Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2014

CIVIL TECHNOLOGY

MARKS: **200**

TIME: **3 hours**

* C V L T D M *

This question paper consists of 17 pages.

REQUIREMENTS:

1. Answer book
2. Drawing instruments
3. A non-programmable 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.
7. Use the mark allocation as a guide for the length of your answer.
8. Drawings and sketches must be fully dimensioned and neatly finished off with titles and labels to conform to SANS (SABS) Recommended Practice for Building Drawings.
9. For the purpose of this examination, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
10. Use your discretion where dimensions and/or details have been omitted.
11. Answer QUESTIONS 5.1, 5.2, 5.3 and 6.1 on the ANSWER SHEETS provided.

QUESTION 1: CONSTRUCTION PROCESSES

1.1 A kitchen cupboard must be made so that it is comfortable to use.
Answer the following questions with regard to the kitchen cupboard in FIGURE 1.1.

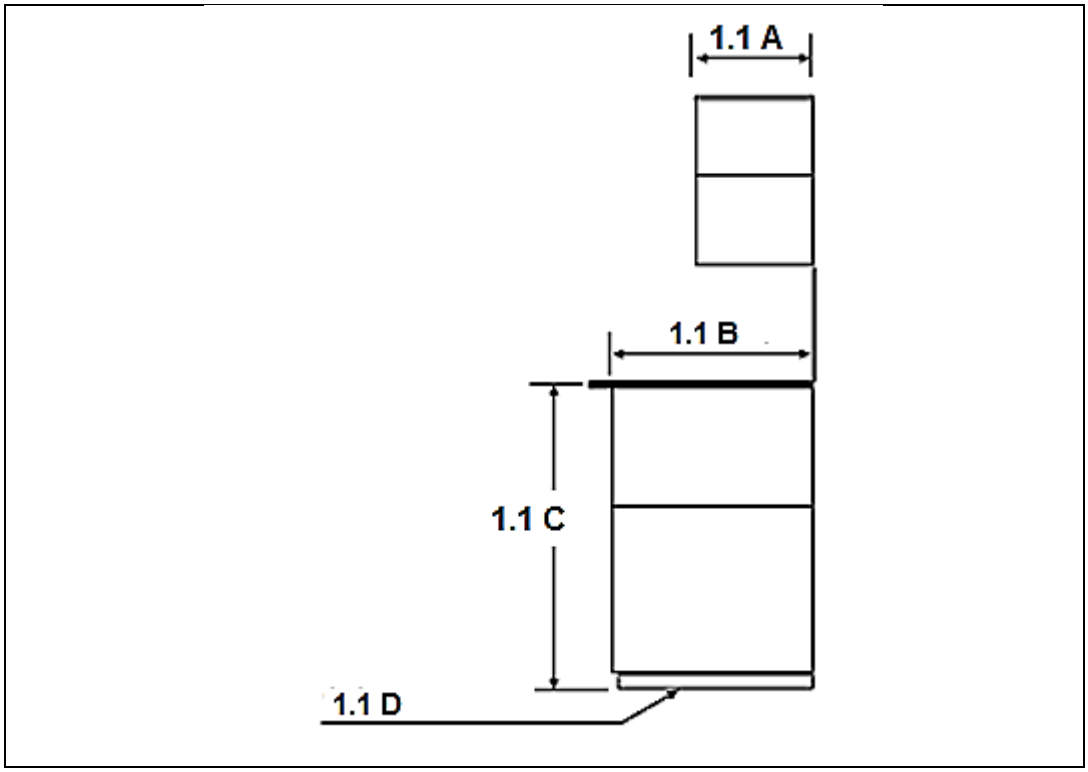


FIGURE 1.1

1.1.1 What is the comfortable depth measurement at 1.1 A? (1)

1.1.2 What is the comfortable depth measurement at 1.1 B? (1)

1.1.3 What is the comfortable height measurement at 1.1 C? (1)

1.1.4 What is part 1.1 D called? (1)

1.1.5 Why is part 1.1 D shorter than the cupboard depth? (1)

1.2 Name FOUR safety measures with regard to safe storage of materials.
(4 x 1) (4)

1.3 You are responsible for safety in a workshop.
Briefly explain why cutting tools must be sharp. (2)

1.4 Identify the type of tool which will be used for the following type of work:

1.4.1 To test whether walls were built vertically (1)

1.4.2 To sand large surfaces of wood (1)

1.5 Indicate whether the following statements with regard to scaffolds are TRUE or FALSE. Write only the word 'true' or 'false' next to the question number in the ANSWER BOOK.

1.5.1 Scaffolds may not be moved while workers are still on the scaffold. (1)

1.5.2 The scaffold may only be moved if the workers are fastened with harnesses. (1)

1.5.3 Scaffolds must be constructed on a level surface. (1)

1.5.4 When scaffolds are constructed on a slope, the scaffold pipes must be lengthened so that the platform is horizontal. (1)

1.5.5 High scaffolds must be anchored to the ground with anchor wires. (1)

1.5.6 Scaffolds may not be constructed higher than six storeys. (1)

1.5.7 A guard rail must be added onto the scaffold. (1)

1.5.8 Scaffolds must be constructed upright. (1)

1.6 1.6.1 Make a neat line sketch in good ratio to illustrate the elevation of the following brickwork:

- Three brick courses
- Toothing on the lefthand-side
- Raking back on the righthand side (6)

1.6.2 Indicate the following labels:

- Bed joint
- Perpends
- Arris (3)

[30]

QUESTION 2: ADVANCED CONSTRUCTION PROCESSES

2.1 Indicate whether the following statements with regard to the concrete cube test are TRUE or FALSE. Write only the word 'true' or 'false' next to the question number in the ANSWER BOOK.

2.1.1 The cube moulds must be made of steel. (1)

2.1.2 Concrete must be cast in layers of 100 mm thick. (1)

2.1.3 38 compacting tamps must be applied per layer. (1)

2.1.4 The filling of the cube must take place within 20 minutes. (1)

2.1.5 Cubes must be covered with damp bags within the first 24 hours. (1)

2.1.6 The cubes must be vibrated. (1)

2.1.7 The concrete cubes must be removed from the mould after 24 hours. (1)

2.1.8 Concrete cubes must then be left in the sun to dry out well. (1)

2.2 Answer the following questions with regard to the foundations in FIGURES 2.2 A to 2.2 D.

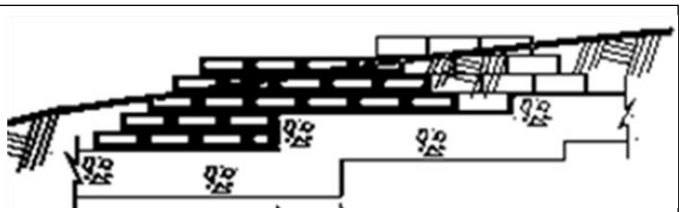


FIGURE 2.2 A

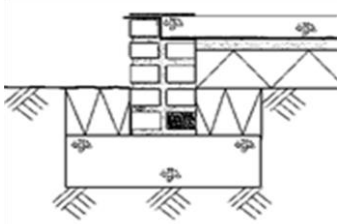


FIGURE 2.2 B

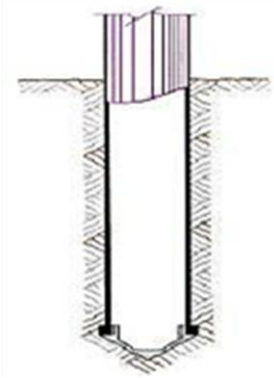


FIGURE 2.2 C

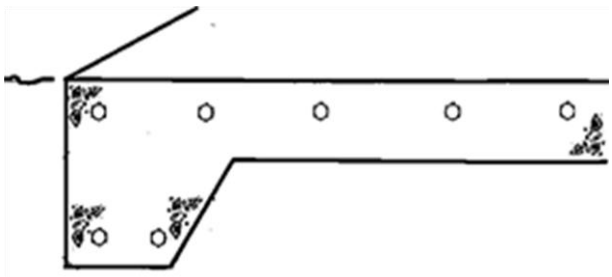


FIGURE 2.2 D

2.2.1 Identify the type of foundations in FIGURES 2.2 A to 2.2 D. (4)

2.2.2 Under which circumstances will the foundation in FIGURE 2.2 A be used? (1)

2.2.3 Which type of foundation will be used when solid ground is deep under the ground surface? (1)

2.3 Name the FOUR ingredients of a concrete mix. (4 x 1) (4)

2.4 Name THREE methods of curing concrete. (3 x 1) (3)

2.5 The mixing of concrete by hand is done in steps in a specific sequence. Rearrange the descriptions of the steps below in the correct sequence in your ANSWER BOOK.

