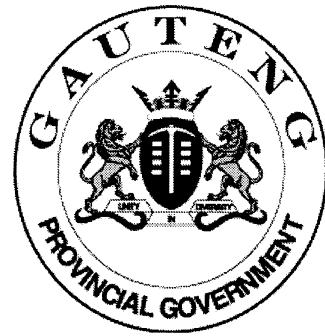


**SENIOR CERTIFICATE
EXAMINATION
*SENIORSERTIFIKAAT-EKSAMEN***



**OCTOBER / NOVEMBER
*OKTOBER / NOVEMBER***

2005

**TECHNICAL DRAWING
*TEGNIESE TEKENE***

**First Paper : Descriptive Geometry and
Locus
*Eerste Vraestel : Beskrywende
Meetkunde en Lokus***

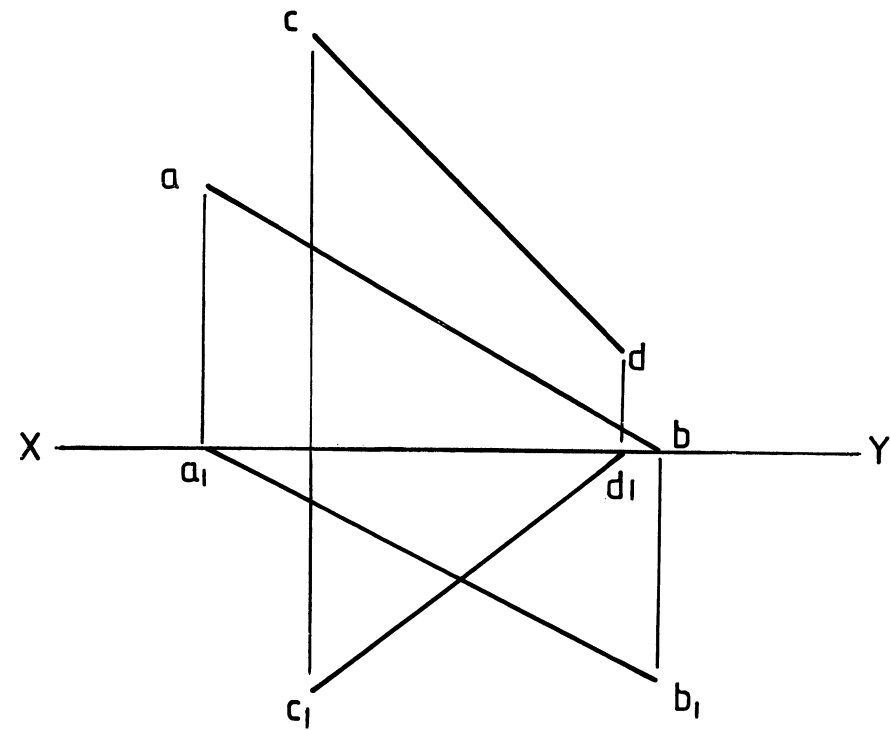
HG

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**Cover + 9 pages
*Voorblad + 9 bladsye***

TECHNICAL DRAWING/TEGNIESE TEKENE HG
Paper 1/Vraestel 1





QUESTION 1

**MARKS
PUNTE**

The front view and top view of line segments AB and CD are shown.

Determine :

- 1.1 The true length of line segment CD 4
- 1.2 The true angle of inclination of line segment CD to the VP 1
- 1.3 The diameter of the smallest possible circle to touch both line segments 9
- 1.4 How far from point A will the circle touch line segment AB? 2
- 1.5 The vertical trace (VT) and horizontal trace (HT) of line segment AB 4
- 1.6 Indicate all answers clearly on your drawing.

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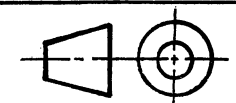
VRAAG 1

Die vooraansig en boaansig van lynstukke AB en CD word getoon.

Bepaal :

- 1.1 Die ware lengte van lynstuk CD 4
- 1.2 Die ware helling van lynstuk CD ten opsigte van die VV 1
- 1.3 Die diameter van die kleinste moontlike sirkel wat albei lynstukke sal raak 9
- 1.4 Hoe vër vanaf punt A sal die sirkel aan lynstuk AB raak? 2
- 1.5 Die vertikale snyspoor (VS) en horisontale snyspoor (HS) van lynstuk AB 4
- 1.6 Dui alle antwoorde duidelik aan op u tekening.

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QUESTION 2

A mine tunnel is represented by a line segment QR and is heading in the direction of a vein of coal which is represented by plane figure ABC.

