

GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

POSSIBLE ANSWERS FOR :

MOTOR BODY REPAIRING SG

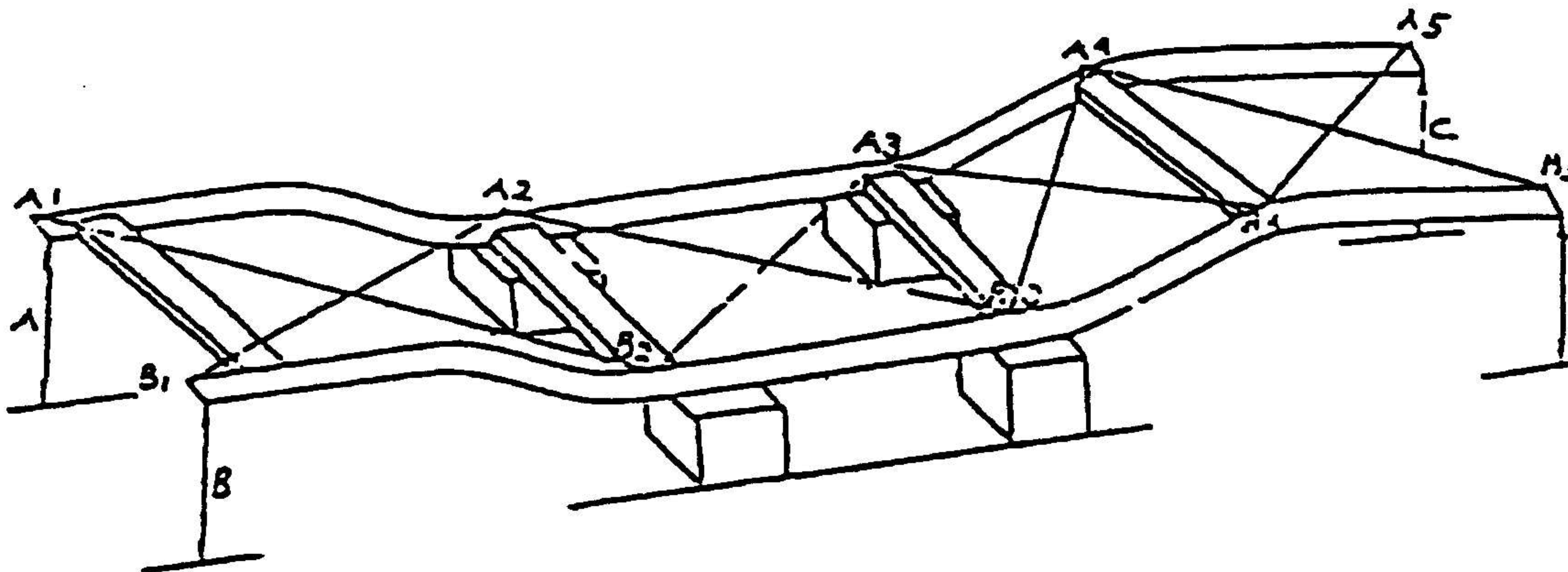
QUESTION 1

Lift the car and place on stands.	(1)
Remove the wheels, rear bumper, rear lights and wiring.	(1)
Remove tar and silencing material.	(1)
Remove petrol tank if necessary.	(1)
Set the porto-powers in a firm position. Use two porto-powers if necessary.	(1)
Place a large nozzle in the welding torch.	(1)
Pump both porto-powers until active.	(1)
Light the flame and heat the folds in the floor.	(1)
Pump the porto-powers while heating is taking place.	(1)
Watch the spaces between the rear doors and the mudguards.	(1)
Watch the opening on the boot and measure often.	(2)
Close the lid occasionally to ensure that it fits.	(2)
Level the folds in the floor.	(1)
Cool down and remove porto-powers.	(1)
Straighten out the mudguard.	(2)
Use hand-tools to straighten the fender and body.	(2)
Heat the folds in the fenders and inner plates.	(1)
Straighten and cool down.	(1)
Remove porto-powers.	(1)
Shrink and level dents and finish off.	(2)
Fit light unit and trimmings.	(2)
Filling up is done where necessary and finish off where necessary.	(2)
Replace petrol tank and wheels and let the car down.	(1)

Any 2x20= [40]

QUESTION 2

2.1



Sketch = 5 Measuring points = 8 8+5=(13)

Cross measuring $A_1 - B_2 = A_2 - B_1$
 $A_2 - B_3 = A_3 - B_2$ (6)

Height measuring A compare with B
 C compare with D (6)

2.2 Important rules when using gas welder

Acetylene cylinders must only be used in an upright position.
 Cylinders must be anchored safely to a wall or trolley.
 Oil and grease should be kept away from cylinders and regulators.
 Leaks are traced by means of soap water - not a flame.
 Avoid contact with copper to any part of the equipment except for the nozzle.
 Should a regulator freeze in cold weather, it must be heated with a warm cloth and not with a flame.
 Use only rubber pipes, regulators and pipes that are in good condition.

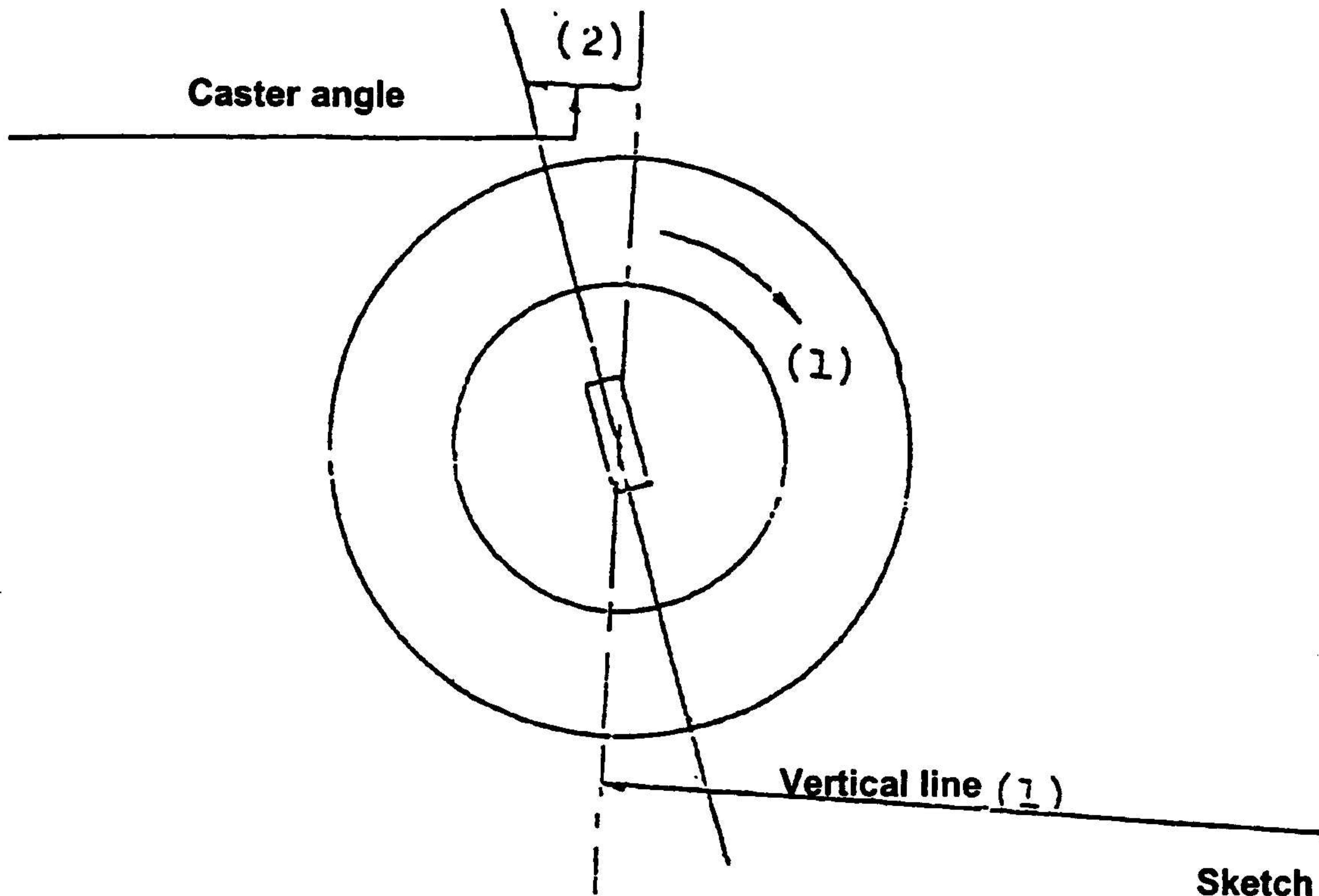
Any 6 of these safety measures or any acceptable answer counts 1 mark. (6)

