GAUTENG DEPARTMENT OF EDUCATION /
GAUTENGSE DEPARTEMENT VAN ONDERWYS
SENIOR CERTIFICATE EXAMINATION /
SENIORSERTIFIKAAT-EKSAMEN

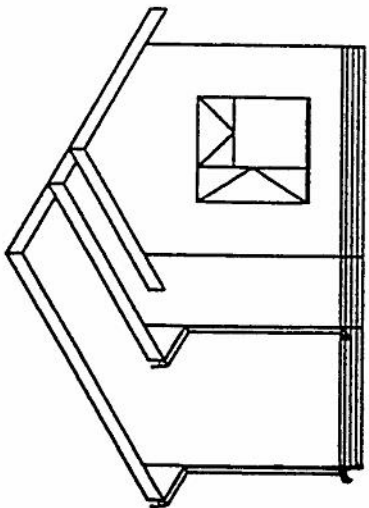**BUILDING CONSTRUCTION SG**
BOUKONSTRUKSIE SG
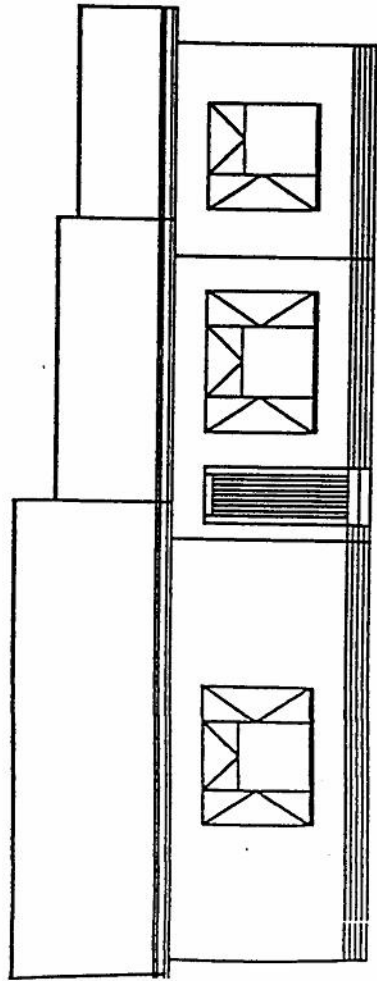
POSSIBLE ANSWERS OCT / NOV 2006

QUESTION 1 / *VRAAG 1*

NORTH VIEW		*NOORD-AANSIG*
Correct view	2	*Aansig korrek*
Roof height auxillary view	4	*Dakhoogte-hulpaansig*
Roof design	3	*Dakontwerp*
Substructure	2	*Onderbou*
Superstructure	2	*Bobou*
Gutter	2	*Geut*
Fascia board	2	*Fassieplank*
Downpipe	2	*Afleipyp*
Door	2	*Deur*
Step	2	*Trap*
Window placing	2	*Vensterplasing*
Window sill	2	*Vensterbanke*
Window opening	4	*Oopswaairame getoon*
Labelling	2	*Byskrifte*
Line work	2	*Lynwerk*
Scale	2	*Skaal*
	37	

WEST ELEVATION		*WES-AANSIG*
Correct view	2	*Aansig korrek*
Roof design	3	*Dakontwerp*
Ridging	2	*Nokplaat*
Fascia board	2	*Fassieplank*
Gutter	2	*Geut*
Downpipe	2	*Afleipyp*
Substructure	2	*Onderbou*
Superstructure	2	*Bobou*
Neatness	2	*Netheid*
Line work	2	*Lynwerk*
Scale	2	*Skaal*
	23	

NOORD-AANSIG / NORTH ELEVATION
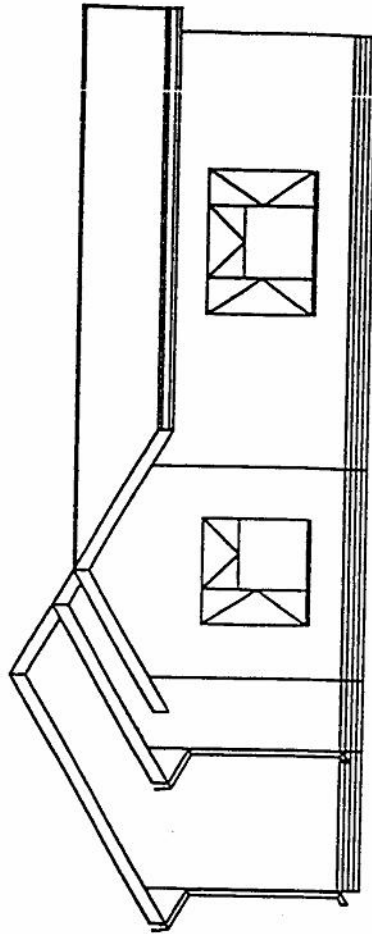
WES-AANSIG / WEST ELEVATION

BEPALING VAN DAKHOOGTES
DETERMINE ROOF HEIGHT

QUESTION 2 / VRAAG 2

BEREKEN LR

L.O.M   R.O.M

Neem momente om RR

10 x LR	=	(6 x 2) + (12 x 6) + (4 x 9) ü	
10 LR	=	12 + 72 + 36 ü	
10 LR	=	$\frac{120}{10}$	
LR	=	12 kN üü	(6)

BEREKEN RR

L.O.M   R.O.M

Neem momente om LR

10 x RR	=	(4 x 1) + (12 x 4) + (6 x 8) ü	
10 RR	=	4 + 48 + 48 ü	
10 RR	=	$\frac{100}{10}$	
RR	=	10 kN üü	(6)

