

**ISEBE LEMFUNDO LEMPUMA KOLONI
EASTERN CAPE EDUCATION DEPARTMENT
OOS-KAAP ONDERWYSDEPARTEMENT**

NATIONAL SENIOR CERTIFICATE

GRADE 11

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2020

FINAL EXAMINATION

MARKS: 200

TIME: 3 hours

This question paper consists of 6 pages.

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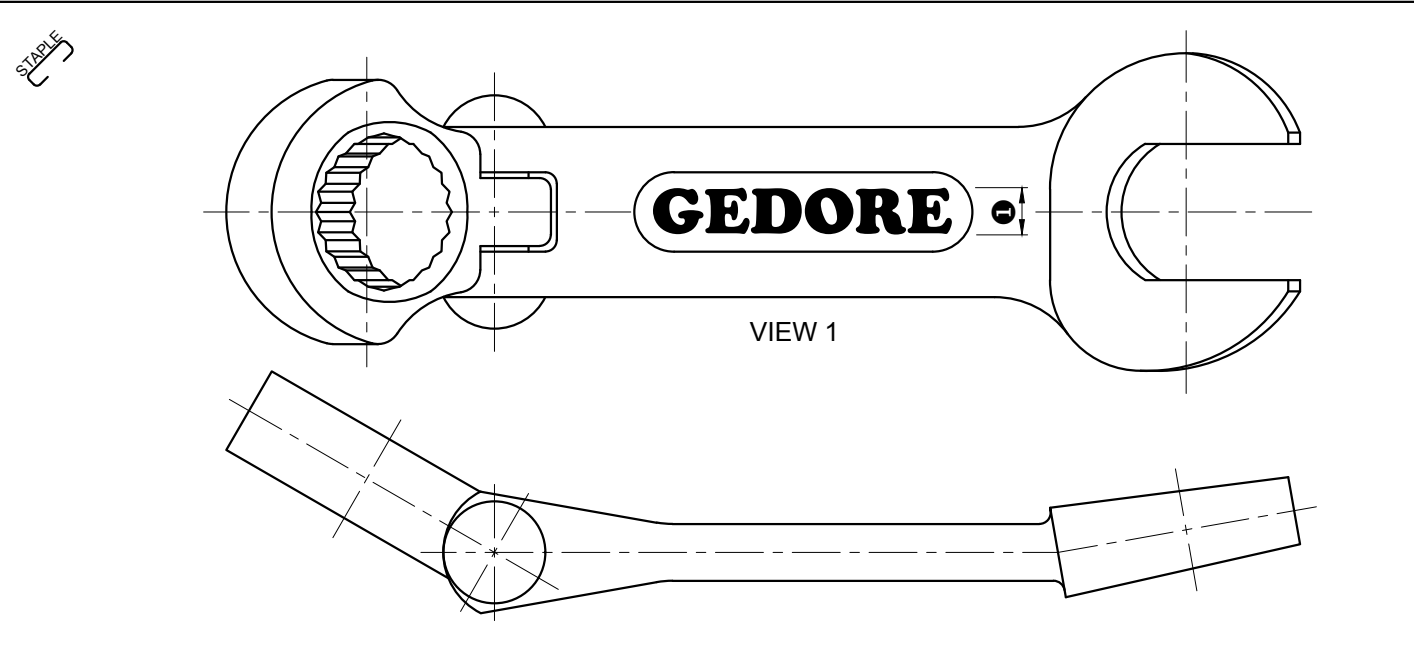
INSTRUCTIONS AND INFORMATION

1. The question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings must be drawn to scale 1 : 1, unless otherwise stated.
4. ALL questions must be answered on the answer sheets provided.
5. ALL the answer sheets must be re-stapled in numerical sequence and handed in irrespective of whether the question was attempted or not.
6. Careful time management is essential in order to complete all the questions.
7. Print your name in the block provided on every ANSWER SHEET.
8. ALL answers must be drawn accurately and neatly.
9. Any details or dimensions not given must be estimated in good proportion.
10. ALL drawings are in third angle orthographic projection, unless otherwise stated .