2.3 The welding nozzle has one hole only for heating gases.
 The cutting nozzle has one hole in the middle for oxygen only and 6 or more holes for heating gases. (2)

2.4 The cutting nozzle must be moved towards the operator if possible. (2)

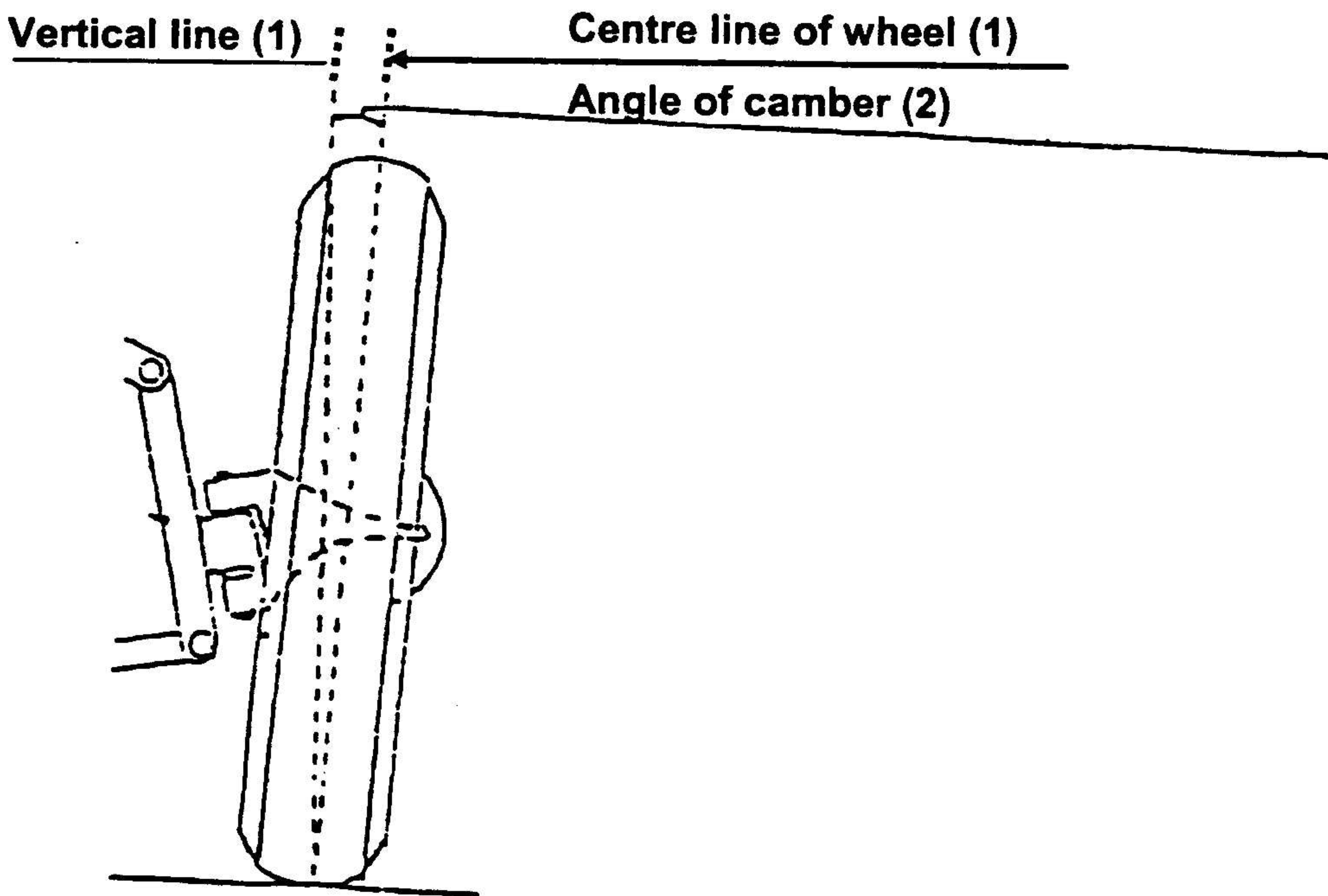
[35]

QUESTION 3



Caster

Sketch 8
Angle 3
(11)



Camber Angle

Sketch 8
Angle 3
(11)

3.2 DISADVANTAGES:

Any THREE of the following.

An accident from the front causes greater damage.

Repair work is more difficult because the body cannot be removed from the chassis.

Method of measuring cannot be applied fully.

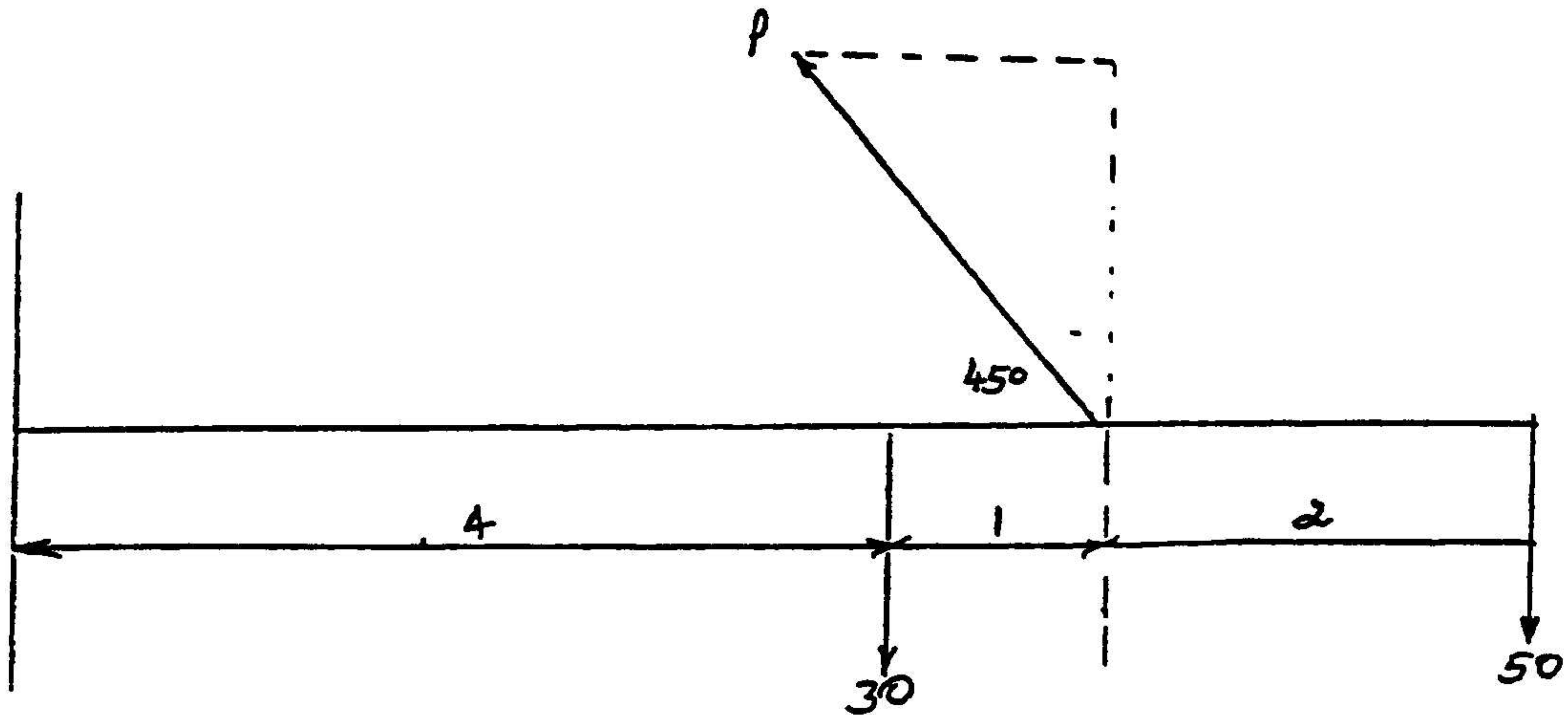
Repair work is more expensive and requires special bending and stretching equipment.

