POSSIBLE ANSWERS FOR / MOONTLIKE ANTWOORDE VIR :

FITTING AND TURNING SG
PAS-EN DRAAIWERK SG

705-2/0

PAS- EN DRAAIWERK SG 705 - 2/1	1

GAUTENGSE DEPARTEMENT VAN ONDERWYS
SENIORSERTIFIKAAT -EKSAMEN
MOONTLIKE ANTWOORDE VIR : PAS- EN DRAAIWERK SG

VRAAG 1 / QUESTION 1

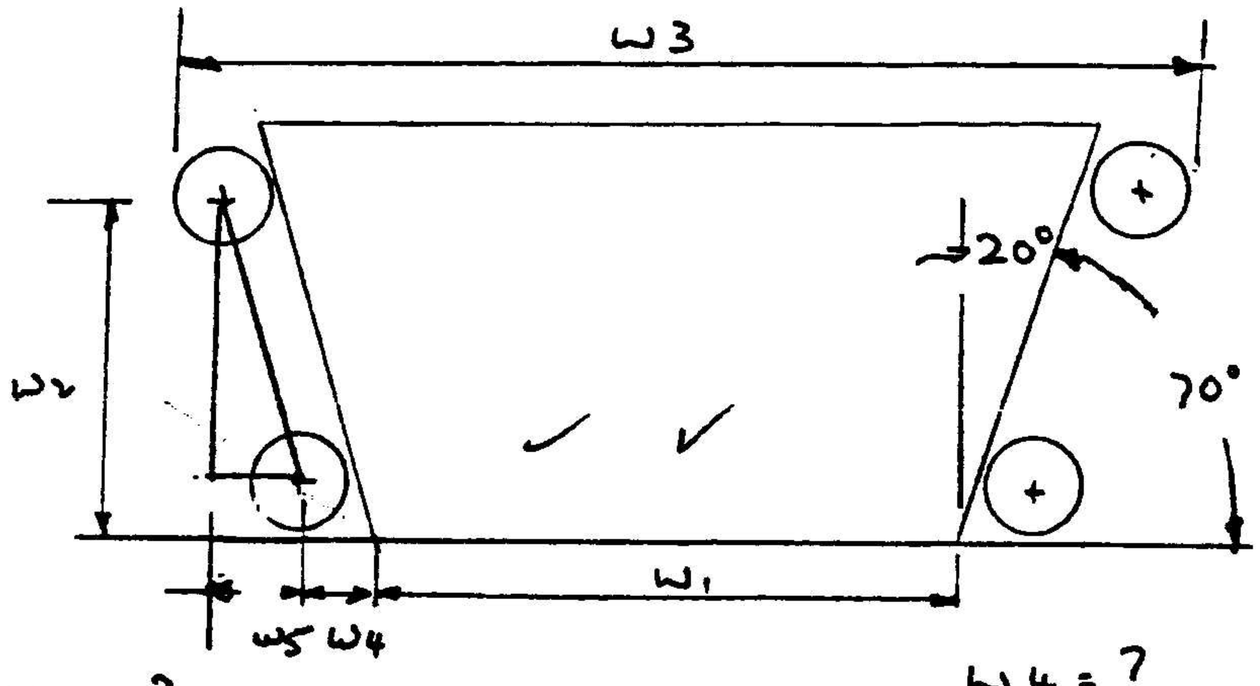
1.1	B ✓		**1.6**	A ✓		**1.11**	C ✓
1.2	A ✓		**1.7**	C ✓		**1.12**	C ✓
1.3	B ✓		**1.8**	B ✓		**1.13**	C ✓
1.4	B ✓		**1.9**	C ✓		**1.14**	D ✓
1.5	B ✓		**1.10**	B ✓		**1.15**	A ✓

1.16	**1.16.1**	WAAR	**1.16.1**	TRUE ✓
	1.16.2	VALS	**1.16.2**	FALSE ✓
	1.16.3	WAAR	**1.16.3**	TRUE ✓
	1.16.4	VALS	**1.16.4**	FALSE ✓
	1.16.5	WAAR	**1.16.5**	TRUE ✓

[25]

VRAAG 2 / QUESTION 2

2.1



W4 = ?

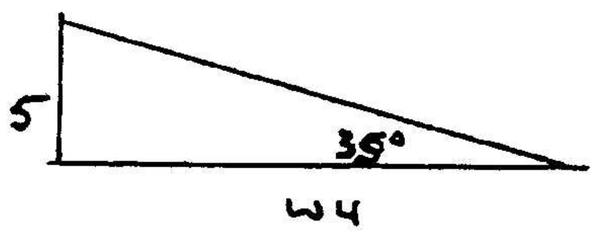
W1 = 20mm

W2 = 60-5 = 55mm ✓

TAN 35° = $\frac{5}{W4}$ ✓

W4 = $\frac{5}{\text{TAN } 35°}$

W4 = 7,141mm ✓



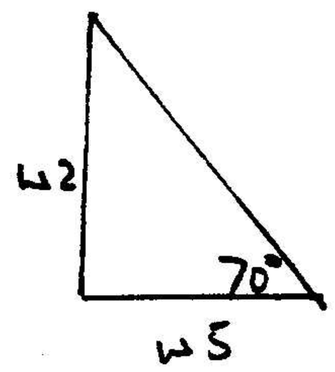
PAS- EN DRAAIWERK SG 705 - 2/1	2

W5 = ?