Determine :

- 2.1 The true angle of inclination of the vein to the VP 7
- 2.2 The true shape of the vein 4
- 2.3 How much further must the mine tunnel be extended in order to reach the vein. The completed tunnel must be a straight line 10
- 2.4 The geographical bearing of the tunnel 3
- 2.5 Show the completed tunnel in all the views. 4

NOTE : Use a scale 1mm = 1m for your answers. 2

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VRAAG 2

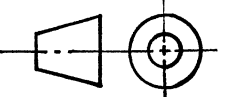
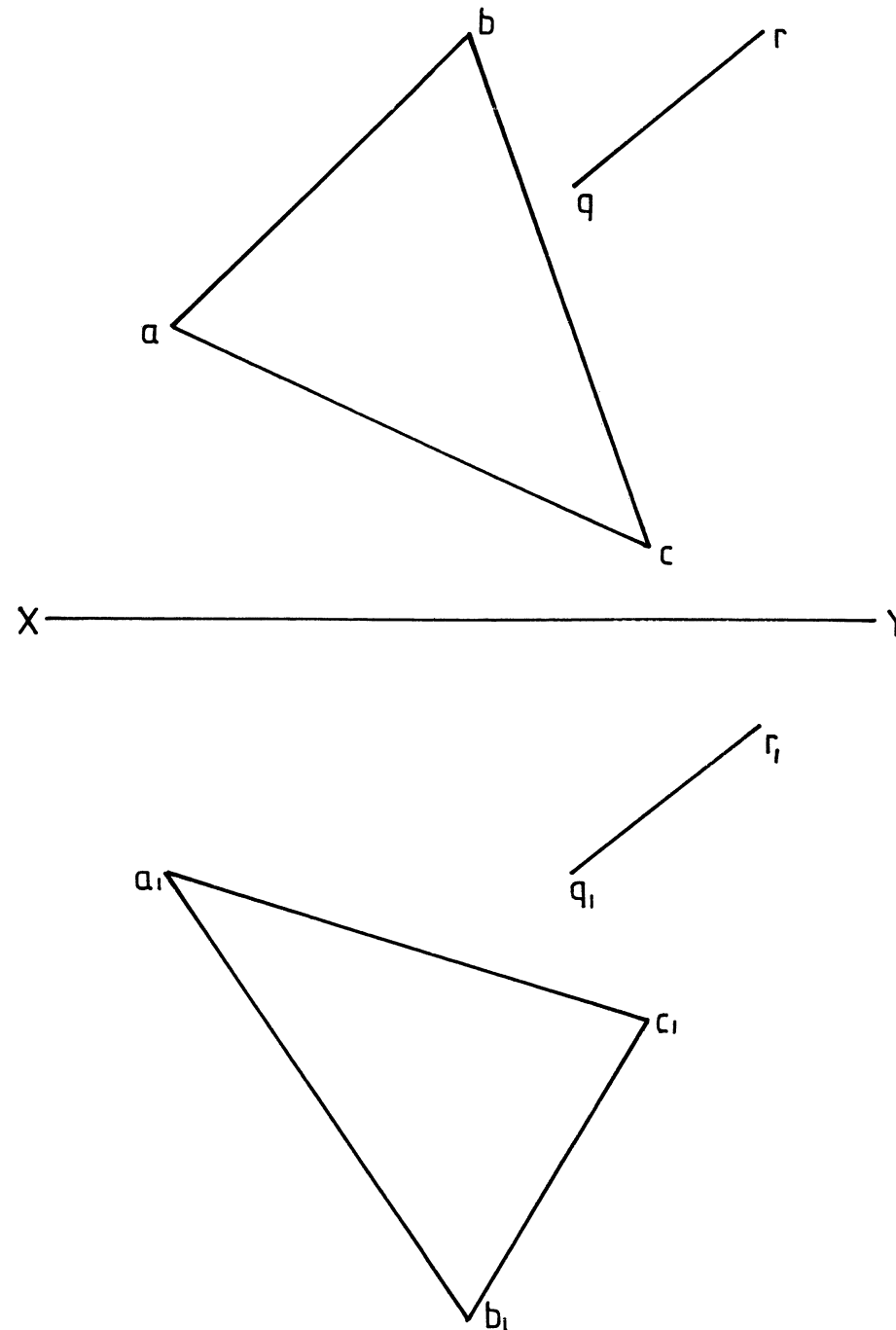
'n Myntonnel word voorgestel deur 'n lynstuk QR en strek in die rigting van 'n steenkoolgroef voorgestel deur vlakfiguur ABC.