(3)
[25]

QUESTION 4

- 4.1 Lift the car, place on stands and remove the wheel. (1)
 Remove dents roughly. (1)
 Remove silencing material. (1)
 Set porto-powers and press fender until the folds are straight. (1)
 Bring ends together and fasten with a pair of welding pliers. (1)
 Weld in a few places only with touching. (1)
 Start away from the welding tach and weld between the tachs. (1)
 Level regularly with the hammer and dolly while the metal is hot. (1)
 Shrink the stretched parts if necessary. (1)
 Knock out dents around the welding place. (1)
 File the surface with the body file. (1)
 Remove small dents. (1)
 Strengthen the surface with a plate. (1)
 Sand down with a sanding machine and remove Porto-power (1)
 Knock the weld a little down. (1)
 Clean the weld and tin the surface. (1)
 Fill with body lead. (1)
 File down with body file and sanding ribbon. (1)
 Replace wheel and lower car. (1)
 Any 15 = (15)
- 4.2 Factors determining the width of cut:
- The size of the nozzle
 The heat of the flame
 Speed
 The cutting line
 Distance between nozzle and workpiece
- Any FOUR above – 2 marks each (8)
- 4.3 Keep the nozzle at a 90° angle from the work piece.
 Make sure that the distance remains the same between the cutting nozzle and the workpiece. (2)
 [25]

QUESTION 5



Calculate downward forces:

$$\begin{aligned} \text{Down forces} &= (4 \times 30) + (7 \times 50) \\ &= 120 + 350 \\ &= \underline{470\text{N}} \end{aligned}$$

(3)

Calculate upward forces

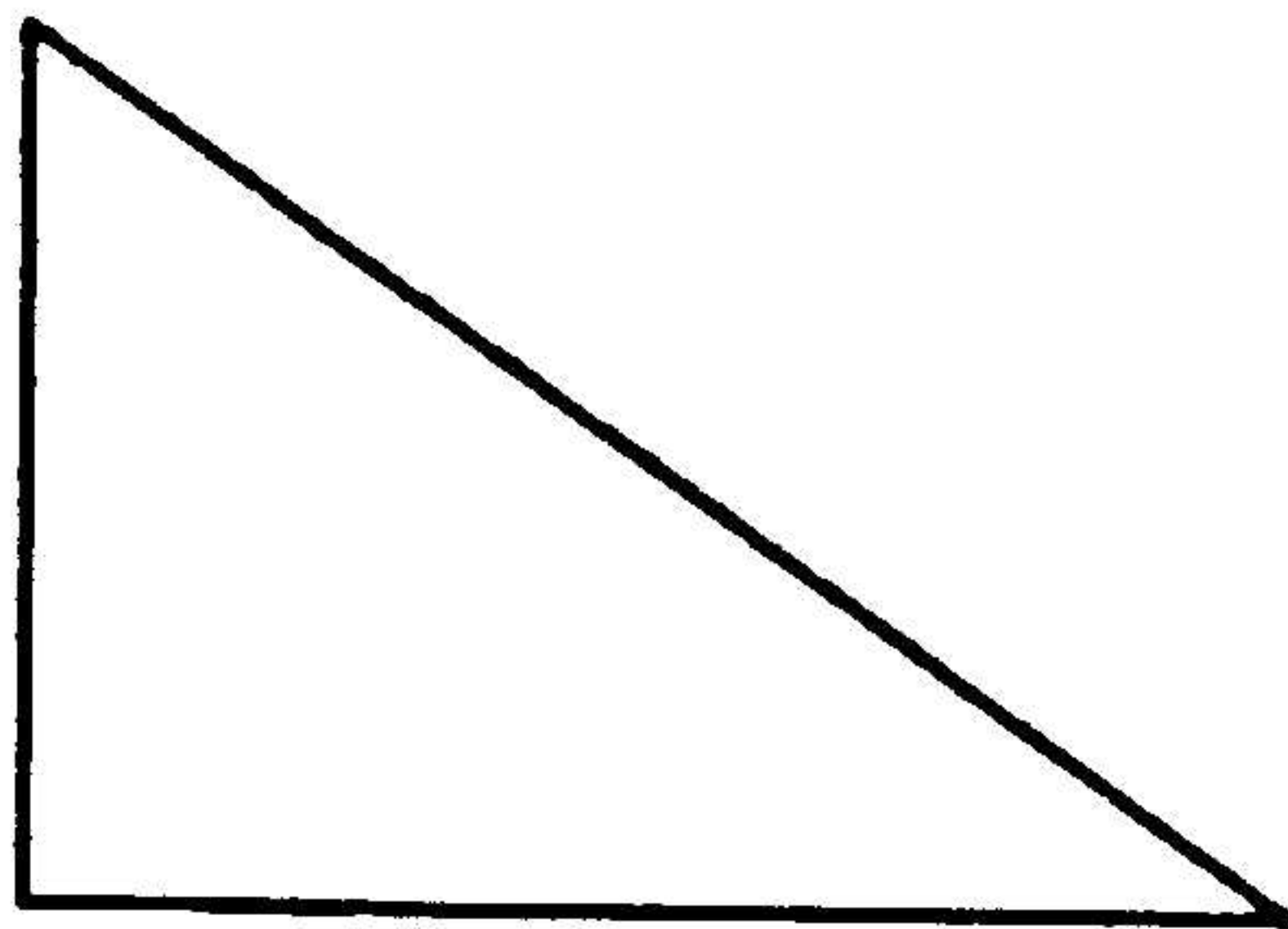
$$\begin{aligned} \text{Upward forces} &= \text{Downward forces} \\ X \times 5 &= 470 \end{aligned}$$

$$X = \frac{470}{5}$$

$$X = \underline{94\text{N}}$$

(3)

5.1 Calculate force P



(2)

$$\sin 45^\circ = \frac{\text{opposite}}{\text{angle}}$$

$$\sin 45^\circ = \frac{X}{P}$$

$$P = \frac{X}{\sin 45^\circ} (\sin 45^\circ = .7071) \quad (1)$$

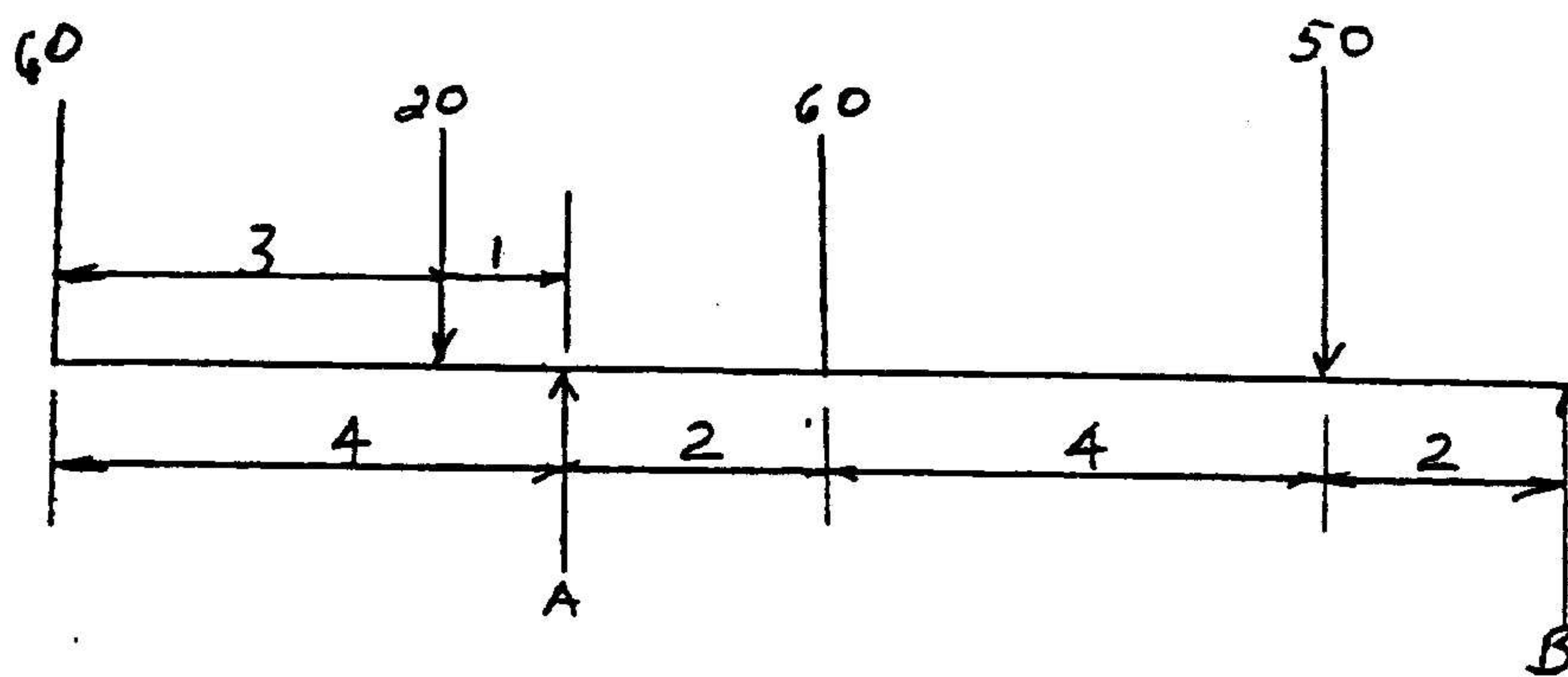
$$P = \frac{94.}{.7071} (X = 94) \quad (1)$$

$$P = 132.9 \text{ N}$$

$$\text{Say } P = \underline{133 \text{ N}} \quad (4)$$

(12)