2.5.1 Mix thoroughly (1)

2.5.2 Add water while mixing continuously (1)

2.5.3 Add the stone (1)

2.5.4 Spread the cement over the sand (1)

2.5.5 Mix until a thick paste (1)

2.5.6 Mix properly (1)

2.5.7 Spread the sand approximately 100 mm thick (1)

2.5.8 Make a pile with a depression on top (1)

2.6 Answer the following questions with regard to reinforcement steel bar in FIGURE 2.6 with the bar code 6 Y 1604 150.

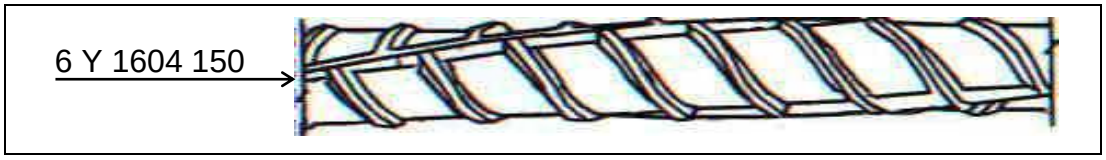


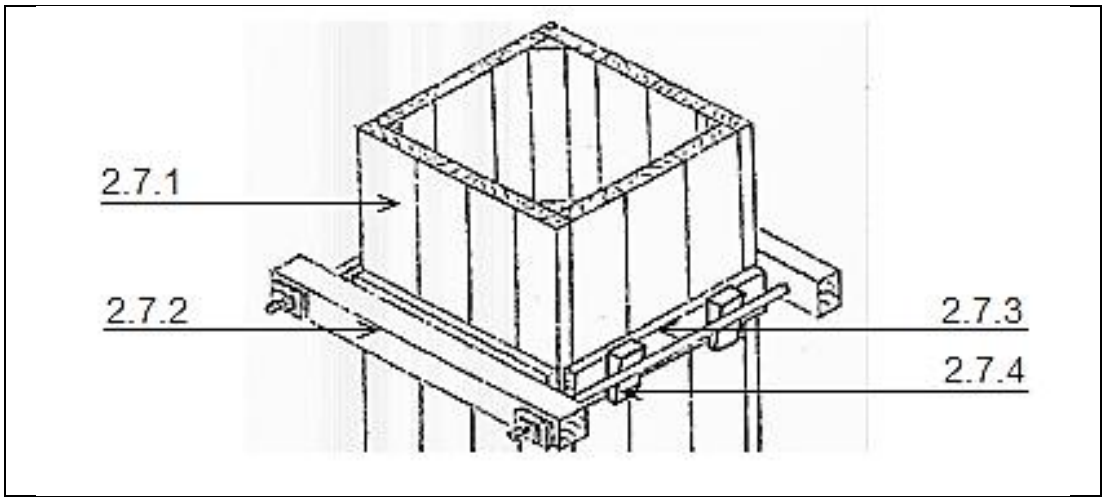
FIGURE 2.6

2.6.1 Briefly describe the purpose of the ribs on the steel bar in FIGURE 2.6. (2)

2.6.2 What is diameter measurement of the bar? (1)

2.6.3 What is the number of the bar? (1)

2.7 Identify the parts labelled 2.7.1 to 2.7.4 of the formwork in FIGURE 2.7.



(4)

FIGURE 2.7

2.8 Name THREE requirements to which formwork must comply. (3 x 1) (3)

[40]

QUESTION 3: CIVIL SERVICES

3.1 FIGURE 3.1 shows a solar heating system as interconnection with an electric geyser. Identify all the numbers which indicate the correct flow direction of the water in the different pipes of the system.
Write only the correct numbers in the ANSWER BOOK. (5)

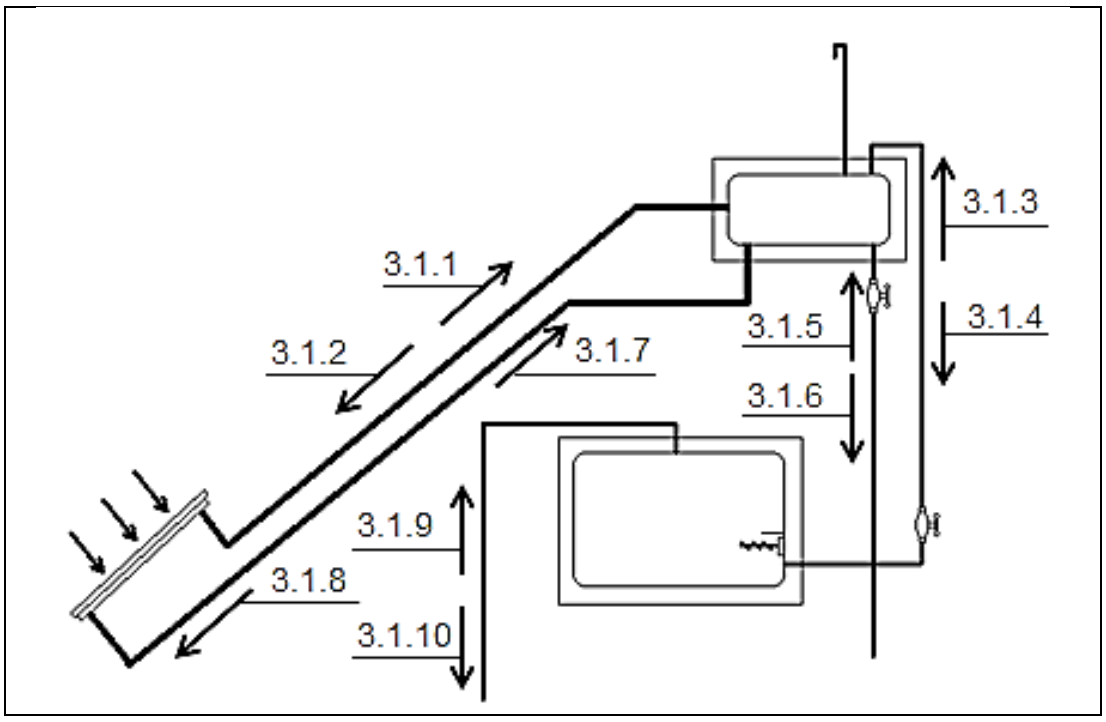


FIGURE 3.1

3.2 Name FOUR factors which determine the maximum water temperature in a solar heating system. (4 x 1) (4)

3.3 Under which circumstances will an indirect hot water system be used? (1)

3.4 Where in a water supply system will the following taps and valves be used?

3.4.1 Stop cock (1)

3.4.2 Ball valve (1)

3.5 Briefly describe what a french drain is. (4)

3.6 Answer the following questions with regard to the structure in FIGURE 3.6:

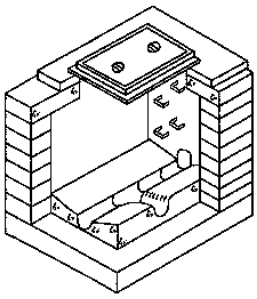


FIGURE 3.6

3.6.1 What is the structure called? (1)

3.6.2 Name TWO places in a drainage system where the structure will occur. (2 x 1) (2)

3.7 Name TWO purposes of an inspection eye. (2 x 1) (2)

3.8 Describe the purpose of a trap. (2)

3.9 Indicate whether the following statements are TRUE or FALSE.
Write only the word 'true' or 'false' next to the question number in the ANSWER BOOK. (1)

3.9.1 The minimum depth of a drain pipe is 200 mm. (1)

3.9.2 Drains should be laid at a constant gradient. (1)

3.9.3 Drains should be laid in a straight line. (1)

3.9.4 At all direction changes vent pipes should be inserted. (1)

3.9.5 Drains under buildings should be encased in at least 150 mm of concrete. (1)

3.10 Briefly describe TWO advantages of wind power generating over coal power generating. (2 x 1) (2)

[30]

QUESTION 4: MATERIALS AND QUANTITIES

4.1 Name TWO advantages of each of the following types of particle boards:

4.1.1 Veneered particle board (2 x 1) (2)

4.1.2 Melamine-covered particle board (2 x 1) (2)

4.1.3 Waterproof particle board (2 x 1) (2)

4.2 Briefly discuss the correlation between the density and the strength of particle boards. (2)

4.3 Briefly describe how the humid conditions will influence the sizes of particle boards. (3)

4.4 Name SIX advantages of concrete. (6 x 1) (6)

4.5 Name FOUR factors which can influence the workability of concrete. (4 x 1) (4)

4.6 To calculate the quantities and perimeter of a structure, it is necessary to determine the centre line first. Determine the centre line of the 220 mm cavity brick wall structure in FIGURE 4.6. (5)

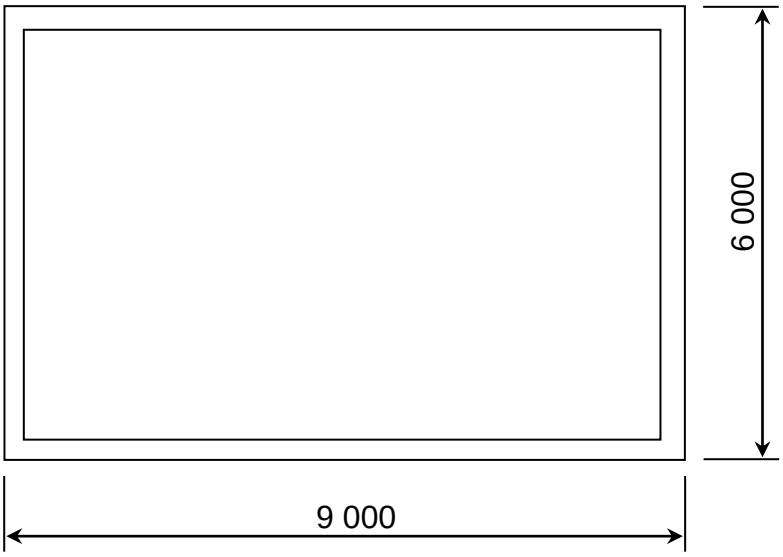


FIGURE 4.6

4.7 Table 4.7 shows a part of a quantity list indicating the information in COLUMN A to D. Explain the purpose of EACH column.