FOR OFFICIAL USE ONLY				
				MODERATED MARK
1				
2				
3				
4				
TOTAL				
	2	0	0	2 0 0

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
SCHOOL

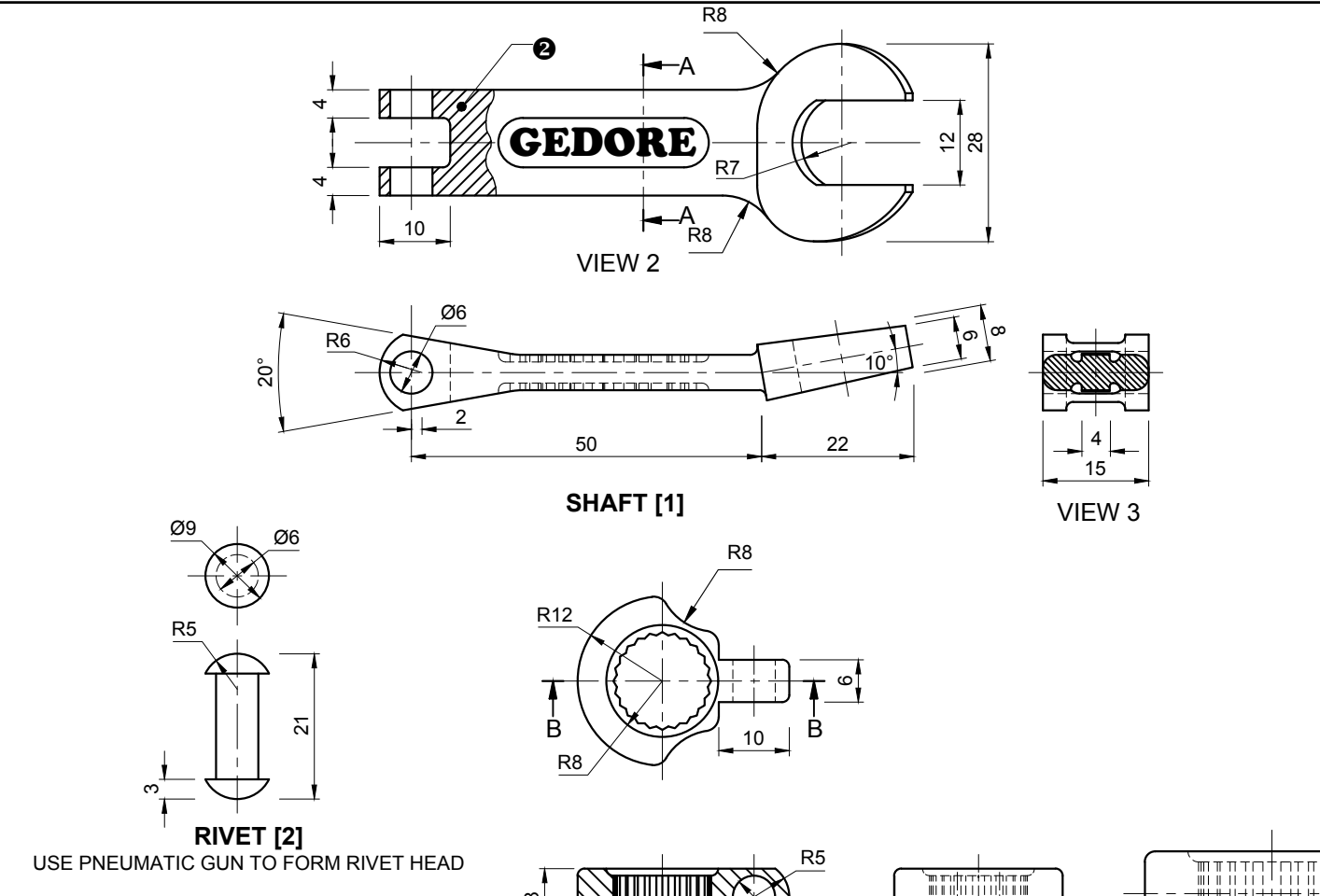


QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
A detail drawing of a spanner, a title block, assembled views and a table of questions. The drawings have not been prepared to the indicated scale.