5.2

Take moments around A

$$\begin{aligned} \text{Left} &= \text{Right} \\ 8B + (60 \times 4) + (20 \times 1) &= (60 \times 2) + (50 \times 6) & (2) \\ 8B + 240 + 20 &= 120 + 300 & (2) \\ 8B + 260 &= 420 \\ 8B &= 420 - 260 & (2) \\ 8B &= 160 \end{aligned}$$

$$\begin{aligned} B &= \frac{160}{8} & (1) \\ \text{Reaction on B} &= \underline{20 \text{ N}} & (1) \end{aligned}$$

Take moments around B

$$\begin{aligned} \text{Left} &= \text{Right} \\ (50 \times 2) + (60 \times 6) + (20 \times 9) + (60 \times 12) &= 8A & (2) \\ 100 + 360 + 180 + 720 &= 8A \\ 1360 &= 8A \end{aligned}$$

$$\begin{aligned} A &= \frac{1360}{8} & (2) \\ A &= 170 \text{ N} & (1) \end{aligned}$$

$$\begin{aligned} \text{Test } 170 + 20 &= 60 + 20 + 60 + 50 \\ \underline{190 \text{ N}} &= \underline{190 \text{ N}} \end{aligned}$$

(13)
[25]

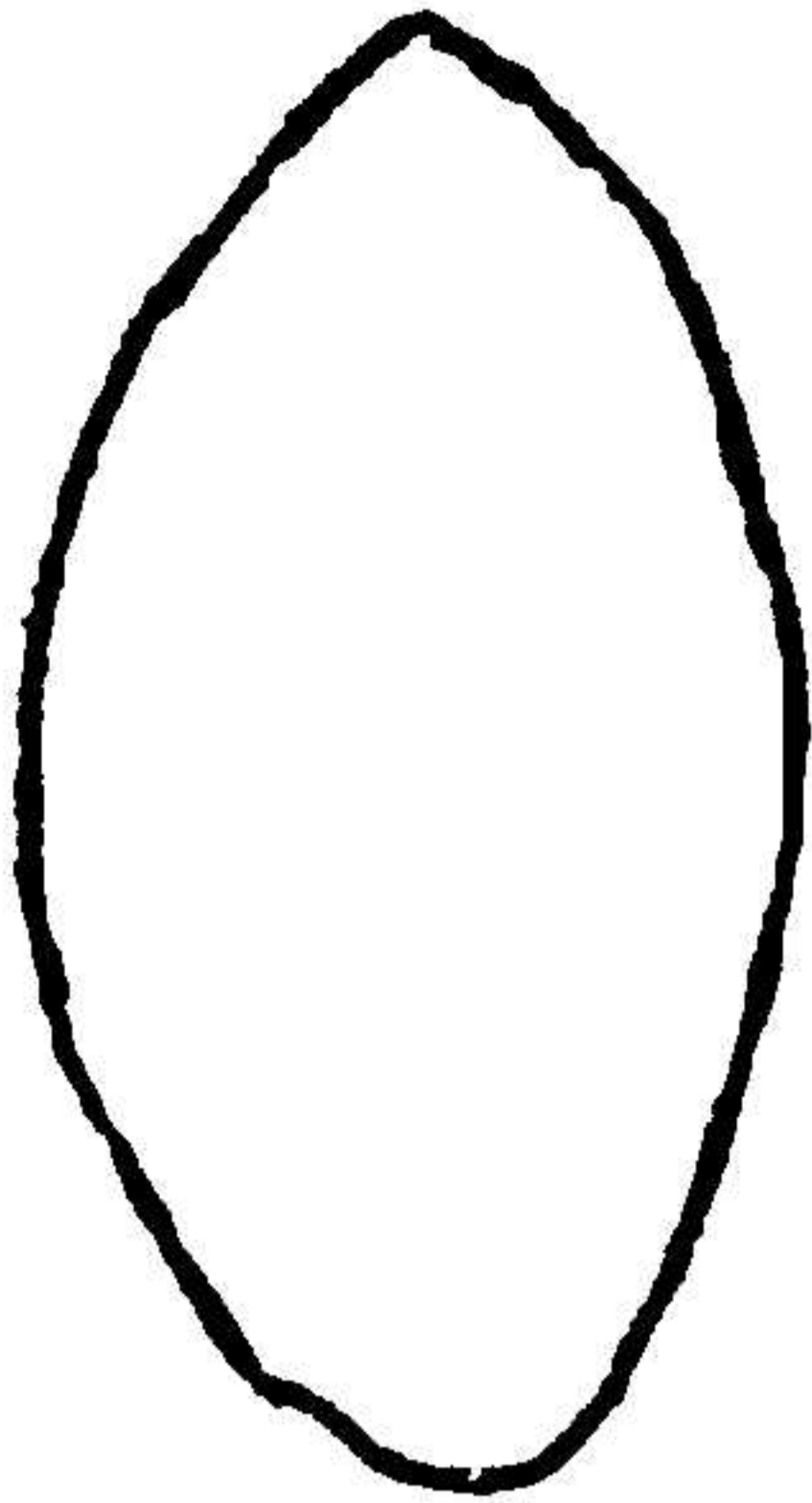
QUESTION 6Method of painting a door

Sandpaper the whole section with 220 water paper.	(1)
Pay attention to the roughness of previous primer and sandpaper until smooth.	(1)
Clean and dry thoroughly.	(1)
Cover parts that do not need painting.	(1)
Spray a thin coat of primer.	(1)
Spray two good coats of primer on front and rear of door.	(1)
Allow to dry for 30 minutes.	(1)
Apply a few thin layers of spots filling should any deep scratches or small dents occur.	(1)
Sand down with 220 water paper.	(1)
Clean and apply a coat of primer over the spot putty.	(2)
Mix the correct shade of paint while the primer is drying.	(2)
Sand the primer down lightly with 600 water papers.	(2)
Mix one part colour paint with three parts thinner.	(1)
Spray the rear and the inside of the door with colour coat.	(1)
Wait until paint is thoroughly dry before the door is painted on the outside.	(1)
First spray a thin coat of colour paint.	(1)
Spray 4 coats at 15 minute intervals.	(1)
Allow 4 hours to dry thoroughly.	(2)
Remove paper-wasting tape.	(1)
Finish off with a good rubbing compound polish if necessary.	(2)
	[25]

QUESTION 7

7.1	<p>Good lights. Spray-booth must have a suction fan. All electrical connections must be flameproof. Fresh air must enter only through filters. No open flames or cigarettes allowed in spray booth. Compressed air hoses must have a pressure meter and safety valve. Baking of duco should only be done by hot air from paraffin heater on the outside of the spray booth. Spray booth must be clean. Gas mask should always be worn. Workspace should be sufficient.</p>	(10)
7.2	<p>After final coat, allow drying for 8 hours. Use 1 500 WP and rub till a dull surface is obtained. Now use a fine compound and smear over the surface. Use the polishing machine and wool buff for rubbing. Use rubbing compound as required. Rub till a deep gloss is obtained. Apply polish and rub with soft cloth. The reason for this is to remove all dust and orange peel surface. A very high gloss will now appear on the surface. Remove traces of compound and polish between panels.</p>	(5)

7.3 In general practice the perfect spray pattern is as follows:



(5)

7.4 After the base-coat has dried, the mixing of the clear-coat, thinners and hardener can be done by means of the mixing ruler. Mix thoroughly and then spray till a gloss covers the surface of the base coat. The same procedure should be followed as with the normal duco. Rub with 1 500 WP till surface is dull. Clean and polish with polisher and buff till a deep shine is obtained.

