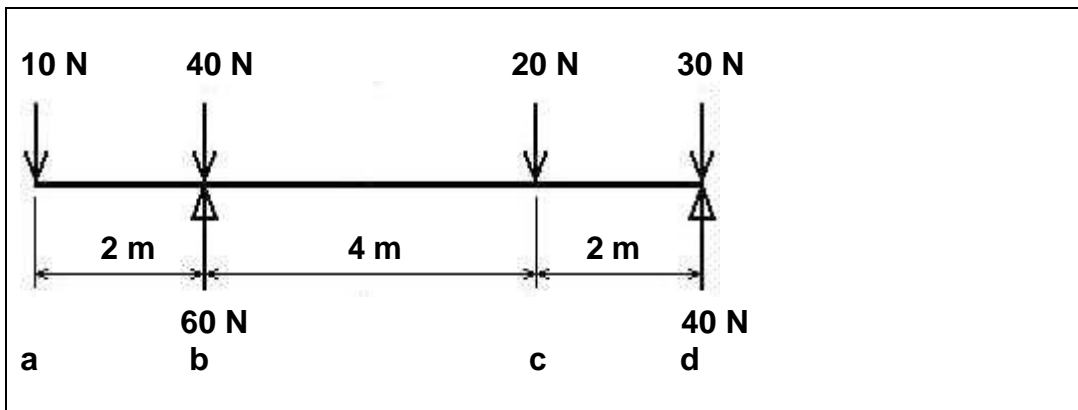


FIGURE 5.3

(5)

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 Briefly describe the purpose of a window- or door catalogue for building drawings. (2)
- 6.3 Make a neat sketch to illustrate each of the following symbols:
- 6.3.1 Concrete (2)
- 6.3.2 Hardcore filling (2)
- 6.3.3 Undisturbed earth (2)
- 6.3.4 Glass (2)
- 6.4 What are the standard length-, width- and thickness measurements of a standard clay brick for drawing purposes? (3)
- 6.5 Identify 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 Type of floor covering
- 6.5.4 Wall fittings
- 6.5.5 Gutters
- 6.5.6 Manholes (3)

[40]**TOTAL: 200**

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

QUESTION/VRAAG 5.2

5.2 5.2.1 The shear force values/Die skuifkragwaardes

a =

b =

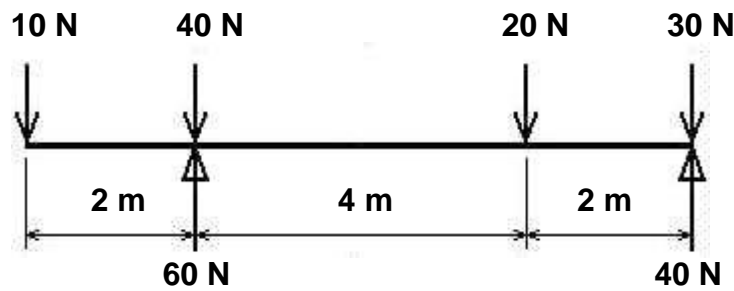
c =

d =

(4)

5.2.2 The shear force diagram/Die skuifkrag diagram

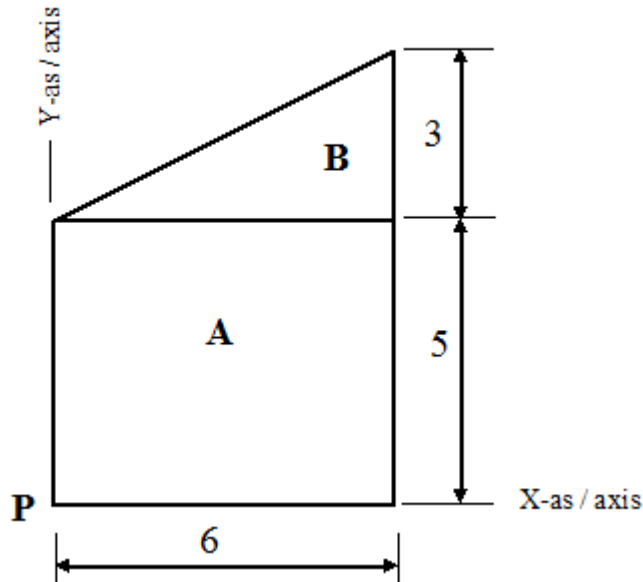
SCALE/SKAAL: 1 N = 2 mm





(5)
[9]

ANSWER SHEET	B	CIVIL TECHNOLOGY	NAME:
ANTWOORDBLAD		SIVIELE TEGNOLOGIE	NAAM:

QUESTION/VRAAG 5.4

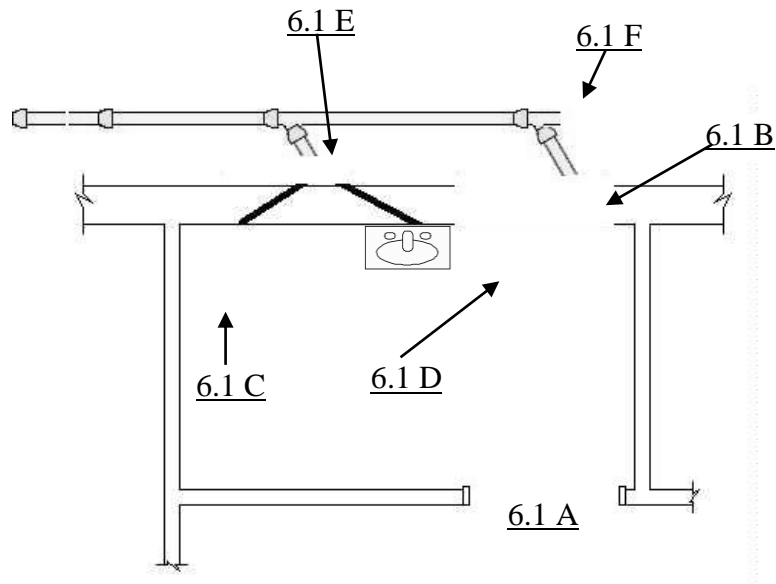


(11)

Form	Area	X	AX	Y	AY
A 	(1)	(1)		(1)	
B 	(1)	(1)		(1)	
Total	(1)		(1)		(1)

$X = \dots\dots\dots(1)$ $Y = \dots\dots\dots$ (1)

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

QUESTION/VRAAG 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

FORMULA SHEET**IMPORTANT ABBREVIATIONS**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
G	Centre of gravity	h	Height	d	Diameter
C	Centroid	b	Breadth/Width	r	Radius
L	Length	s	Side	A	Area
π	$\text{Pi} = \frac{22}{7} = 3,142$	\emptyset	Diameter	V	Volume

FORMULES

AREA OF	FORMULA (in words)	FORMULA (in symbols)	FORMULA FOR THE POSITION OF CENTROIDS	
			X-axis	Y-axis
Square	Length x Breadth	$l \times b$	$\frac{b}{2}$	$\frac{b}{2}$
Rectangle	Length x Breadth	$l \times b$	$\frac{l}{2}$	$\frac{b}{2}$
Right-angled triangle	$\frac{1}{2} \times \text{base} \times$ height	$\frac{1}{2}b \times h$	$\frac{b}{3}$	$\frac{h}{3}$
Equilateral triangle/Pyramid	$\frac{1}{2} \times \text{base} \times$ height	$\frac{1}{2}b \times h$	$\frac{b}{2}$	$\frac{h}{3}$
Circle	$\pi \times \text{radius} \times$ radius	πr^2	Centroid is in the centre	
Circle	$\pi \times \text{diameter} \times$ diameter divided by 4	$\frac{\pi d^2}{4}$		
Semi-circle	$\pi \times \text{radius} \times$ radius divided by 2	$\frac{\pi r^2}{2}$	Centroid is 0,424r on the centre line	

$$\text{Position of centroid} = \frac{(A1 \times d) + (A2 \times d)}{\text{Total area}}$$

$$\text{Posisie van sentroed} = \frac{\text{Totale oppervlakte}}{(A1 \times d) + (A2 \times d)}$$

OPPERVLAKTE VAN	FORMULE (in woorde)	FORMULE (in simbole)	FORMULE VIR DIE POSISIE VAN SENTROÏEDE	X-as	Y-as
Vierkant	Lengte x Breedte	$l \times b$	$\frac{b}{2}$	$\frac{b}{2}$	$\frac{b}{2}$
Reghoek	Lengte x Breedte	$l \times b$	$\frac{b}{2}$	$\frac{l}{2}$	$\frac{b}{2}$
Reghoekige driehoek	$\frac{1}{2} \times \text{basis} \times \text{hoogte}$	$\frac{1}{2} b \times h$	$\frac{b}{3}$	$\frac{h}{3}$	$\frac{h}{3}$
Gelyksydige driehoek/Piramide	$\frac{1}{2} \times \text{basis} \times \text{hoogte}$	$\frac{1}{2} b \times h$	$\frac{b}{2}$	$\frac{h}{2}$	$\frac{h}{3}$
Sirkel	$\pi \times \text{radius} \times \text{radius}$	πr^2	πr^2		
Sirkel	$\pi \times \text{deursnee} \times \text{gedeel deur 4}$	$\frac{\pi d^2}{4}$	$\frac{\pi d^2}{4}$		
Halfsirkel	$\pi \times \text{radius} \times \text{radius} \times \text{deur 2}$	$\frac{\pi r^2}{2}$	$\frac{\pi r^2}{2}$		Sentroed is 0,424r op die middellyn

