



**education**

Department of  
Education  
FREE STATE PROVINCE

**PROVINCIAL PAPER**

**GRADE 12**

**ENGINEERING GRAPHICS AND DESIGN P1**

**JUNE 2019**

MARKS: 100  
TIME: 3 HOURS

This paper consists of 6 pages.

**INSTRUCTIONS AND INFORMATION**

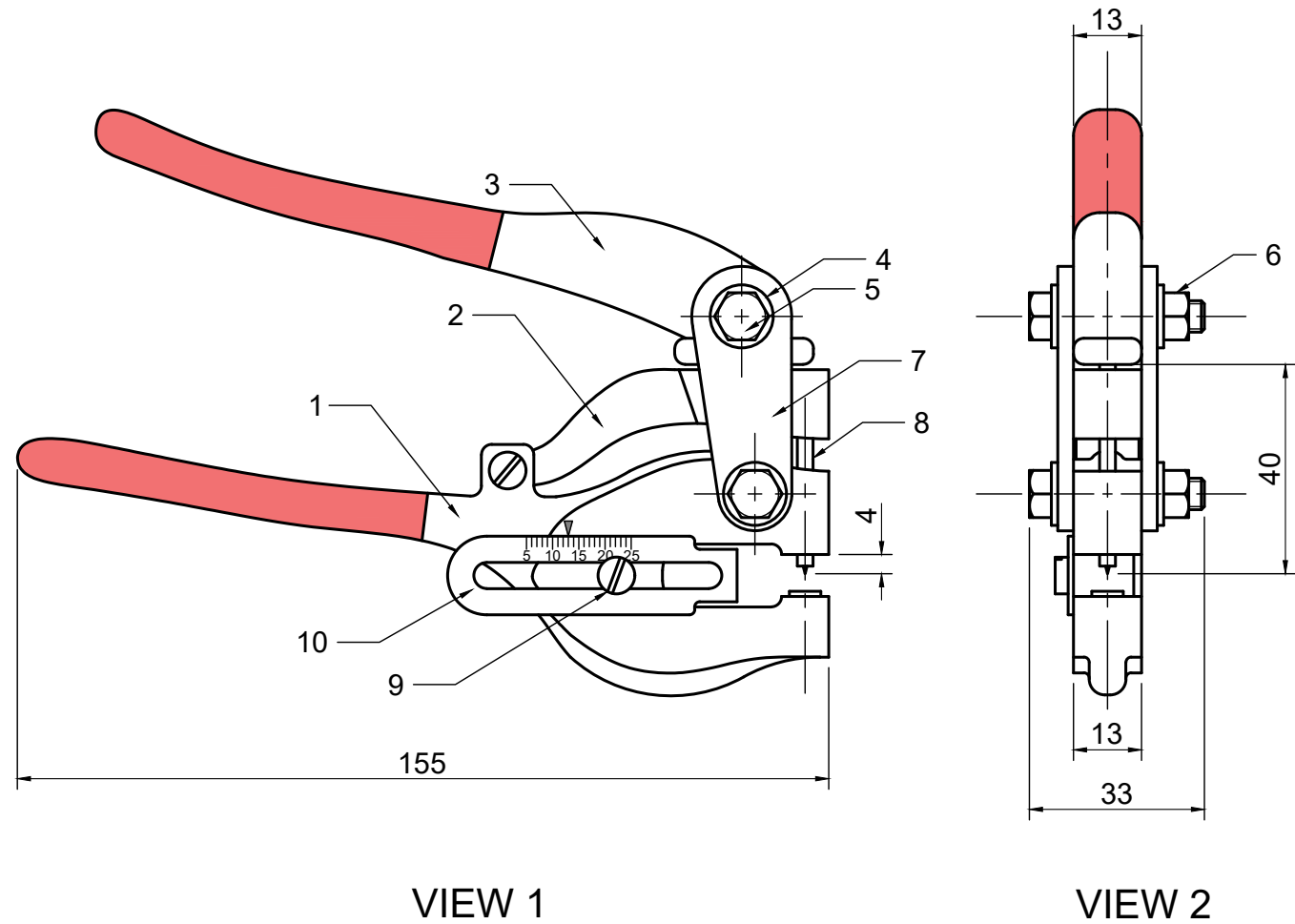
1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in third angle orthographic projection, unless stated otherwise.
4. ALL drawings must be drawn to scale 1:1, unless stated otherwise.
5. ALL questions must be answered on the DIAGRAM SHEETS, as instructed.
6. ALL the pages must be restapled in numerical sequence, irrespective of whether the question was attempted or not.
7. Time management is essential in order to complete all the questions.
8. Print your name and surname as well as the grade in the space provided on each page.
9. ALL answers must be drawn accurately and neatly.
10. ALL necessary construction and projection lines must be shown.
11. Plan each drawing carefully from the given position, which is indicated on the diagram sheets.
12. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY								
QUESTION	MARKS OBTAINED			½	MODERATED			½
1								
2								
3								
4								
TOTAL								
	1	6	0		1	6	0	

