GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

METALWORK SG
(Second Paper)

QUESTION 1

1.1 C
1.2 B
1.3 A
1.4 D
1.5 A
1.6 D
1.7 D
1.8 B
1.9 C
1.10 A
1.11 B
1.12 C
1.13 D
1.14 C
1.15 A
1.16 B
1.17 D
1.18 C
1.19 A
1.20 C

[20]

QUESTION 2

2.1 Flat chisel (1)

2.2

A. Bring the tapered part of the chisel to the red heat and plunge into water or oil.
B. Polish the steel with an emery cloth.
C. Warm the chisel slowly, allowing time for the heat to pass through the metal. Warm away from the point.
D. Watch for the appearance of straw colour. Allow time for the colour to pass slowly down to the point of the chisel.
E. Continue to heat slowly until the taper of the chisel is all purple.
F. Cool in water. (10)

2.3 Because of the constant hammering, a chisel may spread over the shank. This effect is called mushrooming. (2)

2.4 A. Grind away mushroom head.
B. Taper head by grinding.
C. Apply correct heat treatment. (3)

2.5 If a chisel with a mushroom head is hammered, pieces may break off and cause injury. (1)

2.6 Both sides of the cutting edge should form an angle of 60°. (1)

2.7 A cross-cut chisel – because keyways are generally narrow, any other chisel would not do. (2)
[20]

QUESTION 3

3.1
A – Screw cutting - 4 -
B – Parting off - 6 -
C – Finishing off - 2 -
D – Facing off - 5 -
E – Taper turning - 3 -
F – Knurling - 1- (12)

3.2 Tool post (2)

3.3 High speed steel, it is tough (2)

3.4 So that the tool does not rub against the metal being cut (2)

3.5 (a) The cutting edge must take a clean cut and be strong enough to withstand the conditions of use. (1)

(b) The tool must be ground so that the chips flow away easily. (1)
[20]

QUESTION 4

4.1 False
4.2 False
4.3 True
4.4 False
4.5 True
4.6 True
4.7 False
4.8 True
4.9 False
4.10 True **[10]**

QUESTION 5

5.1 G
5.2 E
5.3 J
5.4 M
5.5 B
5.6 I
5.7 A
5.8 C
5.9 F
5.10 L

(2)

[10]

QUESTION 6

6.1 External micrometer (1)

6.2
1. Anvil
2. Spindle
3. Sleeve
4. Thimble
5. Rachet
6. Datum line
7. Spindle lock
8. Frame

(8)

6.3 Used to measure the diameter of round bars
Used to measure the thickness of sheet metal (2)

6.4

Major division	88 mm
Minor division	0 mm
Thimble reading	0.16 mm
Reading	88.16 mm

(4)

6.5 Turn the spindle onto the anvil using the rachet, after ensuring the micrometer is absolutely clean. The reading of the barrel and the thimble must correspond to zero. (3)

6.6
A. Do not leave the micrometer lying around.
B. Ensure the anvil and micrometer faces are always clean.
C. Micrometer must be drawn off the work gently when taking the readings.
(Any two answers) (2)

[20]