FORMULAE

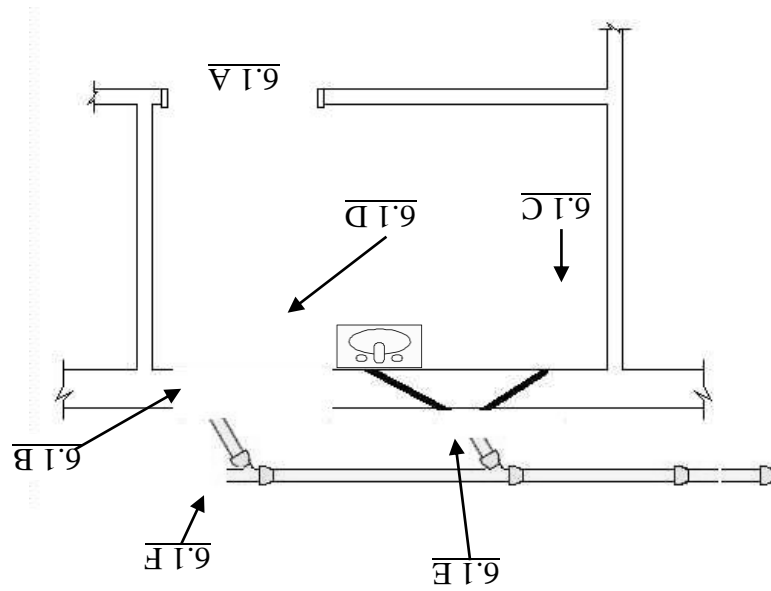
SIMBOOL	BESKRYWING	SIMBOOL	BESKRYWING	SIMBOOL	BESKRYWING	SIMBOOL	BESKRYWING
G	Swartepunt	h	Hoogte	d	Deursnee		
C	Sentroed	b	Breedte/Wydte	r	Radius		
L	Lengte	s	Sy	A	Oppervlakte		
π	$\pi = \frac{22}{7} = 3,142$	\emptyset	Deursnee	V	Volume		

BELANGRIKE AFKORTINGS

FORMULEBLAD

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



VRAAG/QUESTION 6.1

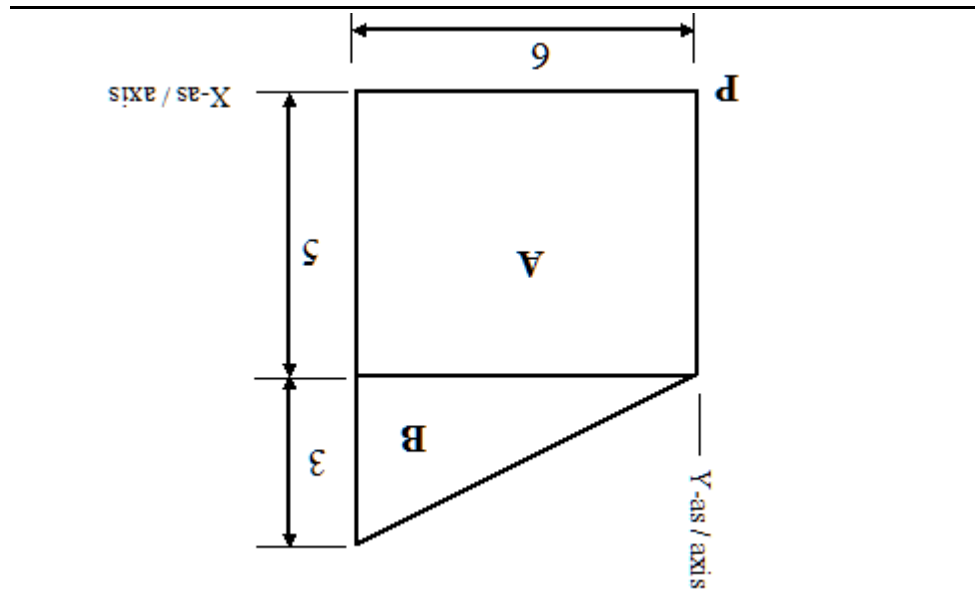


BADKAMERVLOERPLAN
SKAAL 1 : 50

BADKAMER BINNEMATE: 3 m x 1,7 m
 BUITEMUURDIKTE: 280 mm
 BINNEMUURDIKTE: 120 mm

$$X = \dots = Y = \dots = \dots$$

Vorm	Area	X	AX	Y	AY
A 	(1)	(1)		(1)	
B 	(1)	(1)		(1)	
Totaal	(1)		(1)		(1)