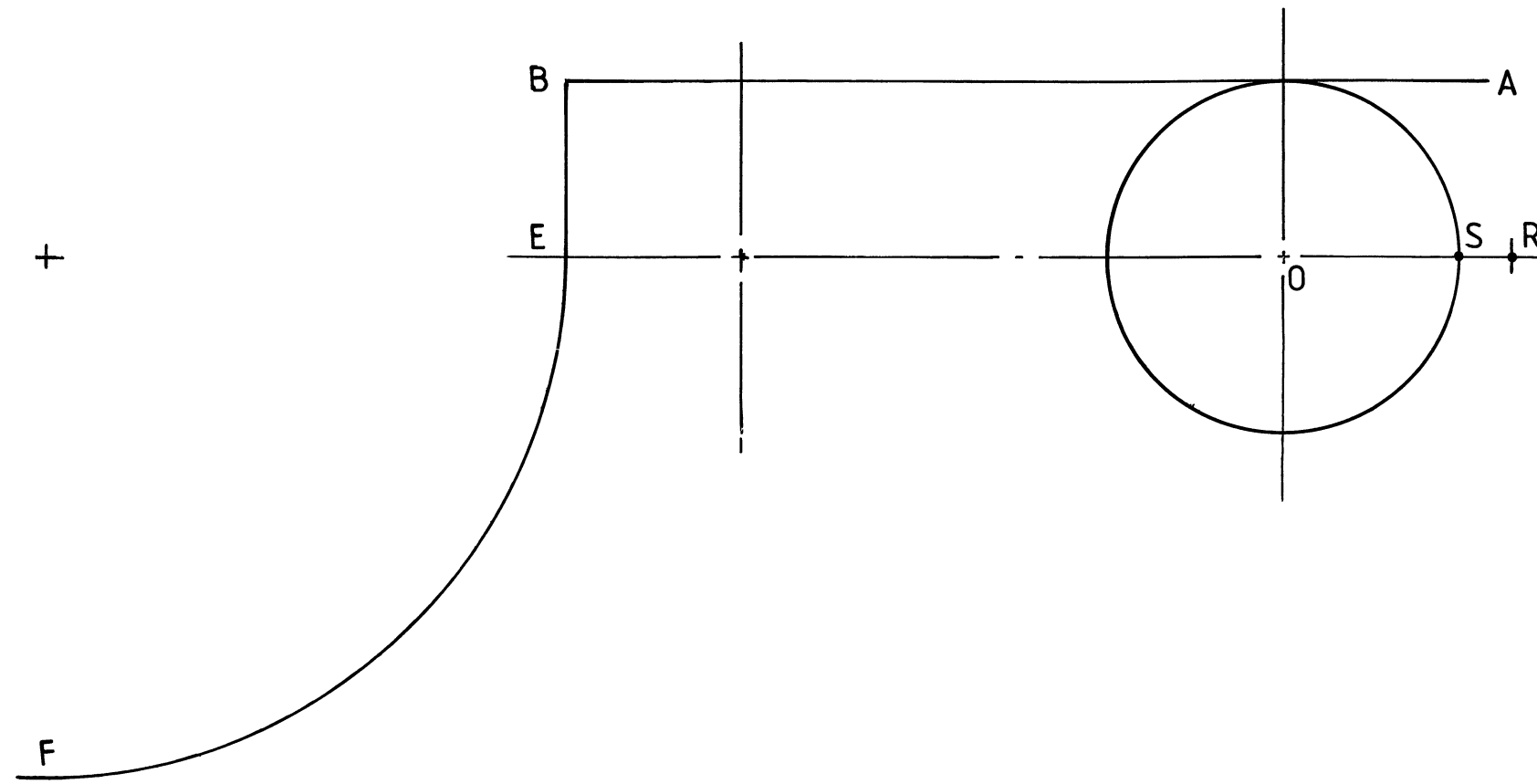
Bepaal :

- 2.1 Die ware helling tussen die groef en die VV 7
- 2.2 Die ware vorm van die groef 4
- 2.3 Hoeveel verder moet die tunnel verleng word om die groef te bereik. Die voltooide tunnel moet 'n reguit lyn vorm. 10
- 2.4 Die geografiese ligging van die tunnel 3
- 2.5 Toon die voltooide tunnel aan in al die aansigte. 4

NOTA : Gebruik 'n skaal van 1 mm = 1 m vir jou antwoorde. 2

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QUESTION 3

The figure shows a disc with centre O, carrying points R and S. The disc rolls without slipping on the contour AB and EF.

Determine:

- 3.1 The locus of point R that will generate a **Superior Trochoid** for one half of a revolution
- 3.2 The locus of point S for two thirds of a revolution of the same circle used in 3.1 as it moves on the contour EF
- 3.3 Name the curve generated in 3.2.
- 3.4 Show all constructions and calculations.

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VRAAG 3

Die figuur toon 'n ronde skyf met middelpunt O, wat punte R en S bevat. Die skyf rol sonder om te gly oor kontoer AB en EF.