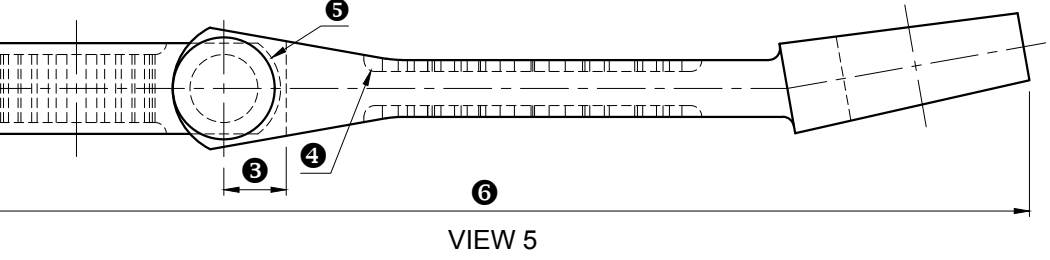
Instructions:
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and the title block. [32]

QUESTIONS		ANSWERS	
1	What is the name of the manufacturing company?		1
2	In which town is the manufacturer based?		1
3	What is the drawing number?		1
4	What is the file name?		1
5	Who prepared the drawing?		1
6	Who approved the drawing?		1
7	How many days did it take for the drawing to be approved after it was checked?		2
8	From which material is the shaft manufactured?		1
9	How many revisions were made?		1
10	How many rivets must be manufactured?		1
11	Which part of the spanner swivels?		1
12	What machine must be used to form the rivet head?		1
13	What is the height of the "word", that is cast into the spanner, at ❶?		2
14	What type of section is shown at ❷?		1
15	What is VIEW 1 called?		1
16	What is VIEW 3 called?		2
17	What is VIEW 4 called?		2
18	Determine the complete dimensions at:	❸	2
		❹	2
		❺	1
		❻	2
19	In the space below (ANSWER 19), draw, in neat freehand, the SANS symbol for the projection system used.		4
TOTAL		32	



BUFFALO METALWORKS MANUFACTURES	244 MAIN STREET LUSIKISIKI 4820 073 532 0791
TITLE: GEDORE SPANNER 625	
ALL UNDIMENSIONED RADII ARE R1.	SCALE 2:1
ALL DIMENSIONS ARE IN MILLIMETRES.	FINISH: MACHINED 0.05 C
PROGRAMME: AUTOCAD 2020	
FILE NAME: lak78.dwg	
DRAWING NO.: DOEEC-20	
QUANTITY: 5 000	

PARTS LIST			SURNAME	DATE	REVISIONS	DATE
PART	QUANTITY	MATERIAL				
1. SHAFT	1	CHROMIUM-VANADIUM	DRAWN: XONGO	2020/03/03	1.	
2. RIVET	1	ALUMINIUM	CHECKED: LAWE	2020/03/15	2.	
3. RING HEAD	1	CHROMIUM-VANADIUM	APPROVED: TONA	2020/03/18	3.	
					4.	



ANSWER 19

NAME

NAME

2



QUESTION 2: CAM

Given:

- The detail of a camshaft and a follower in its lowest position.
- The centre lines of the cam profile.