TOETS

Opwaartse kragte   =   Afwaartse kragte

12 kN + 10 kN   =   4 kN + 12 kN + 6 kN
22 kN   =   22 kN   (2)

BMA	=	LR x 0			BMB	=	(LR x 1)	
	=	21 x 0 ü				=	(12 x 1) ü	
	=	0 kN.m ü	(2)			=	12 kN.m ü	(2)

BMC	=	(LR x 4) – (B x 3)			BMD	=	(LR x 8) – (C x 4) – (B x 7)	
	=	(12 x 4) – (4 x 3) ü				=	(12 x 8) – (12 x 4) – (4 x 7) ü	
	=	48 – 12				=	96 – 48 – 28 ü	
	=	36 kN.m ü	(3)			=	20 kN.m ü	(3)

BME	=	(LR x 10) – (D x 2) – (C x 6) – (B x 9)	
	=	(12 x 10) ü – (6 x 2) ü – (12 x 6) ü – (4 x 9) ü	
	=	120 – 12 – 72 – 36 ü	
	=	0 kN.m ü	(6)

[30]

BEREKEN SKUIFKRAGTE

SKA	=	LR ü		SKB	=	LR – B
	=	12 kN ü			=	12 – 4 ü
					=	8 kN ü

SKC	=	LR – B – C		SKD	=	LR – B – C - D
	=	12 – 4 – 12 ü			=	12 – 4 – 12 – 6 ü
	=	-4 kN ü			=	-10 kN ü

SKE	=	RR ü
	=	10 kN ü

(10)

RUIMTEDIAGRAM   SKAAL 1:100

BUIGMOMENTE-DIAGRAM   SKAAL 2 mm = 1 kN.m

SKUIFKRAGTEDIAGRAM   SKAAL 2 mm = 1 kN.m

[20]

4
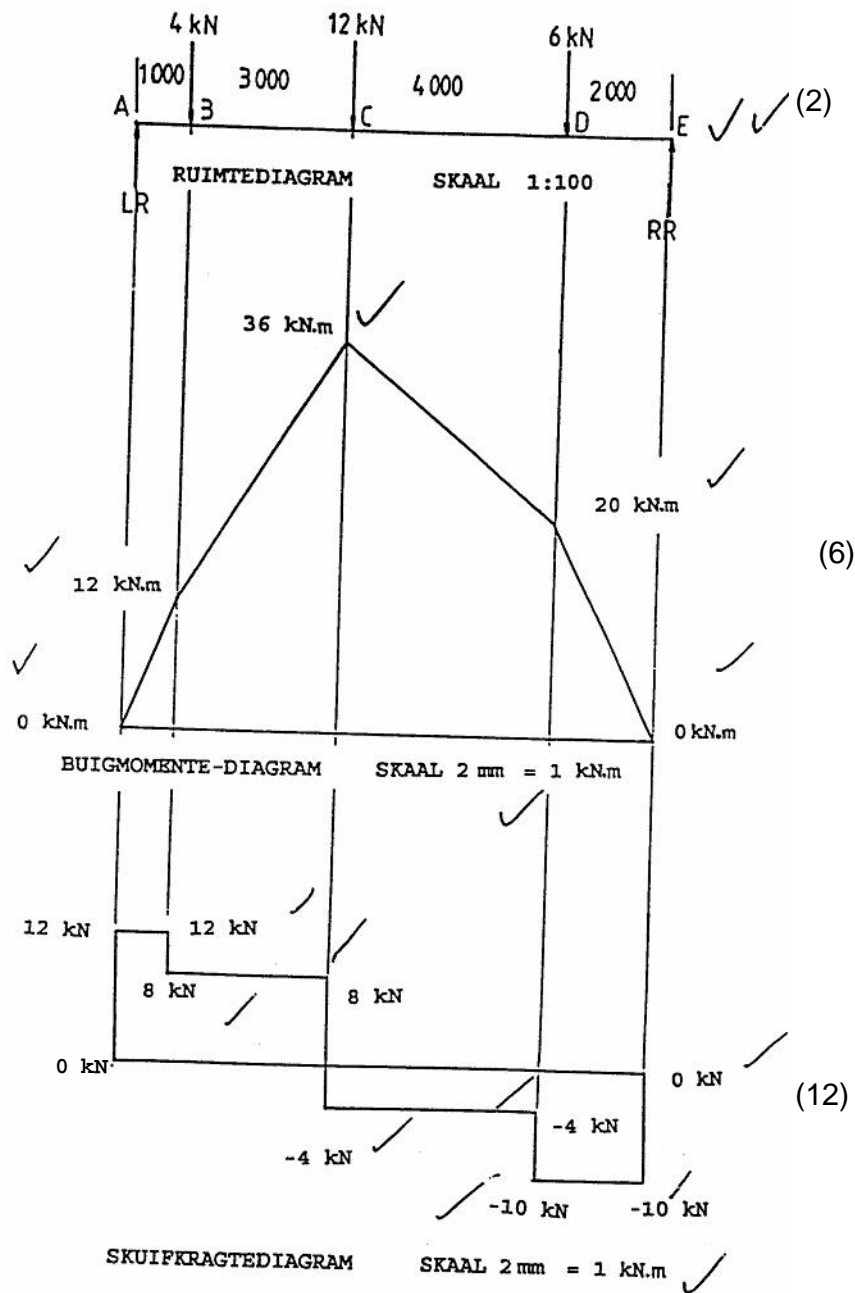
QUESTION 3 / *VRAAG 3*

3.1.1 All staircases, pathways, and gangways, basements and any other places where insufficient lighting may occur must be properly illuminated.
Alle trappe, gange, loopplanke en ander plekke waar gevaar weens swak lig bestaan, moet toereikend verlig wees.