A	B	C	D
			T.A. / Subtr. 1 x D1 = 2,4 x 0,9
2/	2,4		
	0,9		
	2	4.32	thus: 4,32 m^2 vir 2 x D1

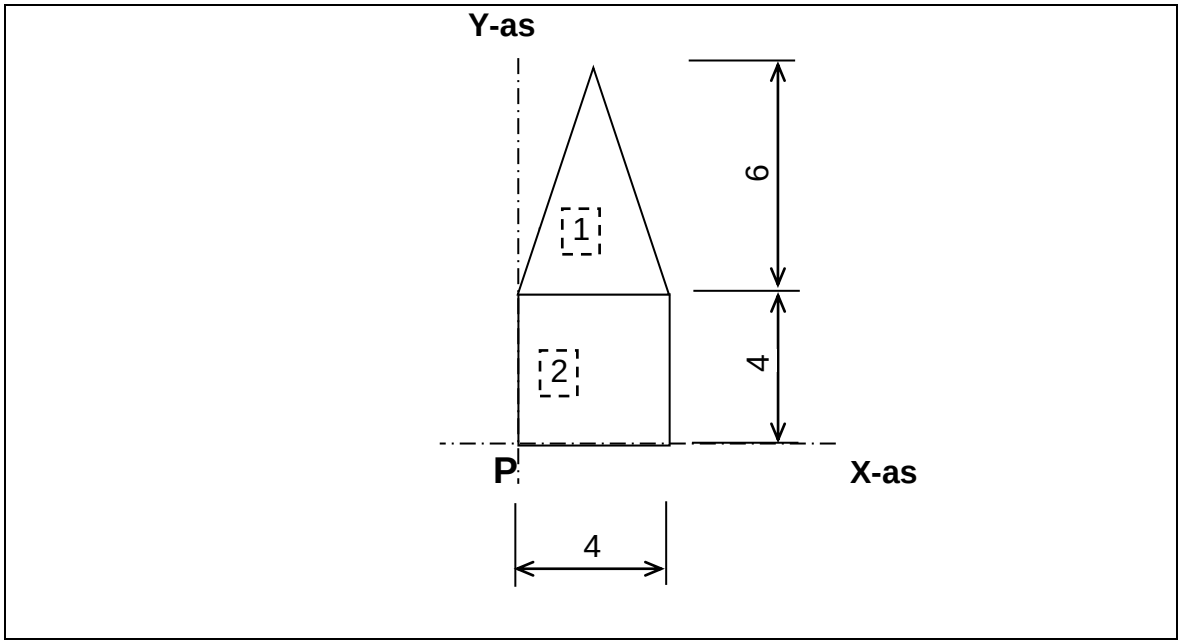
TABLE 4.7

(4)

[30]

QUESTION 5: APPLIED MECHANICS

5.1 Calculate the centroid of the body in FIGURE 5.1 from point P.
(The table on ANSWER SHEET A can be used for the calculations.)

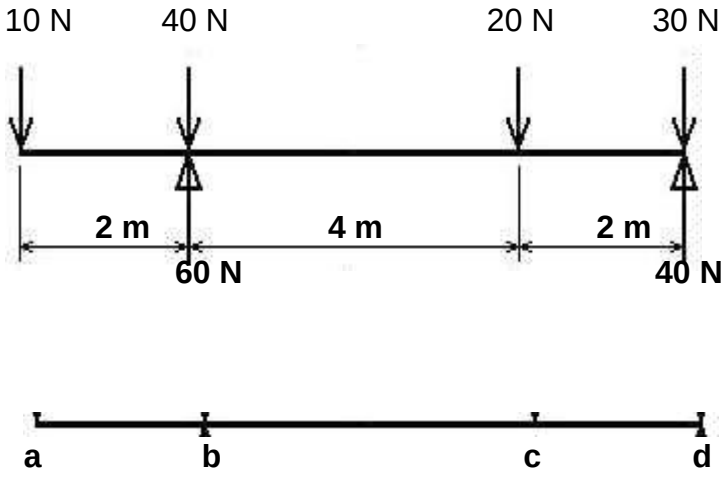


(12)

FIGUUR 5.1

5.2 FIGURE 5.2 on ANSWER SHEET A shows a beam with pointed loads.
Calculate on ANSWER SHEET A the following:

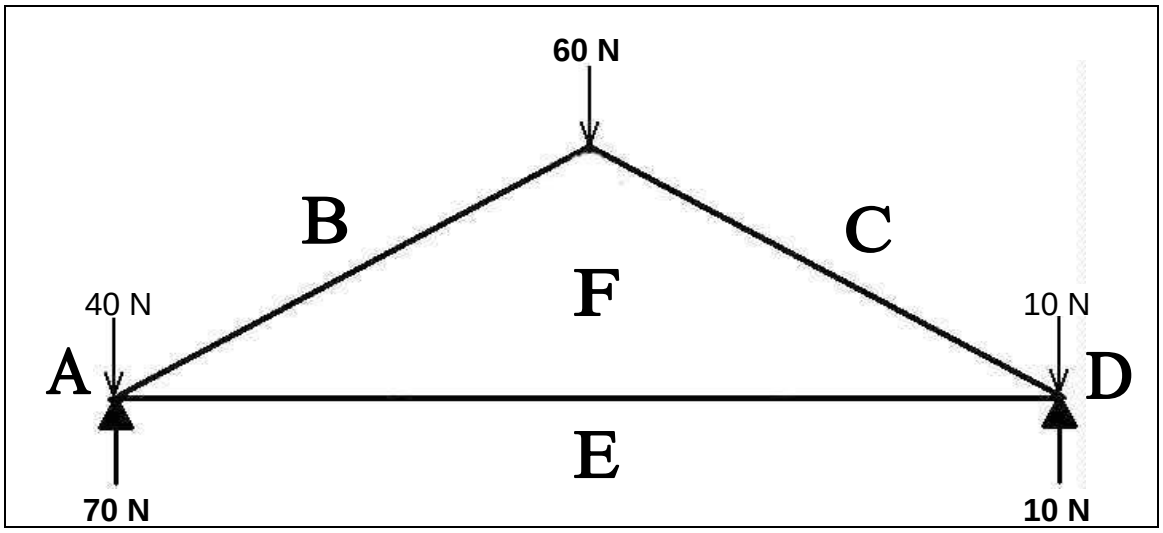
SCALE/SKAAL: 1 N = 2 mm



5.2.1 The shear force values (4)

5.2.2 Complete the shear force diagram according to the shear force values. (4)

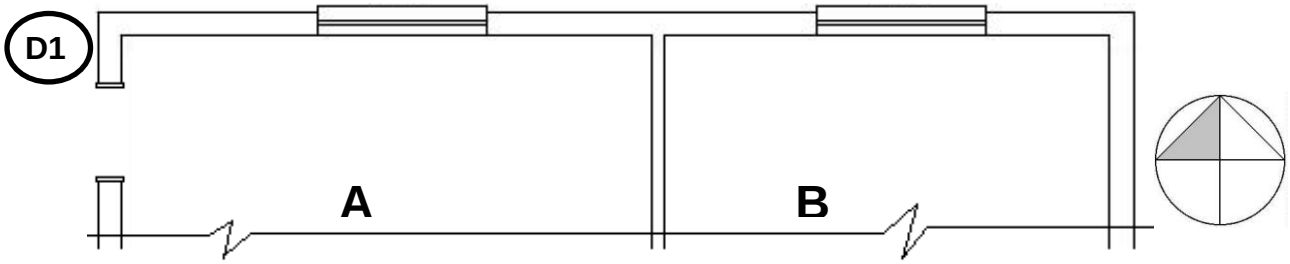
5.3 FIGURE 5.3 on ANSWER SHEET B shows a space diagram of a roof truss.



Determine graphically on ANSWER SHEET B the sizes and nature of the parts of the truss by completing the force diagram and the table. (10)
[30]

QUESTION 6: GRAPHICS AND COMMUNICATION

6.1 FIGURE 6.1 on ANSWER SHEET C shows the north elevation of a part of a floor plan.



Buitemure / Outer walls = 220 mm
Binnemuur / Inner wall = 110 mm
Kamer A / Room A = 7 m
Kamer B / Room B = 6 m

Answer the following questions with regard to the floor plan:

6.1.1 Complete the measurement writing of the north elevation according to the standard building drawing practice. (10)

6.1.2 Draw the outer door in at opening **D1**. (3)

6.1.3 Draw a water closet in good ratio at the eastern side of room **B**. (3)

6.1.4 Draw a hand wash basin in good ratio at the northern side of room **B**. (3)

6.1.5 Draw a shower in good ratio at the western side of room **B**. (3)

6.2 Answer the following questions with regard to the structure in FIGURE 6.2.

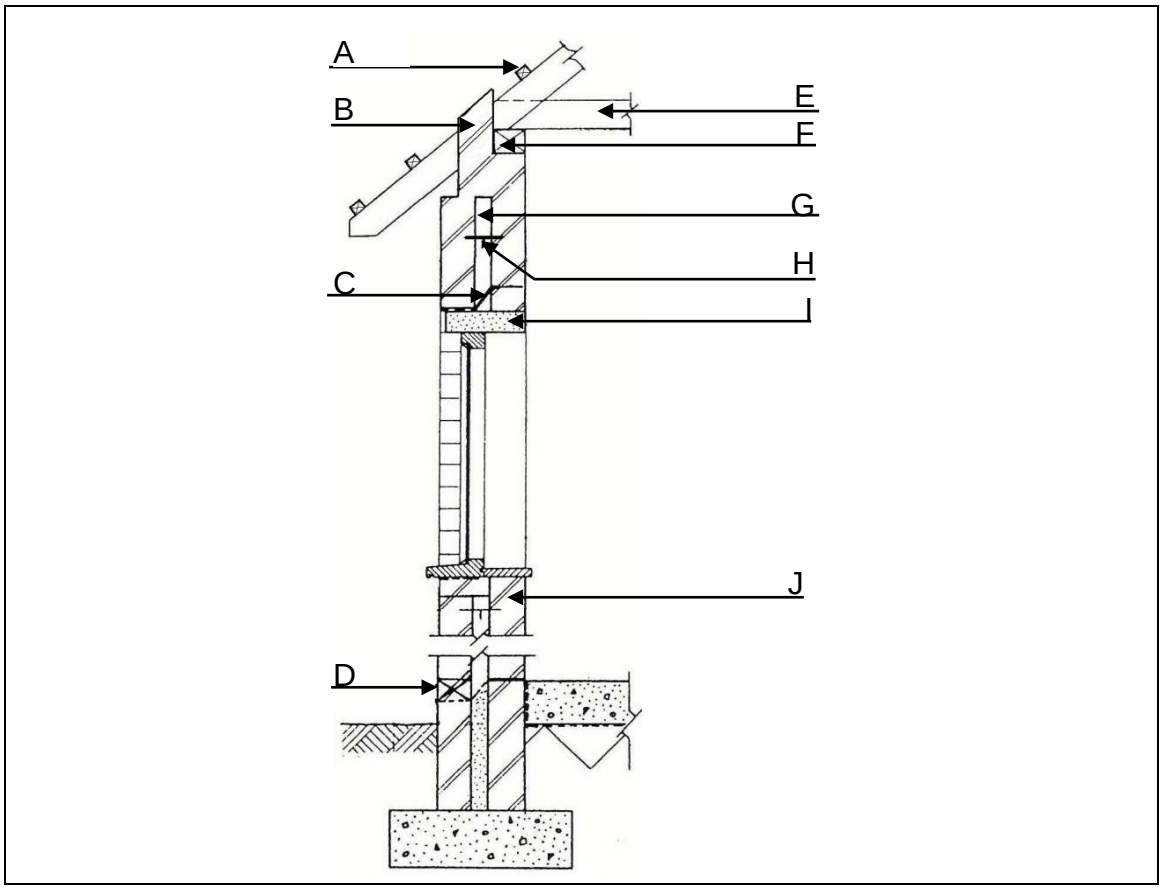


FIGURE 6.2

6.2.1 Identify the parts A to J. (10)

6.2.2 What is the purpose of part C? (1)

6.2.3 What is the purpose of part D? (1)

6.2.4 What are the standard width and thickness measurements of part A for a tiled roof construction? (2)

6.2.5 What are the standard width and thickness measurements of part E? (2)

6.2.6 From which type of material is part F manufactured? (1)

6.2.7 From which type of material is part I manufactured? (1)

[40]

TOTAL: 200

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

QUESTION/VRAAG 5.1 (12)

Shape / Vorm	Area	X	mX	Y	mY
1					
2					
TOTAL/TOTAAL					
X =		Y =			

QUESTION/VRAAG 5.2

5.2.1 FIGURE: The shear force values/Die skuifkragwaardes (4)

a = ...
b = ...
c = ...
d = ...

5.2.2 Die skuifkragdiagram/The shear force diagram (4)

SCALE/SKAAL: 1 N = 2 mm

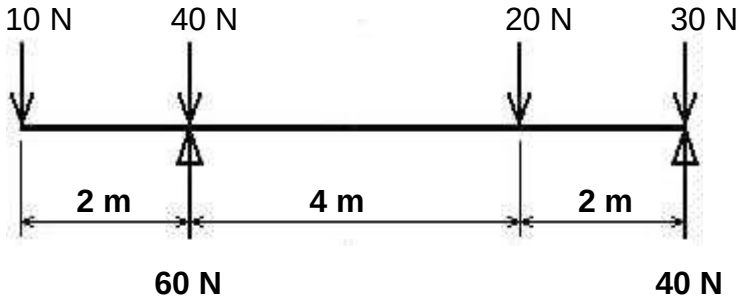
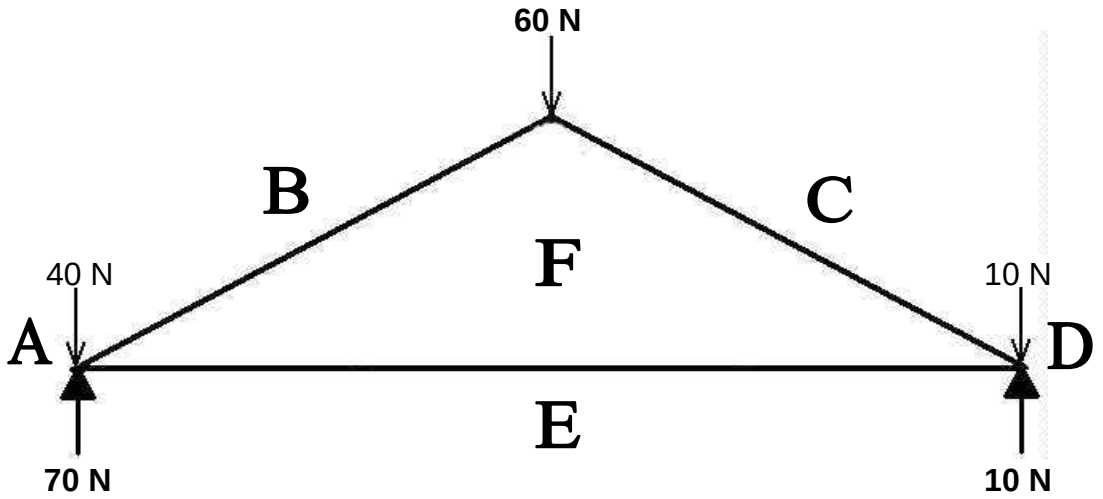


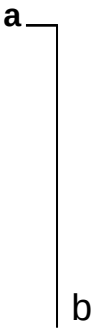
FIGURE 5.2

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

QUESTION/VRAAG 5.3

SPACE DIAGRAM:
RUIMTEDIAGRAM:





FORCE DIAGRAM
KRAGTEDIAGRAM

SCALE/SKAAL: 1 mm = 1 kN

PART / DEEL	Size/ Groote	Nature/Aard ↔	Nature/Aard →←
BF			
CF			
EF			

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

QUESTION/VRAAG 6.1

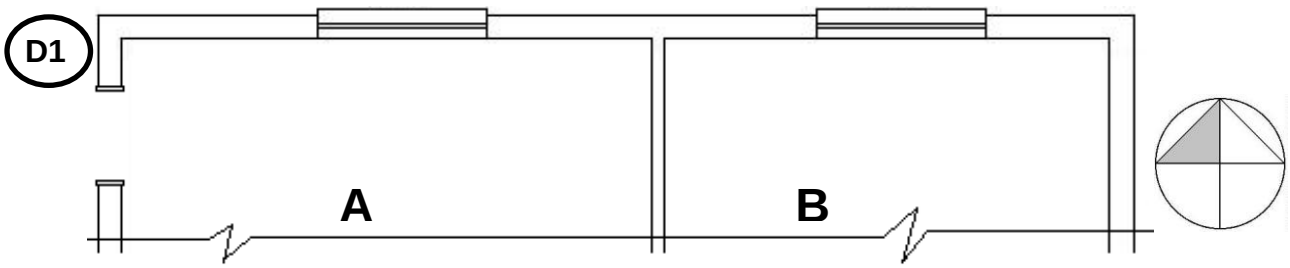


FIGURE 6.1

Outer walls / Buitemure = 220 mm
Inner wall / Binnemuur = 110 mm
Room A / Kamer A = 7 m
Room B / Kamer B = 6 m (22)

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	Pi = $\frac{22}{7}$ = 3, 142	ø	Diameter	V	Volume

FORMULAE

AREA OF	FORMULA (in words)	FORMULA (in symbols)	FORMULA FOR THE POSITION OF CENTROIDS	
			X-axis	Y-axis
Square	Length x Breadth	l x b	$\frac{b}{2}$	$\frac{b}{2}$
Rectangle	Length x Breadth	l x b	$\frac{l}{2}$	$\frac{b}{2}$
Right-angled triangle	½ x base x height	½b x h	$\frac{b}{3}$	$\frac{h}{3}$
Equilateral triangle/Pyramid	½ x base x height	½b x h	$\frac{b}{2}$	$\frac{h}{3}$
Circle	π x radius x radius	πr^2	Centroid is in the centre	
Circle	π x diameter x diameter divided by 4	$\frac{\pi d^2}{4}$		
Semi-circle	π x radius r x radius divided by 2	$\frac{\pi r^2}{2}$	Centroid is 0,424r on the centre line	

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

FORMULEBLAD

BELANGRIKE AFKORTINGS

SIMBOOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
G	Swaartepunt	h	Hoogte	d	Deursnee
C	Sentroïed	b	Breedte/Wydte	r	Radius
L	Lengte	s	Sy	A	Oppervlakte
π	Pi = $\frac{22}{7}$ = 3,142	ø	Deursnee	V	Volume

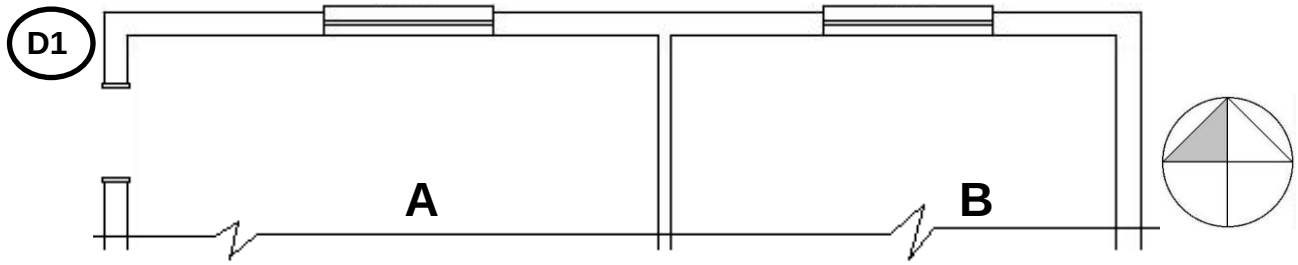
FORMULES

OPPERVLAKTE VAN	FORMULE (in woorde)	FORMULE (in simbole)	FORMULE VIR DIE POSISIE VAN SENTROÏEDE	
			X-as	Y-as
Vierkant	Lengte x Breedte	l x b	$\frac{b}{2}$	$\frac{b}{2}$
Reghoek	Lengte x Breedte	l x b	$\frac{l}{2}$	$\frac{b}{2}$
Reghoekige driehoek	½ x basis x hoogte	½b x h	$\frac{b}{3}$	$\frac{h}{3}$
Gelyksydige driehoek/Piramide	½ x basis x hoogte	½b x h	$\frac{b}{2}$	$\frac{h}{3}$
Sirkel	π x radius x radius	πr^2	Sentroïed is in die middel	
Sirkel	π x deursnee x deursnee gedeel deur 4	$\frac{\pi d^2}{4}$		
Halfsirkel	π x radius x radius gedeel deur 2	$\frac{\pi r^2}{2}$	Sentroïed is 0,424r op die middellyn	

