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

FITTING AND TURNING SG
PAS- EN DRAAIWERK SG

Possible Answers / Moontlike Antwoorde
Feb / Mar / Maart 2006

QUESTION / *VRAAG* 1

1.1 B,C ü ü
1.2 C,D ü ü
1.3 A,D ü ü
1.4 B,D ü ü
1.5 B ü
1.6 D ü
1.7 A,D ü ü
1.8 A,D ü ü
1.9 B ü
1.10 T/W ü ü
1.11 T/W ü ü
1.12 T/W ü ü
1.13 F/O ü ü
1.14 T/W ü ü

[25]

QUESTION / *VRAAG* 2

2.1

1.	Employment ü	1.	*Indiensneming*
2.	Negotiations ü	2.	*Onderhandelinge*
3.	Safety and Security ü	3.	*Veiligheid en sekuriteit*
4.	Welfare ü	4.	*Welsyn*
5.	Education and Training ü	5.	*Onderrig en Opleiding* (5)

2.2

1. Regular inspections to determine necessary maintenance. ü
2. Programs put in place of which part must be replaced or re-set. ü
3. Regular care of machines. ü
4. Operator should report anything suspicious. ü (4)

2.2

1. Gereelde inspeksies om noodsaaklike instandhouding vas te stel. ü
2. Program in plek gestel van watter onderdeel vervang of verstel moet word. ü
3. Gereelde versiening van masjiene. ü
4. Operateur moet enigiets verdags rapporteer. ü

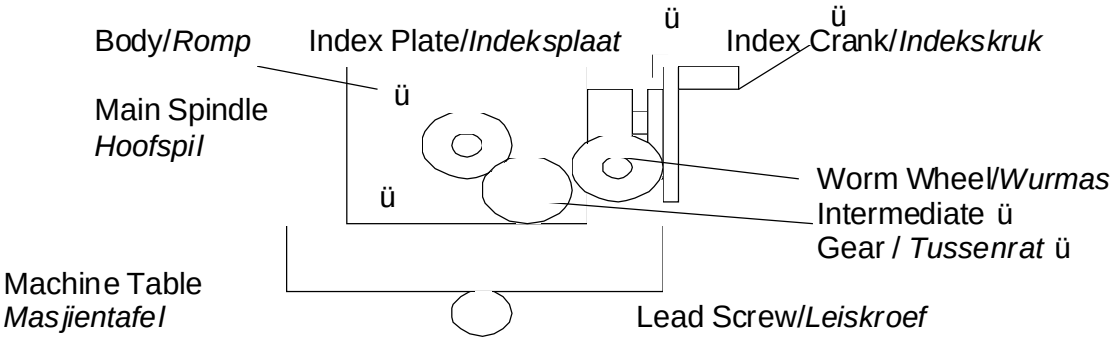
2.3 (ANY 4)

1. Production cost and time reduced to minimum. ü
2. Supervision and production control made easy. ü
3. Programme changes easily affected. ü
4. Maximum production – all available space utilised. ü
5. Better quality product – better and safer methods employed. ü
6. Feeling of unity amongst workers created by avoiding unnecessary divisions. ü (4)

2.3

1. Produksiekoste en tyd tot minimum beperk.
2. Toesig oor arbeid asook produksiebeheer vereenvoudig.
3. Programveranderings maklik gedoen.
4. Maksimum produksie – all beskikbare spasie benut.
5. Beter gehalte produk – beter en veiliger metodes toegepas.
6. Eenheidsgevoel onder werkers deur onnodige skeidings te vermy.

2.4



(6)

2.5.1
PCD/SSD = Tm
= 75 X 6 ü
= 450 mm ü

2.5.2
OD/BD = PCD/SSD + 2 add
= 450 + (2X6) ü
= 462 ü

2.5.3
a = m ü
= 6 mm ü

2.5.4
Ded = 1.157
= $1{,}157^{m}$ X 6 ü
= 6,942 mm ü

2.5.5
WD = 2 X Ad
= 2 X 6 ü
= 12 mm ü

2.5.6
FD/VD = Ad + Ded
= 6 + 6,942 ü
= 12,942 mm ü (12)

2.6

Chordal Addendum = $m+\left[\frac{mT}{2}\left(1-\frac{90^\circ}{\cos T}\right)\right.$