3.1.2 Staircases, pathways and gangways should be free from materials, waste or any other obstacles.
Alle trappe, loopgange, en loopplanke moet vry wees van materiaal, afval of ander hindernisse.

3.1.3 All openings in floors, hatchways and stairways, or any other opening through or from which persons are liable to fall, must be adequately safeguarded.
Alle openinge in vloere, luikgange en trappe of enige ander opening waardeur of waarvan persone kan val, moet toereikend beveilig wees.

3.1.4 Danger areas, where materials and debris are liable to fall on workers, must be adequately fenced off and catch platforms or nets must be provided.
Gevaargebiede waar materiaal op werkers kan val, moet toereikend omhein wees en van toereikende vangplatforms of nette voorsien wees.

3.1.5 Hoisting of materials must be done only by means of a hoist or chute.
Slegs hysmasjiene en of glybane moet gebruik word om materiaal op te hys.

TWO MARKS EACH   *TWEE PUNTE ELK*

3.2 Common bricks
Gewone stene

Face bricks
Sierstene

Fireproof bricks
Vuurvaste stene

Purpose bricks
Doelvervaardigde stene

Selected bricks (Colour or quality)
Uitgesoekte stene (kleur of gehalte)

Glazed bricks
Geglasuurde stene

ANY FIVE ONE MARK EACH   *ENIGE VYF EEN PUNT ELK*

3.3   Safety precautions   *Veiligheidsmaatreëls*

Make sure that the area on and around the machine is free of waste material.
Die gebied op en om die masjien moet skoon van afvalmateriaal wees.

Cutting blades must be checked for sharpness and must be clamped properly.
Lemme moet nagegaan word voordat die masjien aangeskakel word. Lemme moet skerp en stewig vas wees.

All the necessary safety guards must be in position.
Alle skerms moet in posisie wees.

Make sure that all the electrical wiring, switches and connections are in good order.
Alle elektriese drade, skakelaars en konneksies moet in 'n goeie toestand wees.

Use the safety devices supplied with each machine.
Gebruik alle veiligheidstoerusting wat by die masjiene voorsien word.

Assume a safe position when operating a particular machine.
Neem altyd 'n veilige posisie by die masjien in.

Push the wood slowly and evenly through the machine. Do not jerk or force the material.
Stoot altyd die hout egalig en gemaklik deur die masjien. Moenie materiaal stamp of forseer nie.

Do not wear loose clothing.
Moenie loshangende klere dra nie.

Concentrate on the point of action.
Konsentreer op die aksiepunt.

Do not machine second-hand wood.
Moenie tweedehandse hout masjineer nie.

ANY FIVE TWO MARKS EACH   *ENIGE VYF TWEE PUNTE ELK*

3.4   Appearance
       Voorkoms

       Density
       Digtheid

       Melting point
       Smeltpunt

       Visible-light transmission
       Sigbare lig-transmissie

Solar heat transmission
Sonhittetransmissie

Ultra-violet rays, transmission
Ultravioletstrale-transmissie
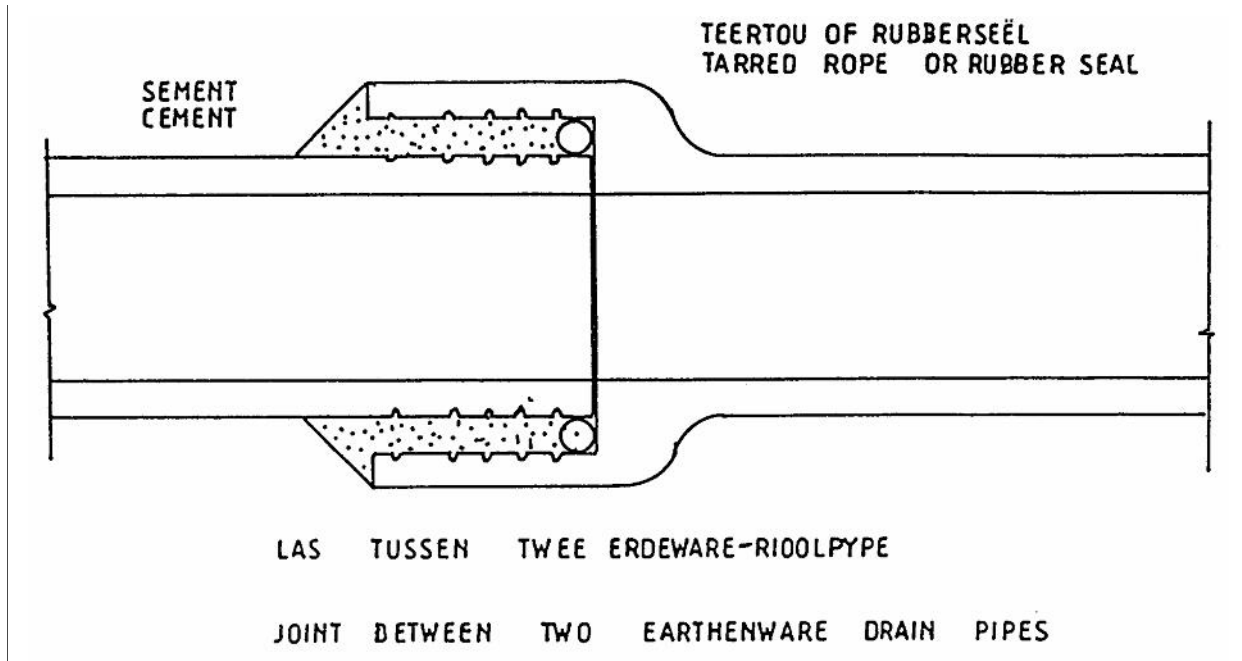
Durability
Duursaamheid