VRAAG/QUESTION 5.4

ANTWOORDBLAD	B	CIVIL TECHNOLOGY	NAME:	
ANSWER SHEET		SIVIELE TEGNOLOGIE	NAAM:	

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

VRAAG/QUESTION 5.2

5.2 Die skuitkragwaardes/The shear force values

5.2.1 a =

b =

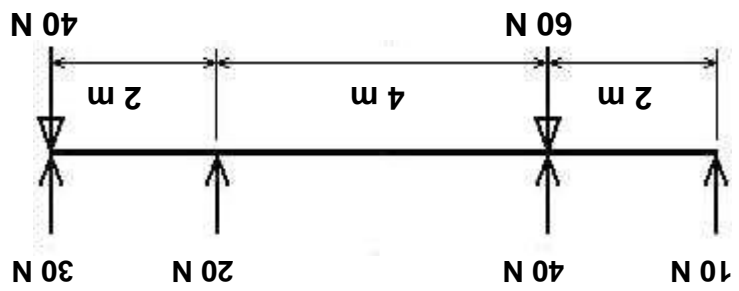
c =

d =

(4)

5.2.2 Die skuitkragdiagram/The shear force diagram

SKAAL/SCALE: 1 N = 2 mm



(5) [9]

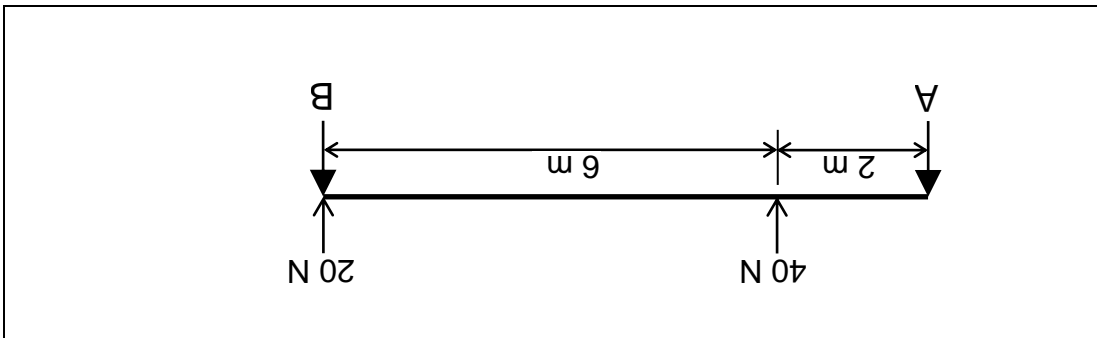
VRAAG 6: GRAFIKA EN KOMMUNIKASIE

- 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 standaardboutekenpraktijk. (11)
- 6.2 Beskryf kortliks die doel van 'n venster- of deurkatalogus vir boutekeninge. (2)
- 6.3 Maak netjiese sketse om elkeen van die volgende simbole te illustreer:
- 6.3.1 Beton (2)
- 6.3.2 Puinvulling (2)
- 6.3.3 Ongesteurde grond (2)
- 6.3.4 Glas (2)
- 6.4 Wat is die standaardlengte-, breedte- en diktemate van 'n baksteen vir tekendoelindes? (3)
- 6.5 Identifiseer DRIE van die volgende vereistes wat in deursnee-aansigte aangedui moet word:
- 6.5.1 Fondamentgroottes
- 6.5.2 Fondamentmure
- 6.5.3 Tipe vloerbedekking
- 6.5.4 Muurmeublement
- 6.5.5 Geute
- 6.5.6 Mangate

TOTAAL: 200**[40]**
(3)

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.