FINAL CONVERTED MARK	CHECKED BY
100	

NAME & SURNAME		GRADE	12	1
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STAPEL



**QUESTION 1: ANALYTICAL (MECHANICAL)**

**Given:**

The working drawings of a mono punch with a title block and a table of questions.

**Instructions:**

With a pencil, complete the table by neatly printing the correct answers in the corresponding answer column. All the questions refer to the accompanying drawings and the title block on diagram sheet 1. **[16]**

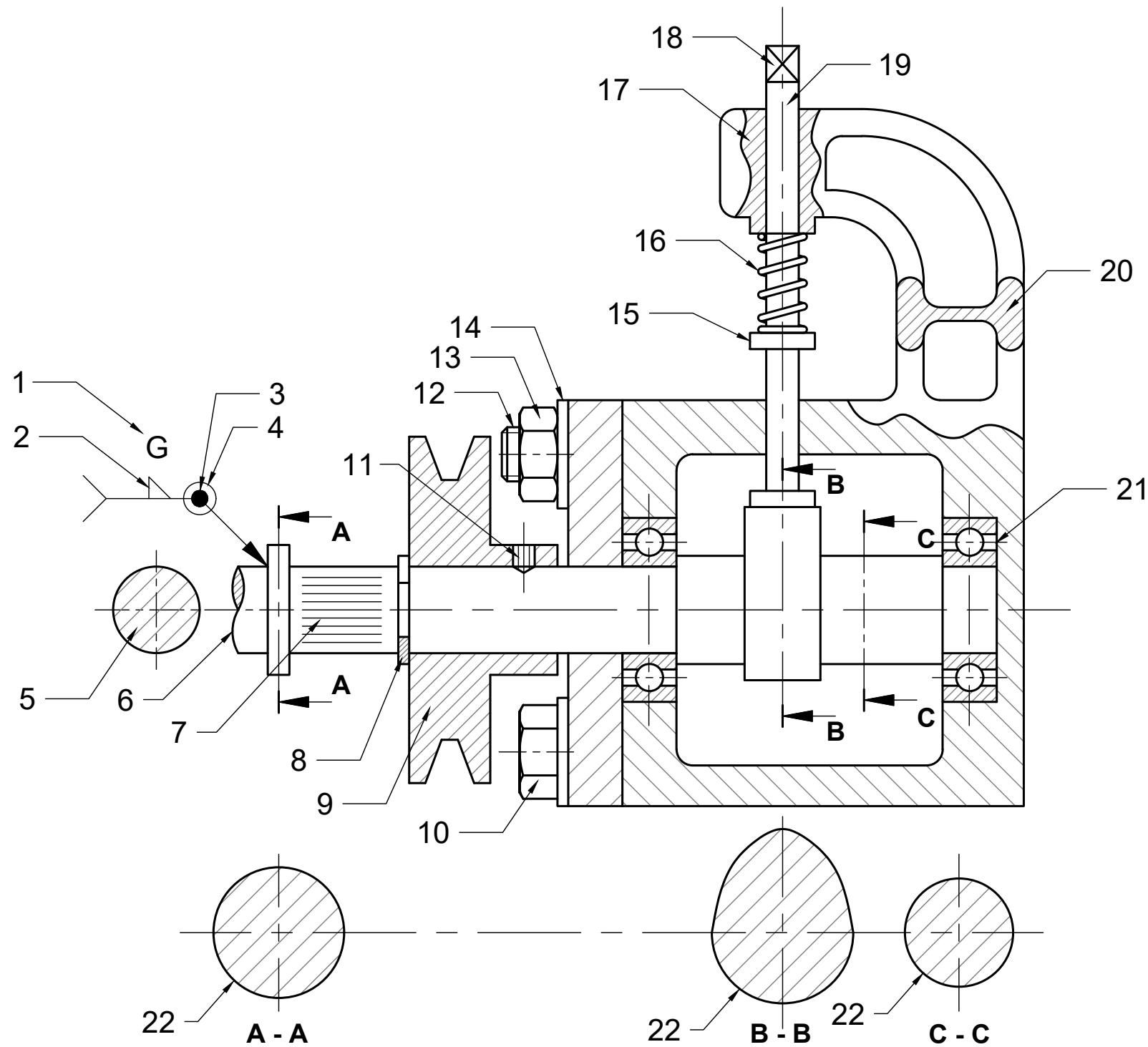
QUESTIONS		ANSWERS	
1	On which date is this drawing approved?	1	
2	What is the manufacturing company's name?	1	
3	What treatment process must be used on the mono punch device?	1	
4	What is the drawing file name?	1	
5	How many mono punch devices should be manufactured?	1	
6	What will we call view 1?	1	
7	What size bolt & nut will be used to join the connector plates?	1	
8	What is the thickness of the washers used?	1	
9	Name the finishing applied on the handles?	1	
10	What is the reason for the finishing?	1	
11	On what distance is the depth indicator set?	1	
12	How many adjusting screws is attached on each unit?	1	
13	What is die diameter of the holes which will be punched with the punch pin?	1	
14	What is total length of the punch pin?	1	
15	Who approved the drawing?	1	
16	How many parts make up the mono punch?	1	
<b>TOTAAL</b>		16	

