



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

ENGINEERING GRAPHICS AND DESIGN P2

MAY/JUNE 2026

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label

DO NOT FOLD THE QUESTION PAPER IN HALF.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL the questions must be answered on the QUESTION PAPER, as instructed.
7. ALL the pages, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
8. Time management is essential in order to complete all the questions.
9. Print your examination number in the block provided on every page.
10. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY											
QUESTION	MARKS OBTAINED			$\frac{1}{2}$	SIGN	MODERATED			$\frac{1}{2}$	SIGN	RE-MARKING
1											
2											
3											
4											
TOTAL											
	2	0	0			2	0	0			2 0 0

FINAL CONVERTED MARK

100

CHECKED BY

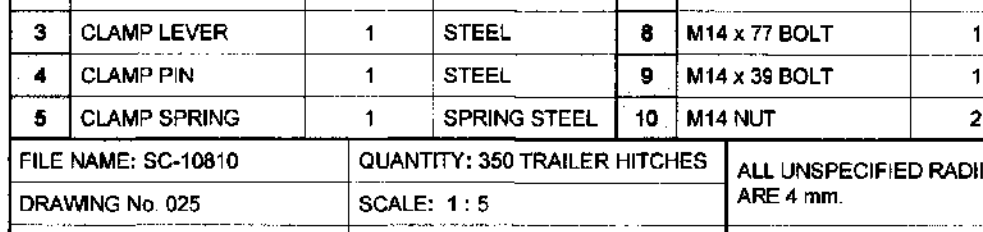
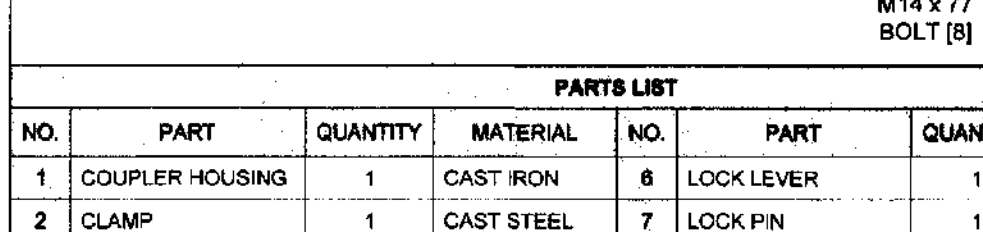
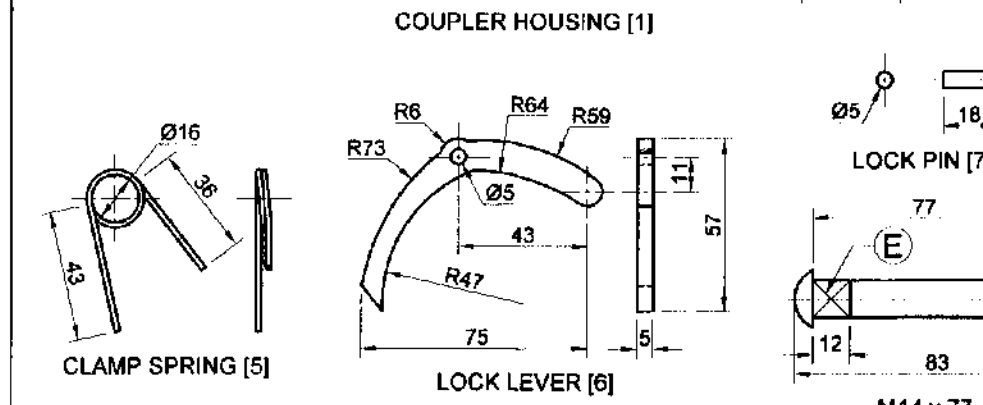
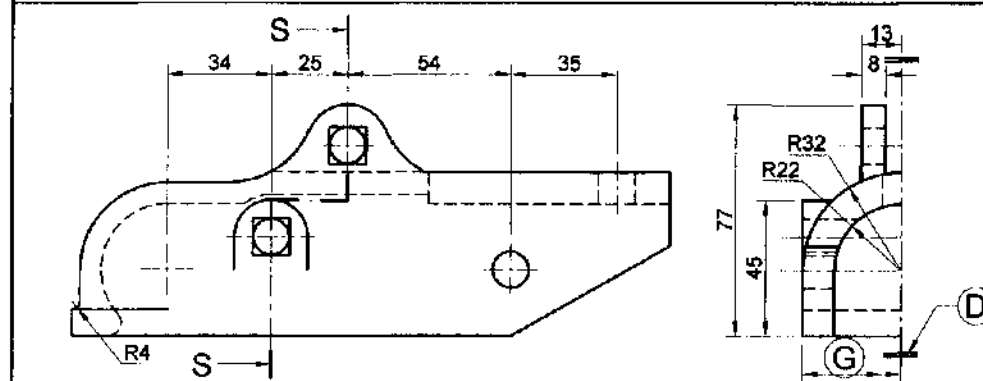
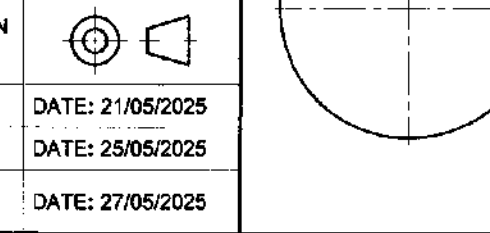
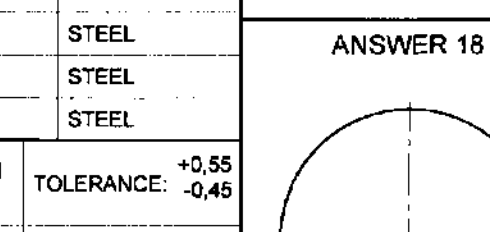
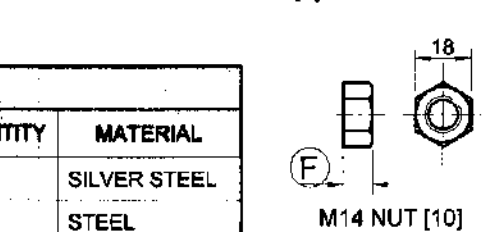
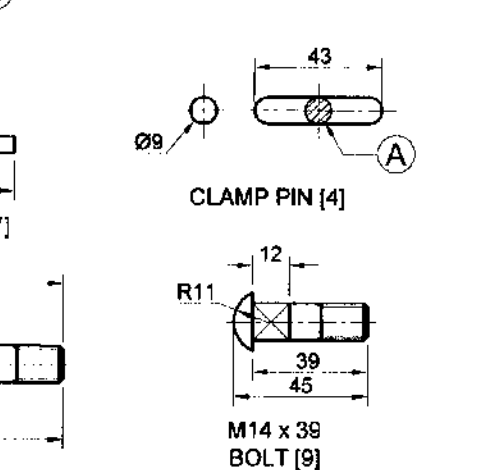
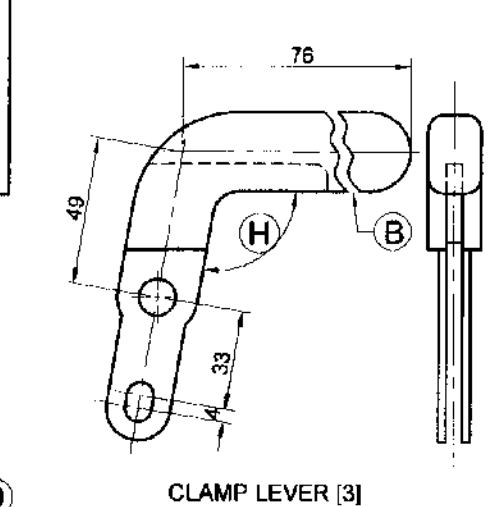
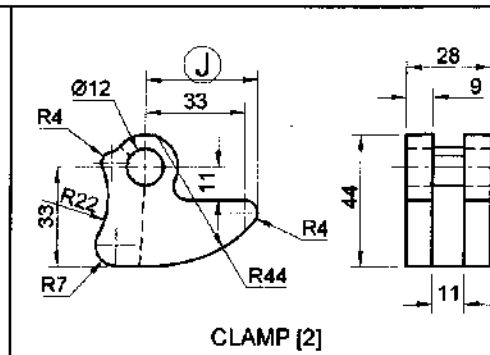
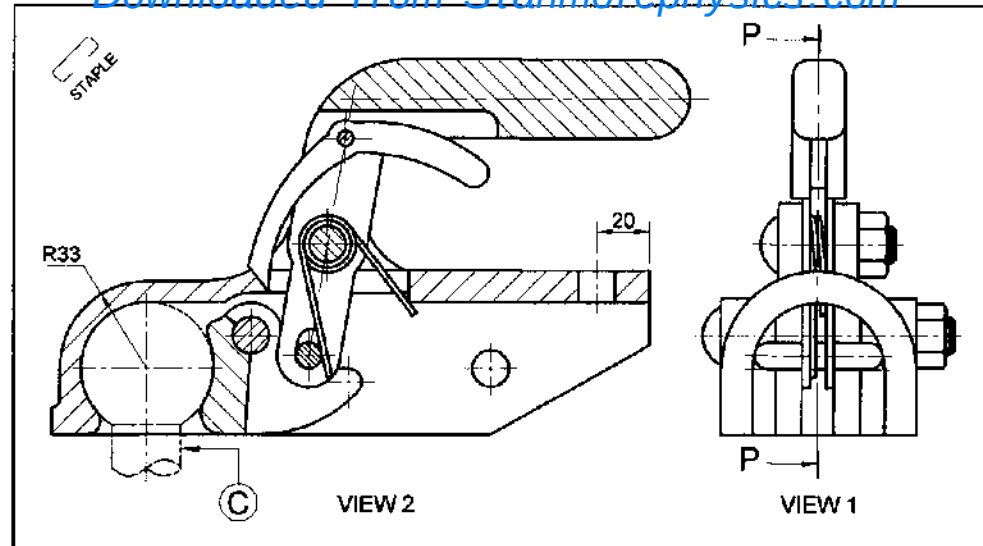
COMPLETE THE FOLLOWING:

CENTRE NUMBER

CENTRE NUMBER

EXAMINATION NUMBER

EXAMINATION NUMBER



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

Two views of a trailer hitch assembly, views of the individual parts of the trailer hitch, a parts list, a title block and a table of questions. The drawings are not presented to the indicated scale.

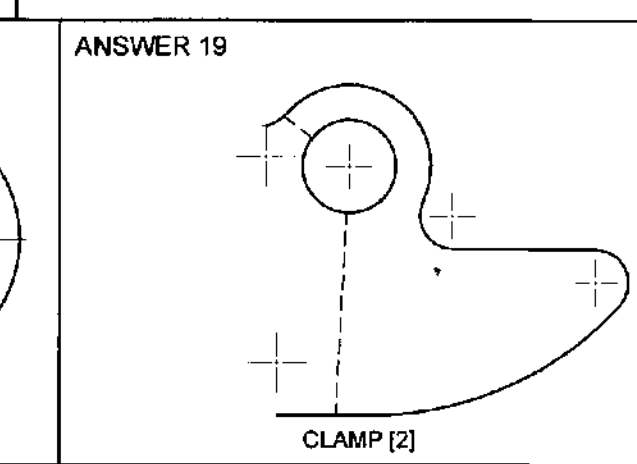
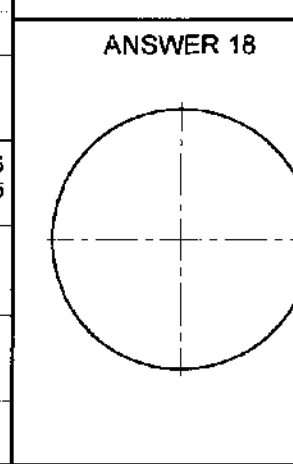
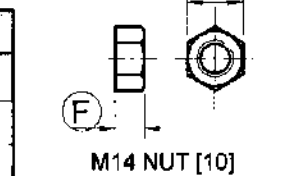
Instructions:

Complete the table below by neatly answering the questions, which refer to the accompanying drawings, title block and mechanical content. Abbreviations may not be used, unless otherwise stated. [30]

QUESTIONS		ANSWERS	
1	What did John do?	1	
2	What was done on 25/05/2025?	1	
3	What is the client's name?	1	
4	What material is required for the clamp lever?	1	
5	What scale is indicated for the drawing?	1	
6	How many parts are required for ONE complete trailer hitch?	1	
7	How many M14 nuts are required for the full order?	1	
8	If VIEW 1 is the right view, what is the full name for VIEW 2?	1	
9	Name the type of section shown at A.	1	
10	Name the section that would be produced by cutting plane S-S.	1	
11	What conventional representation is indicated by the break lines at B?	1	
12	What does the double-dash chain line at C indicate?	1	
13	What is indicated by the parallel lines at D?	1	
14	What is indicated by the cross at E?	1	
15	Determine the complete dimensions at: F: G:	2	
16	Measure the angle at H.	1	
17	With reference to the tolerance, determine the maximum size for the dimension at J. Show the calculations.	1	
18	In the space below (ANSWER 18), draw, in neat freehand on the given disc, the SANS 10111 conventional representation for 6 holes on a circular pitch.	3	
19	In the space below (ANSWER 19), complete, with instruments and to scale 1 : 1, the view of the clamp. Show ALL construction.	4	
20	With reference to the table and the welding symbol below (ANSWER 20), match the encircled number on the symbol with the correct label in the table.	5	
		TOTAL	30

PARTS LIST							
NO.	PART	QUANTITY	MATERIAL	NO.	PART	QUANTITY	MATERIAL
1	COUPLER HOUSING	1	CAST IRON	6	LOCK LEVER	1	SILVER STEEL
2	CLAMP	1	CAST STEEL	7	LOCK PIN	1	STEEL
3	CLAMP LEVER	1	STEEL	8	M14 x 77 BOLT	1	STEEL
4	CLAMP PIN	1	STEEL	9	M14 x 39 BOLT	1	STEEL
5	CLAMP SPRING	1	SPRING STEEL	10	M14 NUT	2	STEEL

FILE NAME: SC-10810	QUANTITY: 350 TRAILER HITCHES	ALL UNSPECIFIED RADII ARE 4 mm.	TOLERANCE: +0,55 -0,45
DRAWING No. 025	SCALE: 1 : 5	ALL DIMENSIONS ARE IN MILLIMETRES.	
CLIENT: LBJ TRAILER DESIGN, SOMERSET EAST	DRAWING PROGRAMME: AUTOCAD 2026		
LYNX DRAUGHTING CC 75 BHACA LANE, GRADOCK 5680	www.roolkatdraw.co.za 023 685 1857	DRAWN: JRC	DATE: 21/05/2025
		CHECKED: MAURIZIO	DATE: 25/05/2025
		APPROVED: JOHN	DATE: 27/05/2025



ANSWER 20	
DESCRIPTION	
WELD ALL AROUND	
PITCH OF WELD	
FILLET WELD	
LENGTH OF WELD	
WELDING PROCESS	

STAPLE

QUESTION 3: ISOMETRIC DRAWING

Given:

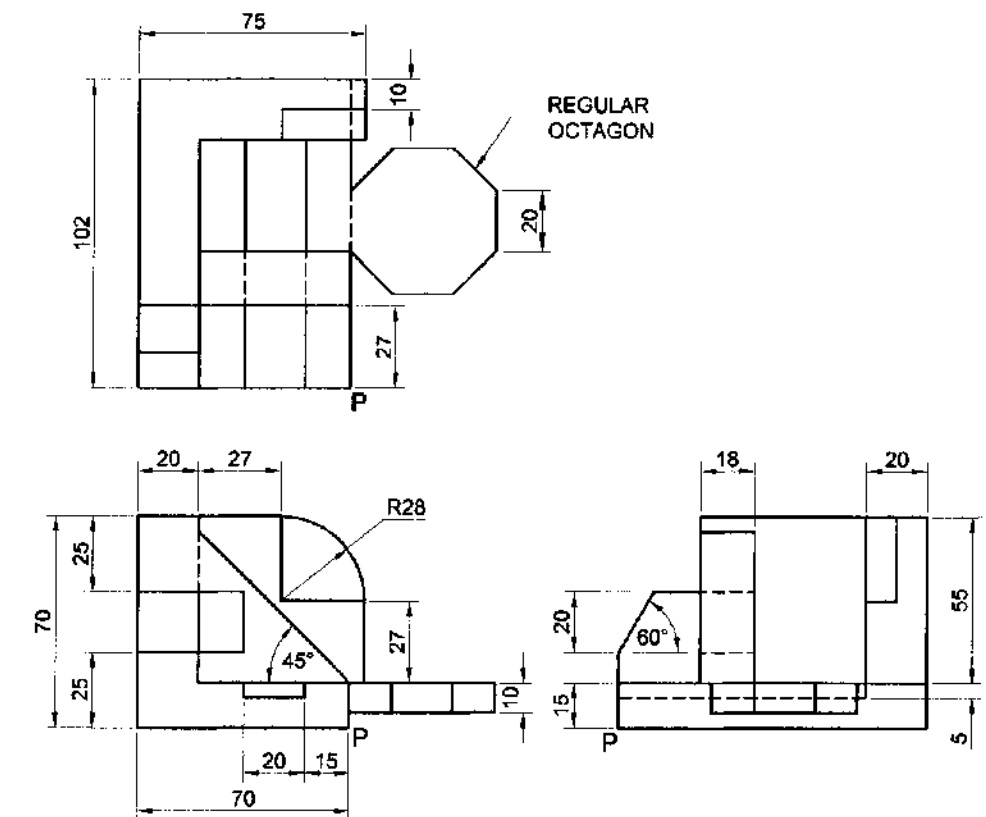
- The front view, top view and right view of a casting
- The position of point P on the drawing sheet

Instructions:

Using scale 1 : 1, convert the orthographic views of the casting into an isometric drawing.

- Use P as the starting point and lowest point of the drawing.
- Show ALL construction.
- NO hidden detail is required.

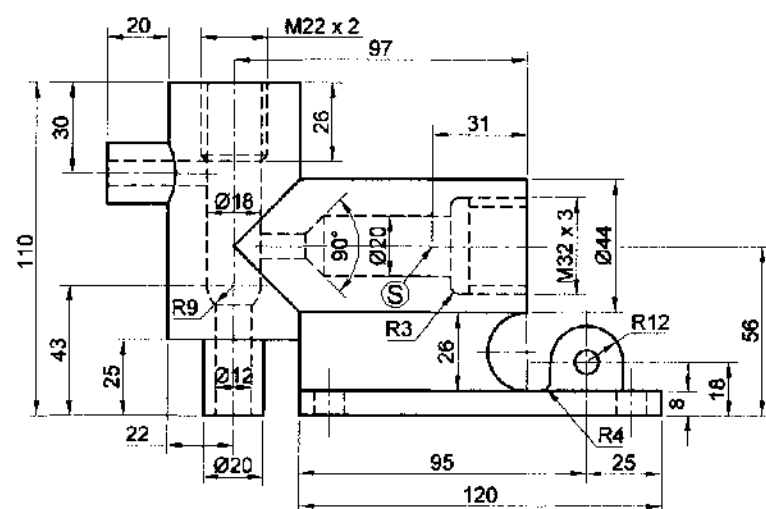
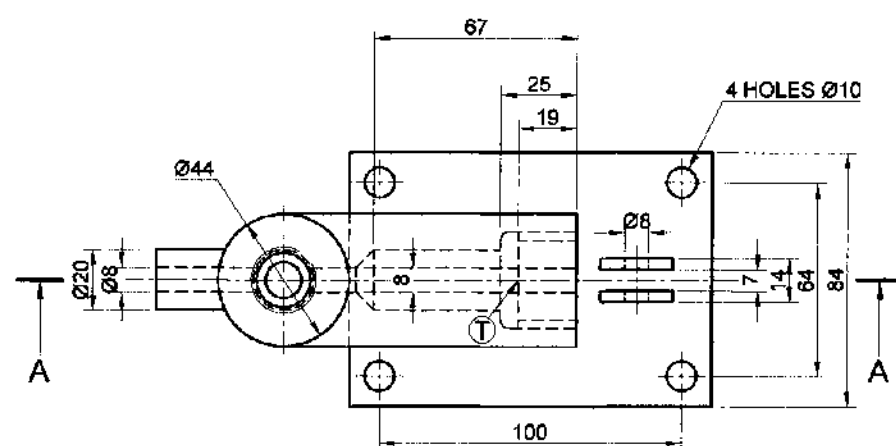
[41]



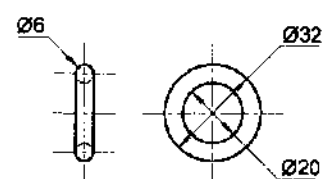
P

ASSESSMENT CRITERIA				
1	PLACING + AUX. VIEW	2 ½		
2	BASE	12 ½		
3	UPPER PORTION	17 ½		
4	ARCS + CONSTRUCTION	2 ½		
5	OCTAGON	6		
PENALTIES (-)				
TOTAL		41		
EXAMINATION NUMBER				
EXAMINATION NUMBER				

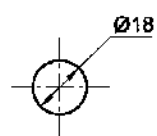
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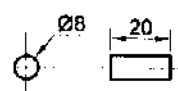
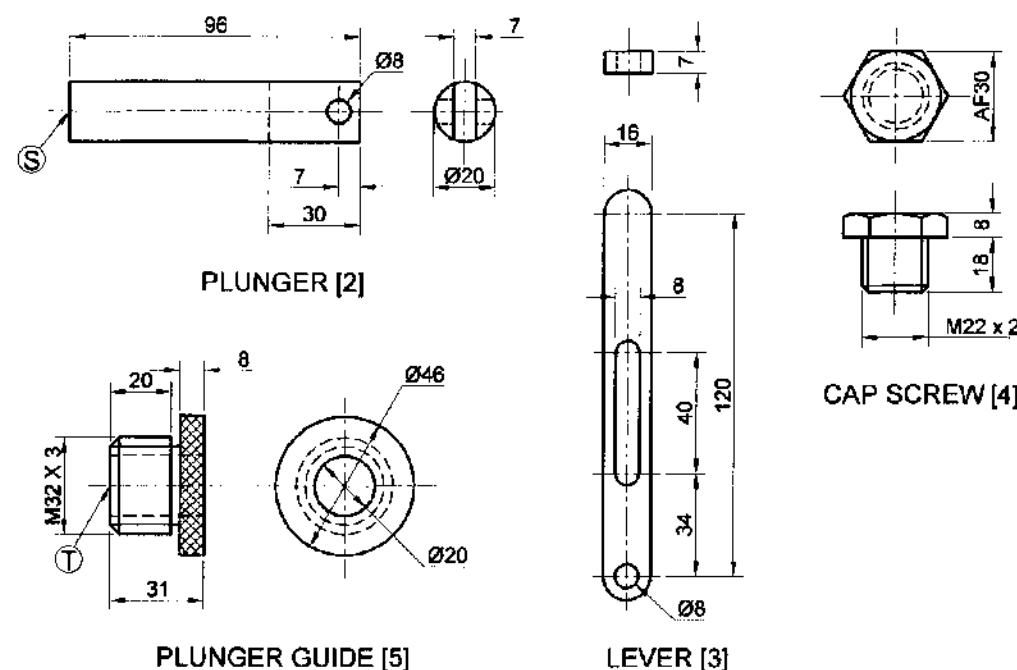
PUMP HOUSING [1]