Bepaal :

- 3.1 Die lokus van punt R wat 'n **Hoër Trogoide** vir 'n halwe omwenteling sal vorm
- 3.2 Die lokus van punt S vir twee derdes van 'n omwenteling op dieselfde skyf gebruik as in 3.1 indien dit rol oor basis kurwe EF
- 3.3 Benoem die lokus gevorm in 3.2.
- 3.4 Toon alle konstruksies en berekeninge.

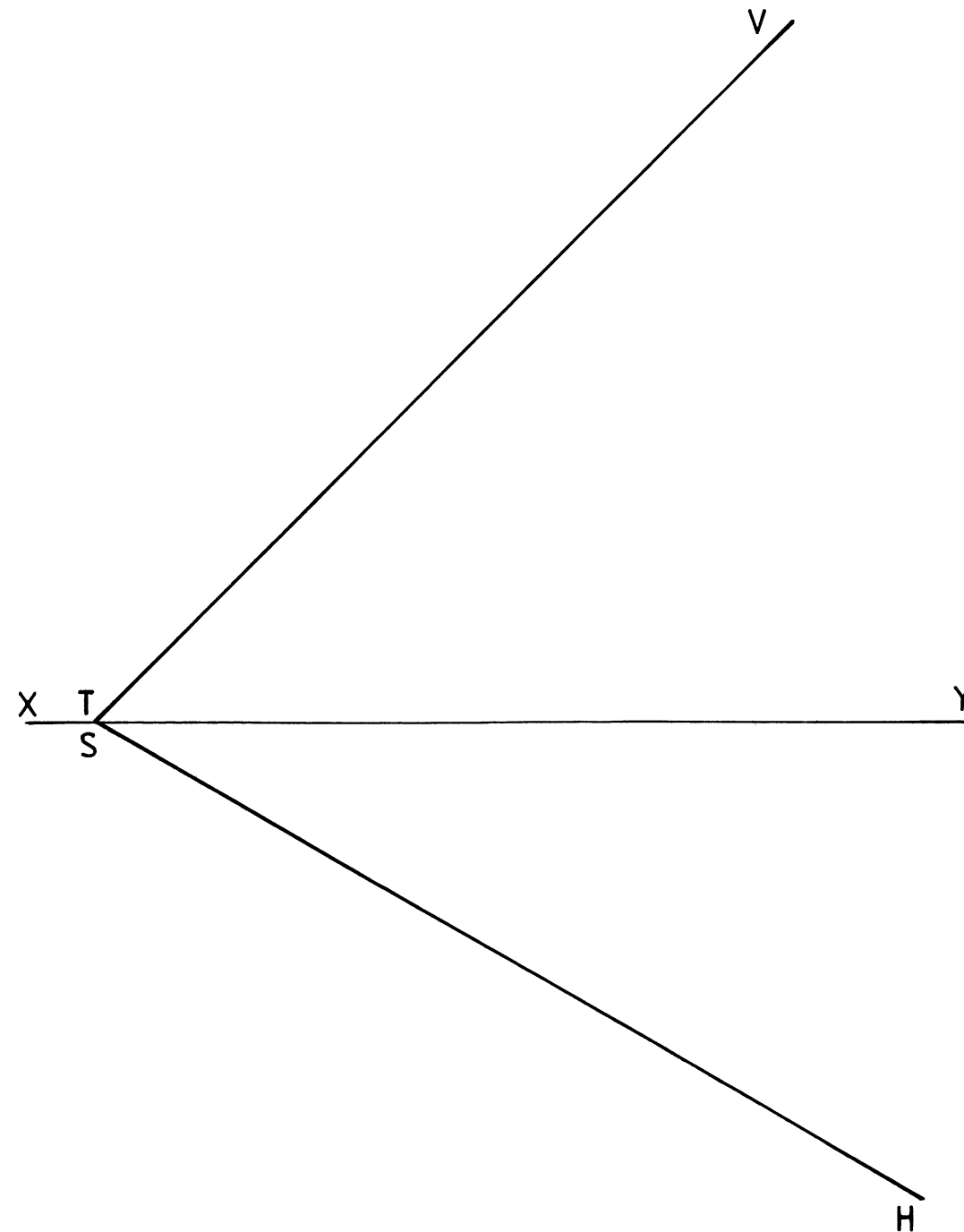
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QUESTION 4

The figure shows the traces VTH of an oblique plane.

Determine :

- 4.1 The true angle of inclination between the oblique plane and the VP
- 4.2 The front view and top view of plane figure ABC lying in the oblique plane, if the true size for AB = 50 mm, BC = 70 mm and CA = 80 mm. Side BC is parallel to and 20 mm in front of the VP and point A is 8 mm above the HP. Point B is the nearest to the X_2Y_2 in the true shape view.

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VRAAG 4

Die figuur toon die snyspore VSH van 'n skuinsvlak.