PART LIST		
ITEM	DESCRIPTION	TOTAL
1	PUNCH JAW	1
2	CLAMP	1
3	CLAMP HANDLE	1
4	WASHER	4
5	M6 BOLT	2
6	M6 NUT	2
7	CONNECTION PLATE	2
8	Ø 3mm PUNCH PIN	1
9	ADJUSTING SCREW	2
10	DEPTH-INDICATOR	1

GENERAL INFORMATION	NON-SLIP RUBBER COATING ON HANDLES		
FILE NAME: ZAP 13-PQR-350	MATERIAL: PEWTER		
DRAWING NUMBER: 14	METAL FINISHING: GALVANIZING	ALL DIMENSIONS ARE IN MILLIMETERS	
JVDB CONTRACTORS 17 JANDIRK STREET DURBAN	DRAWING SOFTWARE: AUTOCAD 2017	DRAWN BY: M MAHLATSI	2018/05/15
	ALL UNSPECIFIED RADII ARE R3.	REVISED BY: L MOLOI	2018/09/25
<b>NTIMA ENGINEERING WORKS</b>  TITLE: <b>MONO PUNCH</b>		APPROVED BY: EK MPAPA	2019/03/01
		P Othole street 55 Sasolburg 1039 www.weich.co.za. Tel No : 089 000 2598	Manufacture 300 devices

DIAGRAM SHEET 1	ENGINEERING GRAPHICS AND DESIGN	JUNE 2019 - PAPER 2	NAME & SURNAME		GRADE	12	2
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STAPEL



**QUESTION 2: SANS 10111 SYMBOLS**

**Given:**

A front view of a cam driver system and a table with questions.