Strength
Sterkte

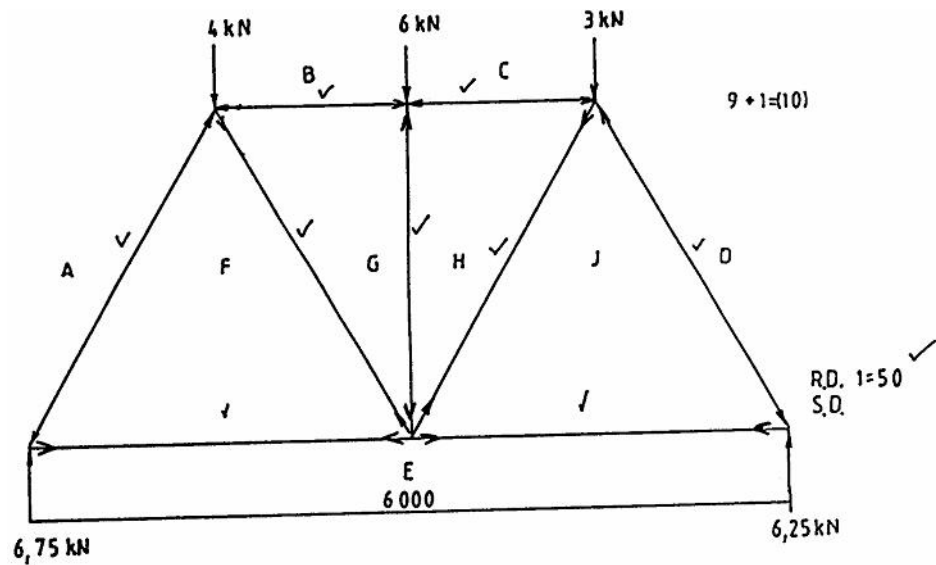Thermal properties
Termiese eienskappe

Sound isolation
Klankisolasie

Behaviour in fire.
Gedrag in brand

ANY TEN TWO MARKS EACH   *ENIGE TIEN TWEE PUNTE ELK*

LAS TUSSEN TWEE ERDEWARE-RIOOLPYPE

JOINT BETWEEN TWO EARTHENWARE DRAIN PIPES

MEMBER / ONDERDEEL	FORCE / KRAG		NATURE / AARD	
AF	7,8 kN	(3)	STRUT / STUT	(1)
BG	5,6 kN	(3)	STRUT / STUT	(1)
CH	5,6 kN	(3)	STRUT / STUT	(1)
DJ	7,2 kN	(3)	STRUT / STUT	(1)
EJ	3,6 kN	(3)	TIE / STANG	(1)
EF	3,9 kN	(3)	TIE / STANG	(1)
FG	3,3 kN	(3)	TIE / STANG	(1)
GH	6 kN	(3)	STRUT / STUT	(1)
HJ	3,7 kN	(3)	TIE / STANG	(1)
		[27]		[9]

[60]

8
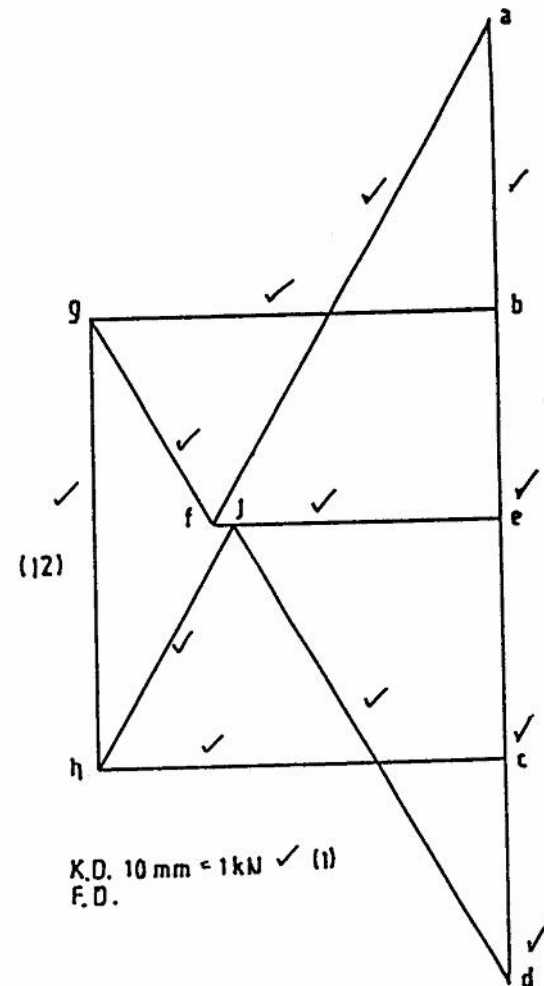
QUESTION 5 / *VRAAG* 5

Roof		*Dakkap*
Wall	2	*Muur*
Wall-plate	2	*Muurplaat*
Plaster	2	*Pleister*
Hatching	2	*Arsering*
Tie beam	2	*Bindbalk*
Brandering	2	*Plafonlatte*
Ceiling	2	*Plafon*
Cornice	2	*Kroonlys*
Rafter	2	*Kapspar*
Beam filling	2	*Balkvulling*
Purlins	2	*Daklatte*
Fascia board	2	*Fassieplank*
Gutter	2	*Geut*
Downpipe	2	*Afleipyp*
Sheeting	2	*Sinkplaat*
Scale	2	*Skaal*
Captions	2	*Beskrywings*
	35	