Specifications:

- The follower reciprocates on the vertical centre line of the camshaft.
- Minimum distance from the cam profile to the centre of the camshaft = 15 mm.
- Rotation = anti-clockwise

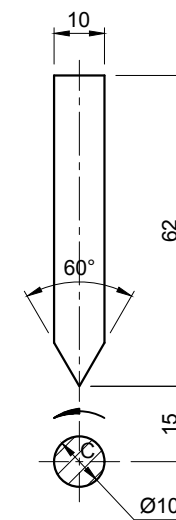
Motion:

- The cam imparts the following motion to the follower:
- It rises 10 mm with uniform motion over the first 30°.
 - It rises 25 mm with uniform motion over the next 30°.
 - It rises 20 mm with uniform motion over the next 60°.
 - It descends 10 mm with uniform motion over the next 60°.
 - There is a dwell period for the next 60°.
 - It returns to the original position with uniform motion over the rest of the rotation.

Instructions:

- Draw, to scale 1 : 1, the given camshaft and the wedge-shaped follower detail at its minimum position.
- Show the direction of rotation on the cam profile.
- Draw to a rotational scale of 360° = 120 mm and a displacement scale of 1 : 1, the complete displacement graph for the required motion.
- Label the displacement graph and include the scale.
- Project and draw the cam profile that would generate the given motion.
- Show ALL necessary constructions and projections.

[39]



ASSESSMENT CRITERIA				
1	GIVEN + MIN. DISTANCE	5		
2	GRAPH CONSTRUCTION	3		
3	PERPENDICULAR HEIGHT	5		
4	UNIFORM MOTION + DWELL	4		
5	GRAPH LABEL + SCALE	2		
6	CAM CONSTRUCTION	13		
7	CAM + CURVE QUALITY	7		
TOTAL		39		
NAME				
NAME				3



QUESTION 3: ISOMETRIC DRAWING

Given:

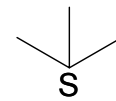
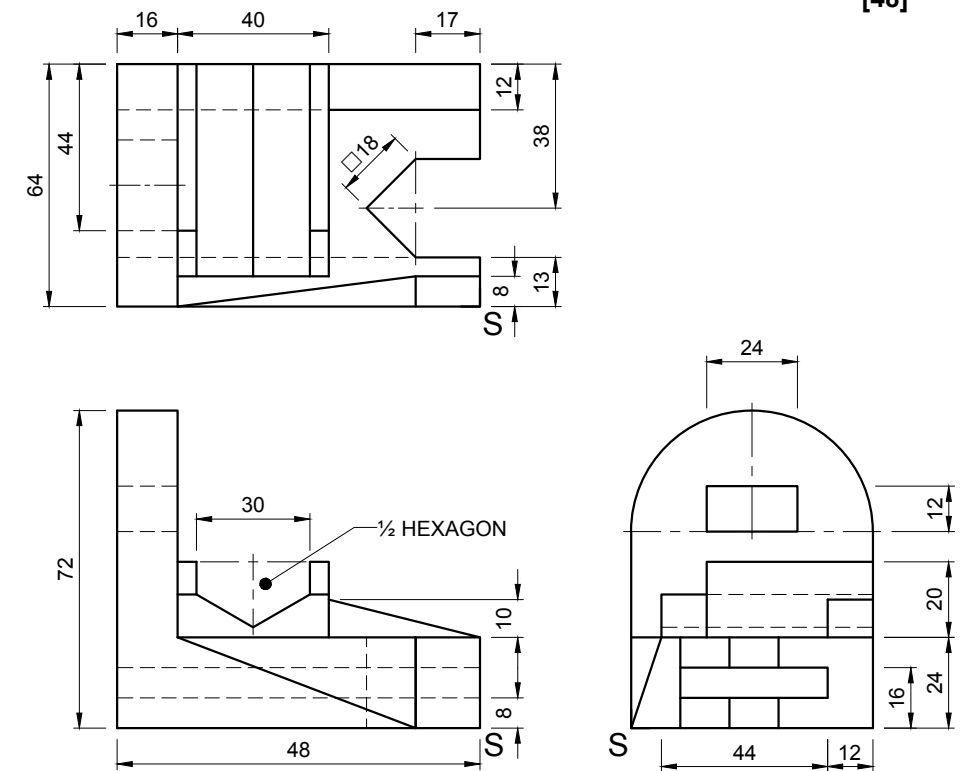
- The front view, top view and right view of a connection bracket.
- The position of point S on the drawing sheet.