**Instructions:**

Complete the table by writing the number of the feature describing the part best. [24]

QUESTIONS		ANSWERS	
1	Weld-all-round	1	
2	Pulley	1	
3	Grip screw	1	
4	Use grinder for finishing	1	
5	Bolt	1	
6	Removed sectioning	1	
7	Washer	1	
8	Stud	1	
9	Field weld (on site)	1	
10	Fillet weld on the other side	1	
11	Parallel knurling	1	
12	Revolved sectioning	1	
13	Interrupted view	1	
14	Shoulder on shaft	1	
15	Circlip	1	
16	A nut	1	
17	Successive sectioning	1	
18	Partly sectioned	1	
19	A rod	1	
20	Square end on shaft	1	
21	Draw, free hand, in the space provided the conventional symbol for a spring.	2	
22	Draw, free hand, in the space provided the conventional symbol for a bearing.	2	
<b>TOTAL</b>		<b>24</b>	

**ANSWER 21**

**ANSWER 22**

STAPEL

**QUESTION 3: ISOMETRIC DRAWING**

**Given:**

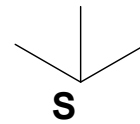
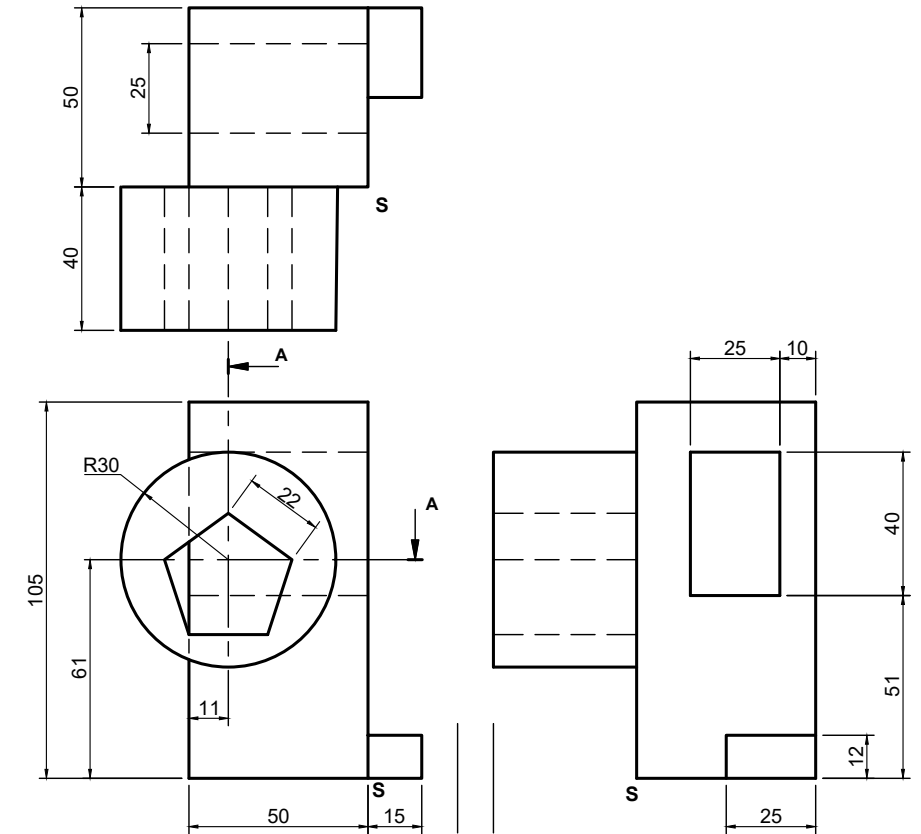
The front view, top view and right view of a casting.  
The position of point S on the diagram sheet 3 (page 4).