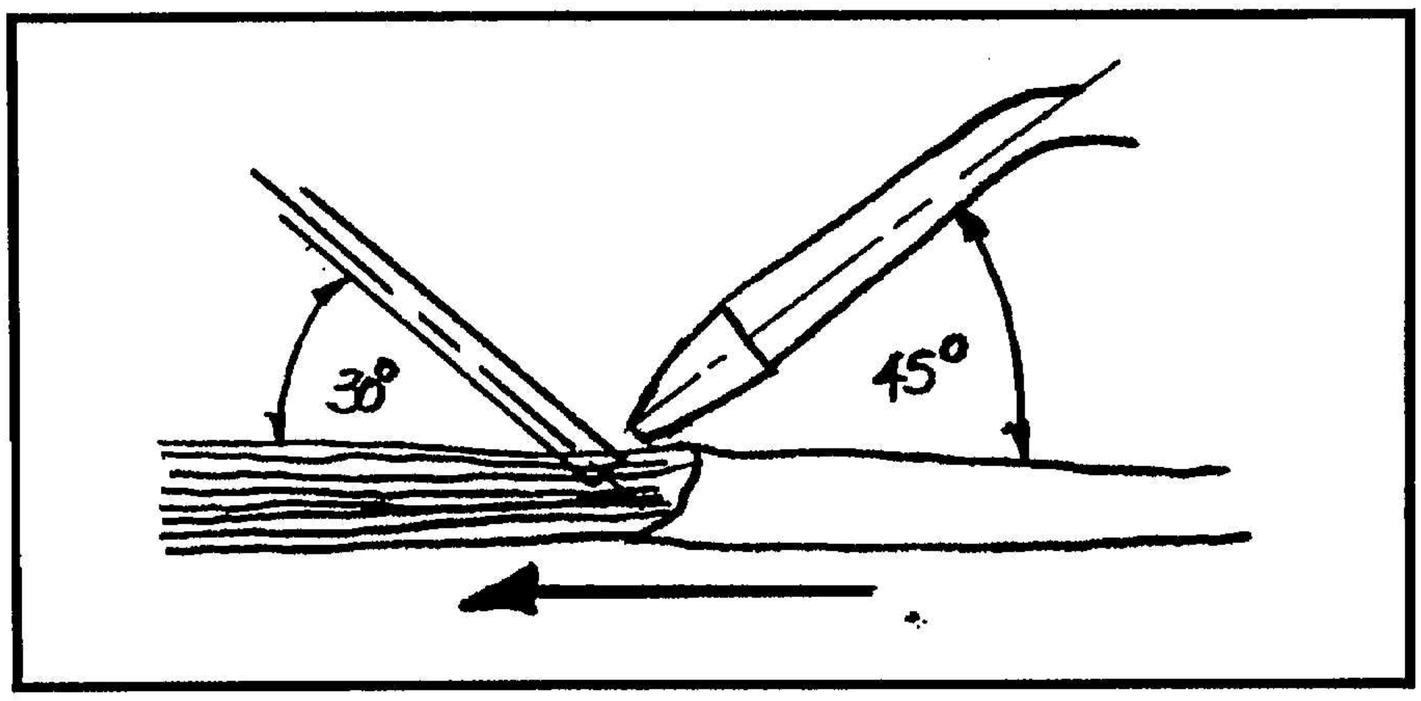
QUESTION 7

7.1
1. Outlet pressure gauges
2. Cylinder contents gauge
3. Flashback arrester
4. Spindle key
5. Nozzle
6. Blow pipe (6)

7.2
7.2.1 D
7.2.2 D
7.2.3 A
7.2.4 C
7.2.5 D
7.2.6 B
7.2.7 B
7.2.8 D
7.2.9 C
7.2.10 D
7.2.11 A
7.2.12 B (12)

7.3
A. Incorrect pressure-regulating settings
B. The nozzle is too large or too small
C. The nozzle is dirty
D. The nozzle is held too close to weld
E. The nozzle is overheated (2)

7.4



For material less than 6 mm, the leftward welding technique is used. The welding rod preceeds the blowpipe. Travel in from right to left. Blowpipe is held at between 60° and 70°, whilst the rod is held between 30° and 40°, (5)
[25]

QUESTION 8

8.1.1 Chasing a thread in the lathe (2)
8.1.2 Chaser rest (2)
8.1.3 Tool post (2)
8.1.4 Tailstock centre (1)
8.1.5 Use lubricating oil or tallow (2)
8.1.6 It can overheat (1)
8.1.7 Allow for expansion (1)
8.1.8 Use a half centre (2)
8.1.9 The centre remains still and the work rotates on it (2)
[15]

8.2.1 Dressing and truing of wheel (2)

8.2.2 It restores cutting ability by removing clogs on the surface; removes blunt grains of the abrasive; exposes new sharp grains (2)

8.2.3 A – Grinding wheel dresser
B – Grinding wheel (2)

8.2.4 Used for sharpening cutting tools (1)

8.2.5 Soft wheel for cutting hard materials
Hard wheel for cutting soft materials (2)

8.2.6 (a) Loading (2)
(b) Glazing (2)

8.2.7 Use goggles, ensure that the working area is free of oil. (2)
[15]

8.3.1 Countersinking (2)
8.3.2 Countersink bit (drill) (2)

8.3.3 (a) To provide a recess for the head of a countersink screw
(b) Used to deburr a hole after drilling (2)

8.3.4 Drill press (2)

8.3.5 Depth gauge indicator/Depth stop (2)

8.3.6 Use centre punch and then drill a pilot hole. (2)

8.3.7 (a) After each work period, it should be thoroughly wiped down and left clean.
(b) Avoid wearing loose clothing when working the drill press.
(Any other safety precaution associated with the drill press) (2)