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

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

VRAAG/QUESTION 6.1



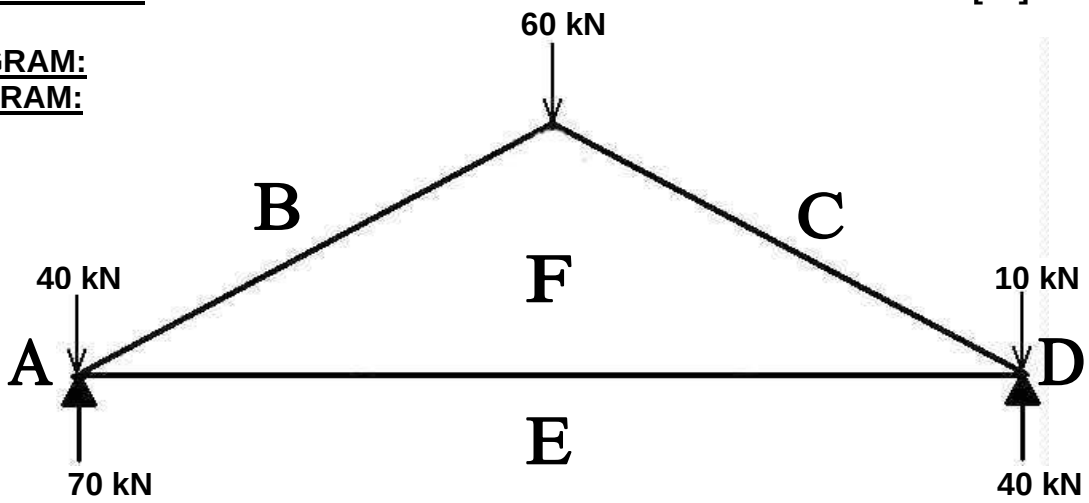
FIGUUR 6.1

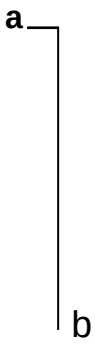
Buitemure/Outer walls = 220 mm
Binnemuur/Inner wall = 110 mm
Kamer A/Room A = 7 m
Kamer B/Room B = 6 m (22)

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

VRAAG/QUESTION 5.3 **[10]**

RUIMTEDIAGRAM:
SPACE DIAGRAM:





KRAGTEDIAGRAM
FORCE DIAGRAM

SKAAL/SCALE: 1 mm = 1 kN

DEEL/	Grootte/	Aard/Nature	
PART	Size	←→	→←
BF			
CF			
EF			

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

VRAAG/QUESTION 5.1 (12)

Vorm / Shape	Area	X	mX	Y	mY
1					
2					
TOTAAL/TOTAL					
X =			Y =		

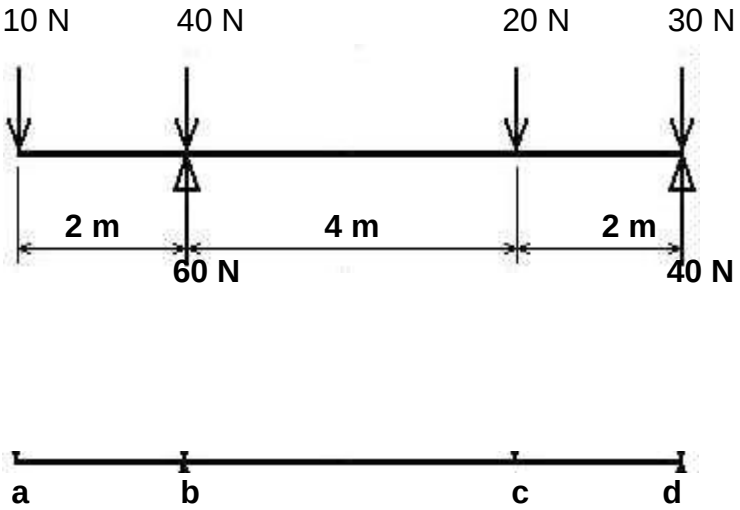
VRAAG/QUESTION. 5.2

5.2.1 Die skuifkragwaardes/The shear force values (4)

a = ……..
b = ……..
c = ……..
d = ……..

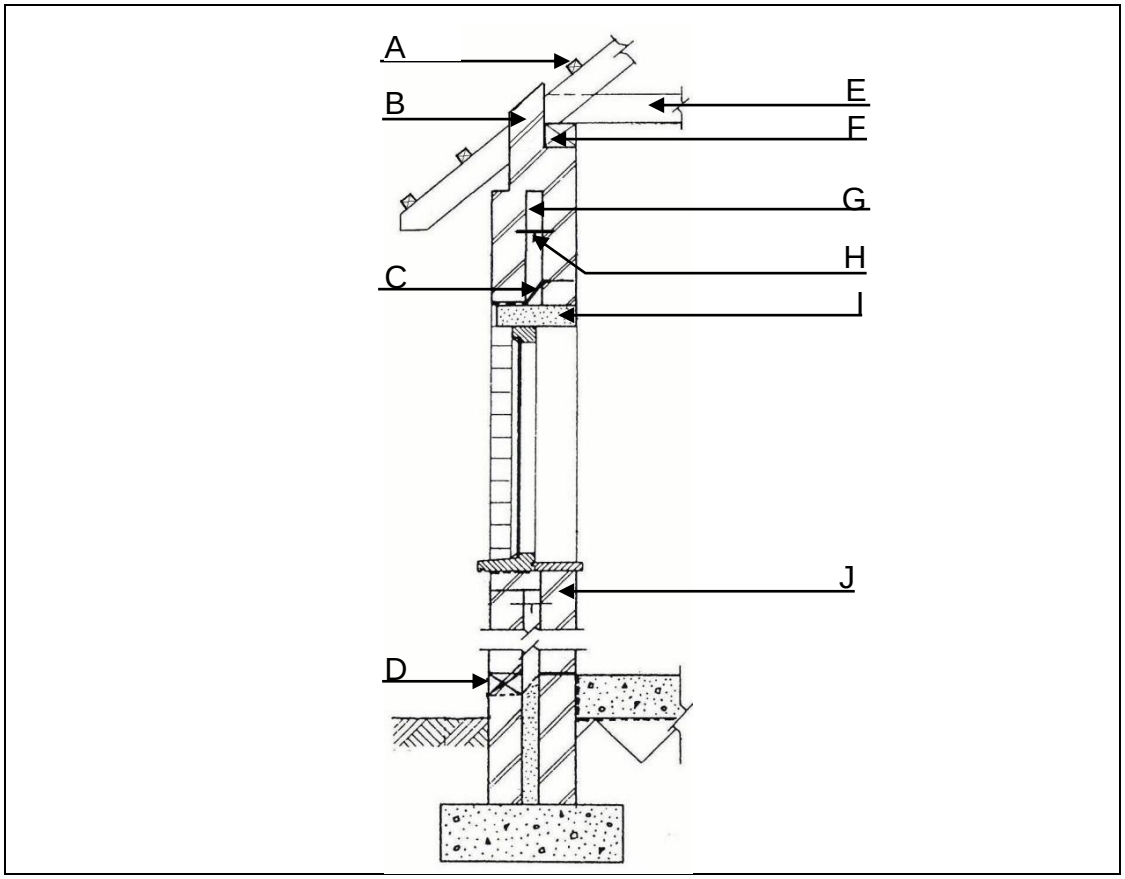
5.2.2 FIGUUR 5.2: Die skuifkragdiagram/The shear force diagram (4)

SKAAL/SCALE: 1 N = 2 mm



FIGUUR 5.2

6.2 Beantwoord die volgende vrae ten opsigte van die struktuur in FIGUUR 6.2.



FIGUUR 6.2

6.2.1 Identifiseer die dele A tot J. (10)

6.2.2 Wat is die doel van deel C? (1)

6.2.3 Wat is die doel van deel D? (1)

6.2.4 Wat is die standaardbreedte en dikte mates van deel A vir 'n teëldakkonstruksie? (2)

6.2.5 Wat is die standaardbreedte en dikte mates van deel E? (2)

6.2.6 Van watter tipe materiaal word deel F vervaardig? (1)

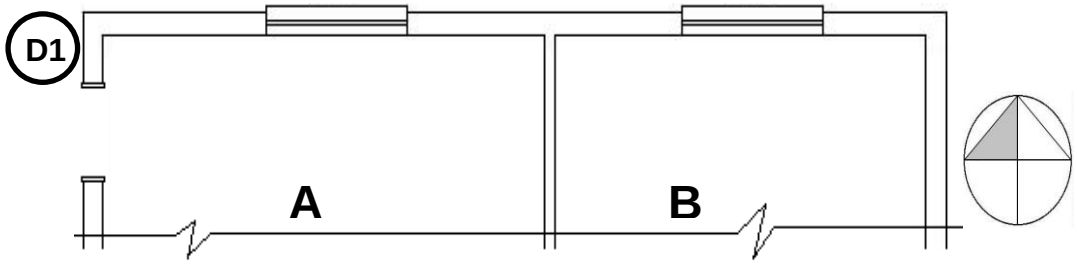
6.2.7 Van watter tipe materiaal word deel I vervaardig? (1)