**Instructions:**

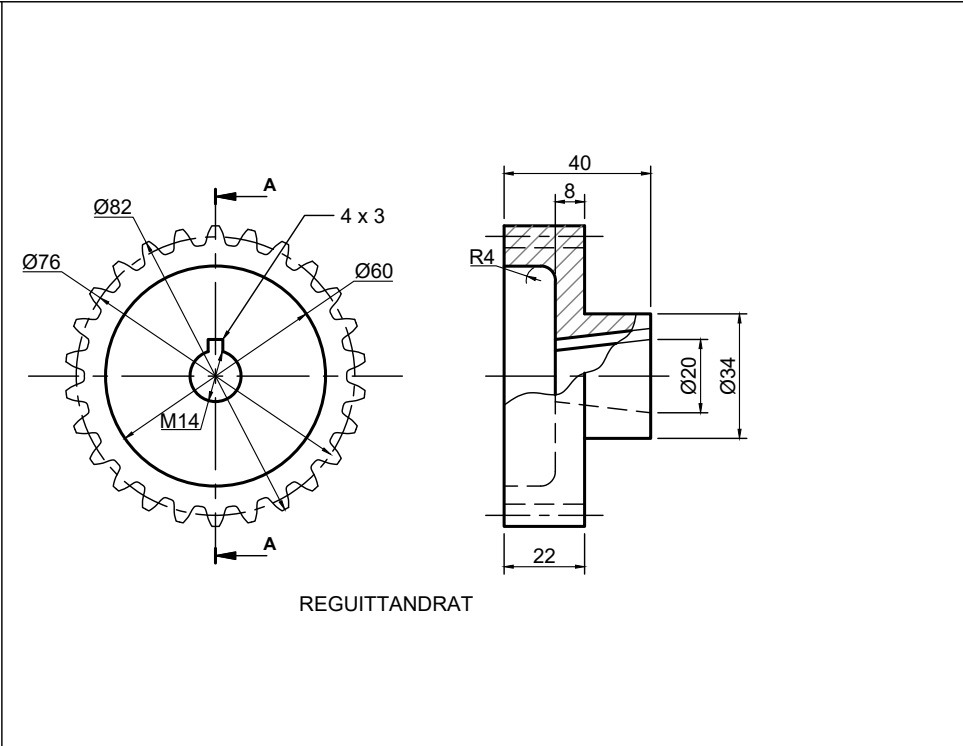
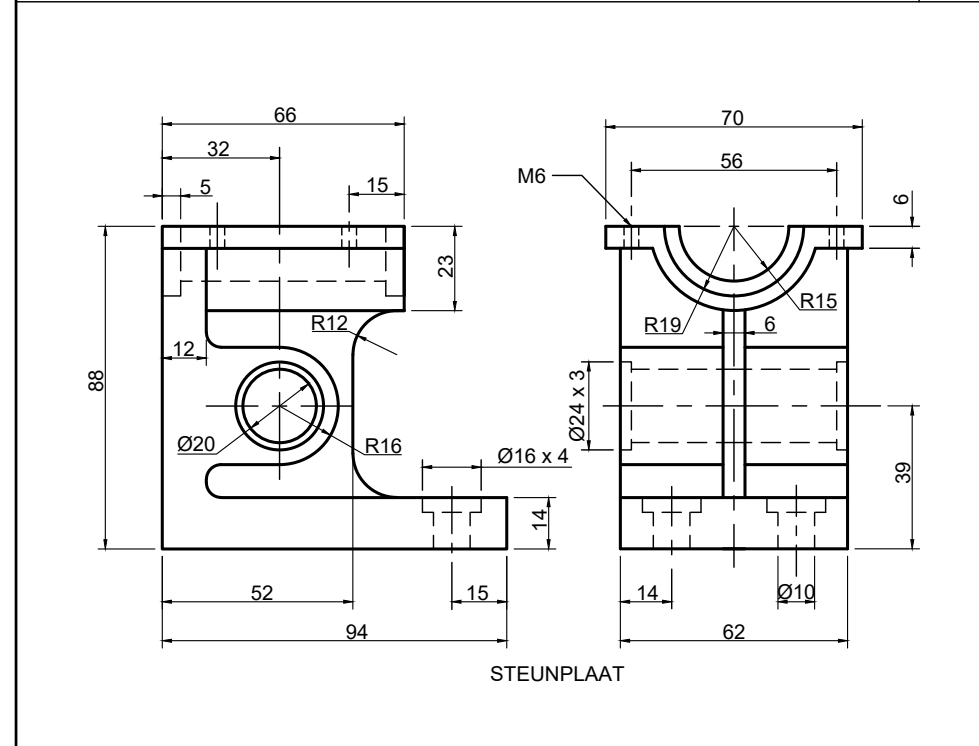
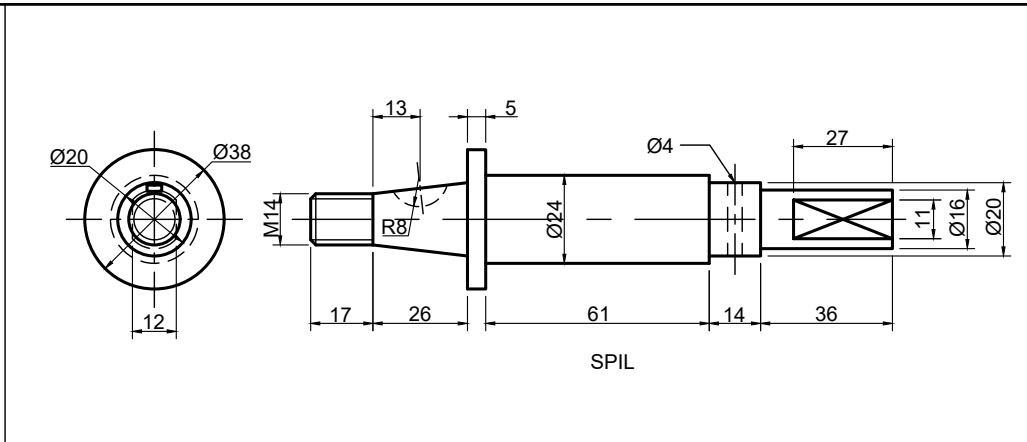