(5)
[25]

TOTAL: 200

GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

MOONTLIKE ANTWOORDE VIR :

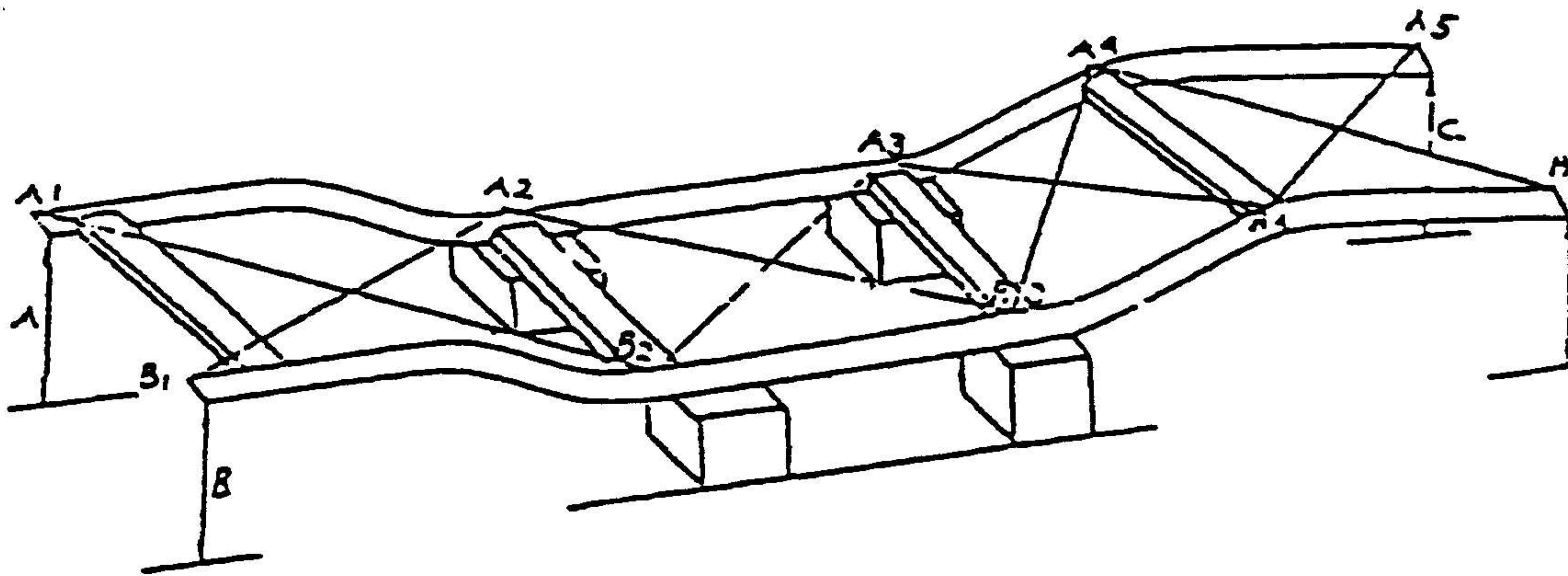
MOTORBAKHERSTELWERK SG

VRAAG 1

Lig die motor op en plaas op blokke.	(1)
Verwyder die wiele, agter buffer, agterligte en bedrading.	(1)
Krap die teer en klankdempende materiaal af.	(1)
Verwyder petroltenk indien nodig.	(1)
Stel die porto-krag teen 'n stewige stutplek. Gebruik twee porto-kragte indien beskikbaar.	(1)
Sit 'n groot spuitstuk in die sweistoestel.	(1)
Pomp albei porto-kragte totdat hulle vasskop.	(1)
Steek die vlam aan en verhit die voue in die vloer.	(1)
Pomp die porto-kragte terwyl verhitting plaasvind.	(1)
Hou die spasies tussen die agterdeure en die modderskerms dop.	(1)
Hou die bagasiebakopening dop en meet kort-kort.	(2)
Laat die deksel kort-kort sak om te verseker dat dit pas.	(1)
Klop die voue in die vloer gelyk.	(1)
Koel af en verwyder die porto-kragte.	(1)
Druk nou die modderskerm gelyk.	(2)
Klop die modderskerm en bak gelyk met handgereedskap.	(2)
Verhit die voue in die modderskerms en binneplate.	(1)
Klop gelyk en koel af.	(1)
Verwyder die porto-krag.	(1)
Pas die bagasiebakdeksel en werk af.	(2)
Krimp en klop duike verder uit en werk af.	(1)
Pas die liggeneheid en afwerkings.	(2)
Opvulwerk word gedoen en afwerking waar nodig.	(2)
Sit petroltenk en wiele terug en laat motor sak.	(1)
	2x20= [40]

VRAAG 2

2.1 Skets met punte korrek aangedui.



Skets = 5 Metingpunte = 8 8+5=(13)

Meting oorkruis $A_1 - B_2 = A_2 - B_1$
 $A_2 - B_3 = A_3 - B_2$ (6)

Meting hoogte A vergelyk met B
 C vergelyk met D (6)

2.2 Belangrike reëls by die gebruik van gassweistoestel

Asetileensilinders moet slegs regop gebruik word.

Silinders moet stewig aan 'n muur of trollie vasgemaak word.

Olie en ghries van kleppe, reëlaars, ens. Moet vermy word.

'n Lek moet met seepwater opgespoor word – nie met 'n vlam nie.

Koper moet vermy word aan enige deel van die toerusting, behalwe vir die brandpunt.

Wanneer 'n reëlaar in koue water vries, moet dit met warm lappe verwarm word – nie 'n vlam nie.

Gebruik slegs rubberpype, reëlaars en blaaspype wat in 'n goeie toestand is.

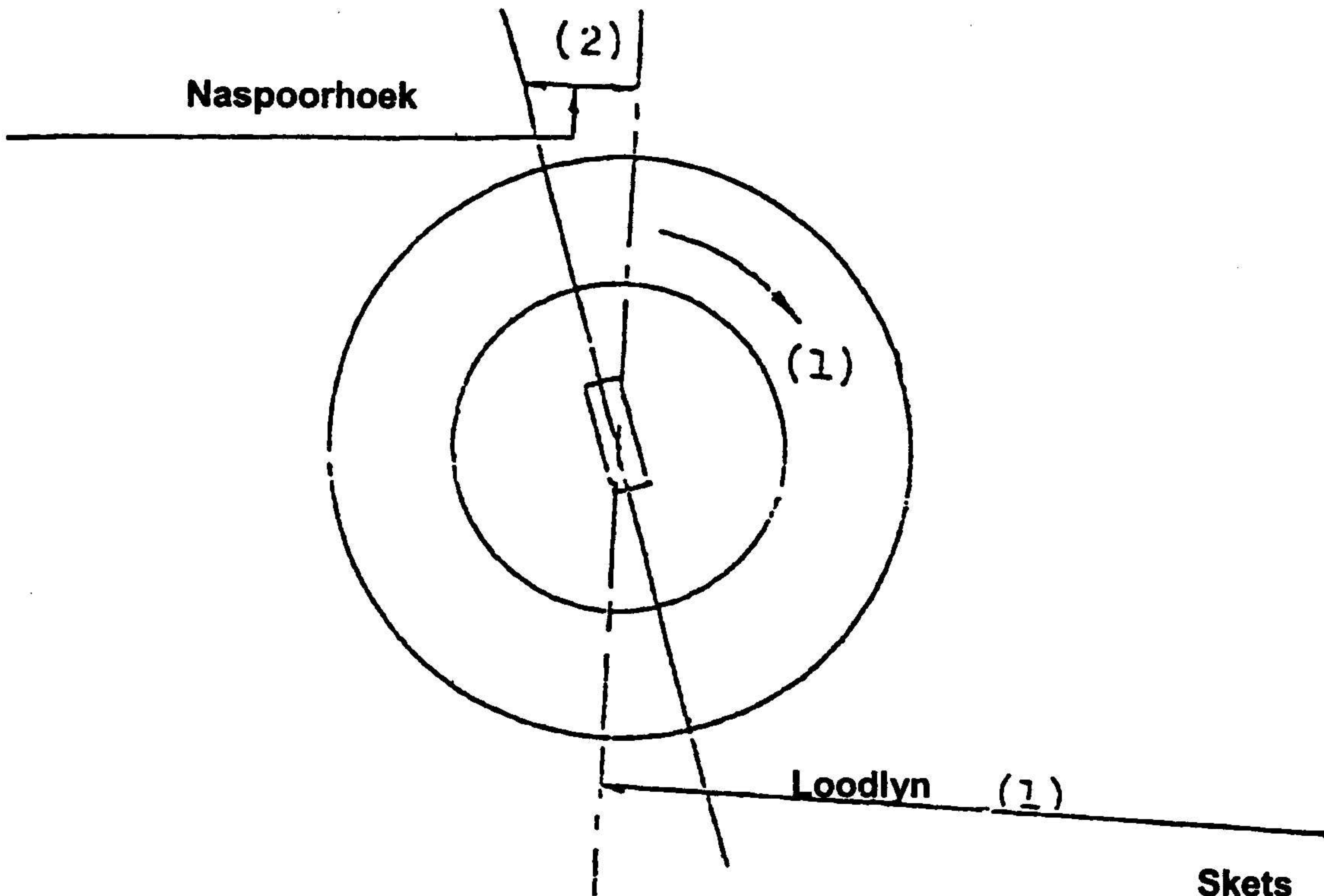
Enige SES van bogenoemde veiligheidsmaatreëls of aanvaarbare antwoord tel EEN punt elk. (6)