Nok		*Ridge*
King post	2	*Hoofstyl*
Rafters	4	*Kapsparre*
Purlins	2	*Kaplatte*
Sheeting	2	*Sinkplate*
Ridging	2	*Nokplaat*
Scale	2	*Skaal*
Linework	2	*Lynwerk*
	15	

GEUT
GUTTER

DOWNPIPE / AFLEIPYP

FASCIA
FASSIE

MUURPLAAT
WALL-PLATE

BALKVULLING
BEAM FILLING

MUUR
WALL

PLEISTER
PLASTER

SINKPLAAT
CORR SHEETING

DAKLAT
PURLIN

KAPSPAR
RAFTER

BINDBALK:
TIE BEAM

BRANDERING
PLAFONLAT
CEILING
PLAFON
CORNICE
KROONLYS

SKAAL
SCALE   1:5

KING POST
HOOFSTYL

NOKPLAAT / RIDGING

DAKLAT / PURLIN

KAPSPAR / RAFTER
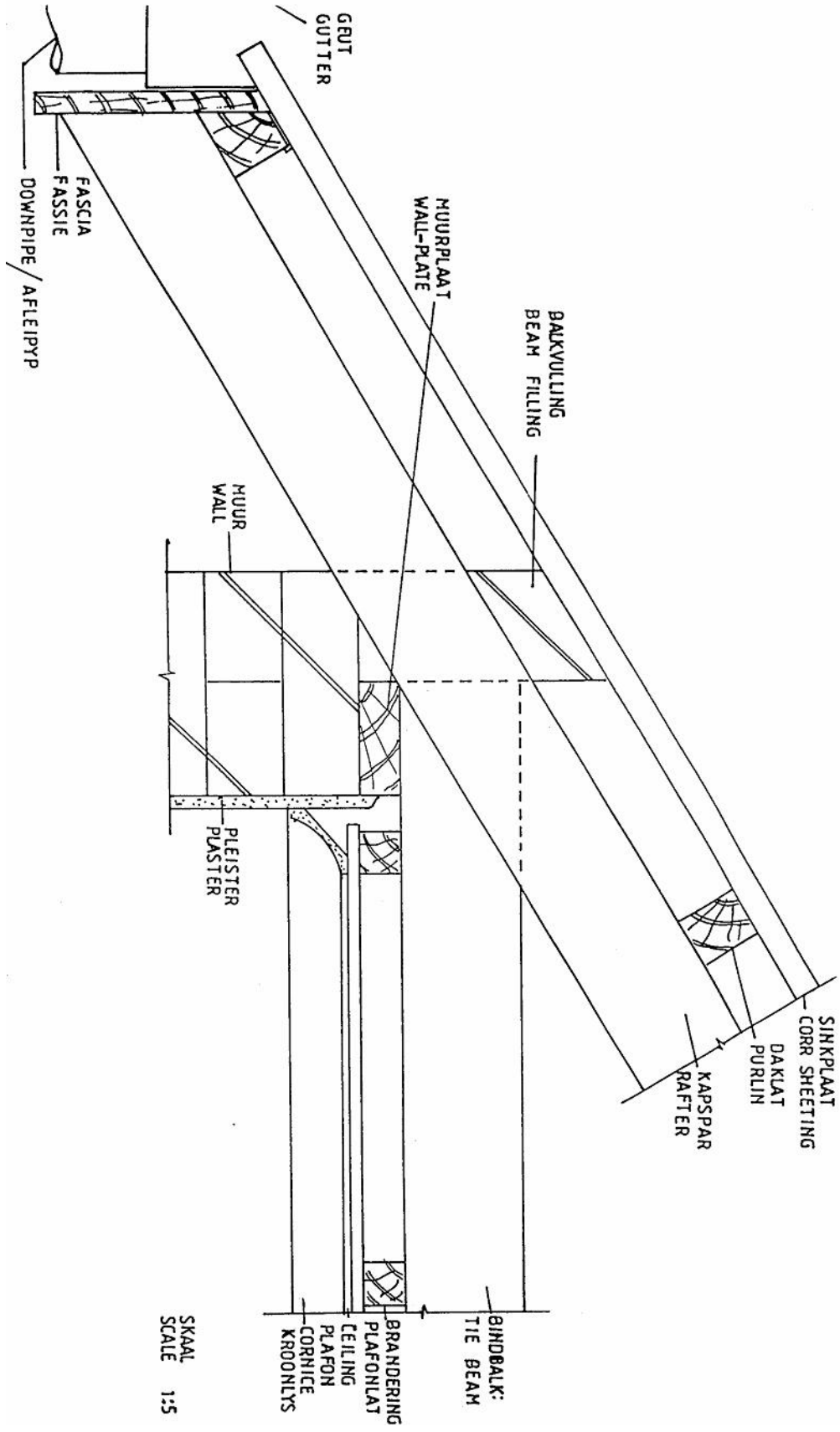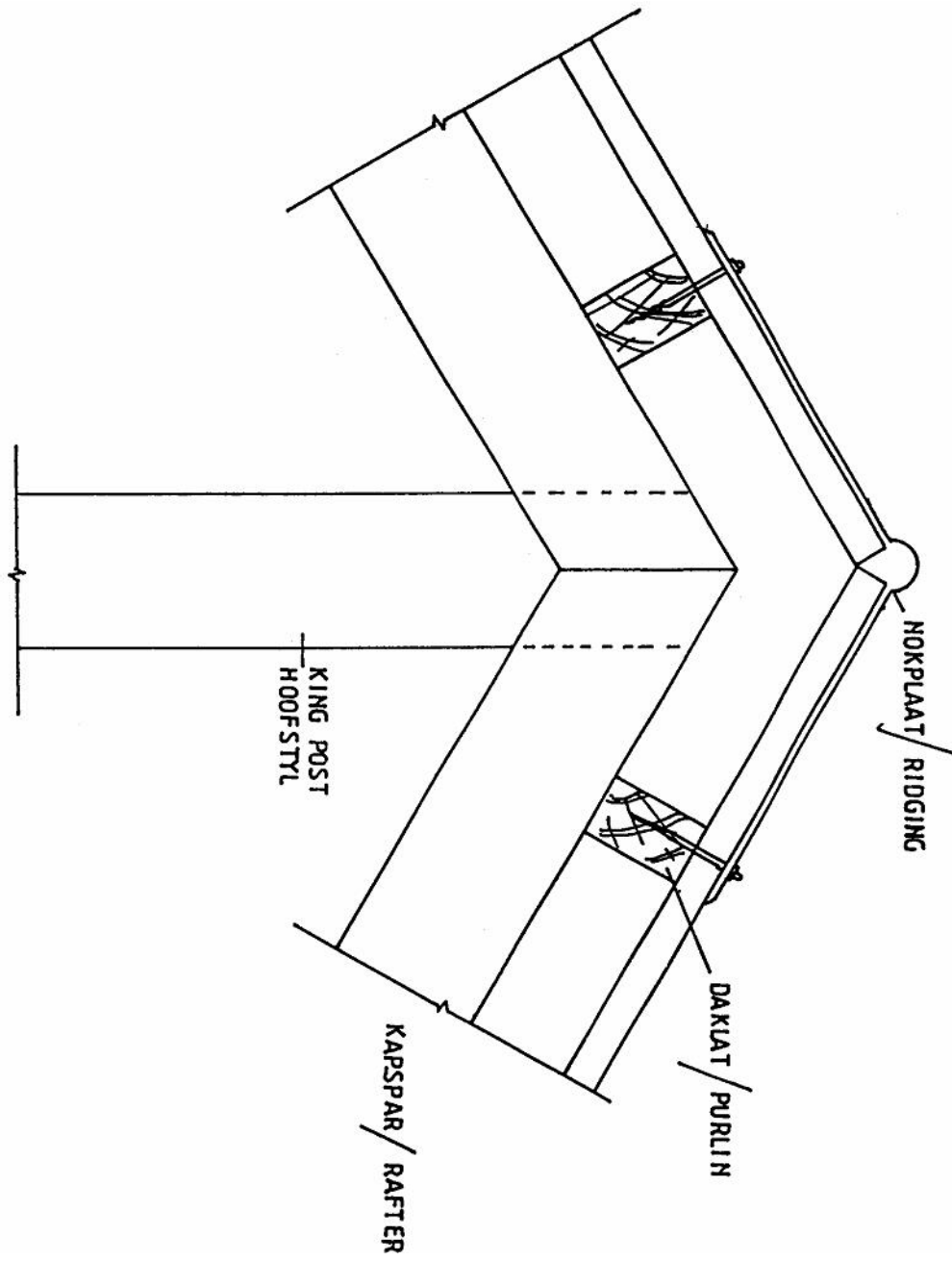
QUESTION 6 / *VRAAG* 6