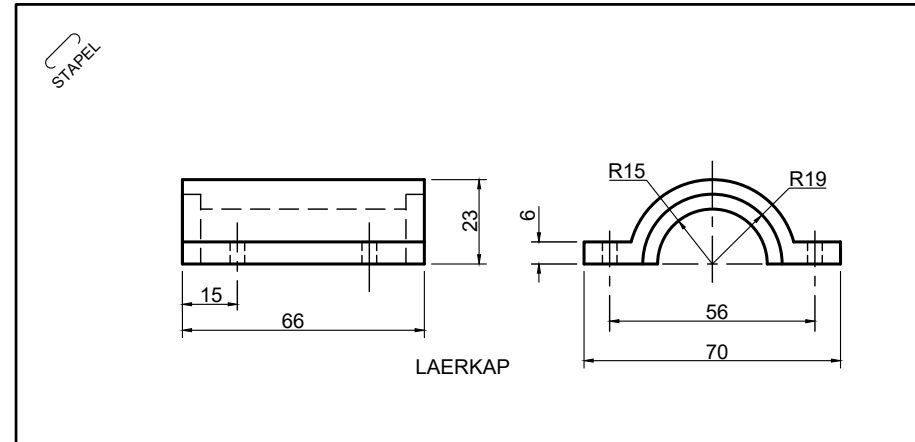
Use a scale of 1:1 to convert the orthographic views of the casting into a sectional isometric drawing on cutting plane A-A.