2.3 Die sweisstraalpunt het net een gat vir die verhittingsgasse. Die snystraalpunt het een gat in die middel vir suurstof, asook ses of meer gaatjies rondom vir die verhittingsgasse. (2)

2.4 Die straalpyp moet indien moontlik na die operateur toe beweeg word (2)

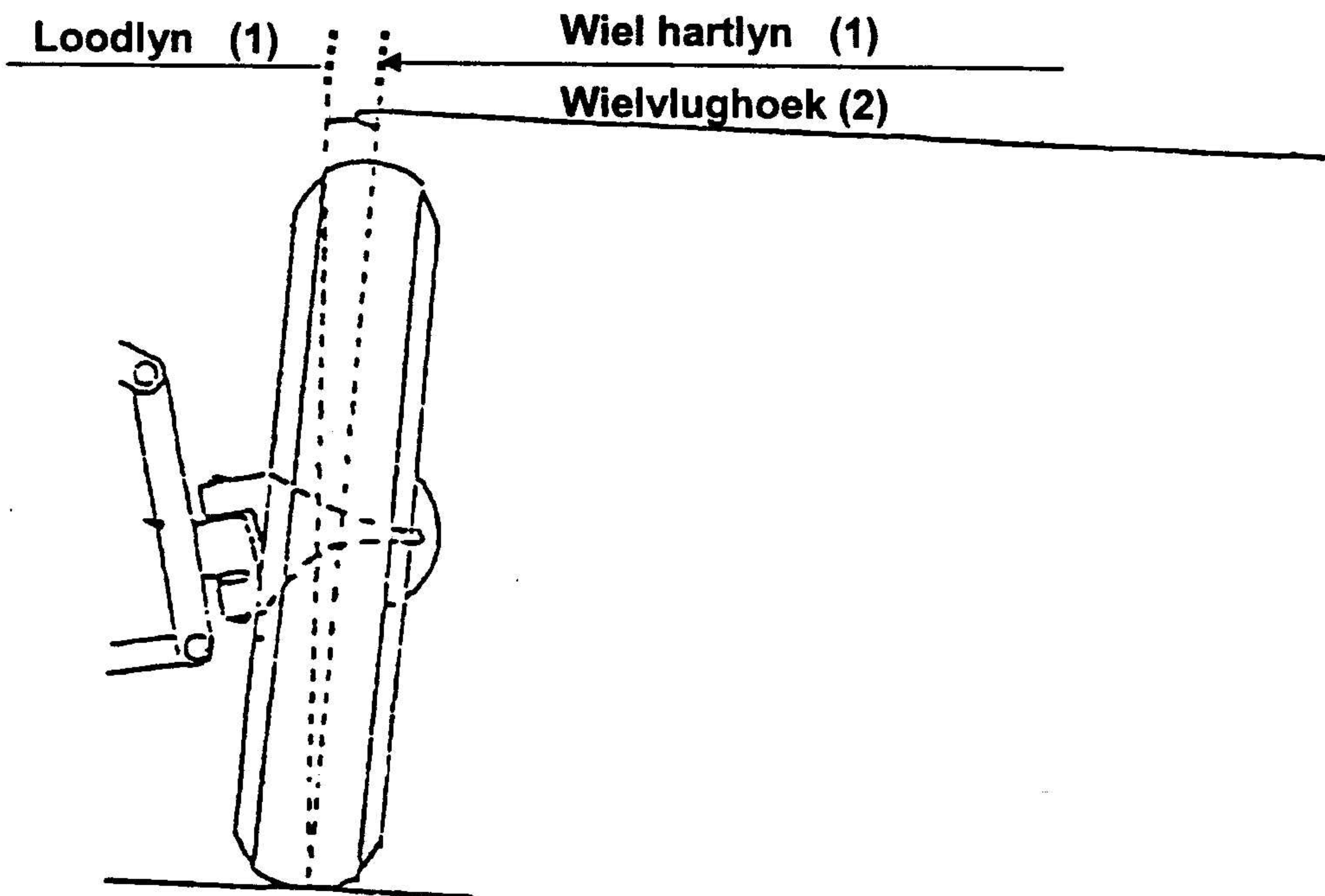
[35]

VRAAG 3



Askanteling

Skets	8
Hoeke	3
	(11)



Wielhelling

Skets	8
Hoeke	3
	(11)

3.2 NADELE

Enige DRIE van die onderstaande.

Na 'n ongeluk van voor is skade groter.

Herstelwerk is moeiliker omdat bak nie van onderstel verwyder kan word nie.

Metode van meet kan nie ten volle toegepas word nie.

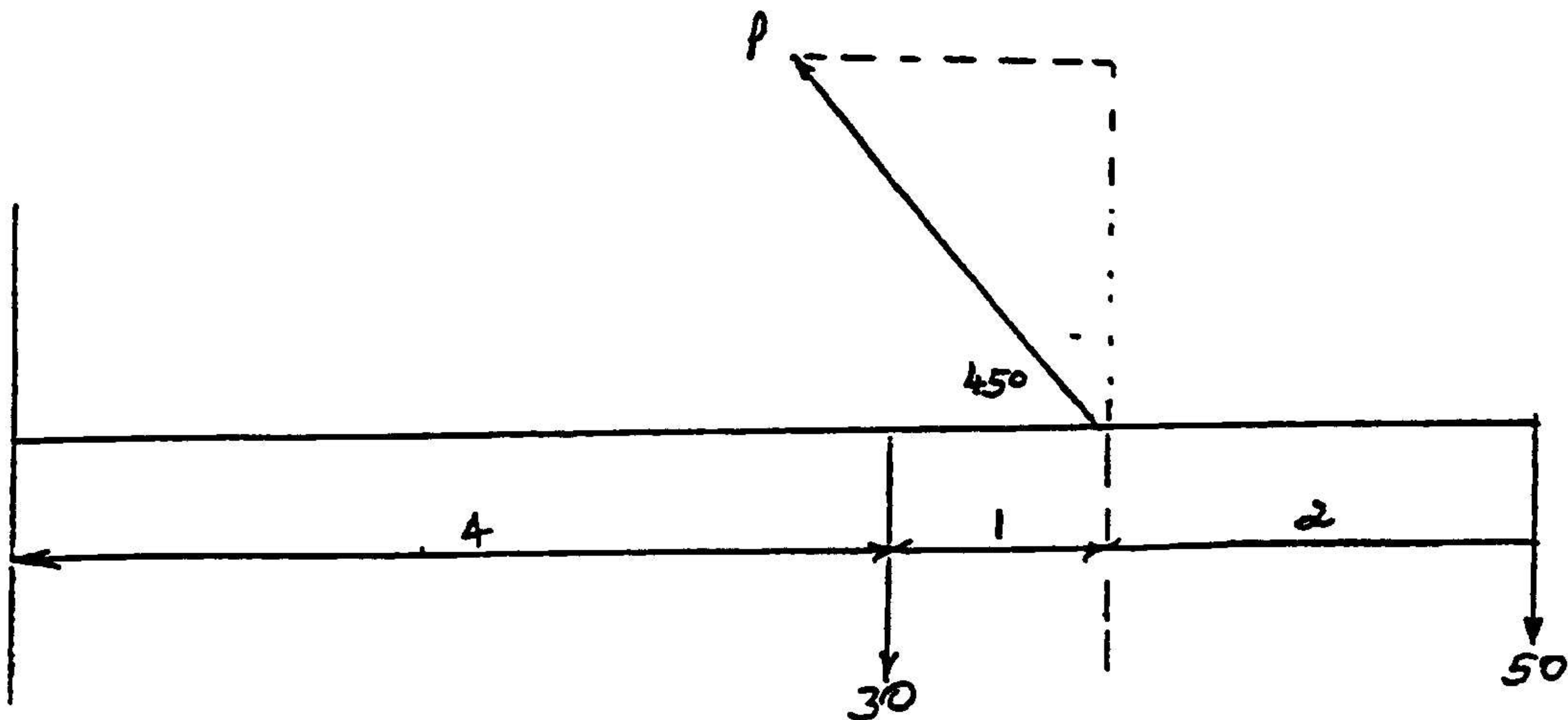
Herstelwerk is duurder en vereis spesiale buig- en trekgereedskap.