Koord-addendum

$m_n + [\ \frac{m_n.T}{2}\ (\ 1 - \text{Cos}\ \frac{90}{56})]$ ü

= 4,8 + [4,8 X 28 (1 – Cos 1,607)] ü
= 4,8 + [134,4 (1 – 0,999606626)]
= 4,8 + [134,4 (0,000393373)]ü
= 4,8 + 0,052869413 ü
= 4,853 mm (4)

[35]

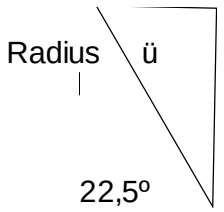
QUESTION / *VRAAG* 3

3.1.1

Chordal distance/*Koordafstand* = 85 + Button/*Knoppie-diam*.
= 85 + 10
= 95 mm ü

3.1.2

95/2 = 47,5 mm



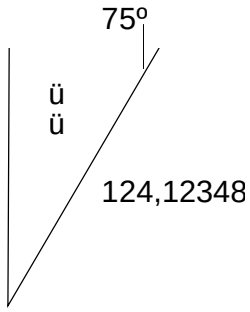
Sin 22,5º = $\frac{47,5 \text{ ü}}{\text{Radius ü}}$

r = $\frac{47,5}{\text{Sin } 22,5^\circ \text{ ü}}$

= 124,123 mm

PCD/SSD = 2 x 124,123
= 248,247 mm ü

3.1.3



Sin 75º = $\frac{\text{Dis/Afs} \div 2 \text{ ü}}{124,12348}$

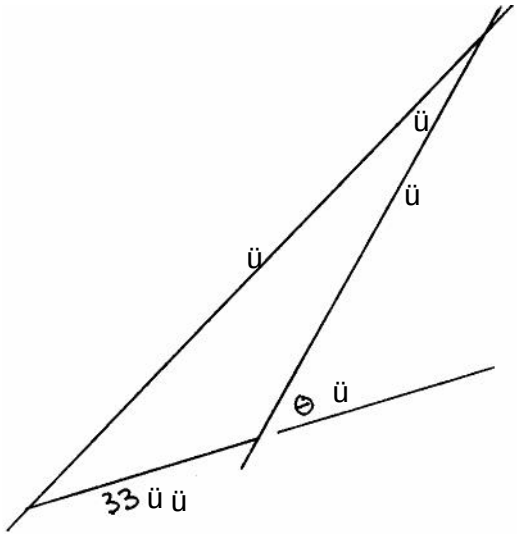
Dis/Afs = 2 X Sin 75º X 124,12348ü
= 239,788 mm ü

(12)

3.2

M	D	M/D
5	250	1250
6	300	1800
	75	

} ü



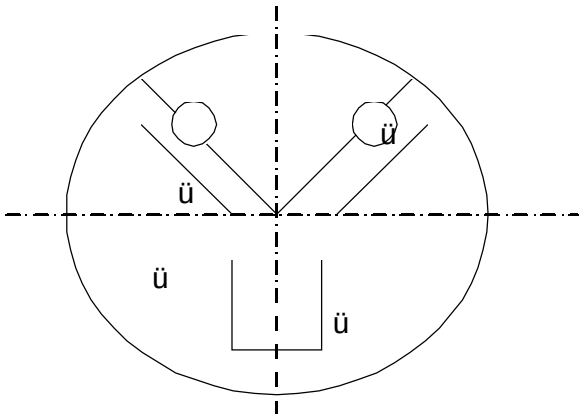
Vector= 33 mm
Vektor

To Scale
Volgens Skaal = 33 X 20 ü
= 660 Units/*Eenhede* ü

Mass / *Massa*= $\frac{660}{75 \text{ ü}}$
= 8,8 kg ü

Angle/*Hoek* ? = 45º (11)

3.3



(4)

3.4

1. Machine failures as a result of defective control are rare ü
2. Machines last longer. ü
3. Higher production. ü
4. Improved accuracy. ü

3.4

1. *Masjiene wat onklaar raak weens foutiewe kontrole is raar.*
2. *Masjiene hou langer.*
3. *Hoër produksie.*
4. *Verbeterde akkuraatheid.*

3.5 (ANY 4)

1. Gears ü	1. *Ratte*
2. Machine slides ü	2. *Masjien-glybane en -sleë*
3. Bearings ü	3. *Laers*
4. Cutting tools ü	4. *Snybeitels*
5. Etc.	5. *Ens.*