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

**[38]**



ASSESSMENT CRITERIA			
1	AUXILIARY VIEW	4	
2	ISO & NON-ISO LINES ( $\frac{32}{2}$ )	16	
3	ISOMETRIC CIRCLE ( $\frac{10}{2}$ )	5	
4	SECTIONING & HATCHING ( $\frac{26}{2}$ )	13	
5	PENALTIES		
<b>TOTAL</b>		<b>38</b>	

**QUESTION 4: MECHANICAL ASSEMBLY**

**GIVEN:**

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

**INSTRUCTIONS:**

- Answer this question on page 5 (page 6).
- Draw, to scale 1:1 and in third-angle orthographic projection, the following views of the assembled parts of the gear sub-assembly:
  - The sectional front view as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, which passes vertically through the gear sub-assembly, is shown on the front view of the spur.
  - A right-view. No hidden detail is required.

**NOTE:**

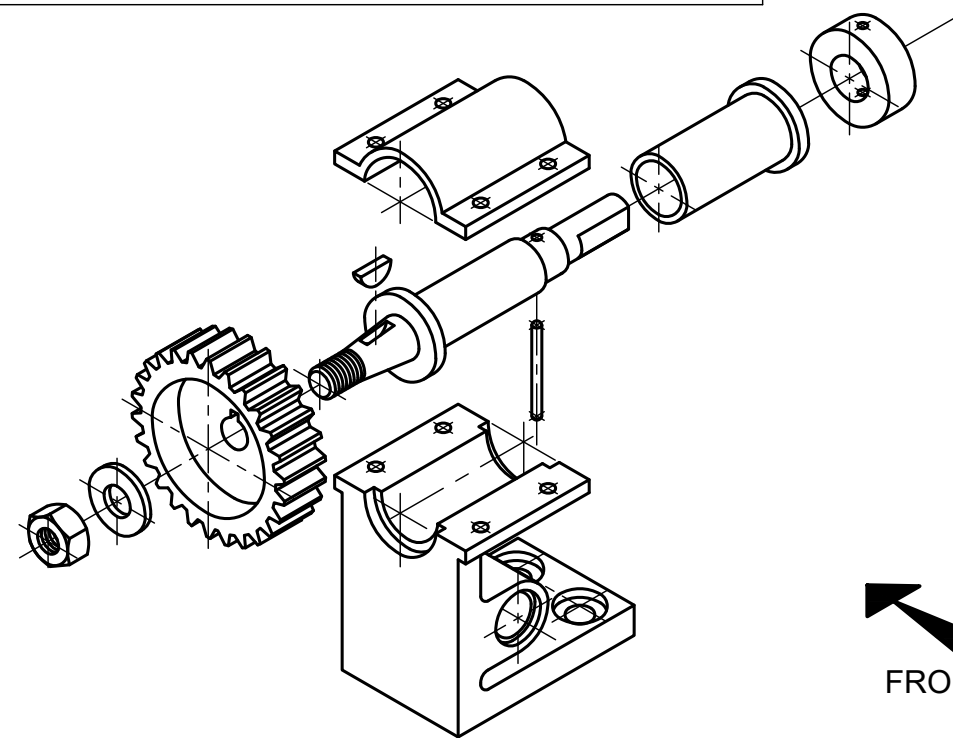
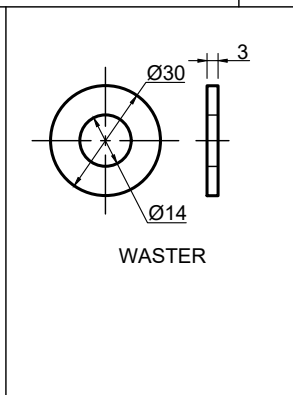
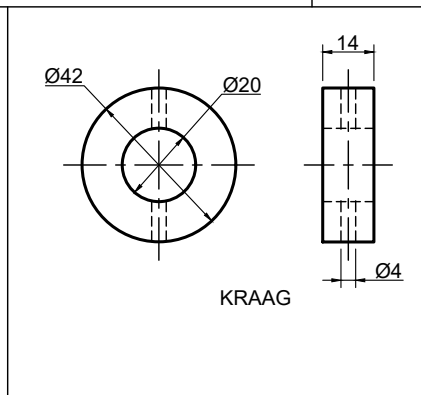
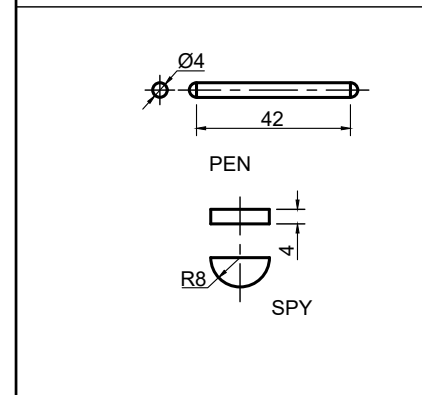
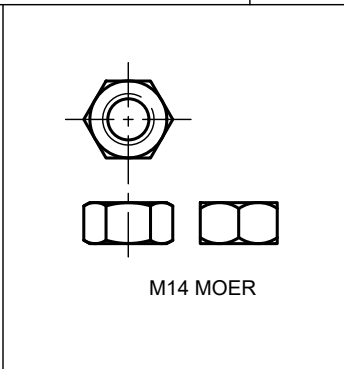
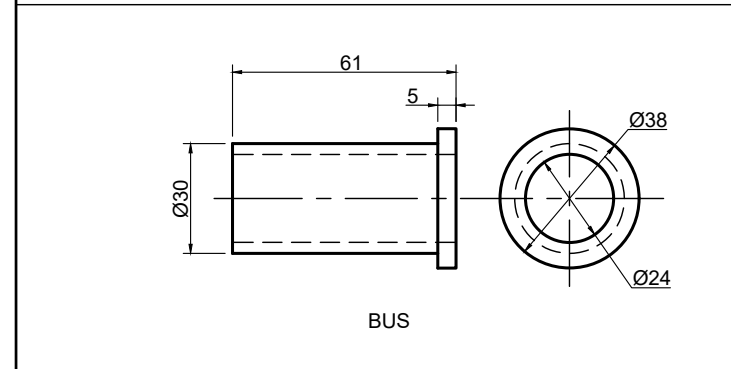
- Planning and positioning of the drawing is essential.
- The drawing must comply with the guidelines as contained in the SANS 10111.
- Show three faces of the M14 nut in the front view.
- Show all deviations on the spindle where the key is imbedded into the spindle as well as where the pin penetrates the spindle with part sections.
- No hidden detail is required.