[40]

TOTAAL: 200

VRAAG 6: GRAFIKA EN KOMMUNIKASIE

6.1 FIGUUR 6.1 op ANTWOORDBLAD C toon die noordaansig van 'n gedeelte van 'n vloerplan.



Buitemure / Outer walls = 220 mm
Binnemuur / Inner wall = 110 mm
Kamer A / Room A = 7 m
Kamer B / Room B = 6 m

Beantwoord die volgende vrae ten opsigte van die vloerplan:

6.1.1 Voltooi die maatskrywing van die noordaansig volgens die standaard boutekenepraktyk. (10)

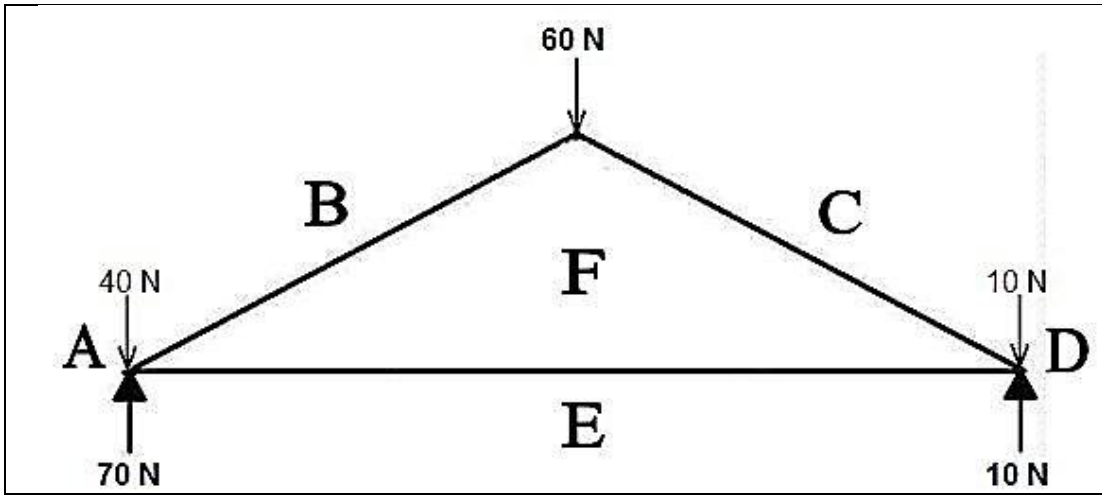
6.1.2 Teken die buitedeur in by opening **D1**. (3)

6.1.3 Teken 'n waterkloset in goeie verhouding aan die oostelike kant van vertrek **B**. (3)

6.1.4 Teken 'n handewasbak in goeie verhouding aan die noordelike kant van vertrek **B**. (3)

6.1.5 Teken 'n stort in goeie verhouding aan die westelike kant van vertrek **B**. (3)

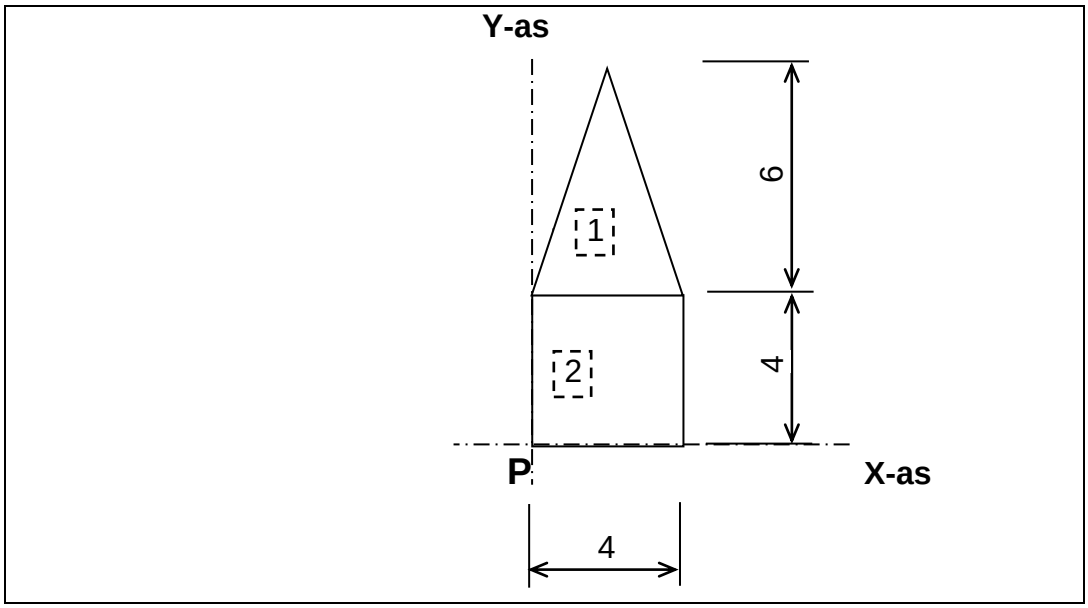
5.3 FIGUUR 5.3 op ANTWOORDBLAD B toon die ruimtediagram van 'n dakkap.



Bepaal grafies op ANTWOORDBLAD B die grootte en aard van die kragte in die onderdele van die kap deur die kragtediagram te teken en die tabel te voltooi. (10)
[30]

VRAAG 5: TOEGEPASTE MEGANIKA

5.1 Bereken die sentroïed van die liggaam in FIGUUR 5.1 vanaf punt P.
(Die tabel op ANTWOORDBLAD A kan vir die berekeninge gebruik word.)

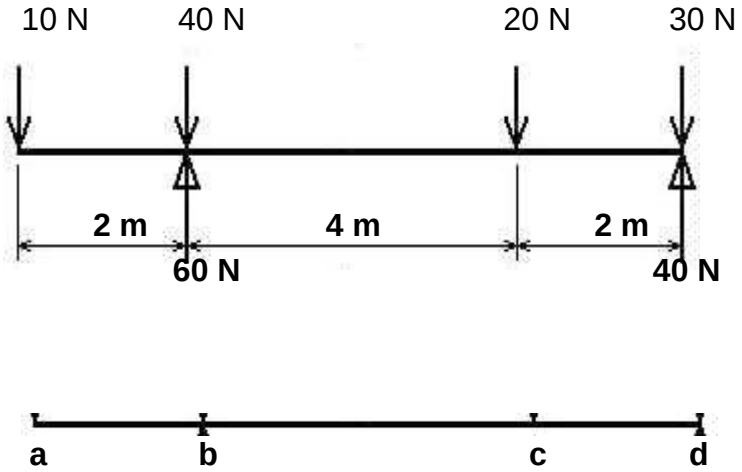


(12)

FIGUUR 5.1

5.2 FIGUUR 5.2 op ANTWOORDBLAD A toon 'n balk met puntbelasting.
Bereken op ANTWOORDBLAD A die volgende:

SCALE/SKAAL: 1 N = 2 mm



5.2.1 Die skuifkragwaardes (4)

5.2.2 Voltooi die skuifkragdiagram volgens die skuifkragwaardes (4)

VRAAG 4: MATERIALE EN HOEVEELHEDE

4.1 Noem TWEE voordele van elkeen van die volgende tipe partikelborde:

4.1.1 Gefineerde partikelbord (2 x 1) (2)

4.1.2 Melamien bedekte partikelbord (2 x 1) (2)

4.1.3 Waterdigte partikelbord (2 x 1) (2)

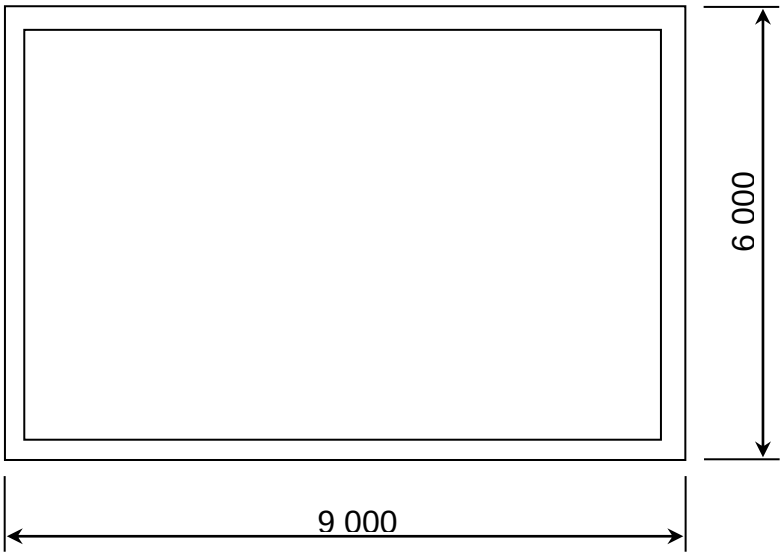
4.2 Bespreek kortliks die korrelasie tussen die digtheid en sterkte van partikelborde. (2)

4.3 Beskryf kortliks hoe die humiditeitstoestande die mates van die partikelborde beïnvloed. (3)

4.4 Noem SES voordele van beton. (6 x 1) (6)

4.5 Noem VIER faktore wat 'n invloed op die bewerkbaarheid van beton het. (4 x 1) (4)

4.6 Om die hoeveelhede en omtrek van 'n struktuur te bereken, is dit nodig om eers die senterlyn te bereken. Bereken die senterlyn van die 220 mm eensteenmuur van die struktuur in FIGUUR 4.6.