(5)

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

5.2.1 Die skuifkragwaardes

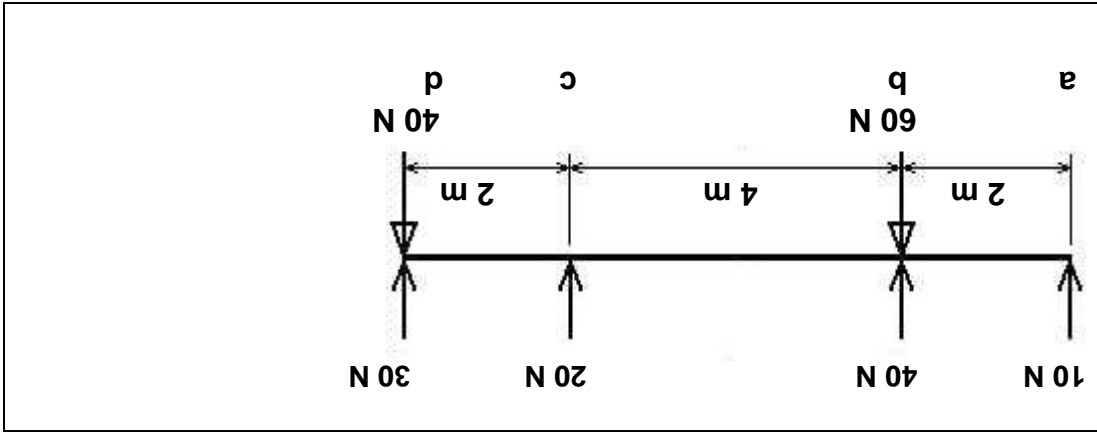
(4)

5.2.2 Voltooi die skuifkragdiagram volgens die skuifkragwaardes

(5)

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

(5)



FIGUR 5.3

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

[30]
(11)

- 4.7.1 Wat word die tipe steen genoem? (1)
- 4.7.2 Van watter materiaal word die tipe steen vervaardig? (1)
- 4.7.3 Noem TWEE voordele van die tipe steen. (2 x 1) (2)
- 4.7.4 Motiveer kortliks waarom mure wat van hierdie tipe steen gebou is, gepleister moet word. (2)
- 4.7.5 Noem EEN doel van die openinge in die steen. (1 x 1) (1)
- 4.8 Beskryf die hoëdruk-preserveringsproses vir hout. (4)
- 4.9 Watter tipe dakbedekking word die meeste in Suid-Afrika gebruik? (1)

[30]


FIGUR 4.7



4.7 Beantwoord die volgende vrae ten opsigte van die steen in FIGUR 4.7.

VRAAG 4: MATERIALE EN HOEVEELHEDE

4.1 Beantwoord die volgende vrae ten opsigte van die hoeveelhedslys in FIGUR 4.1.

A	B	C	D
2/	4.00		
	2.00		

FIGUR 4.1

4.1.1 Wat word kolom B genoem? (1)

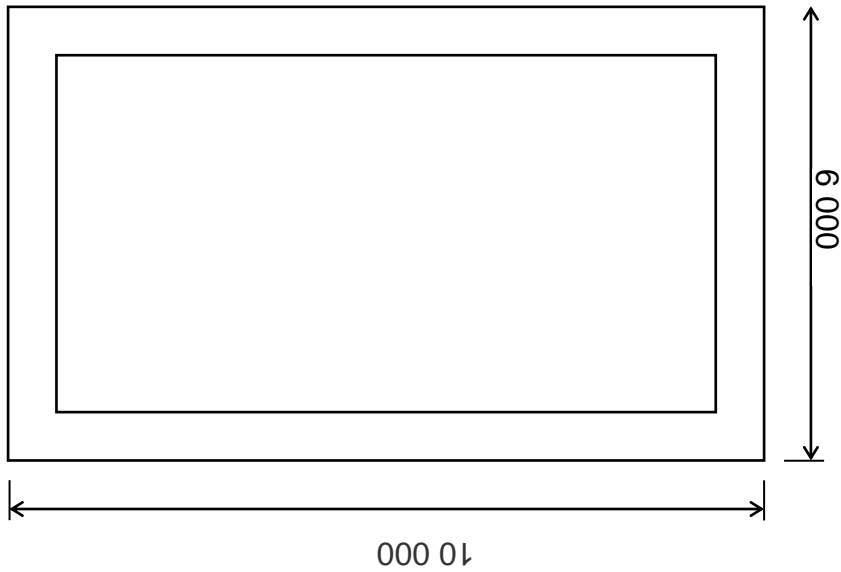
4.1.2 Wat is die resultaat in kolom C? (1)

4.1.3 Verduidelik die doel van kolom D van die hoeveelhedslys. (2)

4.2 FIGUR 4.2 toon 'n 600 mm breë strookfondament vir 'n gebou.

Bereken die hartlyn van die fondament.

Toon alle berekeninge.