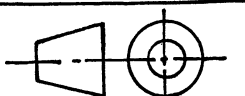
Bepaal :

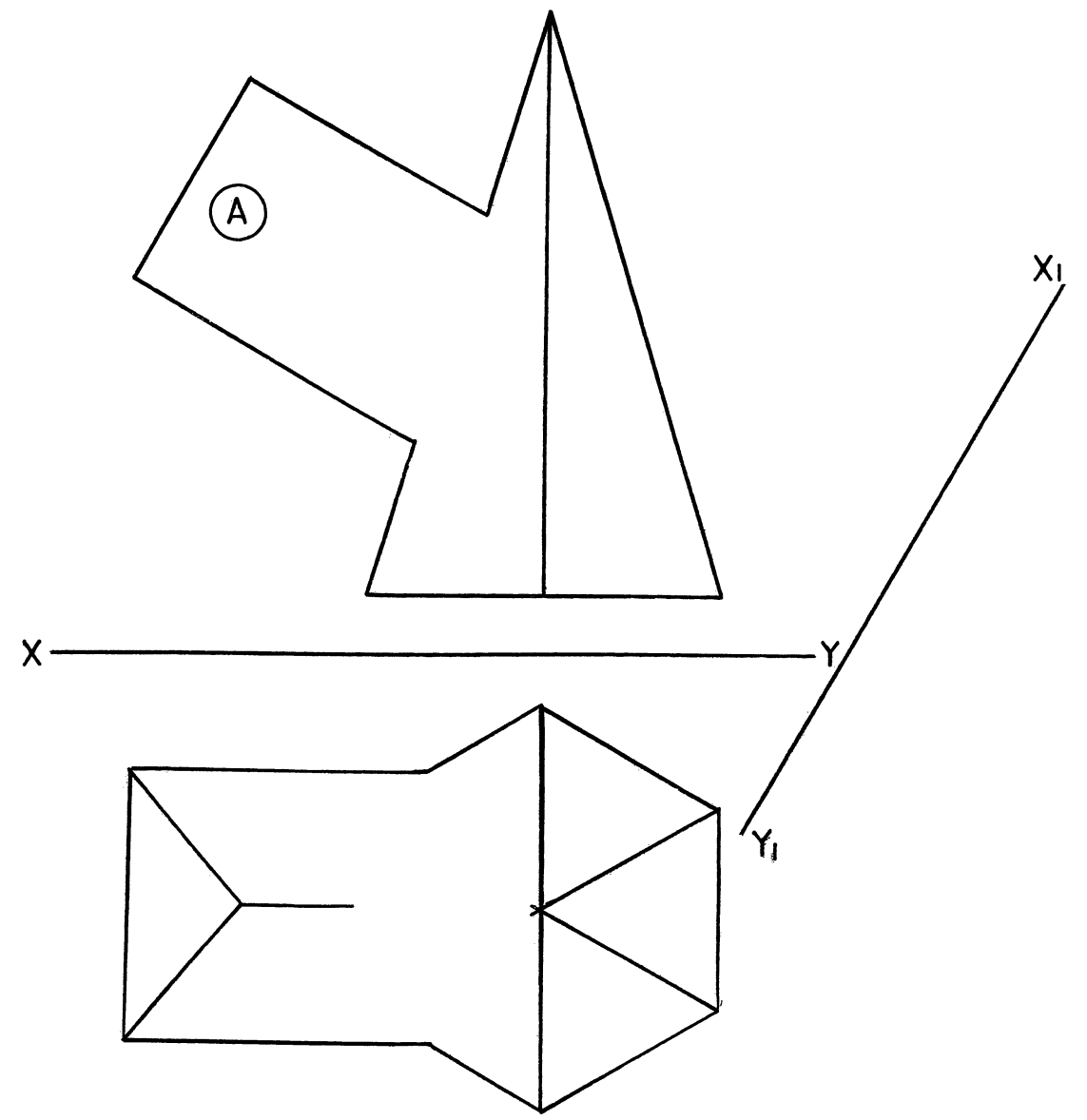
- 4.1 Die ware helling tussen die skuinsvlak en die VV
- 4.2 Die vooraansig en boaansig van vlakfiguur ABC wat in die skuinsvlak lê indien die ware grootte van AB = 50 mm, BC = 70 mm en CA = 80 mm is. Sy BC lê parallel en 20 mm voor die VV en punt A is 8 mm bo die HV. Punt B lê die naaste aan die X_2Y_2 in die ware vormaansig.

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QUESTION 5

The figure shows the incomplete front view and incomplete top view of a right hexagonal pyramid penetrated by a right triangular prism.