TAN 70° = $\frac{W2}{W5}$ ✓

W5 = $\frac{W2}{TAN\ 70°}$ ✓

W5 = 20,018mm ✓



AFSTAND OOR ROLLERS / DISTANCE OVER ROLLERS.

= W1 + 2 (W4 + W5 + RAD ROLLER)

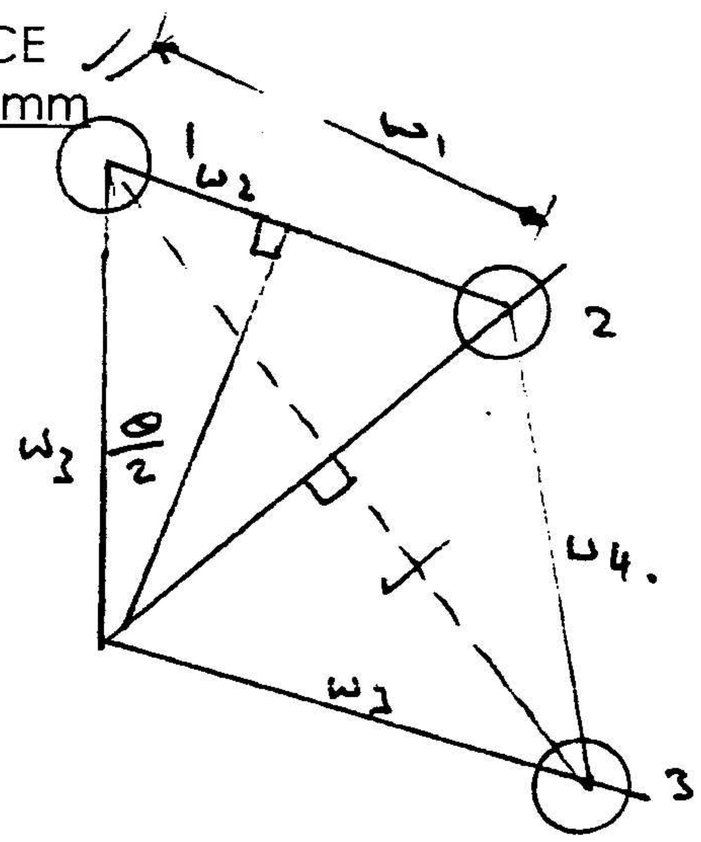
= 20 + 2 (7,141 + 20,018 + 5)

W3 = 84,318mm ✓

AFSTAND / DISTANCE

= W3 = 84,318mm

2.2 **(12)**



$\frac{\theta}{2}$ = $\frac{360°}{8}$ ✓

= 45°

$\frac{\theta}{2}$

2 = 22,5° ✓

W1 = 90 + 16

= 106mm

W2 = $\frac{W1}{2}$

W2 = 53mm ✓

2.2.1 BEREKEN / DETERMINE S.S.D.

SIN. 22,5° = $\frac{W2}{W3}$ ✓

W3 = $\frac{W2}{5 \text{ SIN } 22,5°}$ ✓

W3 = 138,496mm

SSD = 2W3 (2 × 138,496 mm)