**FIGUR 4.2**

(4)

4.3 Noem VIER eienskappe van weekstaal. (4 x 1) (4)

4.4 Motiveer kortliks waarom aluminiumvensteramme in kusgebiede gebruik sal word. (2)

4.5 Noem TWEE faktore wat die dikte van 'n ruit bepaal. (2 x 1) (2)

4.6 Beskryf kortliks die reaksie van gepantserde glas wanneer dit breek. (2)

- 3.1 Beskryf die doel van die termostaat in 'n elektriese geiser. (2)
- 3.2 Verskat die minimum mate van die volgende toebehore bokant die geiser:
3.2.1 Die inkomende watervoorsieningstipe (1)
3.2.2 Vakuumkleppe (1)
- 3.3 Beskryf TWEE funksies van vakuumkleppe van 'n geiser. (2 x 2) (4)
- 3.4 Noem TWEE vereistes vir die oorlooppan van 'n geiser. (2 x 1) (2)
- 3.5 Noem VIER voordele van koperwaterstipe. (4 x 1) (4)
- 3.6 Maak 'n netjiese skets van 'n P-spender. (3)
- 3.7 Voitooi die volgende sinne deur die korrekte woord of mate wat uitgelaat is, langs die vraagnommer in die antwoordboek neer te skryf.
3.7.1 Rioolstipe moet ... wees om te verhoed dat dit lek. (1)
3.7.2 Lê die rioolstipe op 'n gelyke gradient om seker te maak dat die water die ... massa glad kan wegvoer. (1)
3.7.3 Rioolstipe moet minstens ... mm in deursnee wees. (1)
3.7.4 Takriole langer as ... meter moet ook 'n lugstipe hê. (1)
3.7.5 Lugstipe moet minstens ... meter bokant die laagste punt van die dak uitsteek. (1)
- 3.8 Bereken die top bodemvlak vir 'n 110 mm rioolstipe. (3)
Toon alle berekeninge.
- 3.9 Beskryf die reaksie van die water en vaste stowwe in 'n rioolstipe indien die helling te steil is. (3)
- 3.10 Noem TWEE metodes om riele te toets. (2)

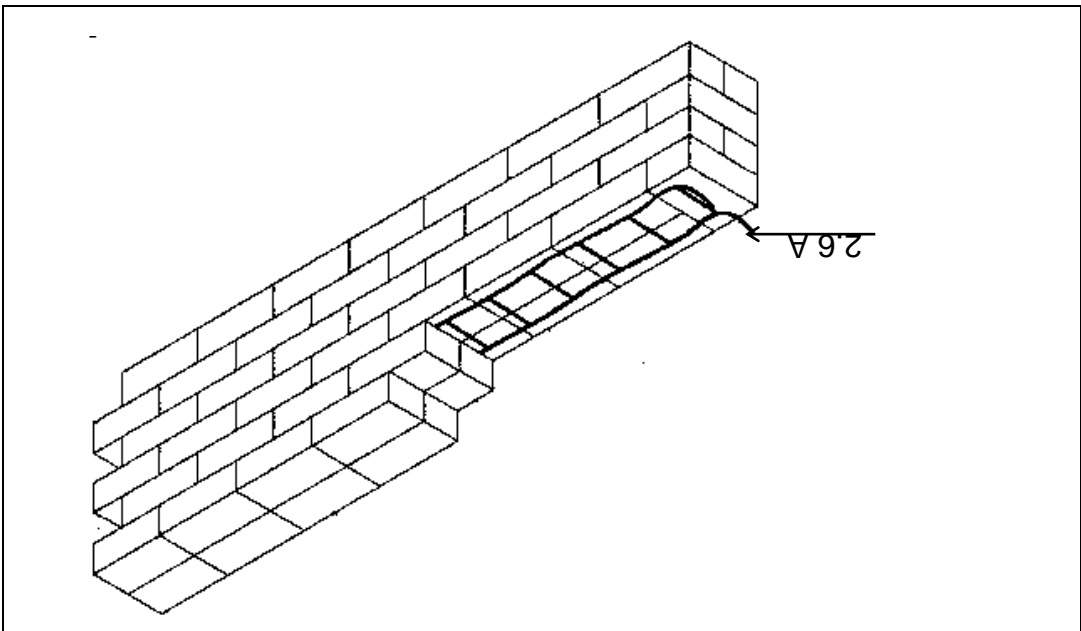
[30]