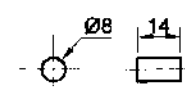
O-RING [8]



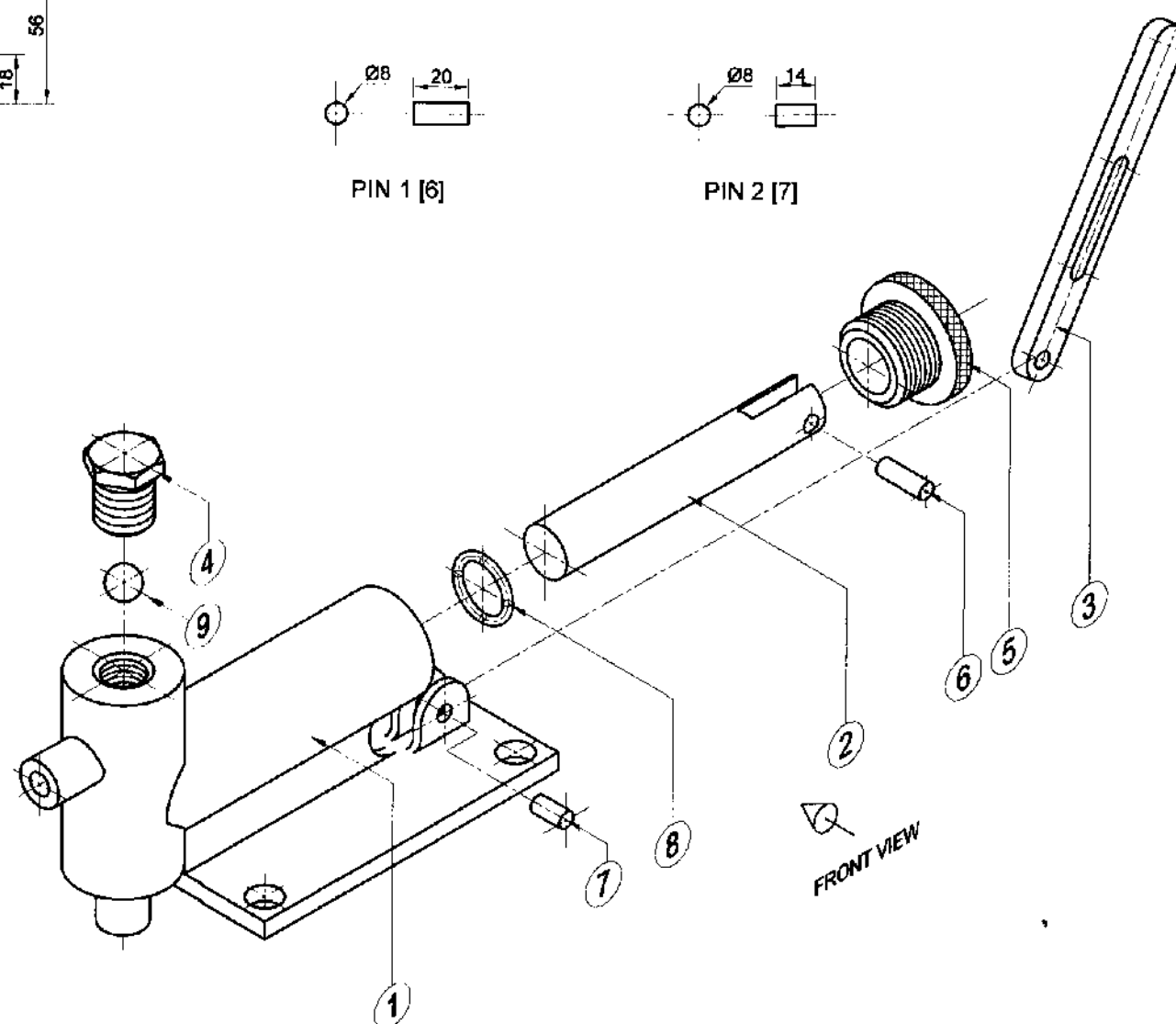
VALVE BALL [9]



PIN 1 [6]



PIN 2 [7]



EXPLODED ISOMETRIC DRAWING

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- Orthographic views of each part of a manual pump assembly
- The exploded isometric drawing of the parts of the manual pump assembly, showing the position of each part relative to all the others

Instructions:

- Answer this question on page 6.
- Draw, to scale 1 : 1 and in third-angle orthographic projection, the following views of the assembled parts of the manual pump assembly:

4.1 A sectional front view on cutting plane A-A, as seen from the direction of the arrow on the exploded isometric drawing. The cutting plane is shown on the top view of the pump housing (part 1).

4.2 The top view

NOTE:

- NOTE:**
- Planning is essential.
 - The drawing must comply with the *SANS 10111* guidelines.
 - The convention of symmetry may **NOT** be applied.
 - Show **THREE** faces of the hexagonal head of the cap screw (part 4).
 - Align point **S** on the plunger (part 2) with point **S** in the pump housing (part 1).
 - Align point **T** on the plunger guide (part 5) with point **T** in the pump housing (part 1).
 - Show the convention for diamond knurling on the top view of the plunger guide (part 5).
 - Add cutting plane A-A.
 - **NO** hidden detail is required.
- [90]**

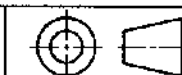
PARTS LIST			
PART		QUANTITY	MATERIAL
1	PUMP HOUSING	1	CAST IRON
2	PLUNGER	1	BRASS
3	LEVER	1	MILD STEEL
4	CAP SCREW	1	BRASS
5	PLUNGER GUIDE	1	BRASS
6	PIN 1	1	MILD STEEL
7	PIN 2	1	MILD STEEL
8	O-RING	1	RUBBER
9	VALVE BALL	1	STAINLESS STEEL

PUMP JOCK
ENGINEERING CC

26 FACTORY STREET
DE AAR
www.pumpjock.co.za
084 108 1045

MANUAL PUMP

ALL DIMENSIONS ARE IN MILLIMETRES.