= 276,992mm ✓

PAS- EN DRAAIWERK SG 705 - 2/1	3

2.2.2 AFSTAND / DISTANCE 1 & 3

COS 45° = $\frac{W4}{W3}$ ✓

W4 = W3 COS 45°

W4 = 97,931mm ✓

AFSTAND TUSSEN / DISTANCE BETWEEN 1&3

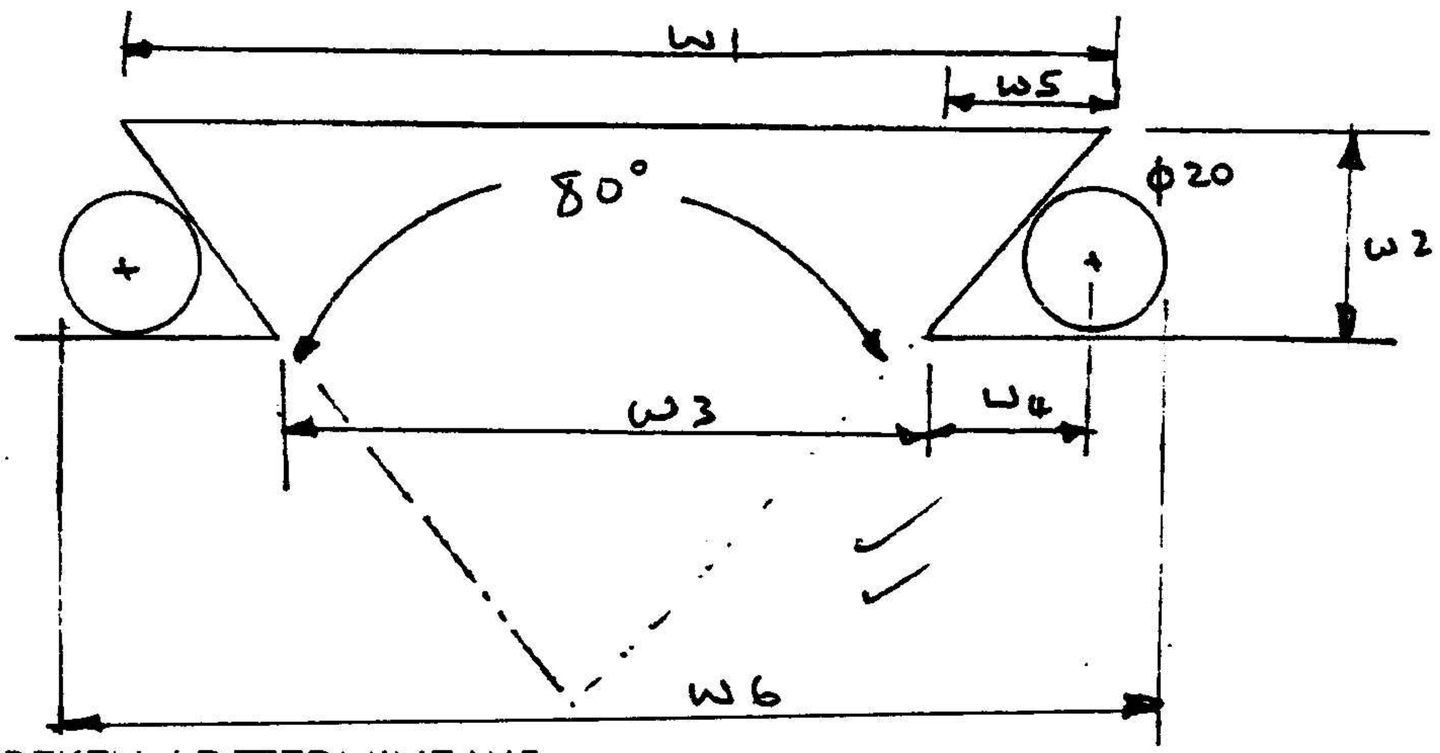
= 2W4 - 2RAD

= 195,862 - 16

= 179,862mm ✓

(10)

2.3



BEREKEN / DETERMINE W5

W1 = 95mm ✓

W2= 22mm

TAN 50° = $\frac{W2}{W5}$ ✓

W5 = $\frac{W2}{TAN\ 50°}$

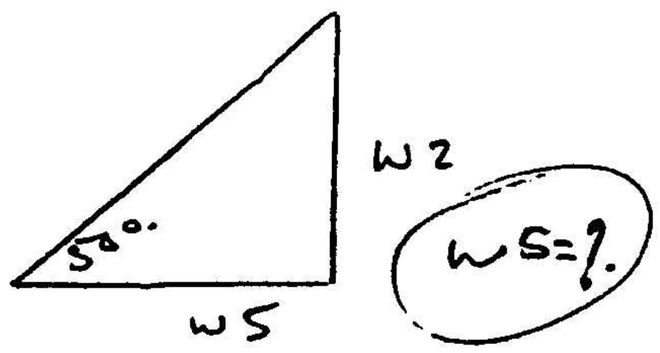
W5 = 18,46mm

W3 = W1 - 2W5 ✓

= 95 - 36,92

W3 = 58,08mm ✓✓

90° - 40° = 50°.

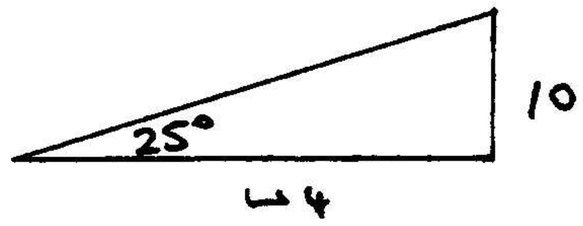


BEREKEN / DETERMINE W4

TAN 25° = $\frac{10}{W4}$ ✓

W4 = $\frac{10}{TAN\ 25°}$ ✓✓

W4 = 21,445mm



AFSTAND OOR ROLLERS / DISTANCE OVER ROLLERS (W6)
= W3 + 2 (W4 + RADIUS) ✓
= 58,08 + 62,89mm ✓✓
W6= 120,97mm

(13)
[35]