6.1   SEPTIC TANK   *SEPTIESE* TENK

Manhole lid	2	*Mangatdeksel*
Sludge	2	*Vloeivulling*
T-junction	2	*T-aansluiting*
Ground level	2	*Grondvlak*
Overflow	2	*Oorloop*
Room 1	2	*Kamer 1*
Room 2	2	*Kamer 2*
French drain	2	*Stapelriool*
Concrete floor	2	*Betonvloer*
Neatness	2	Netheid
	20	

6.2   WORKING OF SEPTIC TANK

The septic tank is designed in such a way that solid sewer and water flows into the first compartment from under the water surface without disturbing the foam on the top.
The heavier solids sinks to the bottom while the lighter part stays in suspension.
The bacteria present in the liquid, attacks the solid sewer, and during this process a gas develops and rises to the top taking tiny solid parts with it and forms a layer of foam.
A crust of foam is formed which act as a humas for the bacteria and larva inside the tank which enlarges the attacking power.
To ensure breeding growth the foam layer must not be disturbed.
Some of the rising solid parts flow into the next compartment where the process is repeated. From the last compartment the content, which is at this stage, a clear liquid, flows into the french drain and seeps into the ground.

WERKING VAN 'N SEPTIESE TENK

Die septiese tenk word so ontwerp dat die riool en water in die eerste kamer onder die watervlak invloei sonder om 'n steuring in die skuimlaag bolangs te veroorsaak.
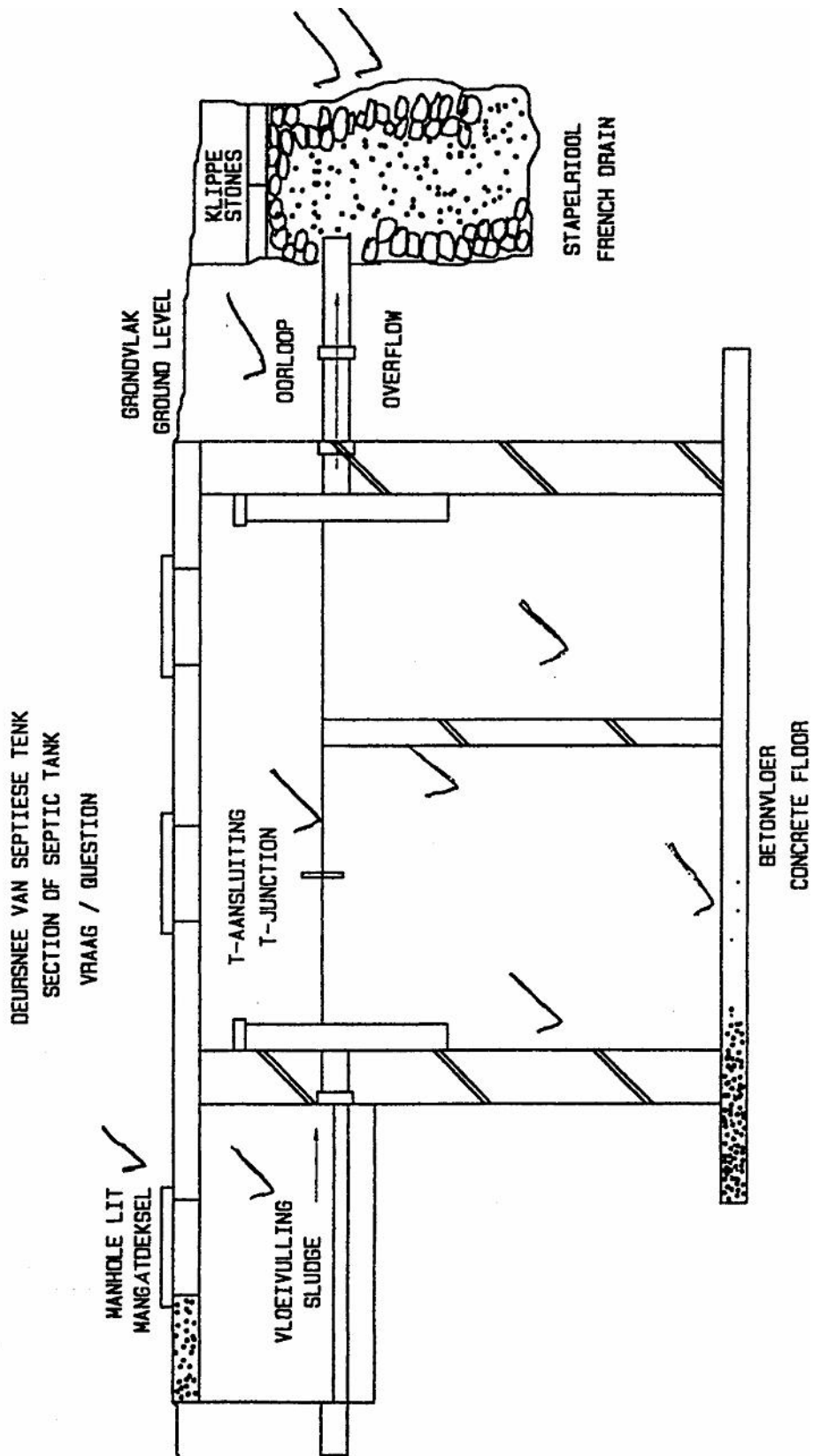*Die swaarder soliede dele sak af terwyl die ligter dele in suspensie bly.*
Die bakterieë wat in die vloeistof teenwoordig is, val die vaste stowwe aan en tydens hierdie proses ontwikkel 'n gas wat na die oppervlak styg en sodoende klein deeltjies soliede stof saamneem en 'n skuimlaag vorm.
'n Kors vorm bo-op die oppervlakte en dien as teelaarde vir die bakterieë en larwes in die tenk, wat die aanvalskrag vergroot.
Om groeitoestande te verseker, moet die skuimlaag nie versteur word nie.
Van die soliede deeltjies wat opstyg, vloei oor na die volgende kompartement waar die proses homself herhaal. Vanaf die laaste kompartement vloei die inhoud, wat teen hierdie tyd 'n helderkleurige vloeistof is, na die stapelriool, waar dit in die grond wegsypel.

MARKS AS SHOWN   PUNTE SOOS AANGEDUI

DEURSNEE VAN SEPTIESE TENK
SECTION OF SEPTIC TANK

VRAAG / QUESTION

KLIPPE
STONES

STAPELRIOOL
FRENCH DRAIN

GRONDVLAK
GROUND LEVEL

OORLOOP
OVERFLOW

T-AANSLUITING
T-JUNCTION

BETONVLOER
CONCRETE FLOOR

MANHOLE LIT
MANGATDEKSEL

VLOEIVULLING
SLUDGE

MARKS AS SHOWN   *PUNTE SOOS AANGEDUI*

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QUESTION 7 / *VRAAG 7*

7.1 Moisture content in wood
Hoeveelheid vog in hout

Defects in wood
Defekte in hout

Grading
Graad van hout

Lengths in which wood is available
Lengtes waarin hout beskikbaar is

Twisting
Buigbaarheid

ONE MARK EACH   *EEN PUNT ELK*

7.2 Concrete is very strong and can resist a very high compressive stress.
Beton is geweldig sterk en kan onder samedrukking 'n hoë drukkrag weerstaan.

Its tensile strength is rather poor, and should be reinforced with steel to resist the tensile stress.
Onder sametrekking breek dit egter maklik en moet met staal bewapen word om die trekspanning te weerstaan.