(3)
[25]

VRAAG 4

- 4.1 Lig die motor op en plaas op blokke en verwyder die wiel. (1)
 Klop die duike rofweg uit. (1)
 Krap die klankdempende materiaal af. (1)
 Stel die porto-krag op en druk die modderskerm totdat die flens reguit is. (1)
 Bring die punte bymekaar en knyp met 'n sweistang vas. (1)
 Sweis eers op 'n paar plekke met voegkolle. (1)
 Begin nou by die verste kant van die sweistang en sweis tussen die voegkolle. (1)
 Klop kort-kort gelyk met die hamer en teenhouer terwyl metaal warm is. (1)
 Krimp nou die verrekte gedeeltes indien nodig. (1)
 Klop die duike rondom die sweisplek uit. (1)
 Vyl die oppervlakte met 'n bakvyl. (1)
 Verwyder alle klein duikies. (1)
 Versterk die flens met 'n plaatjie. (1)
 Skuur met 'n skuurmasjien en verwyder porto-krag. (1)
 Klop die sweislas effens terug. (1)
 Maak die sweislas skoon en vertin die oppervlakte. (1)
 Vul op met baklood. (1)
 Veil met bakvyl en skuur af met skuurlint. (1)
 Plaas die wiel terug en laat die motor sak. (1)
 Enige vyftien = (15)
- 4.2 Faktore wat die wydte van 'n snykerf bepaal:
- Die grootte van die spuitstuk
 Die hitte van die vlam
 Die bewegingslyn
 Die afstand tussen spuitstuk en werkstuk
- Enige VIER van bogenoemde – 2 punte elk (8)
- 4.3 Hou die straalpyp teen 'n 90° hoek van die werkstuk. Sorg dat die snypunt die regte afstand van die werkstuk gehou word. (2)
 [10]
 [25]

QUESTION 5



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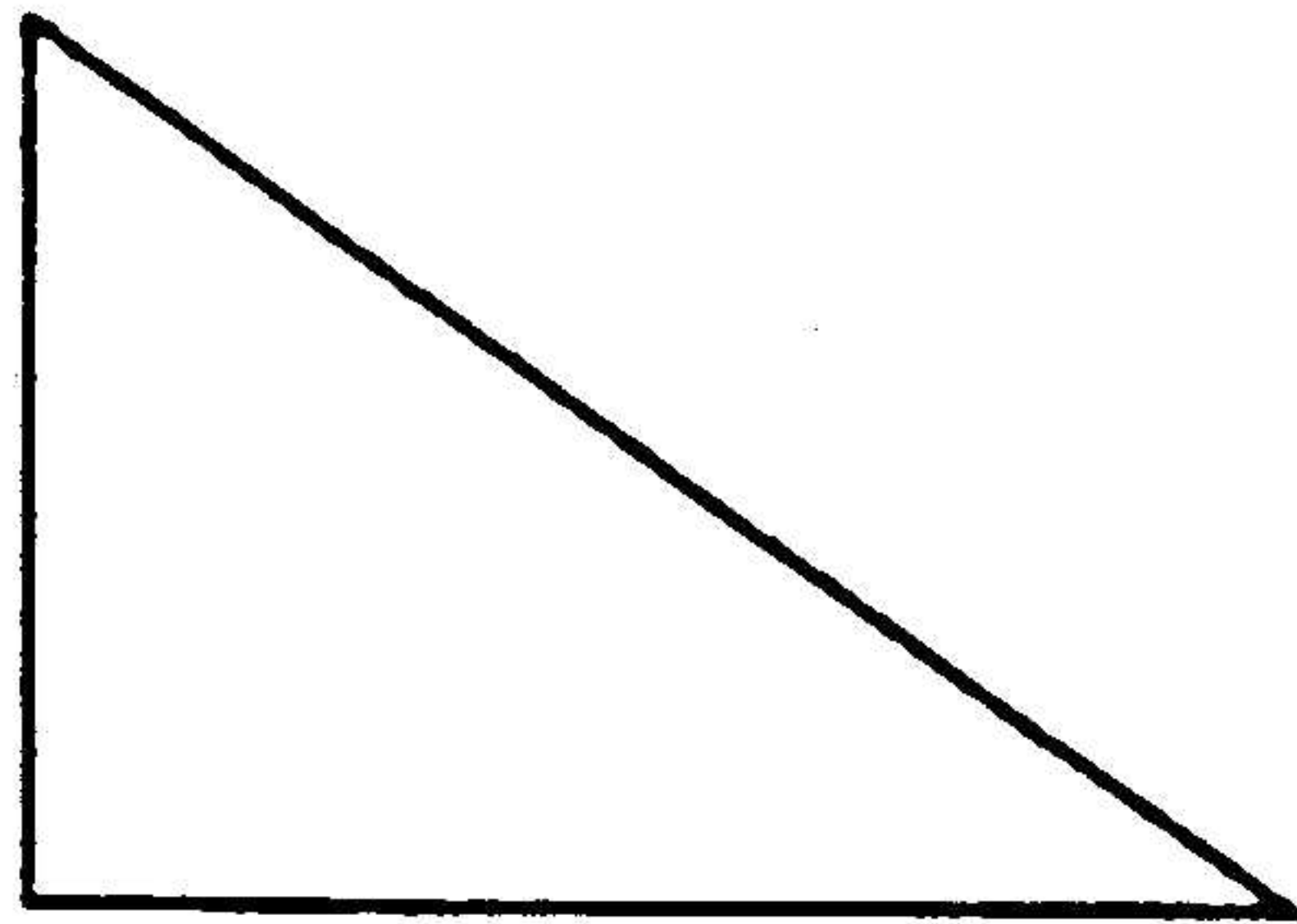
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5.1 Calculate force P



(2)

$$\sin 45^\circ = \frac{\text{opposite}}{\text{angle}}$$

$$\sin 45^\circ = \frac{X}{P}$$

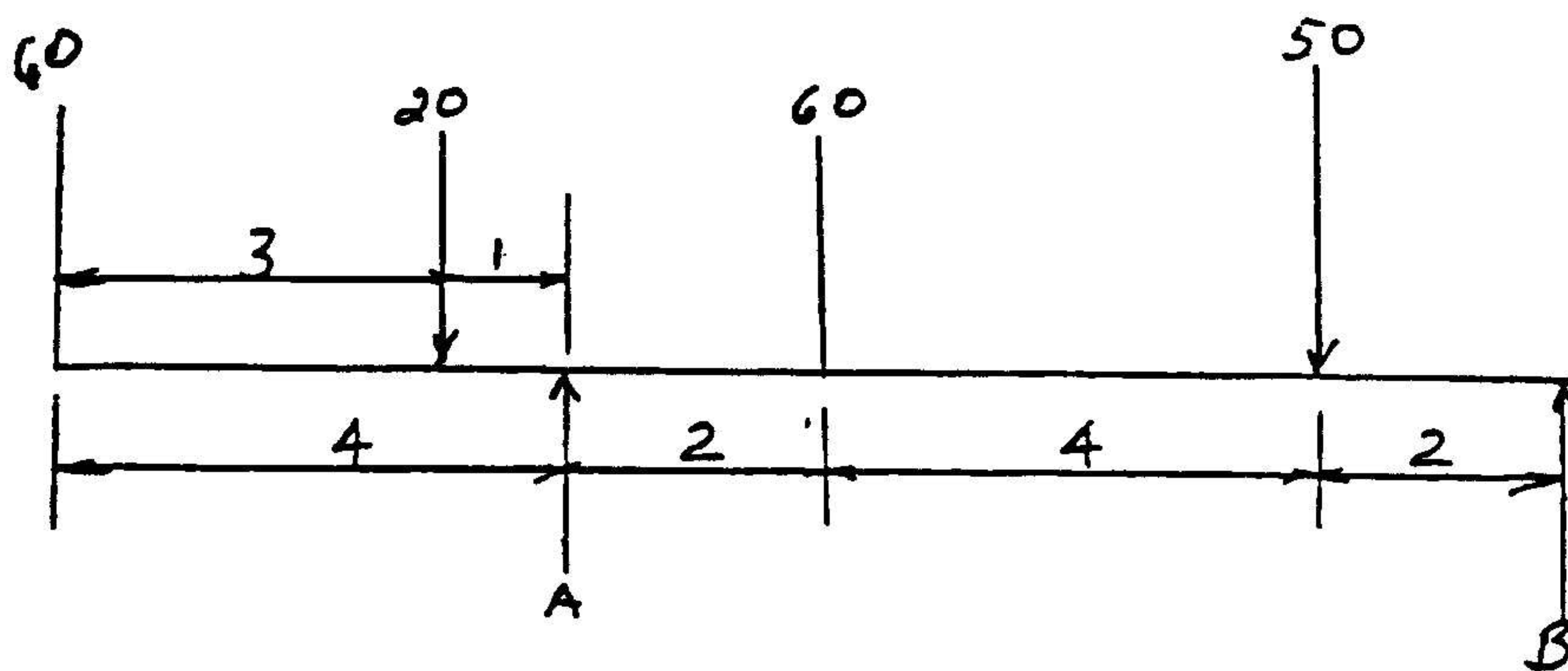
$$P = \frac{X}{\sin 45^\circ} (\sin 45^\circ = .7071) \quad (1)$$

$$P = \frac{94.}{.7071} (X = 94) \quad (1)$$

$$P = 132.9 \text{ N}$$

$$\text{Say } P = \underline{133 \text{ N}} \quad \begin{array}{l} (4) \\ (12) \end{array}$$