VRAAG 3 / QUESTION 3

3.1 STYGING / LEAD = STEEK X AANTAL BEGINNE / PITCH X NO OF STARTS.
= 6 X 3
= 18mm ✓

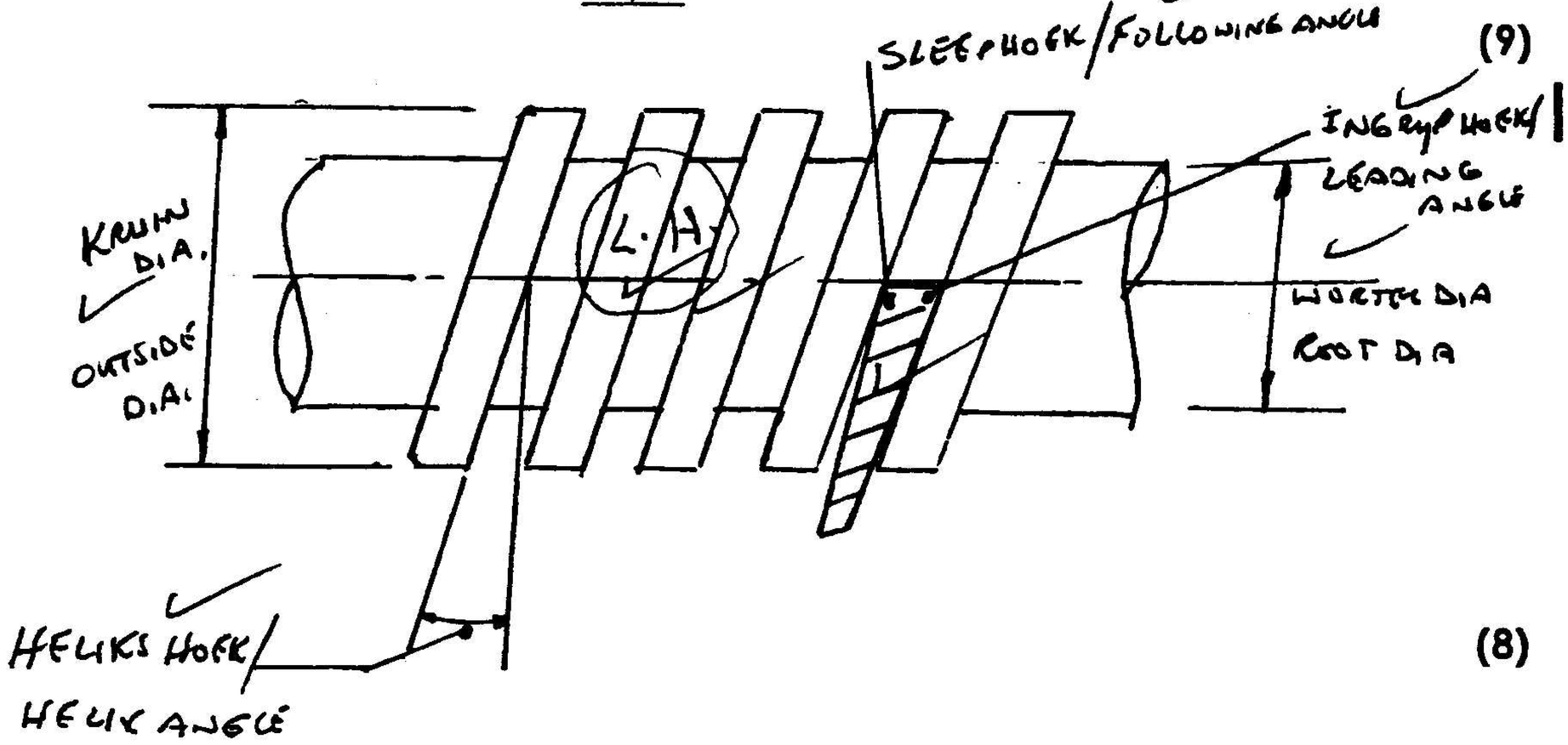
GEMID D.A. / AVE = BUITE D.A. - DIEPTE VAN DRAAD / OUTSIDE D.A. - DEPTH OF THREAD
= 60 - 3
(DM) = 57mm ✓✓

HELIX ANGLE / HELIS HOOEK = (TAN~~-Q~~) ✓
= LEAD / STYGING / TTX DM
= 18 / TTX 57 ✓
HELIKS HOEK / HELIX ANGLE= 5°74'

INGRYPHOEK / LEADINGSANGLE = 90° (~~Q~~ + VRYLOOP) / (~~Q~~ + CLEARANCE)
90° - (5°74 + 30) ✓
= 81,26° ✓

SLEEPHOEK / FOLLOWING = 90° + (~~Q~~ - VRYLOOP) / (~~Q~~ - CLEARANCE)
= 90° + (5°74 - 3°) ✓
= 92,74° ✓

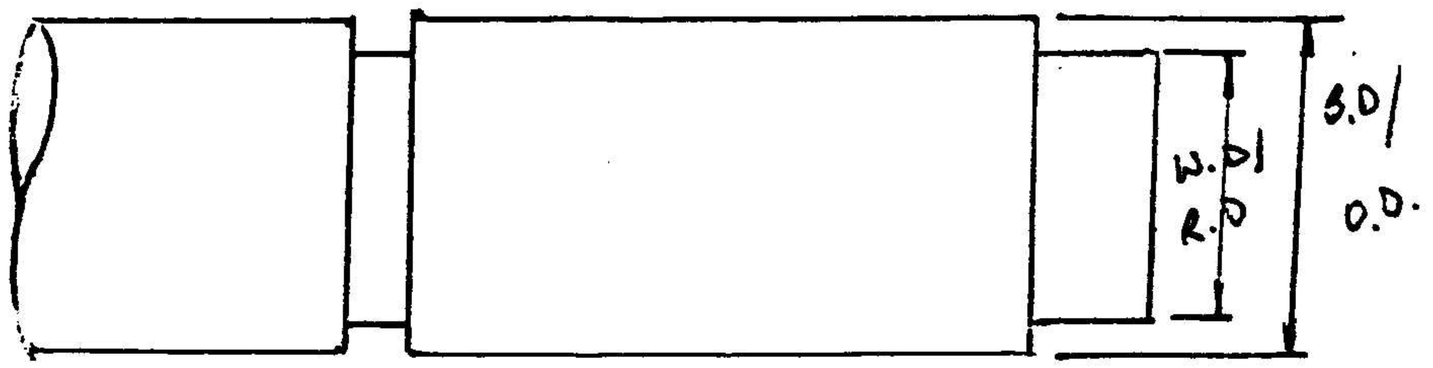
3.2



(9)