8.3.8 Counter bore (1)
[15]

QUESTION 9

9.1 A. Grinding without face shield
B. Untidy workbench
C. Grinding on table
D. Gas flame left unattended
E. Gas bottle lying on its side
F. Tools lying around (5)

9.2.1 Any practical design accepted.
Any form sketches and drawings are acceptable.
Marks will be awarded for creativity and originality. (4)

9.2.2 The cutting list should have item, description, quantity, and material. (4)

9.2.3 Painting
Spray-painting
Chroming (2)
[15]

QUESTION 10

10.1 Pig-iron from the blast furnace is poured into moulds to harden. This is melted together with scrap iron in the cupola furnace. The cupola furnace is a simplified version of the blast furnace. (3)

10.2 The cupola furnace is only a smelting furnace, therefore it is only fed with scrap iron and not iron ore. (2)

10.3.1 Open-hearth furnace
10.3.2 Blast furnace (2)

10.4 Copper and zinc (2)

10.5 Duralluminium Heat resistant Light weight (3)

10.6 It makes it very hard: Which in turn makes it suitable for use as cutting tools.
Wear resistant, heat resistant, tensile strength and shock resistant (1)

10.7 Good conductor of electricity
Resistant to corrosion
Very good conductor of heat (2)
[15]

TOTAL: 200

END

GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

METAALWERK SG
(Tweede Vraestel)

VRAAG 1

1.1 C
1.2 B
1.3 A
1.4 D
1.5 A
1.6 D
1.7 D
1.8 B
1.9 C
1.10 A
1.11 B
1.12 C
1.13 D
1.14 C
1.15 A
1.16 B
1.17 D
1.18 C
1.19 A
1.20 C

[20]

VRAAG 2

2.1 Plat beitel (1)

2.2

A. Bring die tapse gedeelte van die beitel tot net onder rooiwarm en dompel in water of olie.
B. Poleer die staal met 'n amarildoek.
C. Maak die beitel stadig warm en laat tyd toe, sodat die hitte deur die metaal kan beweeg. Verhit weg van die punt af.
D. Wag vir strooikleur om te verskyn. Laat tyd toe vir die kleur om stadig tot by die punt van die beitel te beweeg.
E. Hou aan om stadig te verhit totdat die punt van die beitel heeltemal pers word.
F. Koel af in water. (10)

2.3 Vanweë die gedurige gehamer, kan 'n beitel oor sy skag sprei. Hierdie effek word omkrulling genoem. (2)

2.4 A. Skuur/Slyp die omgekrulde kop af.
B. Maak kop taps met slypmasjien skerp.
C. Pas korrekte hittebehandeling toe. (3)

2.5 Indien 'n beitel met 'n omgekrulde kop geslaan word, kan stukkies afbreek en beserings veroorsaak. (1)

2.6 Albei kante van die snykant moet 'n hoek van 60° vorm. (1)

2.7 'n Ritsbeitel – omdat spygleuwe oor die algemeen nou is, sal geen ander beitel werk nie. (2)
[20]

VRAAG 3

3.1

A	–	Skroefsny	- 4 -
B	–	Afskeiding	- 6 -
C	–	Afwerking	- 2 -
D	–	Voorwerk	- 5 -
E	–	Tapse draaiwerk	- 3 -
F	–	Afkarteling	- 1-

(12)

3.2 Beitelhouer (2)

3.3 Sneldraaistaal, dit is sterk (2)

3.4 Sodat die beitel nie skuur teen die metaal wat gesny word nie. (2)

3.5 (a) Die snykant moet 'n netjiese snit maak wat sterk genoeg sal wees om gebruikstoestande te weerstaan. (1)

(b) Die beitel moet geslyp word sodat stukkies gemaklik wegvloei. (1)
[20]

VRAAG 4

4.1 Onwaar
4.2 Onwaar
4.3 Waar
4.4 Onwaar
4.5 Waar
4.6 Waar
4.7 Onwaar
4.8 Waar
4.9 Onwaar
4.10 Waar **[10]**

VRAAG 5

(2)