FIGUUR 4.6 (5)

4.7 Tabel 4.7 toon 'n deel van 'n hoeveelheidslys wat die inligting in KOLOM A tot D aandui. Verduidelik die doel van ELKE kolom.

A	B	C	D
			T.A. / Subtr. 1 x D1 = 2,4 x 0,9
2/	2,4		
	0,9		
	2	4.32	dus: 4,32 m^2 vir 2 x D1

TABEL 4.7 (4)

[30]

3.3 In watter omstandighede sal 'n indirekte warmwaterstelsel gebruik word? (1)

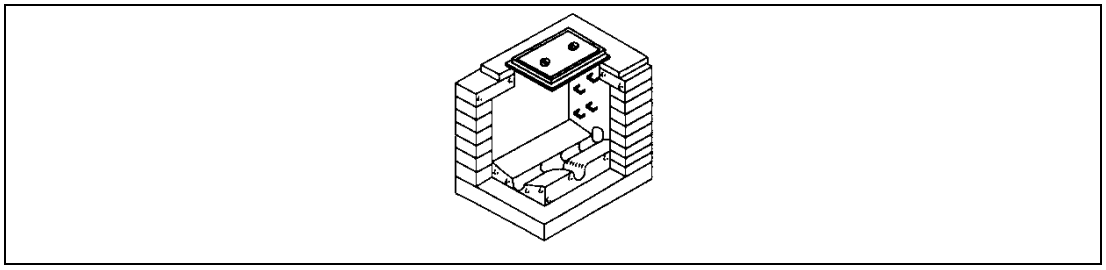
3.4 Waar in 'n watervoorsieningstelsel word die volgende krane en kleppe gebruik?

3.4.1 Afsluitkraan (1)

3.4.2 Vlotterklep (1)

3.5 Beskryf kortliks wat 'n stapelriool is. (4)

3.6 Beantwoord die volgende vrae ten opsigte van die struktuur in FIGUUR 3.6:



FIGUUR 3.6

3.6.1 Wat word die struktuur genoem? (1)

3.6.2 Noem TWEE plekke in 'n rioolstelsel waar die struktuur voorkom. (2 x 1) (2)

3.7 Noem TWEE funksies van 'n inspeksie-oog. (2 x 1) (2)

3.8 Beskryf die doel van 'n sperder. (2)

3.9 Dui aan of die volgende stellings WAAR of ONWAAR is.
Skryf slegs 'waar' of 'onwaar' langs die vraagnommer in die ANTWOORDEBOEK.

3.9.1 Die minimum diepte van 'n rioolpyp is 200 mm. (1)

3.9.2 Riole moet teen 'n konstante val gelê word. (1)

3.9.3 Riole moet in 'n reguit lyn gelê word. (1)

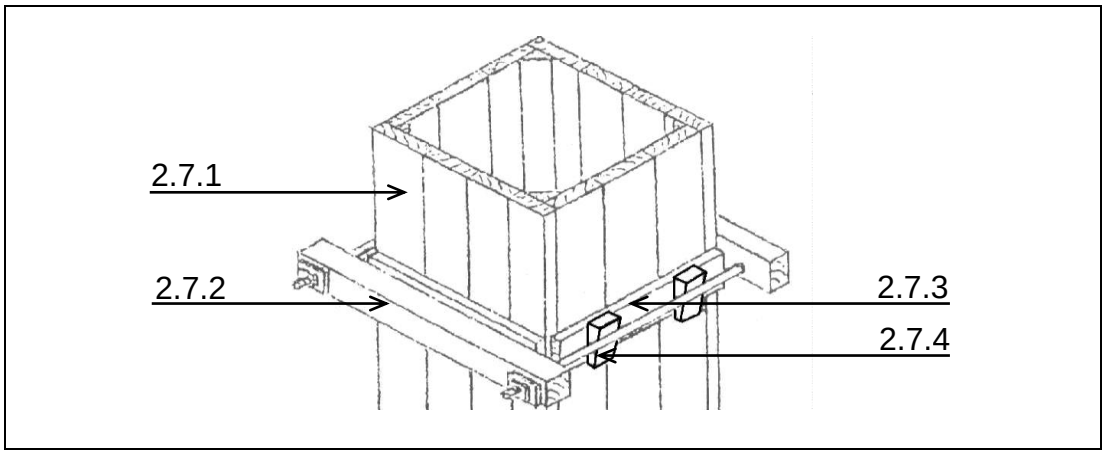
3.9.4 By alle rigtingveranderings moet 'n lugpyp aangebring word. (1)

3.9.5 Riole onder 'n gebou moet met 150 mm beton omhul wees. (1)

3.10 Beskryf kortliks TWEE voordele van windkragopwekking bo steenkoolkragopwekking. (2 x 1) (2)

[30]

2.7 Identifiseer die dele 2.7.1 tot 2.7.4 van die bekisting in FIGUUR 2.7.



(4)

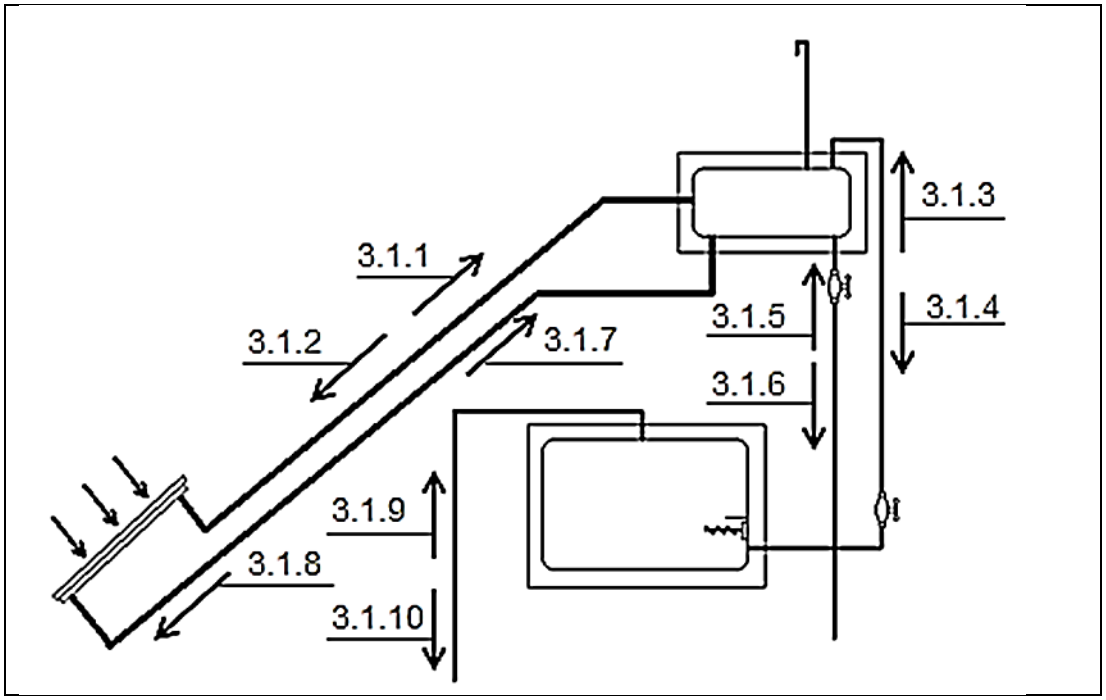
FIGUUR 2.7

2.8 Noem DRIE vereistes waaraan bekisting moet voldoen. (3 x 1) (3)

[40]

VRAAG 3: SIVIELE DIENSTE

3.1 FIGUUR 3.1 toon 'n sonverhittingstelsel as tussenverbinding met 'n elektriese geiser. Identifiseer al die nommers wat die korrekte vloeirigting van die water in die verskillende pype in die stelsel aandui. Skryf slegs die korrekte nommers in die ANTWOORDEBOEK.



FIGUUR 3.1

3.2 Noem VIER faktore wat die maksimum watertemperatuur van 'n sonverhittingstelsel bepaal. (4 x 1) (4)

2.3 Noem die VIER bestanddele van 'n betonmengsel. (4 x 1) (4)

2.4 Noem DRIE metodes vir die nabehandeling van beton. (3 x 1) (3)

2.5 Die meng van beton met die hand word in stappe gedoen volgens 'n spesifieke volgorde. Rangskik die onderstaande beskrywings van die stappe in die korrekte volgorde in jou ANTWOORDEBOEK.

2.5.1 Meng deeglik (1)

2.5.2 Voeg water by en meng gedurig (1)

2.5.3 Voeg die klip by (1)

2.5.4 Strooi die sement oor die sand (1)

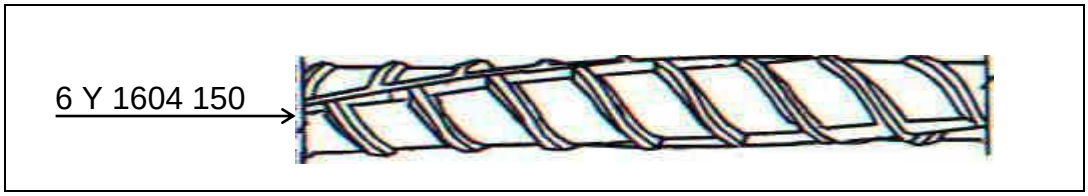
2.5.5 Meng tot 'n dik pap (1)

2.5.6 Meng deeglik (1)

2.5.7 Strooi die sand ongeveer 100 mm dik (1)

2.5.8 Maak 'n hoop met 'n holte aan die bokant (1)

2.6 Beantwoord die volgende vrae ten opsigte van die wapening staalstaaf in FIGUUR 2.6 met die staafkode 6 Y 1604 150.



FIGUUR 2.6

2.6.1 Beskryf kortliks die doel van die ribbe op die staalstaaf in FIGUUR 2.6. (2)

2.6.2 Wat is die deursnee mate van die staaf? (1)

2.6.3 Wat is die nommer van die staaf? (1)

VRAAG 2: GEVORDERDE KONSTRUKSIEPROSESSE

2.1 Dui aan of die volgende stellings ten opsigte van die beton kubustoets WAAR of ONWAAR is. Skryf slegs 'waar' of 'onwaar' langs die vraagnommer in die ANTWOORDEBOEK.