(8)

3.3

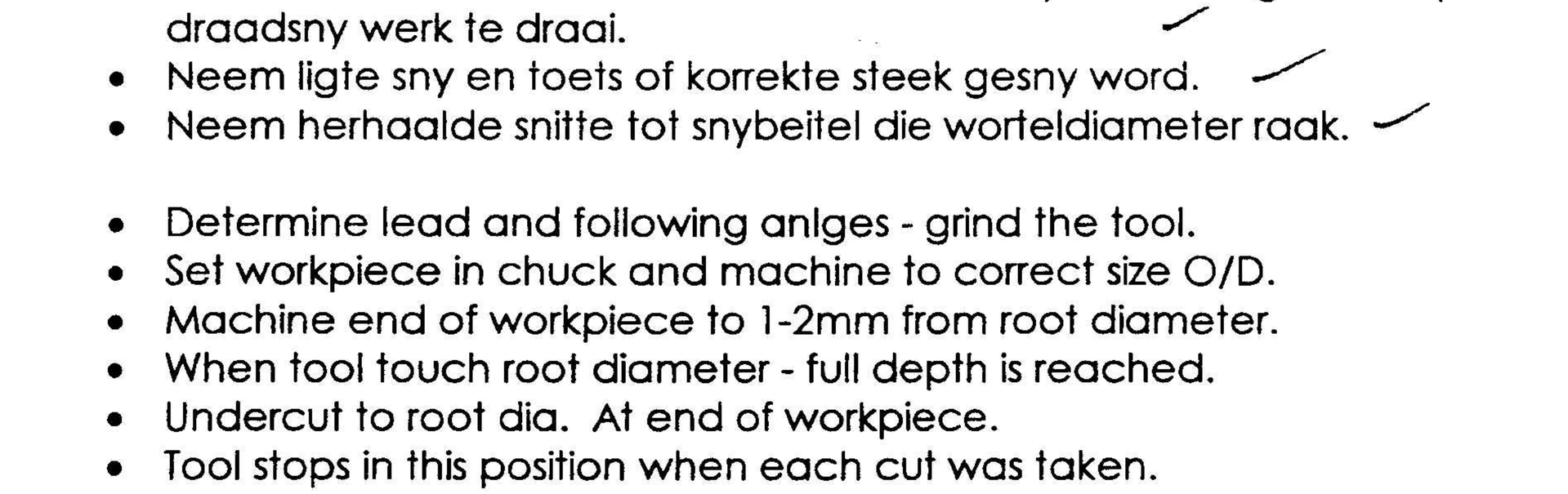


- Bereken die ingryp en sleephoeke van die snybeitel en slyp beitel.
- Stel Werkstuk in draaibank op en draai af tot korrekte buitediameter.
- Draai begin van skroefdraad af vir 1-2mm tot op wortel diameter.
- Wanneer die beitel die worteldiameter raak, word volle diepte bereik.
- Ondersky tot worteldiameter by die end van die skroefdraad.
- Die beitel word in hierdie groef tot stilstand gebring by die voltooiing van elke snit.
- Stel die snybeitel haaks met die as van die werkstuk en senterhoogte.
- Stel die draaibank om die vereiste steek te sny en om 'n geskikte spoed draadsny werk te draai.
- Neem ligte sny en toets of korrekte steek gesny word.
- Neem herhaalde snitte tot snybeitel die worteldiameter raak.

- Determine lead and following anlges - grind the tool.
- Set workpiece in chuck and machine to correct size O/D.
- Machine end of workpiece to 1-2mm from root diameter.
- When tool touch root diameter - full depth is reached.
- Undercut to root dia. At end of workpiece.
- Tool stops in this position when each cut was taken.
- Set the cutting tool square with axis of workpiece and centreheight.
- Set lathe to correct pitch and select correct speed.
- Take light cut for test cut to see whether correct pitch was reached.
- Repeat cuts to get tool to reach root depth.

(10)

3.4



3.4.1 3.4.2 3.4.3 3.4.4.

(8)

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VRAAG 4 / QUESTION 4

4.1 • Werkstuk in posisie terwyl werk gedoen word. ✓ **(2)**
Hold workpiece in position while work is done.
• Verdeel werkstuk in gelyke dele. ✓
Equally divides the circumference of a workpiece into a number of parts.

4.2.1. T = 9° (540') ✓ **(4)**
40° = (40 X 60) = 2400 ÷ 20 ✓
T = 2420 / 540
= 4 26/54 ✓
4 DRAAIE 26 GATE OP 54 GATSIRKEL OF / OR
40 = 40½
= 81/2 X 1/9
= 81/18 = 4,9/18 x 3/3 = 27/54
4 TURNS AND 27 HOLES ON 54 HOLE CIRCLE.