Determine :

- 5.1 The curve of interpenetration in the front view and top view. Show all hidden detail. 20
- 5.2 The development of the triangular branch pipe A. 10

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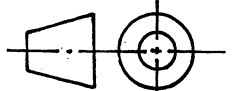
VRAAG 5

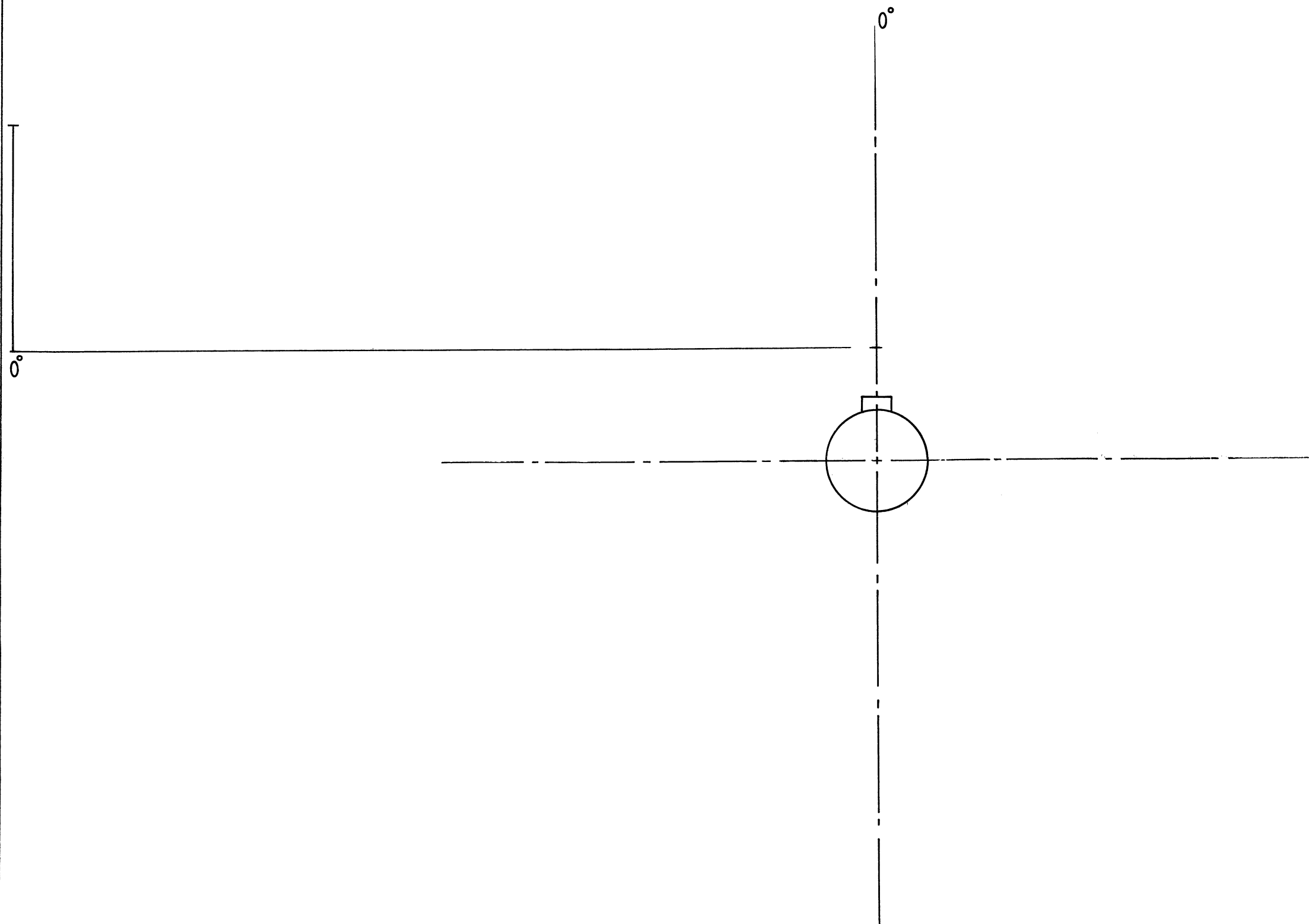
Die figuur toon die onvoltooide vooraansig en onvoltooide booaansig van 'n regte seshoekige piramide wat ingedring word deur 'n regte driehoekige prisma.

Bepaal :

- 5.1 Die indringingskromme in die voor- en booaansig. Alle verborge detail moet getoon word. 20
- 5.2 Die ontwikkeling van die driehoekige takpyp A. 10

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QUESTION 6

The figure shows a shaft on to which a disc fits as well as the displacement to scale 1:1. A groove must be machined into the disc to accommodate a 12mm diameter roller. The roller follower moves in the same plane as the camshaft which rotates anti-clockwise.