5.2

Take moments around A

$$\begin{aligned} \text{Left} &= \text{Right} \\ 8B + (60 \times 4) + (20 \times 1) &= (60 \times 2) + (50 \times 6) & (2) \\ 8B + 240 + 20 &= 120 + 300 & (2) \\ 8B + 260 &= 420 \\ 8B &= 420 - 260 & (2) \\ 8B &= 160 \end{aligned}$$

$$\begin{aligned} B &= \frac{160}{8} & (1) \\ \text{Reaction on B} &= \underline{20 \text{ N}} & (1) \end{aligned}$$

Take moments around B

$$\begin{aligned} \text{Left} &= \text{Right} & (2) \\ (50 \times 2) + (60 \times 6) + (20 \times 9) + (60 \times 12) &= 8A \\ 100 + 360 + 180 + 720 &= 8A \\ 1360 &= 8A \end{aligned}$$

$$\begin{aligned} A &= \frac{1360}{8} & (2) \\ A &= 170 \text{ N} & (1) \end{aligned}$$

$$\begin{aligned} \text{Test } 170 + 20 &= 60 + 20 + 60 + 50 \\ \underline{190 \text{ N}} &= \underline{190 \text{ N}} & (13) \\ & & [25] \end{aligned}$$

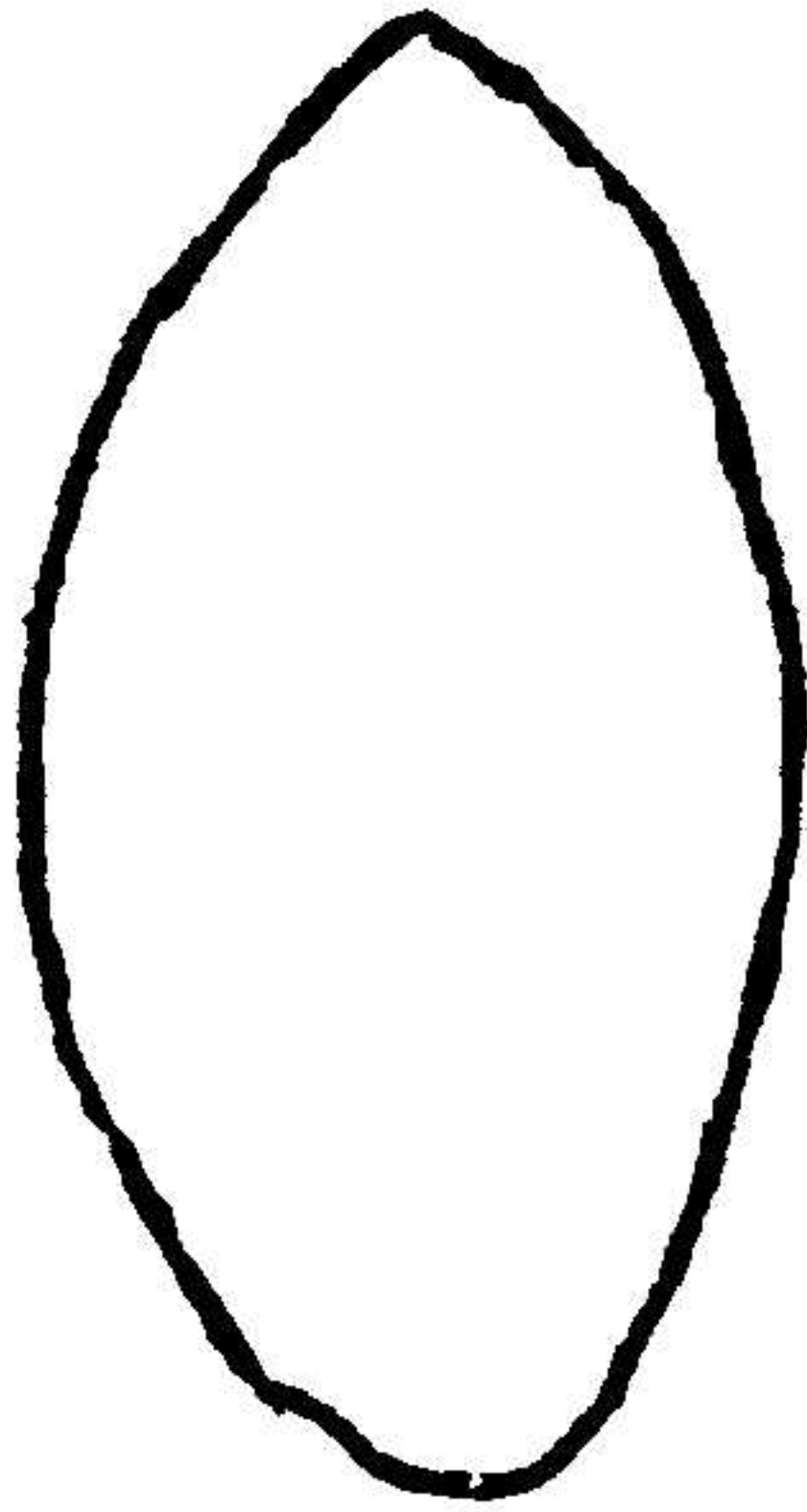
VRAAG 6Metode om deur te verf

Skuur die hele gedeelte met 220 w.s.p.	(1)
Let veral op growwigheid van fabrieksonderlaag en skuur glad.	(1)
Maak skoon en droog.	(1)
Plak toe wat nie gevef moet word nie.	(1)
Spuit 'n dun lagie onderlaag aan.	(1)
Spuit twee goeie lae onderlaag aan die voor- en agterkant van deur.	(1)
Laat vir 30 min. om droog te word.	(1)
Wend 'n paar dun lagies stopverf aan, indien daar enige diep skrape of klein duikies voorkom.	(1)
Skuur die stofverf met 220 w.s.p.	(1)
Maak skoon en spuit 'n laag grondverf oor die stopverf.	(2)
Meng die regte skakering verf terwyl die grondverf droog word.	(2)
Skuur grondlaag nou liggies met 600 w.s.p. af.	(2)
Meng een deel kleurverf met drie dele verdunner.	(1)
Spuit eers die agter en binnekant van deur met kleurlaag.	(2)
Wag tot die verf goed droog is voordat die deur aan die buitekant gevef word.	(2)
Spuit eers 'n laag kleurverf aan.	(2)
Spuit nou 4 lae met tussenposes van 15 min.	(2)
Laat vir ongeveer 4 ure om goed droog te word.	(2)
Verwyder die plakpapier.	(2)
Werk af met 'n goeie skuurpolitoer indien nodig.	(2)
	[25]

VRAAG 7

7.1	Goeie beligting. Daar moet suigwaaiers in die sproeikamer wees. Alle elektriese verbindings moet vlambestand wees. Skoon lug moet die kamer binnekom alleenlik deur filtreerders. Geen vuur of oop vlamme aanwesig. Saamgeperste lugpyp moet voorsien wees van drukmeter en klep. Bak van verf alleenlik deur middel van warm lug. Die sproekamer moet deeglik skoon wees. 'n Gasmasker moet gedra word. Werkruimte moet voldoende wees.	(10)
7.2	Wanneer motor klaar gespuitverf is laat droog vir 8 ure. Gebruik 1 500 WP en skuur tot dowwe oppervlakte. 'n Baie fyn skuurmiddel word aangewend. Redelik dik laag. Die skuurmasjien met 'n wol poleerder wod nou gebruik. Wend skuurmiddels aan soos benodig. Skuur liggies tot 'n diep glans verkry word. Wend nou 'n politoer aan en vryf af met sagte doek. Die rede waarom die metode gebruik word is om stofdeeltjies en waar lemoenskil-voorkoms mag voorkom uit te skakel. 'n Baie hoë glans word nou verkry. Verwyder nou politoer en skuurmiddel wat aanwesig is in voue.	(5)

7.3 In die algemeen word die spuitpatroon aanvaar as die perfekte patroon.



(5)

7.4 Nadat die basislaagverf goed droog geword het, moet die meng van die deursigtige verflaag gedoen word saam met verdunner en verharder volgens die liniaal aanduiding. Spuit nou die deursigtige laag aan tot 'n volledige glans verkry is. Nou word dieselfde metode gevolg vir afwerking soos by gewone spuitverf. Skuur met 1 500 WP tot dowwe oppervlakte, wend skuurmiddel aan en poleer met poleerder en woldraaiskyf tot 'n diep glans verkry word.

(5)
[25]

TOTAAL: 200