4.2.2 T = 40/71 ✓
= 40/70 (÷ 10 = 4/7)
(**A**) T = (4/7 X 4/4) = 16/28 ✓ **(3)**

16 GATE OP 28 GATSIRKEL ✓
16 HOLES ON A 28 HOLE CIRCLE

(**B**) DR = (A - N / A) = 40/1 ✓
= (70-71)/70 X 40/1 ✓
= 40/70
= (4/7 X 8/56) = 32/56 ✓
DR/G = 32T/56T ✓ ✓ **(4)**

(**C**) INDEKSPLAAT DRAAI IN TEENOORGESTELDE RIGTING / ✓
INDEX PLATE TURN IN OPPOSITE DIRECTION **(2)**

4.3

- Absolute programming - only one point of reference is given.
  Slegs een punt van verwysing word gegee.
- Incremental programming - each measurement is based on the previous reference line.
  Elke mate is gebasseer op die vorige verwysingslyn. **(4)**

4.4

- Mass production.
  Massa produksie.
- Saves time.
  Bespaar tyd.
- Different operations can be done simultaneously.
  Verskillende operasies kan gedoen word.
- Saves cost.
  Bespaar geld.
- Unskilled labour can be used.
  Ongeskoolde arbeid kan bebruik word. **(4)**

4.5

SPANNING = $\frac{\text{KRAG}}{\text{OPP}}$ STRESS = $\frac{F}{A}$

A.OPP = $\frac{\text{KRAG}}{\text{SPANNING}} = \frac{4{,}32 \times 10^3}{464 \times 10^3}$

A.OPP = $0{,}0093103 M^2$

MAAR / BUTT A = $\frac{\pi}{4}(D^2-d^2)$

$D^2-d^2 = \frac{0{,}0093103 \times 4 \times 10}{\pi}$

$D^2-14400 = 11854{,}242$

$D^2 = 26254{,}242$

$D = 162{,}03mm$

4.6

DRUK = $\frac{\text{KRAG}}{\text{OPP}}$

KRAG = DRUK X OPP

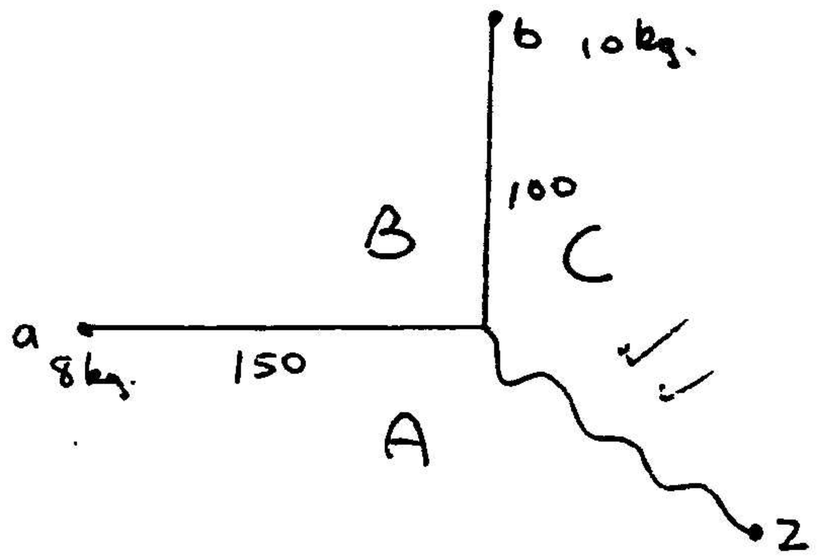
$180 \times \frac{10 \times \pi \times (80)^2}{4 \times 10}$