Design the groove to be machined according to the following specifications:

- Rise from 0° to 90° of rotation from 50% of the displacement to maximum displacement
- At rest for 30° of the cam rotation
- Drop of 40% of displacement for the next 60° of rotation
- Further drop of 50% of displacement for 90° of rotation
- Further drop of 10% of displacement for 30° of rotation to the minimum displacement
- Rise of 50% of displacement from 300° - 360° of rotation to the original position
- Use a scale 96 mm = 360° for rotation

6.1 Complete the displacement graph and construct the completed front view of the grooved cam plate.

6.2 Indicate the following clearly on your drawing :

- 6.2.1 Rotation 1
- 6.2.2 Hatching on camshaft 1
- 6.2.3 What method was used to secure the camshaft to the cam plate? 2
- 6.2.4 What must the diameter of the initial cam disc be if a shoulder of 10mm is allowed to the outside of the groove? 2

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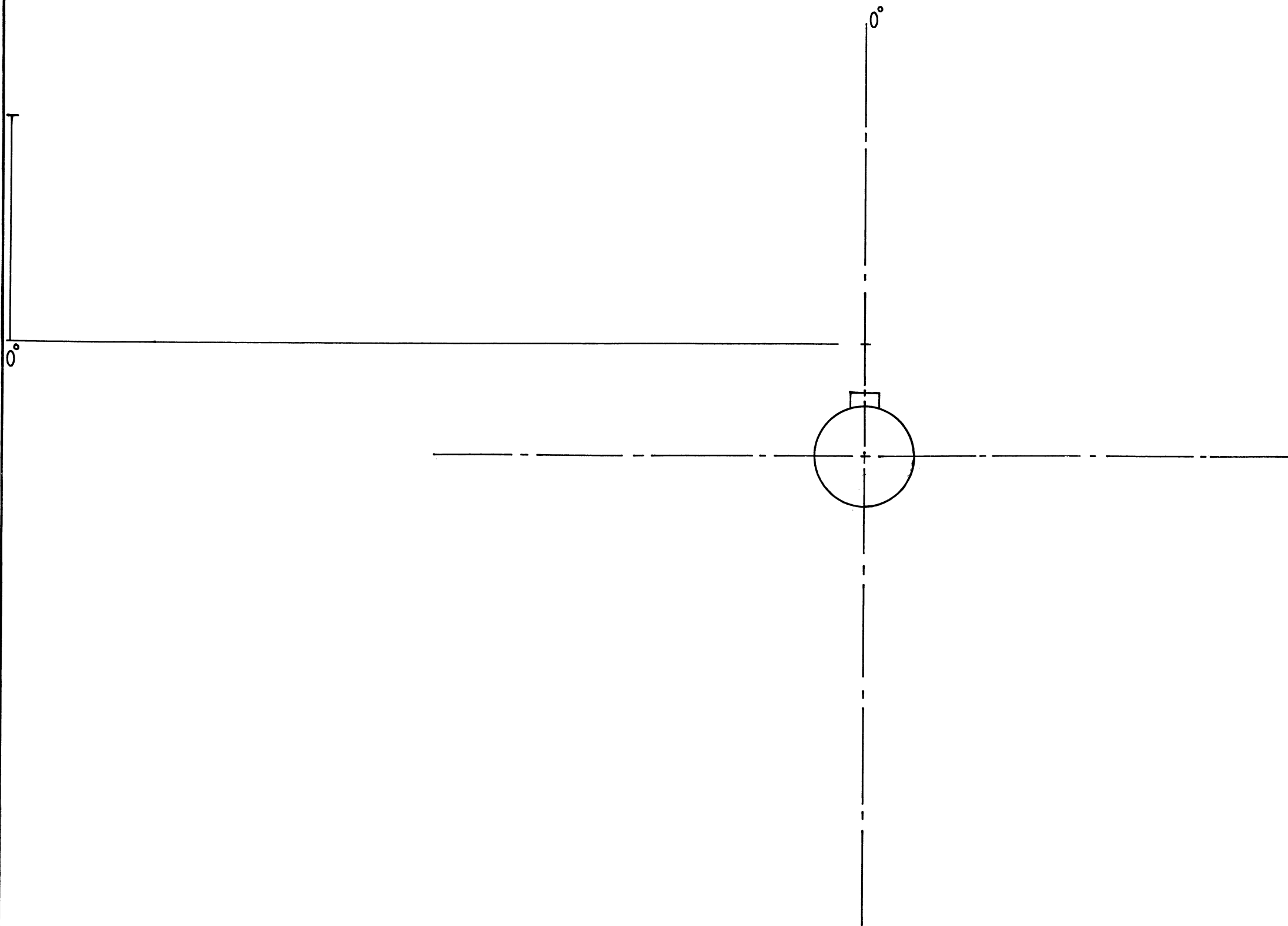
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VRAAG 6

Die figuur toon 'n as waarin 'n ronde skyf pas asook die verplasing volgens 'n skaal van 1:1. 'n Groef moet in die skyf gemasjineer word om 'n 12mm roller te akkommodeer. Die rollervolger beweeg in dieselfde vlak as die nokas wat anti-kloksgewys roteer.