2.1.1 Die kubusvorms moet van staal wees. (1)

2.1.2 Beton moet in lae van 100 mm dik gegiet word. (1)

2.1.3 38 verdigting-stampe moet per laag gegee word. (1)

2.1.4 Die vulling van die kubus moet binne 20 minute voltooi wees. (1)

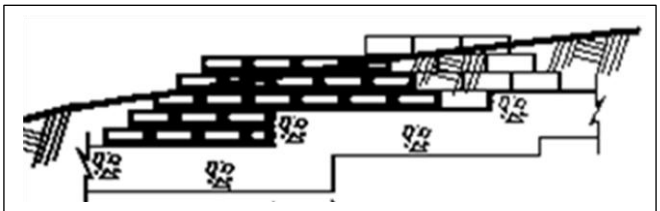
2.1.5 Kubusse moet binne die eerste 24 uur met klam sakke bedek wees. (1)

2.1.6 Die kubusse moet gevibreer word. (1)

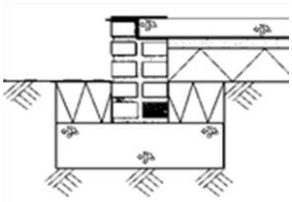
2.1.7 Na 24 uur moet die betonkubusse uit die vorm verwyder word. (1)

2.1.8 Betonkubusse moet daarna in die son gelaat word om goed te droog. (1)

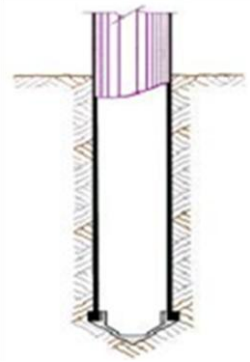
2.2 Beantwoord die volgende vrae ten opsigte van die fondamente in FIGURE 2.2 A tot 2.2 D.



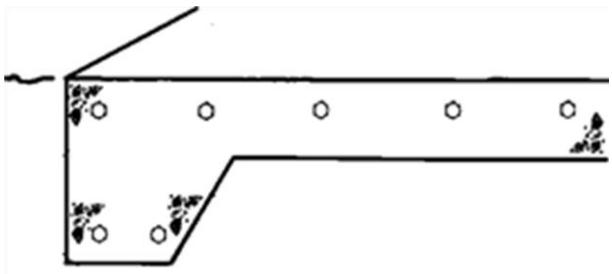
FIGUUR 2.2 A



FIGUUR 2.2 B



FIGUUR 2.2 C



FIGUUR 2.2 D

2.2.1 Identifiseer die tipe fondamente in FIGUUR 2.2 A tot 2.2 D. (4)

2.2.2 In watter omstandighede sal die fondament in FIGUUR 2.2 A gebruik word? (1)

2.2.3 Watter tipe fondament sal gebruik word wanneer soliede grond diep onder die grondvlak is? (1)

1.5 Dui aan of die volgende stellings ten opsigte van steierwerk WAAR of ONWAAR is. Skryf slegs 'waar' of 'onwaar' langs die vraagnommer in die ANTWOORDEBOEK.

1.5.1 Steierwerk mag nie verskuif word wanneer werkers nog op die steier is nie. (1)

1.5.2 Die steier mag net geskuif word indien die werkers met harnasse vas is. (1)

1.5.3 Steiers moet op 'n gelyk vlak opgerig word. (1)

1.5.4 Steiers wat teen 'n helling opgerig word, se steierpype moet verleng word sodat die platvorm horisontaal is. (1)

1.5.5 Hoë steiers moet met ankerdrade aan die grond geanker word. (1)

1.5.6 Steiers mag nie hoër as ses verdiepings opgerig word nie. (1)

1.5.7 'n Beskermreling moet op die steier aangebring word. (1)

1.5.8 Steiers moet regop opgerig word. (1)

1.6 1.6.1 Maak 'n netjiese lynskets in goeie verhouding om die aansig van die volgende steenwerk te illustreer:

- Drie steenlae
- Vertanding aan die linkerkant
- Trumesselwerk aan die regterkant (6)

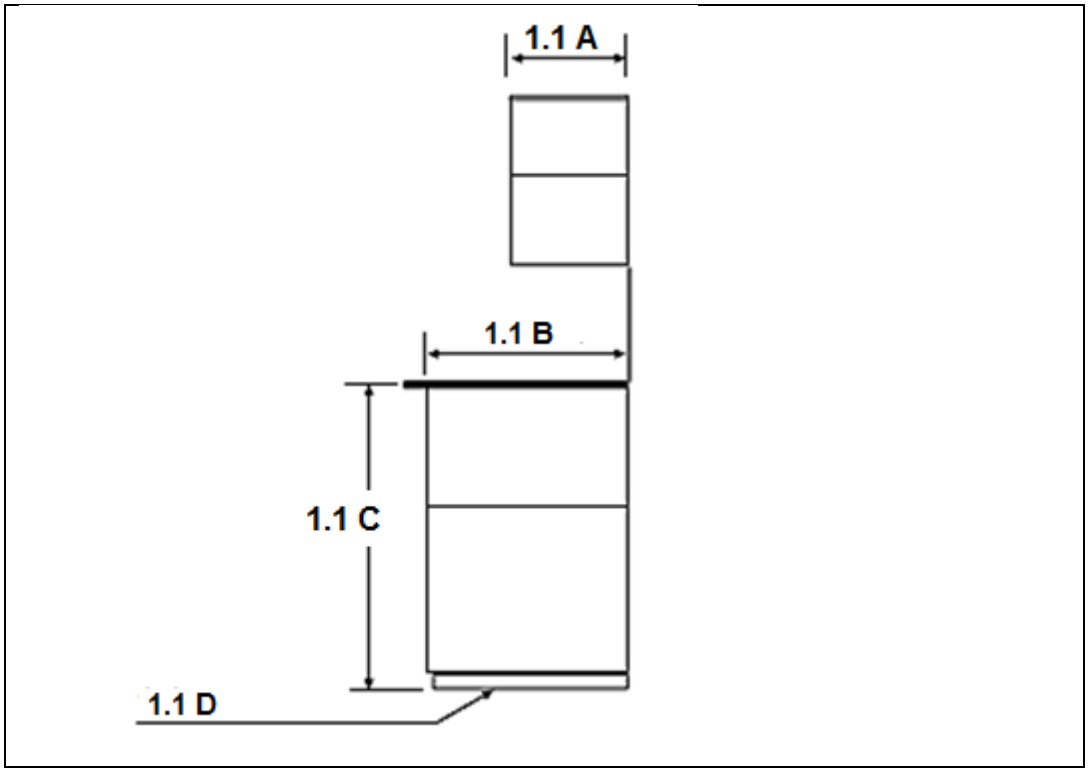
1.6.2 Toon die volgende byskrifte:

- Strykvoeg
- Stootvoeg
- Skerprand (3)

[30]

VRAAG 1: KONSTRUKSIEPROSESSE

1.1 'n Kombuiskas moet so gemaak word dat dit gerieflik is om te gebruik. Beantwoord die volgende vrae ten opsigte van die kombuiskas in FIGUUR 1.1.



FIGUUR 1.1

1.1.1 Wat is die gerieflike dieptemate by 1.1 A? (1)

1.1.2 Wat is die gerieflike dieptemate by 1.1 B? (1)

1.1.3 Wat is die gerieflike hoogtemate by 1.1 C? (1)

1.1.4 Wat word deel 1.1 D genoem? (1)

1.1.5 Waarom is deel 1.1 D korter as die kasdiepte? (1)

1.2 Noem VIER veiligheidsmaatreëls met betrekking tot die veilige berging van materiale. (4 x 1) (4)

1.3 Jy is verantwoordelik vir veiligheid in 'n werkswinkel. Verduidelik kortliks waarom snygereedskap skerp moet wees. (2)

1.4 Identifiseer die tipe gereedskapstuk wat vir die volgende werk gebruik sal word:

1.4.1 Om te toets of mure vertikaal gebou is (1)

1.4.2 Om groot houtoppervlaktes af te skuur (1)

BENODIGDHEDE:

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 gedoen word.
7. Gebruik die puntetoekennings as ’n gids vir die lengte van jou antwoord.
8. Tekeninge en sketse moet volledig en netjies van afmetings, byskrifte en titels voorsien word soos voorgeskryf deur SANS (SABS) se Gebruikskode vir Boutekenepraktyk.
9. Vir die doeleindes van hierdie vraestel moet die afmetings van ’n steen as 220 mm x 110 mm x 75 mm geneem word.
9. Gebruik jou eie oordeel waar afmetings en/of detail ontbreek.
10. Beantwoord VRAAG 5.1, 5.2, 5.3 en 6.1 op die ANTWOORDBLAAIE wat voorsien is.

Province of the
EASTERN CAPE
EDUCATION

NASIONALE SENIOR SERTIFIKAAT

GRAAD 12

SEPTEMBER 2014

SIVIELE TEGNOLOGIE

PUNTE: **200**

TYD: **3 uur**

* C V L T D M *

Hierdie vraestel bestaan uit 17 bladsye.