Watertightness
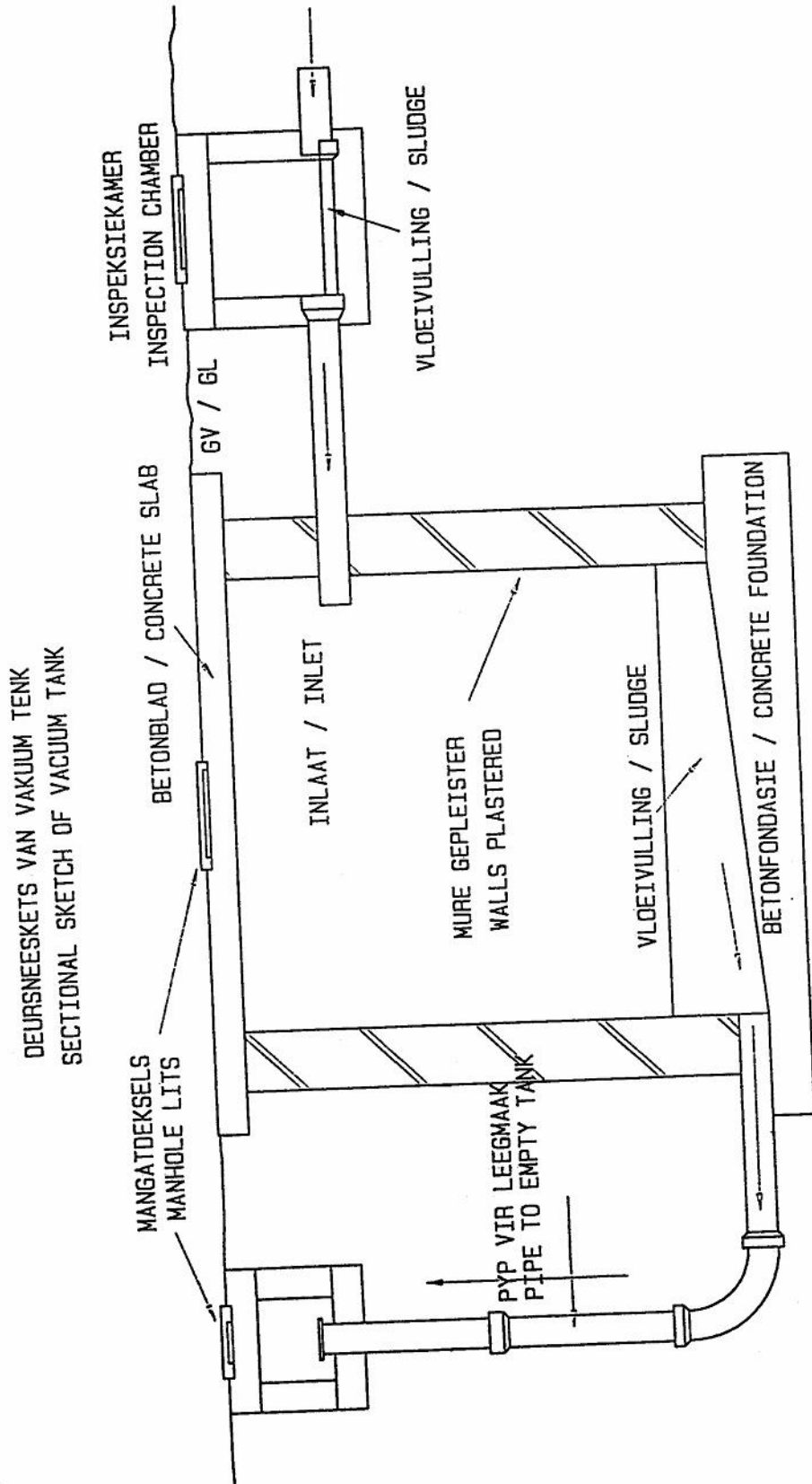*Waterdigtheid*

Durability
Duursaamheid

Resistance to weathering
Bestand teen verwering

Resistance to shocks.
Skokbestand

ANY FIVE, ONE MARK EACH   **ENIGE VYF, EEN PUNT ELK**

7.3

DEURSNEESKETS VAN VAKUUM TENK
SECTIONAL SKETCH OF VACUUM TANK

INSPEKSIEKAMER
INSPECTION CHAMBER

VLOEIVULLING / SLUDGE

GV / GL

BETONBLAD / CONCRETE SLAB

INLAAT / INLET

MURE GEPLEISTER
WALLS PLASTERED

VLOEIVULLING / SLUDGE

BETONFONDASIE / CONCRETE FOUNDATION

MANGATDEKSELS
MANHOLE LITS

PYP VIR LEEGMAAK
PIPE TO EMPTY TANK

15

7.4   Formwork   *Bekisting*

It must be strong enough to support the weight of the concrete.
Dit moet sterk genoeg wees om die massa van die nat beton te kan dra.   (2)

It should not bend to the weight of the concrete or any other load.
Dit behoort nie te buig onder die las van die nat beton of enige ander kragte wat daarop inwerk nie.   (2)

It must be erected accurately according to the measurements, sizes and position as the concrete, when wet, is plastic and will take the shape of the formwork.
Dit moet akkuraat volgens maat, grootte en posisie aanmekaar getimmer word, aangesien die nat beton die vorm van die bekisting aanneem.   (2)

The joints must be leak-proof to keep the grout in.
Die laste moet lekvry wees,   sodat die voegbry nie kan uitloop nie.   (2)

The formwork must be of a size to be erected easily by hand or a hoist.
Die grootte van die bekisting moet so wees dat dit maklik met die hand of meganiese hystoerusting in posisie geplaas kan word.   (2)

7.5   Roof-covering materials
      Dakbedekkingsmateriale

      Corrugated iron
      Gegolfde sink

      Clay tiles
      Kleiteëls

      Asbestos
      Asbes

      Grass
      Gras

      Stone
      Klip

      Perspex or hardened transparent plastic
      Perspex of verharde, deurskynende plastiek

CANDIDATE'S NUMBER / *KANDIDAAT SE NOMMER*

ANSWER SHEET SG 702-2/0
ANTWOORDBLAD SG 702-2/0

100 PVC VAL 1:40
100 PVC FALL 1:40

Feite = 27.
Korrekt/: 3.
Uitbg./
30

AANSLUITING / CONNECTION

HOOFRIOOL / MAIN SEWERAGE