5.1 G
5.2 E
5.3 J
5.4 M
5.5 B
5.6 I
5.7 A
5.8 C
5.9 F
5.10 L **[10]**

VRAAG 6

6.1 Eksterne mikrometer (1)

6.2
1. Aambeeld
2. Spil
3. Huls
4. Oorring
5. Sperrat (ratel)
6. Uitgangslyn
7. Spilslot
8. Raam (8)

6.3 Word gebruik om die diameter van ronde stawe te meet
Word gebruik om die dikte van plaatmetaal te meet (2)

6.4

Maksimum verdeling	88 mm
Minimum verdeling	0 mm
Skroefdopverdeling	0.16 mm
Lesing	88.16 mm

(4)

6.5 Draai die spil op die aambeeld met die ratel, nadat jy seker gemaak het dat die mikrometer heeltemal skoon is. Die lesing op die spil en die aambeeld moet gelyk wees aan nul. (3)

6.6
A. Moenie die mikrometer laat rondlê nie.
B. Maak seker dat die van die aambeeld- en mikrometer-vlakke altyd skoon is.
C. Mikrometer moet versigtig van die werk afgetrek word as die lesings geneem word. (Enige twee antwoorde) **[20]**

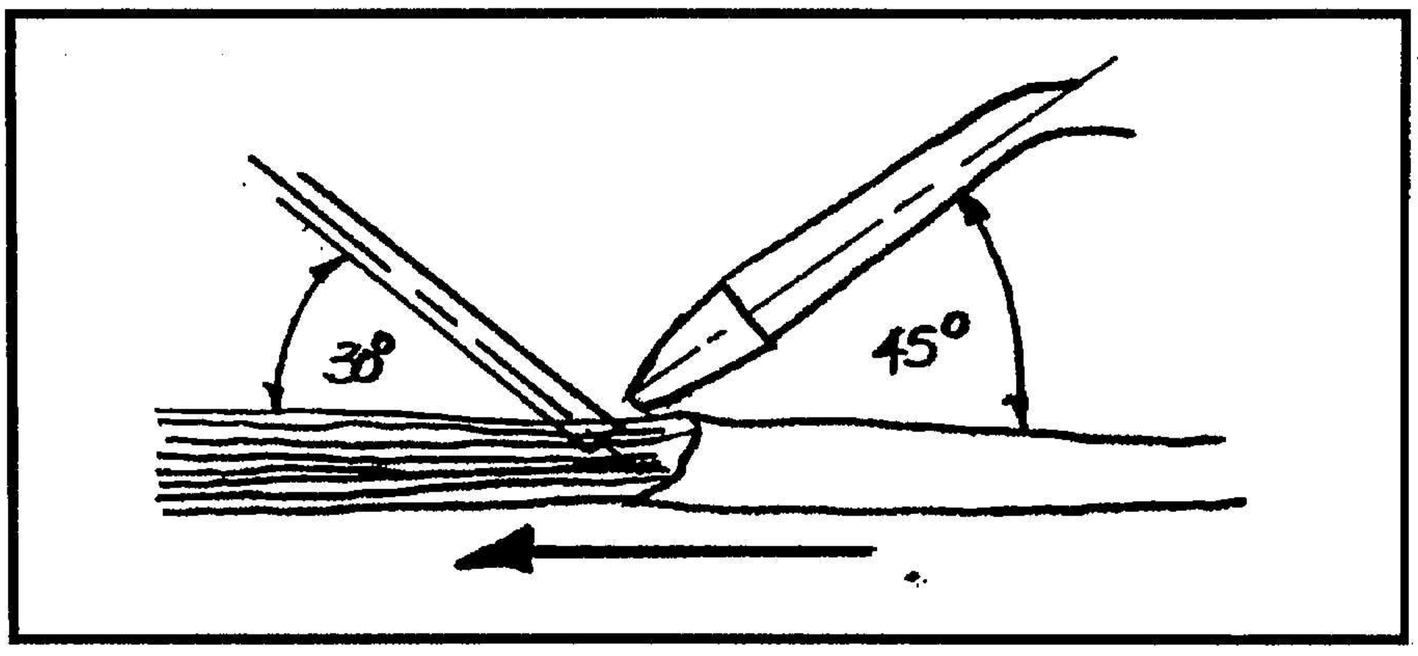
VRAAG 7

7.1
1. Uitlaatdruk-meters
2. Silinderinhoud-meter
3. Terugflitsweerder
4. Spilsleutel
5. Nossel
6. Brander (6)