Instructions:

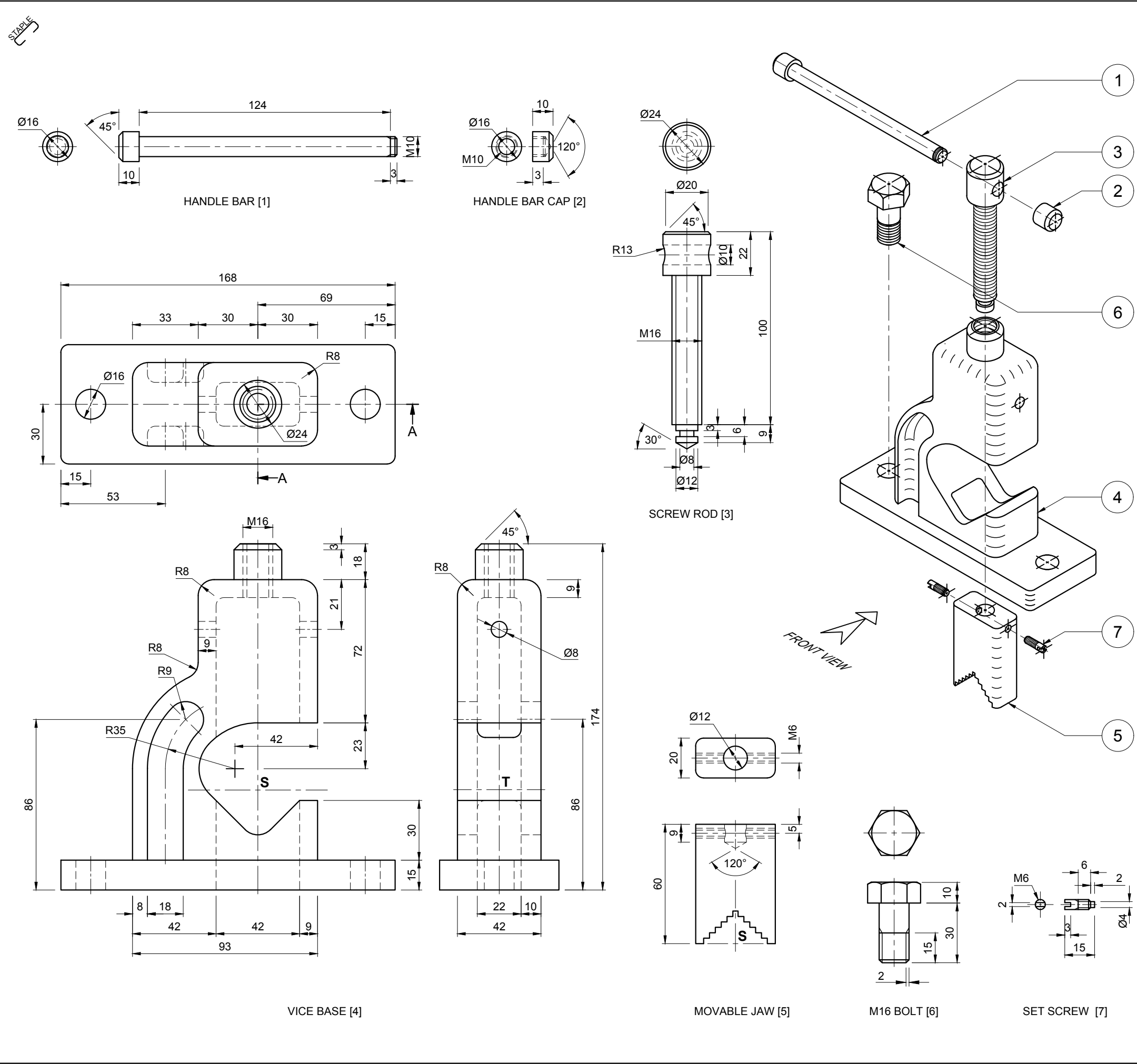
Using scale 1 : 1, convert the orthographic views of the connecting bracket into an isometric drawing.