FOR OFFICIAL USE ONLY	
INCORRECT ORTHOGRAPHIC PROJECTION	
INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL PENALTIES (-)	

ASSESSMENT CRITERIA					
TOP VIEW					
		POSSIBLE	OBTAINED	IGN	MODERATED
1	PUMP HOUSING	8 $\frac{1}{2}$			
2	PLUNGER	2 $\frac{1}{2}$			
3	LEVER	1 $\frac{1}{2}$			
4	CAP SCREW	2 $\frac{1}{2}$			
5	GUIDE + KNURLING	5			
SUBTOTAL		20			
SECTIONAL FRONT VIEW					
1	PUMP HOUSING	26			
2	PLUNGER	6			
3	LEVER + ANGLE	5			
4	CAP SCREW	6 $\frac{1}{2}$			
5	GUIDE	7			
6	O-RING	2 $\frac{1}{2}$			
7	PINS	2			
8	BALL VALVE	1			
SUBTOTAL		56			
GENERAL					
1	CENTRE LINES	3			
2	CUTTING PLANE	3			
3	ASSEMBLY	8			
SUBTOTAL		14			
TOTAL		90			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6



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ENGINEERING GRAPHICS AND DESIGN P2

MAY/JUNE 2026

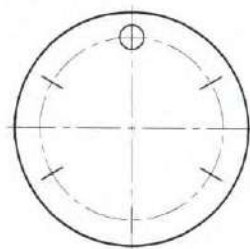
MARKING GUIDELINES

MARKS: 100

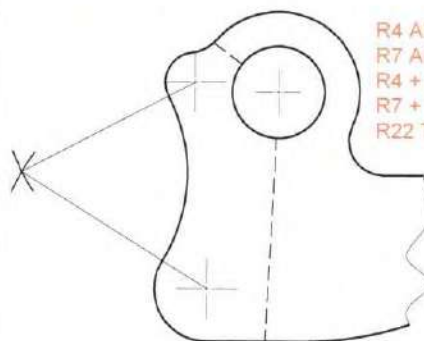
These marking guidelines consist of 7 pages.

ANSWERS

1	<u>APPROVED</u> DRAWINGS	1
2	<u>CHECKED</u> DRAWINGS	1
3	LBJ TRAILER DESIGN	1
4	STEEL	1
5	1 : 5	1
6	11 / ELEVEN	1
7	350 x 2 = <u>700</u>	1
8	SECTIONAL FRONT VIEW	1
9	<u>REVOLVED</u>	1
10	<u>MULTI-PLANE</u> / <u>OFFSET</u>	1
11	<u>INTERRUPTED</u> VIEW	1
12	INDICATES A PART NOT PRESENT	1
13	CONVENTION OF <u>SYMMETRY</u> APPLIED	1
14	SQUARE ON A SHAFT	1
15	F: 11,2 G: 64	2
16	99°/ <u>100°</u> /101°	1
17	33 + 4 + 0,55 ① = 37,55 ①	1
18	See below	3
19		4
20		5
TOTAL		30