(4)

[35]

QUESTION / *VRAAG* 4

4.1.1

Dm/Dg = Root/*Wortel* ø + ½p
= 35 + (½ X 4)ü
= 35 + 2ü
= 37 mm

4.1.2

L = p X Starts/*Gange*
= 4 X 3ü
= 12 mmü

4.1.3

Helix Angle = Tan ? = $\frac{L}{pDm}$ ü
Helikshoek

$= \frac{12}{p \times 37}$ ü

= 0,10323564 ü

? = Tan^{-1} 0,10323564 ü

= 5,894º

= 5º 54' ü

4.1.4

Leading angle/*Ingryphoek* = 90º – (5º 54' + 3)

= 90º – 8º 54' ü

= 81º 6' ü

4.1.5

Following angle/*Nasleephoek* = 90º + (5º 54' - 3)

= 90º + 2º 54' ü

= 92º 54' ü (13)

4.2

1. Mount work on lathe and bore to 35 mm. ü
2. Recess front to major diameter.
3. Set compound slide parallel with the lathe bed. ü
4. Grind tool and set it square with the work. ü
5. Take tool inside the hole and let it scrape the work, then set dial to 0. ü
6. Take tool out and set for light cut. ü
7. Cut first thread. ü
8. Return to start and set dial back to 0. ü
9. Move compound slide forward a distance equal to one pitch. ü
10. Cut second thread – do the same with third thread. ü (10)

4.2

1. *Monteer werk in draaibank en boor uit tot 35 mm.*
2. *Ondersny voorkant tot buitediameter.*
3. *Stel saamgestelde slee parallel met die draaibank-bed.*
4. *Slyp beitel en stel dit haaks met die werk.*
5. *Voer beitel in die gat, laat dit die werk skraap en stel die skaalkraag op 0.*
6. *Neem beitel uit die gat en stel dit vir ligte snit.*
7. *Sny die eerste skroefdraad.*
8. *Keer terug na begin en stel skaalkraag terug op 0.*
9. *Beweeg saamgestelde slee oor 'n afstand gelyk aan een steek vorentoe.*
10. *Sny tweede draad – doen dieselfde met die derde draad.*

4.3

1. Uses less power. ü 2. Gives better finish. ü 3. Has less chatter. ü 4. Less friction – cutter lasts longer. ü 5. Enough space between teeth – well backed off. ü 6. Smaller twisting moment. ü 7. Requires less clearance – stronger teeth. ü	*1. Gebruik minder krag.* *2. Gee beter afwerking.* *3. Het minder trillings.* *4. Minder wrywing – snyer hou langer.* *5. Genoeg spasie tussen tande – goed teruggesny.* *6. Kleiner draaimoment.* 7. *Vereis minder speling – sterker tande.*

(5)

4.4

Slab milling is when a large flat surface must be machined using an arbor and a helical cutter. ü ü

4.4

Vlakfrees is wanneer 'n groot plat oppervlak gemasjineer moet word deur 'n heliese freessnyer op 'n draspil. (2)

4.5

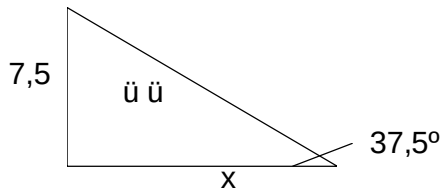
1. Improves the cutting action and finish. ü 2. Prevents long continuous chips. ü 3. Chips easily washed away. ü 4. Reduces chattering. ü 5. Consumes less power. ü	*1. Verbeter sny-aksie en afwerking.* *2. Verhoed lang, aaneenlopende snysels.* *3. Snysels maklik weggewas.* *4. Verminder trillings.* 5. *Gebruik minder krag.*

(5)

[35]

QUESTION / *VRAAG* 5

5.1



Tan 37,5º = $\frac{7,5}{x}$ ü

$x = \frac{7,5}{\text{Tan } 37,5^\circ}$ ü

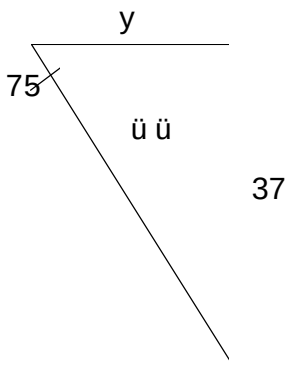
= 9,774 mm ü

X = 69,548 – (2x + 2r) ü

= 69,548 – 2(9,774 + 7,5) ü

= 69,548 – 34,548 ü

= 35 mm



Tan 75º = $\frac{37}{y}$ ü

$y = \frac{37}{\text{Tan } 75^\circ}$ ü

= 9,914 mm ü

Y = 35 + 2(9,914) ü

= 35 + 19,828 ü

= 54,828 mm ü

(16)