- Make S the lowest point of the drawing.
- Show ALL necessary construction.
- NO hidden detail is required.

[48]



ASSESSMENT CRITERIA			
1	AUX' VIEW + PLACING	4	
2	ISOMETRIC LINES	22½	
3	SQUARE + SLOT	9½	
4	HEXAGON	5½	
5	CIRCLE + CIRCLE CONST.	4½	
6	CENTRE LINES	2	
TOTAL		48	
NAME			
NAME			4



QUESTION 4: MECHANICAL ASSEMBLY

Given:

- Orthographic views of each of the parts of a pipe vice assembly.
- The exploded isometric drawing of the parts of a pipe vice assembly, showing the position of each part relative to all the others.
- Starting point S, with the incomplete front view of the movable jaw and starting point T, with the incomplete right view of the movable jaw and vice base, on page 6.

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 pipe vice assembly:
 - 4.1 **The front view** of the pipe vice assembly as seen from the direction of the arrow on the exploded isometric drawing.
 - 4.2 **A half-sectional right view** on cutting plane A-A. Show the left half in section. The cutting plane is shown on the top view of the vice base (part 4).

NOTE:

- Planning of the layout of the views is essential.
- All drawings must comply with the guidelines as contained in the *SANS 10111*.
- Show, in the front view, THREE faces of the M16 bolt.
- Show all bolt constructions.
- NO hidden detail is required.