ANSWER 18

FREEHAND 0,5
PCD CHAIN LINE 1
ONE HOLE ONLY 0,5
5 x DIVISIONS 1
3

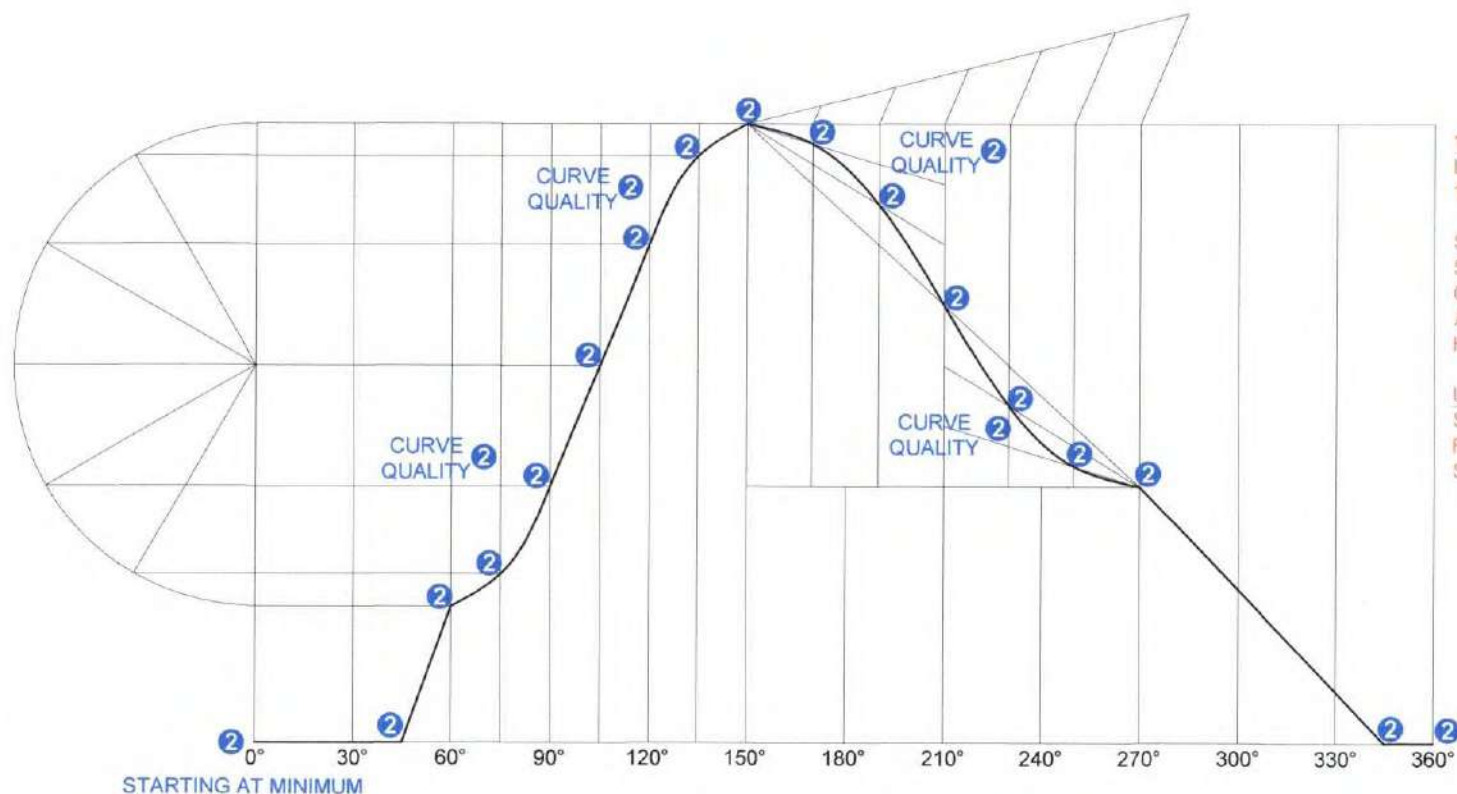
ANSWER 19

R4 ARC 0,5
R7 ARC 0,5
R4 + R22 = R26 1
R7 + R22 = R29 1
R22 TANGENTIAL ARC 1
4

ANSWER 20

DESCRIPTION	
WELD ALL AROUND	8 ✓
PITCH OF WELD	4 ✓
FILLET WELD	7 ✓
LENGTH OF WELD	3 ✓
WELDING PROCESS	5 ✓

PAPER 2 QUESTION 1
GRADE 12
MAY/JUNE 2026
MARKING GUIDELINE



DISPLACEMENT GRAPH ③
SCALE 156 = 360° ③

1. GRAPH CONSTRUCTION

LENGTH 156 1
12 EQUAL DIVISIONS 1

SIMPLE HARMONIC MOTION

SEMI-CIRCLE IN CORRECT POSITION 0.5
CIRCLE DIVISION 0.5
ADDITIONAL 15° DIVISIONS 0.5
HORIZONTAL PROJECTION 0.5

UNIFORM ACCELERATION AND RETARDATION

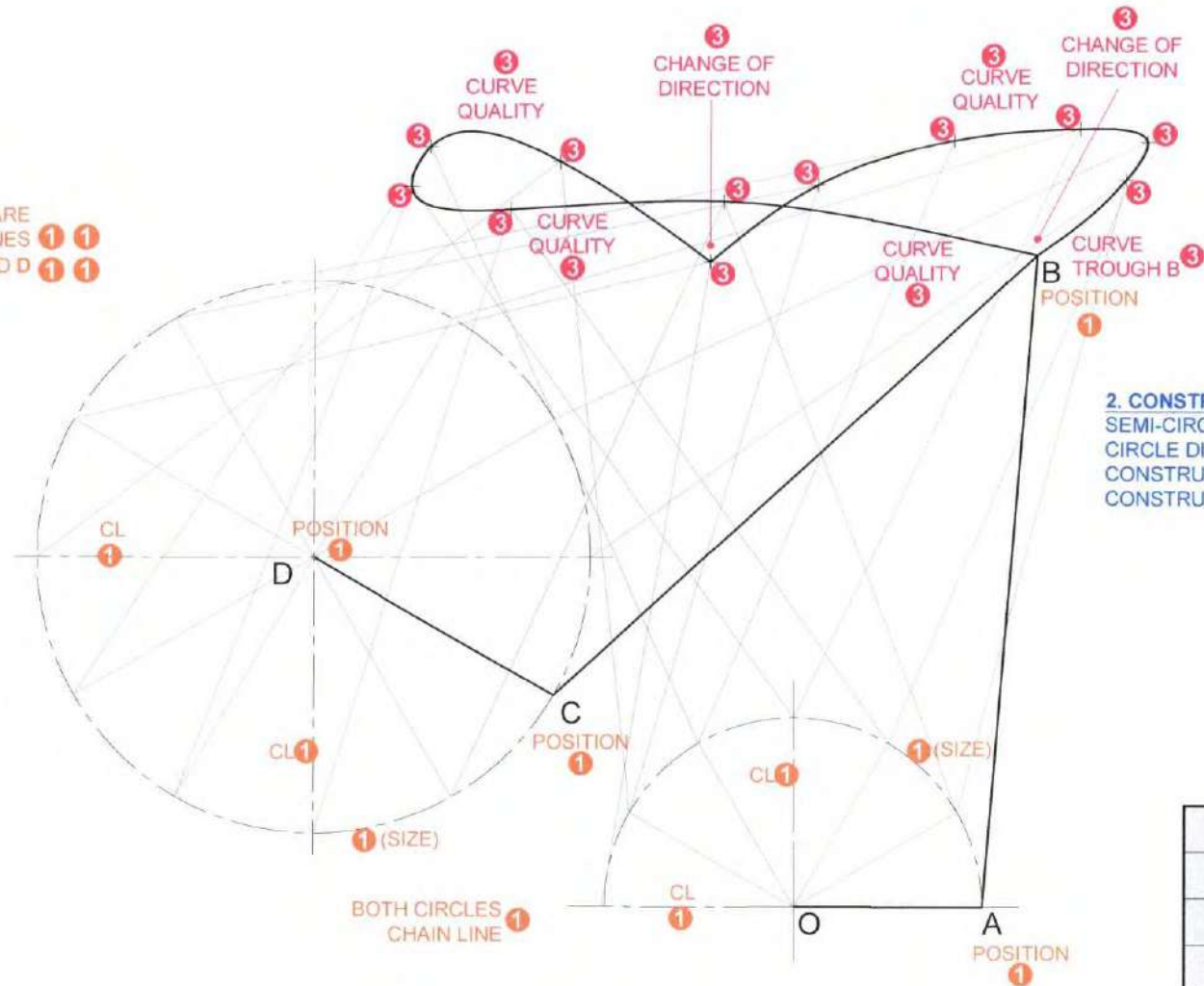
SAME AMOUNT OF V & H DIVISIONS 1
FIRST HALF CONSTRUCTION 0.5
SECOND HALF CONSTRUCTION 0.5
TOTAL 6