VRAAG 3: SIVIELE DIENSTE

- 2.9 Noem EEN gebruik van elkeen van die volgende gereedskapstukke.
- 2.9.1 Reihout (1)
 - 2.9.2 Pleisterplank (1)
 - 2.9.3 Draagbare elektriese rotor (1)
 - 2.9.4 Bandsaag (1)
- 2.10 Watter tipe lys sal gebruik word vir die volgende tipe afwerking?
- 2.10.1 Dit word gebruik om die hoek tussen die muur en die vloer af te werk. (1)
 - 2.10.2 Dit word teen die muur vasgesit om die muurverf teen meubelbeskadiging te beskerm. (1)
 - 2.10.3 Dit word gebruik om die las tussen die muur en die houtdeurraam af te werk. (1)
 - 2.10.4 Dit word gebruik vir die afwerking tussen die plafon en die muur. (1)

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- 2.6.1 In watter steenverband is die muur gebou? (1)
- 2.6.2 Wat is die dikte van die muur? (1)
- 2.6.3 Wat word deel 2.6 A genoem? (1)
- 2.6.4 Beskryf die doel van deel 2.6 A. (2)
- 2.7 Noem TWEE funksies van die holte tussen die twee blaie van 'n holmuur (spoumuur). (2 x 1) (2)
- 2.8 Identifiseer die korrekte woord in die volgende beskrywings. Skryf slegs die korrekte antwoord langs die vraagnommer in die antwoordeboek. (1)
- 2.8.1 Staal deurrame moet met **oksied/verniss** behandel word om te voorkom dat dit roes. (1)
- 2.8.2 Houtrame moet met **knoopplaat/verspanstukke** gestut word om die rame vierkantig te hou. (1)
- 2.8.3 **Gegalvaniseerde/hoespanningstaal**-hoepels kan as kosynbinde gebruik word. (1)
- 2.8.4 Muuropeninge vir vensters moet met **steierplanke/lateie** oorspan word. (1)
- 2.8.5 Voorgespanne betonlateie word in 'n **fabriek/in situ** vervaardig. (1)

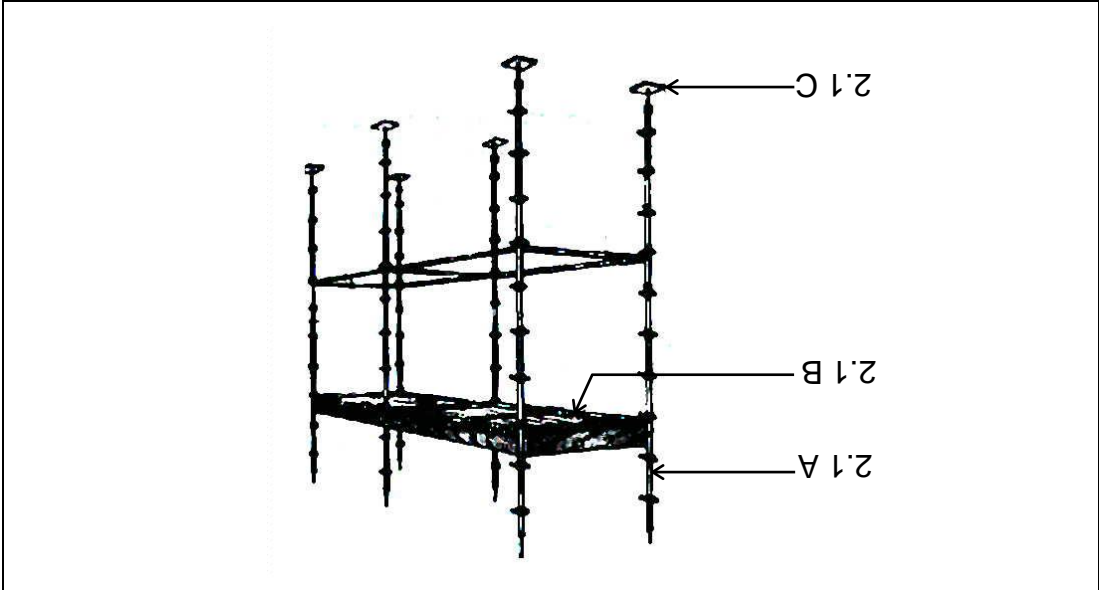


FIGUR 2.6

2.6 Beantwoord die volgende vrae ten opsigte van die muurkonstruksie in FIGUR 2.6:

VRAAG 2: GEVORDERDE KONSTRUKSIEPROSESSE

- 2.1 FIGUR 2.1 toon onvoltooid steierwerk.
Beantwoord die volgende vrae ten opsigte van die steierwerk.
- 2.1.1 Benoem die onderdele 2.1 A tot 2.1 C. (3)
- 2.1.2 Identifiseer TWEE onderdele wat in die steierwerk ontbreek. (2 x 1) (2)
- 2.1.3 Noem VIER veiligheidsmaatreëls wat op steierwerk van toepassing is. (4 x 1) (4)