5.2

P = F/A

A = F/P

= 12250ü / 35000000ü

= 0,00035 m²ü

A = $\frac{pd^2}{4}$

d = v $\frac{A \times 4}{p}$ ü

= v $\frac{0,00035 \times 4}{p}$ ü

= v 0,000445633ü

= 0,021110041 m

= 21,11 mmü (7)

5.3

A = (25 X 50 X 10) – (19 X 44 X 10)ü ü ü ü

= 0,000414 m²ü

F = d X Aü

= 7,3 X 10 X 0,000414ü

= 3022,2 Nü

= 3,022 kNü (9)

5.4

1. Excessive heatü 2. Uses extra power.ü 3. Causes wear on moving parts.ü	*1. Oormatige hitte.* *2. Gebruik ekstra krag.* 3. *Veroorsaak slytasie van bewegende dele.*

(3)

[35]

QUESTION / *VRAAG* 6

6.1.1

A ram = $\frac{pd^2}{4}$ ü

= $\frac{p \times 0,57657^2}{4}$ ü

= 0,25134 m²ü

P = F/A

= 15000ü / 0,25134

= 59680,02827 Paü

= 59,68 kPaü

6.1.2

P1 / 300 = P2 / 59680

A1 = 1ü / 300

A1 = 59680ü

= 0,005026807 m²ü

But/*Maar* A1 = $\frac{pd^2}{4}$

d = v $\frac{A \times 4}{p}$ ü

= v $\frac{0,005026807 \times 4}{p}$ ü

= v0,006400329

= 0,080002061 mü

d = 80 mm (12)

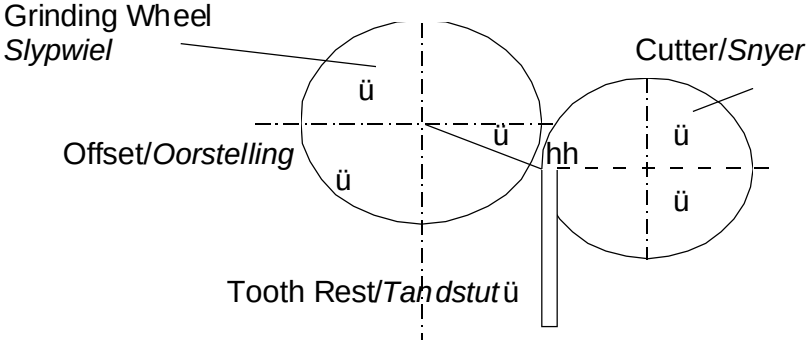
6.2.1

Off-set/Oorstelling = R Sin 4°ü

= 75 Sin 4°ü

= 5,232 mmü

6.2.2



(9)

6.3.1

Indexing = $\frac{N}{9}$ or $\frac{N}{540}$

= $\frac{13^{o}\ 20'}{9}$ ü $\frac{800}{540}$ ü

= 1 and/*en* $\frac{26}{54}$ ü

= 1 Full turn plus 26 hole on 54 hole circle ü

1 Volle draai plus 26 gate op 54-gat-sirkel

6.3.2 (i)

Indexing

Indeksering = $\frac{40}{N}$

= $\frac{40\ =\ 1}{120\ \ 3}$ ü

= 8 holes on 24 ü

8 *gate* op 24 ü

6.3.2 (ii)

$\frac{Dr}{Dn} = \frac{(A - N) \times 40}{A \qquad 1}$ ü

= $\frac{(120 - 119) \times 40}{120 \qquad 1}$ ü

= $\frac{40}{120} = ü \ \frac{1 \times 24}{3 \quad 24}$

Dr = 24 Teeth/*Tande* ü

Dn = 72 Teeth/*Tande* ü

6.3.3 Clockwise/*Kloksgewys*. ü (10)

[35]

TOTAL / *TOTAAL:* 200