ASSESSMENT CRITERIA 2.1

1	GRAPH CONSTRUCTION	6
2	POINTS + CURVE	10 ¹ / ₂
3	LABELS	1
SUBTOTAL 2.1		17 ¹/₂

PAPER 2 QUESTION 2.1
GRADE 12
MAY/JUNE 2026
MARKING GUIDELINES

OA, AB, BC AND CD ARE
CONTINUOUS 'A-TYPE' LINES 1 1
LABELS A, B, C AND D 1 1

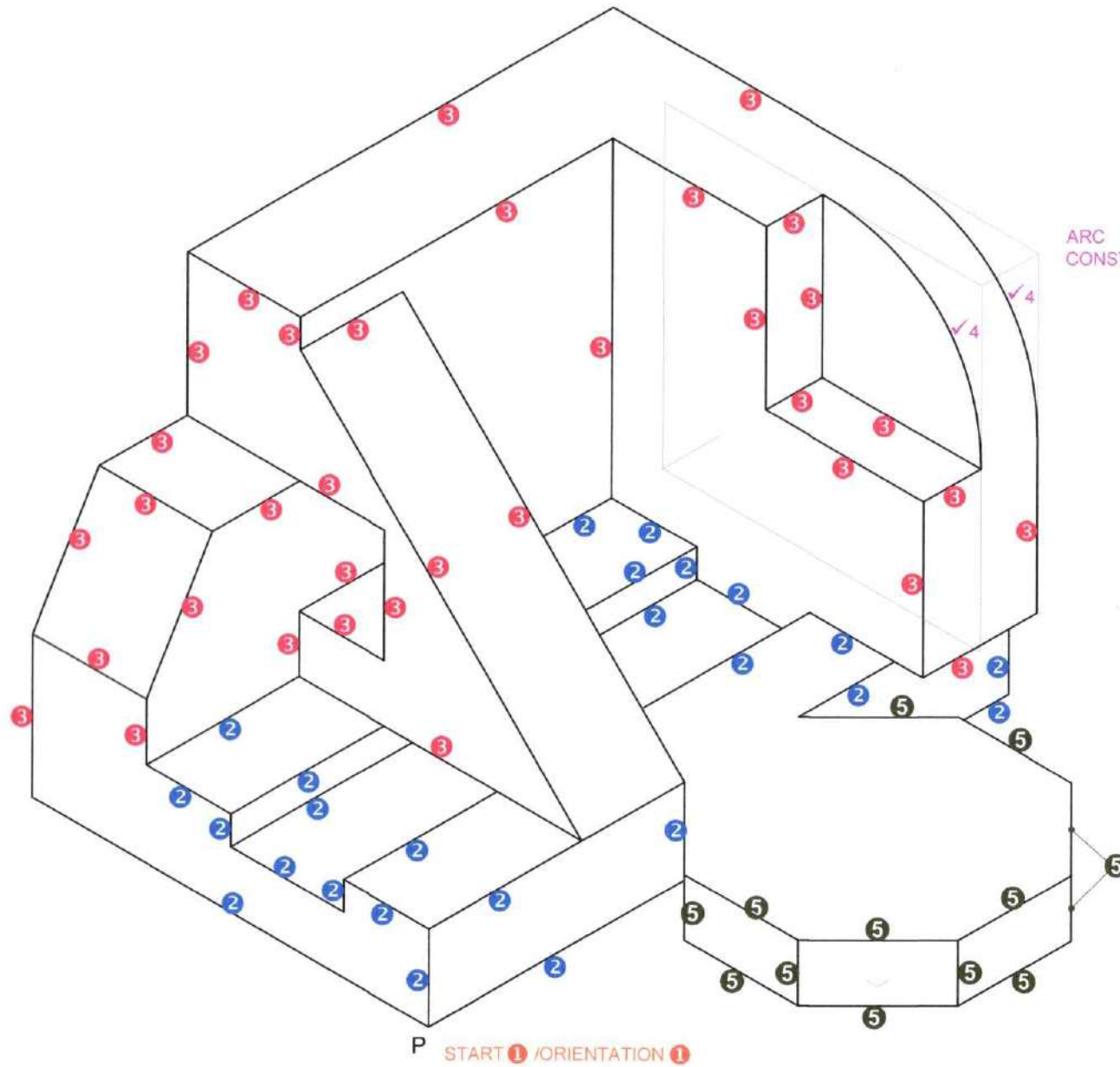


2. CONSTRUCTION
SEMI-CIRCLE DIVISION 0.5
CIRCLE DIVISION 0.5
CONSTRUCTION OF AB FROM A 2
CONSTRUCTION OF BC FROM C 2
5

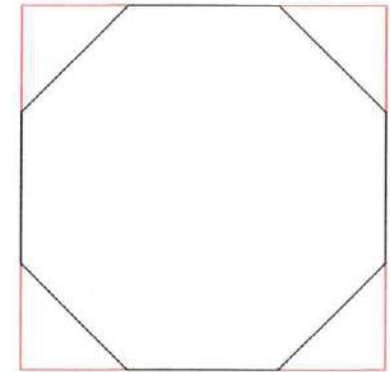
ASSESSMENT CRITERIA 2.2

1	GIVEN	7 $\frac{1}{2}$
2	CONSTRUCTION	5
3	POINTS + CURVE	9
SUBTOTAL 2.2		21 $\frac{1}{2}$

PAPER 2 QUESTION 2.2
GRADE 12
MAY/JUNE 2026
MARKING GUIDELINES

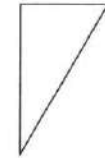


ARC
CONSTRUCTION 4



OCTAGON CONSTRUCTION ✓ 1

60° CONSTRUCTION 1



ASSESSMENT CRITERIA		
1	PLACING + AUX. VIEW	2 ½
2	BASE	12 ½
3	UPPER PORTION	17 ½
4	ARCS + CONSTRUCTION	2 ½
5	OCTAGON	6
TOTAL		41

PAPER 2 QUESTION 3
GRADE 12
MAY/JUNE 2026
MARKING GUIDELINE



basic education

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REPUBLIC OF SOUTH AFRICA

SENIORSERTIFIKAAT-EKSAMEN/ NASIONALE SENIORSERTIFIKAAT-EKSAMEN

INGENIEURSGRAFIKA EN -ONTWERP V2

MEI/JUNIE 2026

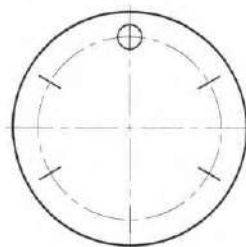
NASIENRIGLYNE

PUNTE: 100

Hierdie nasienriglyne bestaan uit 7 bladsye.

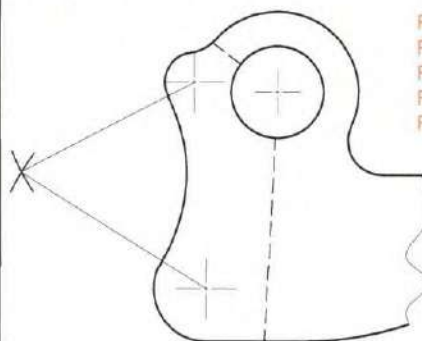
ANTWOORDE		
1	TEKENINGE <u>GOEDGEKEUR</u>	1
2	TEKENINGE <u>NAGESIEN</u>	1
3	LBJ SLEEPWA-ONTWERP	1
4	STAAL	1
5	1 : 5	1
6	11 / ELF	1
7	350 x 2 = <u>700</u>	1
8	DEURSNEE-VOORAANSIG	1
9	<u>GEWENTELDE</u>	1
10	<u>MULTI-VLAK</u>	1
11	<u>ONDERBROKE</u> AANSIG	1
12	DUI 'N DENKBEELDIGE ONDERDEEL AAN	1
13	KONVENSIE VAN <u>SIMMETRIE</u> TOEGEPAS	1
14	VIERKANT OP 'N AS	1
15	F: 11,2 G: 64	2
16	99°/ <u>100°</u> /101°	1
17	33 + 4 + 0,55 ① = 37,55 ①	1
18	Sien hieronder	3
19		4
20		5
TOTAAL		30