**FIGUR 2.1**

- 2.2 Watter tipe brandluser sal gebruik word om 'n elektriese brand te blus? (1)
- 2.3 Dui aan of die volgende stellings ten opsigte van veiligheid WAAR of ONWAAR is. Skryf slegs 'waar' of 'onwaar' langs die vraagnommer in die ANTWOORDEBOEK. (1)

- 2.3.1 Slegs twee persone kan op 'n keer met 'n masjien werk. (1)
- 2.3.2 Veiligheids stewels moet gedra word wanneer met handgereedskap gewerk word. (1)
- 2.3.3 Uitrawings moet met 'n heining afgeskort word. (1)
- 2.3.4 Slotte wat dieper as 1 500 mm is, moet verspan word. (1)
- 2.3.5 Stapels mag nie meer as drie maal hoër as die wydte wees nie. (1)
- 2.4 Beskryf TWEE vereistes vir die muurkonstruksie van 'n woonhuis. (2 x 2) (4)
- 2.5 Wat is die gemiddelde dikte van die mortelvoë in steierwerk? (1)

- 1.1 Maak netjiese lynsketse van die volgende balke.
1.1.1 Eenvoudige ondersteunde balk (2)
1.1.2 Kantelbalk (2)
- 1.2 Beskryf die doel van staalwapening in 'n betonbalk deur na die eienskappe van staal en beton te verwys. (4)
- 1.3 Noem VIER vereistes vir goeie staalwapening (4 x 1) (4)
- 1.4 Motiveer volledig waarom die voeë van betonbekisting deeglik geseël moet wees. (2)
- 1.5 Wat is die doel van bekistingolie wat aan die binnekant van bekisting gesmeer word? (1)
- 1.6 Dui aan of die volgende stellings ten opsigte van betonkonstruksie WAAR of ONWAAR is. Skryf slegs 'waar' of 'onwaar' langs die vraagnommer in die ANTWOORDEBOEK.
1.6.1 Metaal is die enigste materiaal wat vir die bekisting van betonkolomme gebruik word. (1)
1.6.2 Blaasgate in beton vind plaas wanneer ou en nuwe hout saam tydens die konstruksie van bekisting gebruik word. (1)
1.6.3 Beton is meer duursaam wanneer die bekisting vinnig verwyder word. (1)
1.6.4 Voorgespanne betonlateie word onder beherde toestande vervaardig. (1)
1.6.5 Voorgespanne betonlateie word met staaldrade versterk. (1)
- 1.7 Noem VIER faktore wat in aanmerking geneem moet word wanneer keermure ontwerp word. (4 x 1) (4)
- 1.8 Beskryf kortliks wat 'n beerstut in 'n beerkeermuur is. (2)
- 1.9 Maak 'n netjiese skets van 'n beton-kantelbalk-keermuur. (4)

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VRAAG 1: KONSTRUKSIEPROSESSE

BENODIGHEDE:

1. ANTWOORDEBOEK

2. Tekengereedskap

3. 'n Nieprogrammeerbare sakrekenaar

INSTRUKSIES EN INLIGTING

1. Hierdie vraestel bestaan uit SES vrae.

2. AL die vrae is VERPLIGTEND.

3. Beantwoord elke vraag as 'n geheel. MOET NIE onderafdelings skei NIE.

4. Begin elke vraag op 'n NUWE bladsy.

5. Sketse kan gebruik word om jou antwoorde te illustreer.

6. ALLE berekeninge en geskrewe antwoorde moet in die ANTWOORDEBOEK of op die aangehegte ANTWOORDBLAIE gedoen word.

7. Gebruik die puntetoekenning as aanduiding vir die lengte van jou antwoorde.

8. Tekeninge en sketse moet volledig en netjies van afmetings, byskrifte en titels voorsien word soos voorgeskryf deur SANS (SABS) se Gebruikskode vir Boutekenpraktik.

9. Gebruik jou eie oordeel waar afmetings en/of detail ontbreek.

10. Beantwoord VRAE 5.2, 5.4 en 6.1 op die ANTWOORDBLAIE wat voorsien is.

Hierdie vraestel bestaan uit 15 bladsye, insluitende 3 antwoordblaaie.



TYD: 3 uur

PUNTE: 200

SIVIELE TEGNOLOGIE

NOVEMBER 2014

GRAAD 11

**NASIONALE
SENIOR SERTIFIKAT**