= 904778,68N

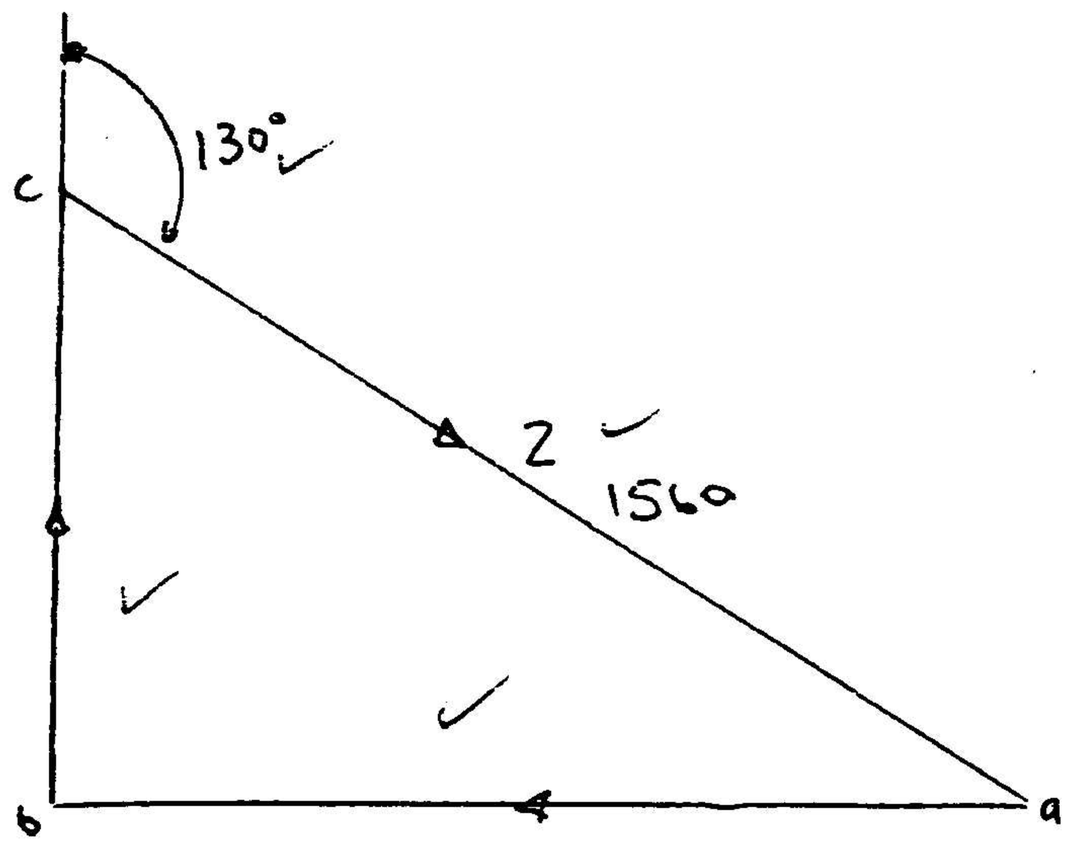
= 904,78kN **(5)** **[35]**

VRAAG 5 / QUESTION 5

5.1



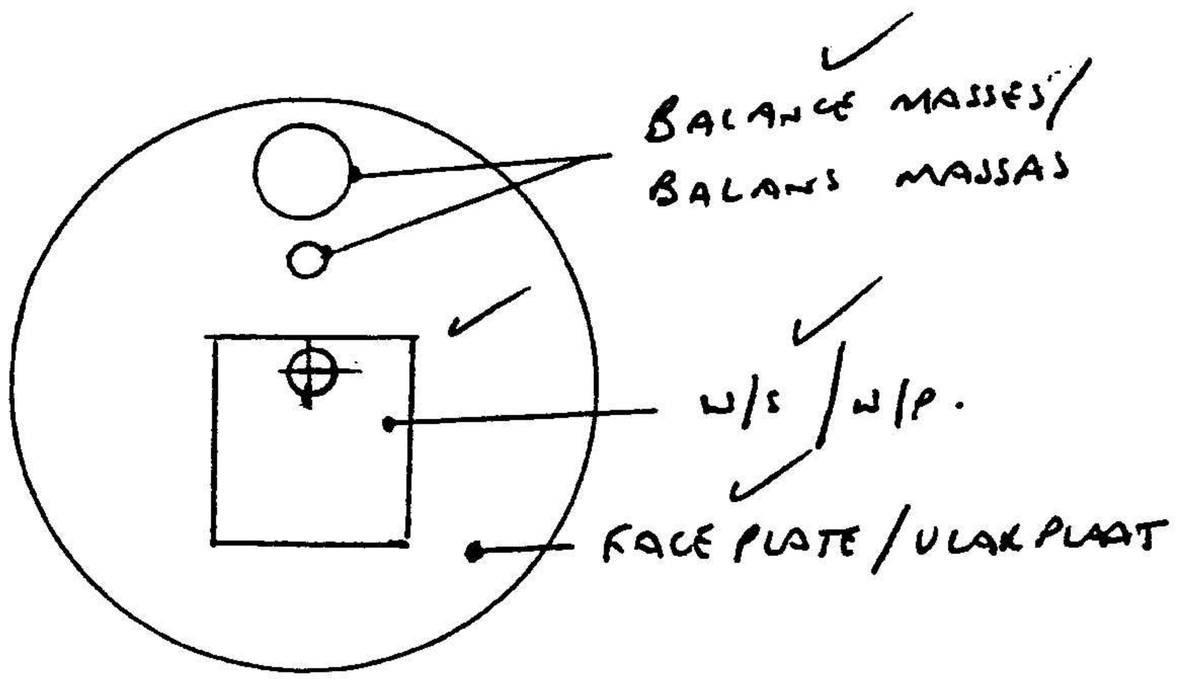
A = MASSA X AFSTAND
= 8 X 150 ✓
= 1200 EENHEDE
B = MASSA X AFSTAND
= 10 X 100 ✓
= 1000 EENHEDE



MASSA = 2 ✓
AFSTAND
= 1560 ✓
400
2 M= 3,9KG ✓ ✓
POSISIE / POSITION = 130° ✓

(13)

5.2



(4)

5.3 **5.3.1** ATCH CIRCLE DIAMETER / = STEEKSIRKEL DIAMETER. M X T

6 X 76 ✓
456mm

5.3.2 OUTSIDE DIAMETER /= PCD + 2ADD OF (T+2) X m
(78 X 6)

= 456 + 12 ✓
= 468mm

5.3.3 ADDENDUM= MODULE

= 6mm ✓

5.3.4 DEDENDUM= 1,157 X mm

= 1,157 X 6mm ✓
= 6,942 mm

5.3.5 WORKING DEPTH/
WERK DIEPTE 2 ADD

= 2 X 6 ✓
= 12mm

5.3.6 FULL DEPTH /
VOLLE DIEPTE ADD + DED

= 6 + 6,942 ✓
= 12,94 mm ✓ OF 12,5 mm. **(12)**

5.4
- Tipe skroefdraad. ✓
  Type of screwthread.
- Aantal gange. ✓
  Number of starts.
- Steek van die draad. ✓
  Pitch of thread.
- Buite diameter van draad. ✓
  Outside dia of thread.
- Linkerhand of regterhand. ✓
  Lefthand of righthand. ✓

(6)

[35]