ANTWOORD 18



VRYHAND 0.5
SSD KETTINGLYN 1
SLEGS EEN GAT 0.5
5 x VERDELINGS 1
3

ANTWOORD 19

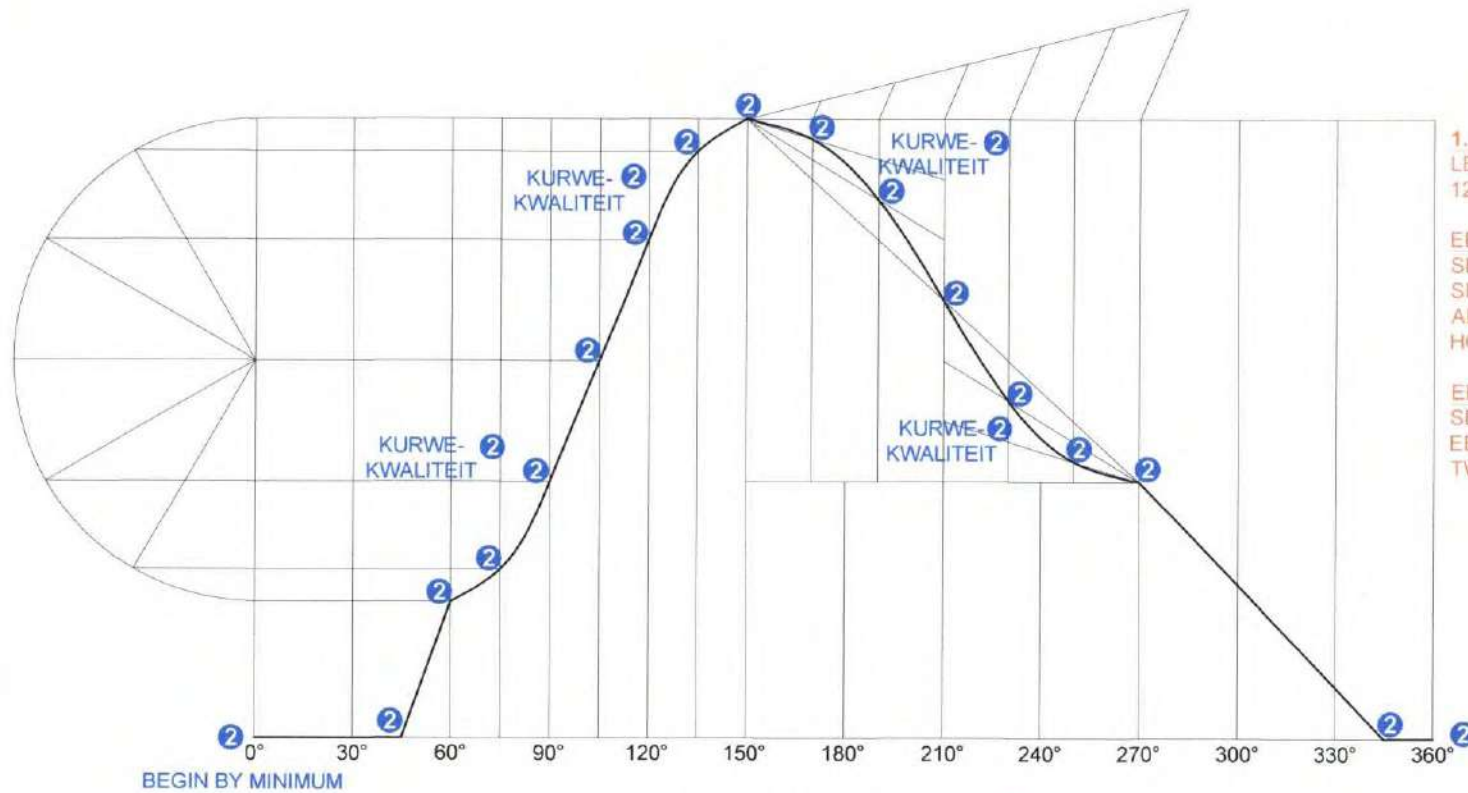


R4 BOOG 0.5
R7 BOOG 0.5
R4 + R22 = R26 1
R7 + R22 = R29 1
R22 RAAKBOOG 1
4

BESKRYWING

RONDOMSWEIS	8	✓
SWEISSTECK	4	✓
HOEKSWEISLAS	7	✓
LENGTE VAN SWEISLAS	3	✓
SWEISPROSES	5	✓

VRAESTEL 2 VRAAG 1
GRAAD 12
MEI/JUNIE 2026
NASIENRIGLYNE



VERPLASINGSGRAFIEK ③
SKAAL 156 = 360° ③

1. GRAFIEKKONSTRUKSIE

LENGTE 156	1
12 GELYKE INDELINGS	1
EENVOUDIGE HARMONIESE BEWEGING	
SEMI-SIRKEL IN KORREKTE POSISIE	0.5
SIRKELVERDELING	0.5
ADDISIONELE 15°-VERDELINGS	0.5
HORISONTALE PROJEKSIE	0.5
EENVORMIGE VERSNEL + VERTRAGING	
SELFDE HOEVEELHEID V & H VERDELING	1
EERSTE HELFTE VAN KONSTR.	0.5
TWEEDE HELFTE VAN KONSTR.	0.5
TOTAAL	6

ASSESSERINGSKRITERIA 2.1

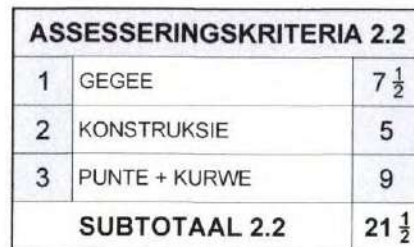
1	GRAFIEKKONSTRUKSIE	6
2	PUNTE + KURWE	10 $\frac{1}{2}$
3	BYSKRIFTE	1
SUBTOTAAL 2.1		17 $\frac{1}{2}$

VRAESTEL 2 VRAAG 2.1

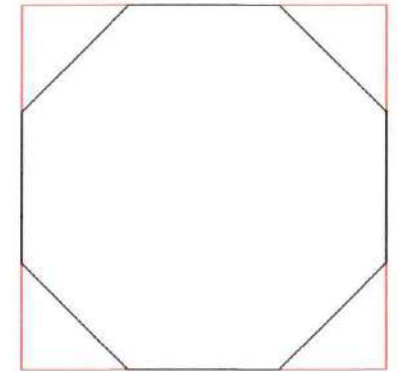
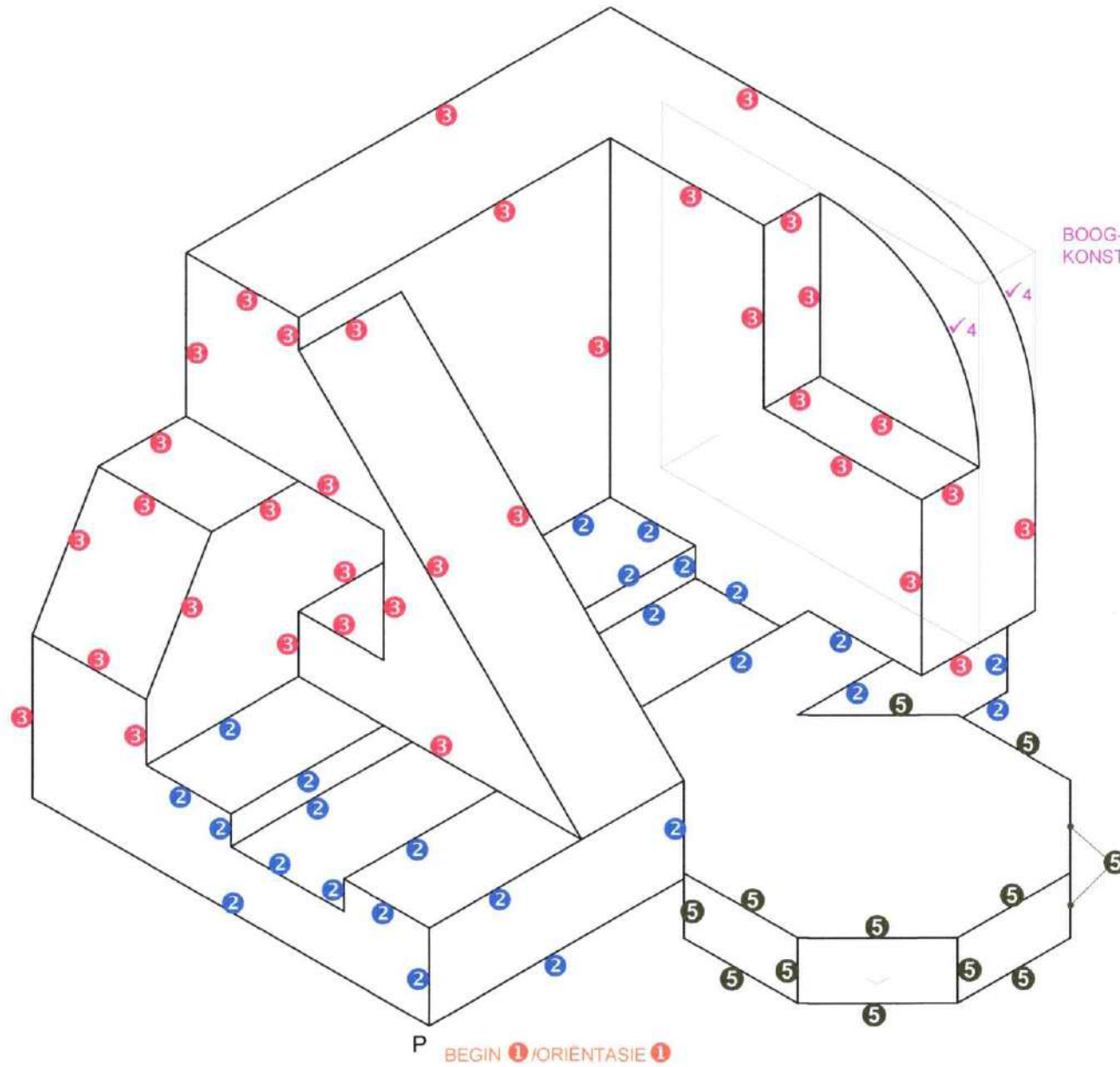
GRAAD 12

MEI/JUNIE 2026

NASIENRIGLYNE

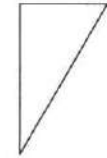


VRAESTEL 2 VRAAG 2.2
GRAAD 12
MEI/JUNIE 2026
NASIENRIGLYNE



AGTHOEK-KONSTRUKSIE ✓ 1

60°-KONSTRUKSIE 1



ASSESSERINGSKRITERIA		
1	PLASING + HULPAANSIG	2 ½
2	BASIS	12 ½
3	BOONSTE GEDEELTE	17 ½
4	BOË + KONSTRUKSIE	2 ½
5	AGTHOEK	6
TOTAAL		41

VRAESTEL 2 VRAAG 3
 GRAAD 12
 MEI/JUNIE 2026
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