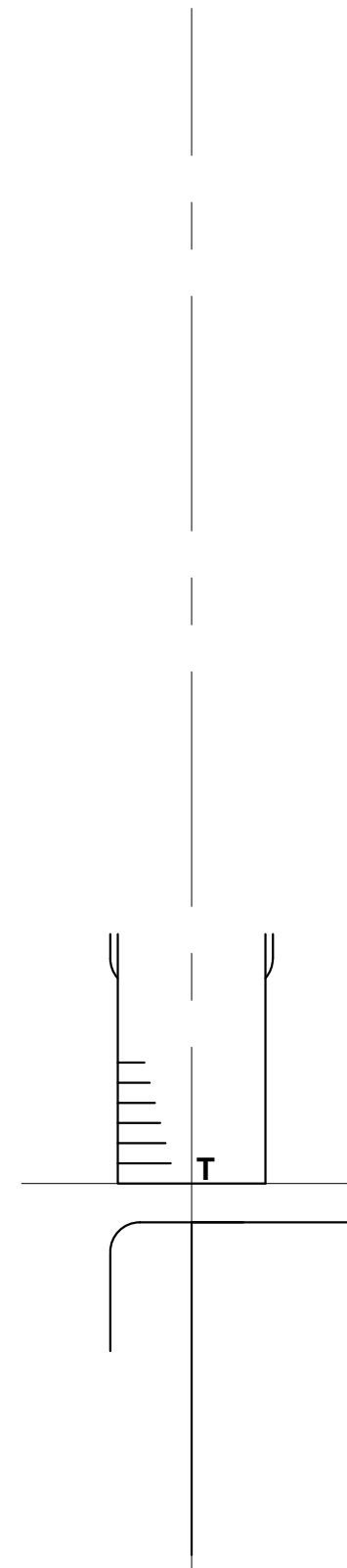
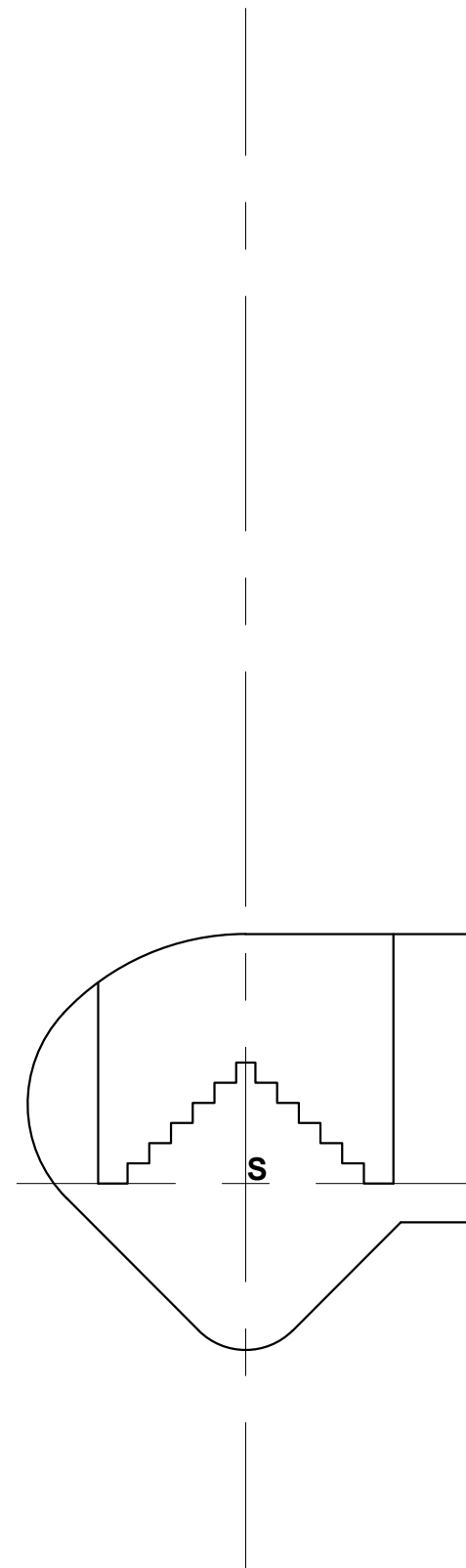
[81]

PARTS LIST		
PART	MATERIAL	QUANTITY
1. HANDLE BAR	STEEL	1
2. HANDLE BAR CAP	STEEL	1
3. SCREW ROD	STEEL	1
4. VICE BASE	CAST IRON	1
5. MOVABLE JAW	MS	1
6. M16 BOLT	MS	1
7. SET SCREW	MS	2

TITLE:

PIPE VICE	244 MAIN STREET LUSIKISIKI 4820 073 532 0791
BUFFALO	
METALWORKS MANUFACTURERS	
ALL DIMENSIONS ARE METRIC.	
ALL UNDIMENSIONED RADII ARE R 4.	

STABLE



PENALTIES		
1	WRONG SCALE -2	
2	WRONG PLACING OF VIEWS -2	
3	PARTS NOT ASSEMBLED -2	
4	WRONG HATCHING -2	
TOTAL PENALTIES (-)		

ASSESSMENT CRITERIA			
FRONT VIEW			
1	HANDLE BAR	4½	
2	SCREW ROD	6½	
3	HANDLE BAR CAP	3½	
4	M15 BOLT	9½	
5	VICE BASE	12	
6	CENTRE LINES	2	
7	ASSEMBLY	3	
SUB-TOTAL		41	
HALF SECTIONAL RIGHT VIEW			
1	HANDLE BAR	1	
2	SCREW ROD	10	
3	HANDLE BAR CAP	1½	
4	M15 BOLT	4½	
5	VICE BASE	17½	
6	MOVABLE JAW	4½	
7	CENTRE LINES	1	
SUB-TOTAL		40	
TOTAL		81	
PENALTIES (-)			
TOTAL			

NAME	
NAME	6