VRAAG 6 / QUESTION 6

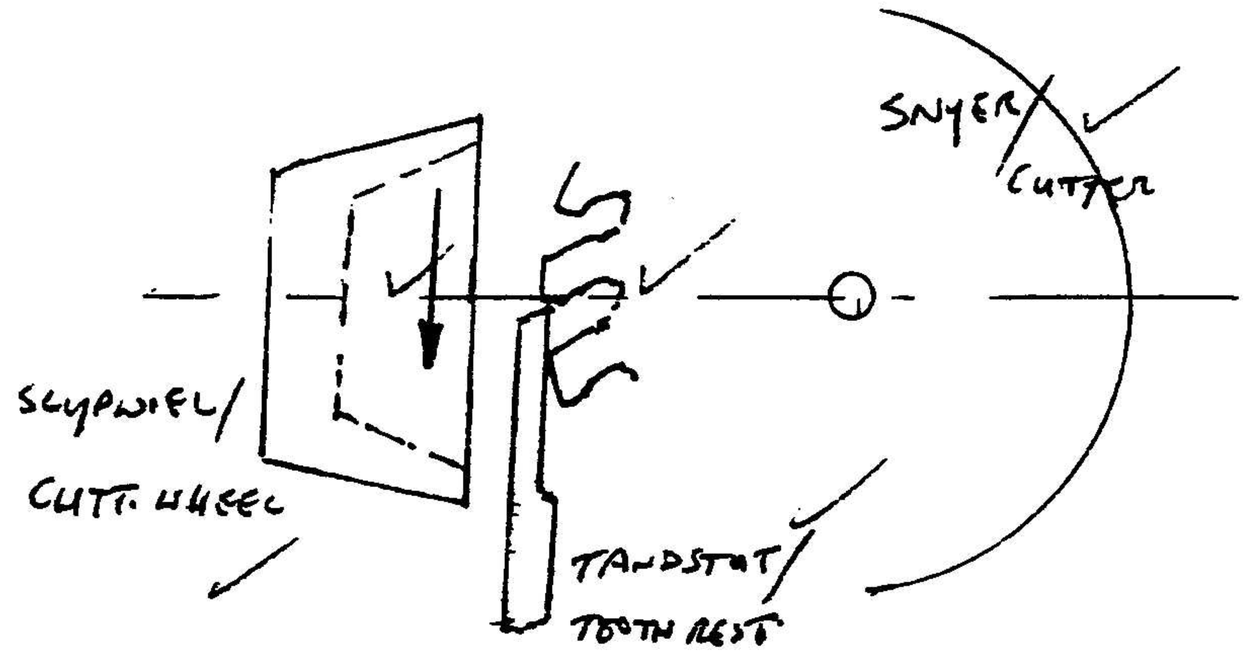
6.1
- Module. ✓
  Module.
- Nommer van snyer. ✓
  Number of cutter.
- Snydiepte. ✓
  Dutting depth.

6/0.

- Diameter van snyer.
  Diameter of cutter.
- Hoek.
  Angle.

Enige 4 van bogenoemde / any 4 of the above. **(4)**

6.2 **6.2.1**



5

6.2.2 AFSTELLING / SETTING= $\sqrt{}$SIN~~Θ~~
60 SIN 4°
= 60 X
= 4,185mm

3

6.2.3
- Bring senter van freessnyer en senter van hokslypwiel in lyn met mekaar deur middel van 'n hoogtemeter.
  Bring centre-line of cutter and hollow grinding wheel in line with each other. Use a vernier heightmeter.
- Die tandstut word ook in die senter van die freessnyer en slypwiel gestel.
  The toothrest also get set in die cenre.
- Die tandstut word nou die berekende afstand (4,185mm) laat sak.
  The toothrest will now be lowered the calculated distance (4,185mm).
- Die primêre vryloophoek kan nou korrek geslyp word.
  The primary clearance angle may now be grinded. **(13)**

5

6.3
- Die spasie deur 'n masjien benodig moet die oorhang van bewegende dele en materiaal insluit.
  Space needed by machines must include overhang of moving machinery hand material.
- Gange moet groot genoeg wees vir die lewering en afhaal van materiaal.
  Passages must be wide enough for delivery and handling of material.
- Vloere moet sterk genoeg wees om masjiene, onvoltooide en voltooide onderdele te ondersteun.
  Floors must be strong enough for machines finished and unfinished work.

- Veiligheidstoestelle en diensfasiliteite moet maklik bereikbaar wees.
  Safety facilities and service faciilities must be reached quickly. **(6)**

6.4
- Masjiene word beter gebruik.
  Good machine usasage.
- Beter toesig.
  Better supervision.
- Minder onderbrekings.
  Less interruptions
- Lae instandhoudingskostes.
  Low maintenance cost.
- Beter kontrole oor totale vervaardigingskostes.
  Better control over total manufacturing costs.
- Groter verskeidenheid / buigsaamheid.
  Greater flexibility. **(5)**

Enige 5 van bogenoemde / any 5 of the above.

6.5
- Veroorsaak hitte.
  Generates heat.
- Slytasie.
  Wear.
- Wrywing.
  Friction. **(3)**

6.6 **6.6.1** Indien primêre vryloophoek te klein is, sal die tande vryf of sleep.
If primary clearance angle is to small, the teeth will drag of rub.

6.6.2 As dit te groot is, sal die tande tril, brand en vinnig slyt.
If to large, it will chatter, burn and weal of. **(4)**

[200]