Ontwerp die groef wat gemasjineer moet word om aan die volgende spesifikasies te voldoen :

- Styging van 0° tot 90° van rotasie vanaf 50% van die verplasing, na maksimum verplasing
- Rus vir die volgende 30° van nokrotasie
- Daling van 40% van die verplasing vir die volgende 60° van nokrotasie
- Verdere daling van 50% van die verplasing vir die volgende 90° van nokrotasie
- Verdere daling van 10% van die verplasing vir die volgende 30° van nokrotasie na minimum verplasing
- Styging van 50% van verplasing vanaf 300° tot 360° van nokrotasie tot by die aanvanklike posisie
- Gebruik 'n skaal van 96mm = 360° vir rotasie

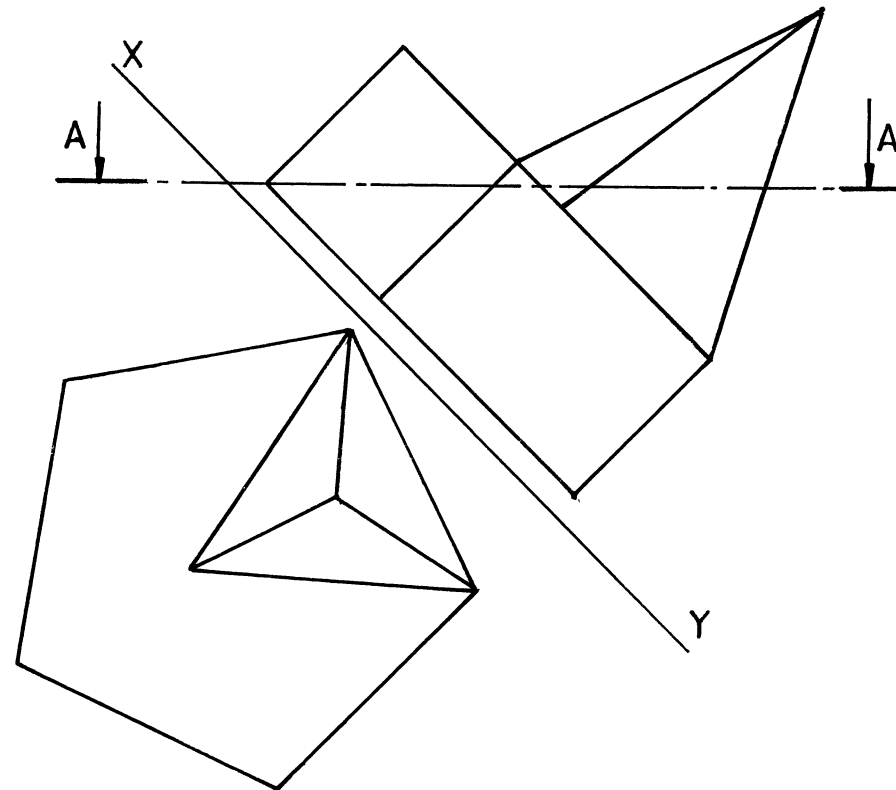
6.1 Voltooi die nokverplasingsdiagram en konstrueer die volledige vooraansig van die gegroefde nokplaat.

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6.2 Toon die volgende duidelik aan op jou tekening :

- 6.2.1. Rotasie 1
- 6.2.2. Arsering van die nokas 1
- 6.2.3. Watter metode is gebruik om die nokas aan die plaat te heg? 2
- 6.2.4. Wat moet die diameter van die aanvanklike nokskyf wees indien 'n skouer van 10mm aan die buitekant van die groef toegelaat moet word? 2

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QUESTION 7

The front view and auxiliary view of a casting is shown. The casting consists of a right triangular pyramid with its base resting on top of a right regular pentagonal prism.

Draw :

- 7.1 A sectional top view on cutting plane A-A. (No hidden detail must be shown.)
- 7.2 A right view. Show all hidden detail.

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VRAAG 7

Die vooraansig en hulpaansig van 'n gietstuk word getoon. Die gietstuk bestaan uit 'n regte driehoekige piramide wat met sy basis bo-op 'n regte reëlmatige vyfhoekige prisma rus.

Teken :

- 7.1 'n Deursnee bo-aansig op snyvlak A-A. (Geen verborge detail moet getoon word nie.)
- 7.2 'n Regteraansig. Toon alle verborge detail.

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