7.2
7.2.1 D
7.2.2 D
7.2.3 A
7.2.4 C
7.2.5 D
7.2.6 B
7.2.7 B
7.2.8 D
7.2.9 C
7.2.10 D
7.2.11 A
7.2.12 B (12)

7.3
A. Foutiewe drukreël-stellings
B. Die nossel is te groot of te klein
C. Die nossel is vuil
D. Die nossel word te naby aan die sweislas gehou
E. Die spuitstuk is oorverhit (2)

7.4



Vir materiaal dunner as 6 mm word die linkswaartse sweistegniek gebruik. Die sweisstafie word voor die brander gehou. Beweeg van regs na links. Brander word tussen 60° en 70° gehou, terwyl die sweisstafie tussen 30° en 40° gehou word. (5)

[25]

VRAAG 8

8.1.1 Nasny van skroefdraad in die draaibank (2)
8.1.2 Nasnyrus (2)
8.1.3 Beitelhouer (2)
8.1.4 Loskop-senter (1)
8.1.5 Gebruik smeerolie of vet (2)
8.1.6 Dit kan oorverhit (1)
8.1.7 Laat toe vir uitsetting (1)
8.1.8 Gebruik 'n halfsenter (2)
8.1.9 Die senter staan stil terwyl die werk daarop draai (2)
[15]

8.2.1 Bywerking en ronding van wiel (2)

8.2.2 Dit herstel die snyvermoë deur verstopping aan die oppervlak te verwyder; verwyder stomp korrels van die skuurmiddel; ontbloot nuwe skerp korrels (2)

8.2.3 A – Slypwielbywerker
B – Slypwiel (2)

8.2.4 Word gebruik vir die skerpmaak van snybeitels (1)

8.2.5 Sagte wiel om harde materiaal skerp te maak
Harde wiel om sagte materiale skerp te maak (2)

8.2.6 (a) Laaiing (2)
(b) Glasuring (2)

8.2.7 Gebruik bril en verseker dat die werkoppervlak olievry is (2)
[15]

8.3.1 Versinkwerk (2)
8.3.2 Versinkboor (2)

8.3.3 (a) Om 'n holte te maak vir die kop van 'n versinkskroef
(b) Word gebruik om die baard te verwyder na boorwerk (2)

8.3.4 Boorpers/Staanboor (2)

8.3.5 Diepte-aanwyser/Diepte-stop (2)

8.3.6 Gebruik senterpons en boor dan 'n voorlopergat (2)

8.3.7 (a) Na elke werksperiode moet dit deeglik afgevee en skoon gelaat word
(b) Moenie los klere dra wanneer daar met die staanboor gewerk word nie.
(Enige ander veiligheidsmaatreël wat op die staanboor van toepassing is). (2)

8.3.8 Teenboor (counter bore) (1)
[15]

VRAAG 9

9.1 A. Slyp sonder 'n gesigskerm
B. Slordige werksbank
C. Slyp op tafel
D. Laat gasvlam onbewaak
E. Gasbottel (-silinder) lê op sy kant
F. Gereedskap lê rond (5)

9.2.1 Enige praktiese ontwerp word aanvaar.
Enige vorm van sketse en tekeninge is aanvaarbaar.
Punte sal vir kreatiwiteit en oorspronklikheid toegeken word. (4)

9.2.2 Die snylys moet item, beskrywing, hoeveelheid en materiaal bevat. (4)

9.2.3 Verfwerk
Spuitverfwerk
Chroomwerk (2)
[15]

VRAAG 10

10.1 Ru-yster uit die hoogoond word in vorms gegiet om hard te word. Die boogoond is 'n vereenvoudigde vorm van die hoogoond. (3)

10.2 Die boogoond is slegs 'n smeltoond en daarom word dit slegs met afvalyster en nie met ystererts nie gevoer. (2)

10.3.1 Opeherd-oond
10.3.2 Hoogoond (2)

10.4 Koper en sink (2)

10.5 Duralluminium Hittebestand Liggewig (3)

10.6 Dit maak dit baie hard, wat dit geskik maak om vir snybeitels te gebruik. Bestand teen slytasie, hitte, treksterk en skokbestand. (1)

10.7 Goeie geleier van elektrisiteit
Roesbestand
Baie goeie geleier van hitte (2)
[15]

TOTAAL: 200

EINDE