The following must be added on the drawing:

- The section plane. Name the section plane A-A.
- The projection symbol for the system used.
- Print the title and scale :

GEAR SUB-ASSEMBLY  
SCALE 1:1

[82]



FRONT VIEW

PARTS LIST	
ITEM	DESCRIPTION
1	STAND
2	BEARING CAP
3	SPINDLE
4	BUSH
5	COLLAR
6	PIN
7	KEY
8	SPUR
9	WASTER
10	M14 NUT

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ASSESSMENT CRITERIA			
SECTIONAL FRONT VIEW			
1	STAND ( $\frac{20}{2}$ )	10	
2	BEARING CAP ( $\frac{3}{2}$ )	1.5	
3	SPINDLE ( $\frac{29}{2}$ )	14.5	
4	BUSH ( $\frac{6}{2}$ )	3	
5	COLLAR ( $\frac{14}{2}$ )	7	
6	PIN ( $\frac{4}{2}$ )	2	
7	KEY ( $\frac{2}{2}$ )	1	
8	SPUR ( $\frac{16}{2}$ )	8	
9	WASHER ( $\frac{3}{2}$ )	1.5	
10	M14 NUT ( $\frac{10}{2}$ )	5	
SUB TOTAL 1		53.5	
RIGHT VIEW			
1	STAND ( $\frac{17}{2}$ )	8.5	
2	BEARING CAP ( $\frac{5}{2}$ )	2.5	
3	SPINDLE ( $\frac{5}{2}$ )	2.5	
4	COLLAR ( $\frac{1}{2}$ )	0.5	
5	PIN ( $\frac{2}{2}$ )	1	
6	SPUR ( $\frac{2}{2}$ )	1	
SUB TOTAL 2		16	
TECHNICAL COMPLIANCY			
1	TITLE & SCALE	2	
2	PROJ. SYMBOL	3	
3	LABEL SECTION	1	
4	SECTION LINE ( $\frac{6}{2}$ )	3	
	CENTER LINES	3.5	
SUB TOTAL 3		12.5	
PENALTIES			
GRAND TOTAL		82	

TITLE & SCALE	PROJECTION SYMBOL
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DIAGRAM SHEET 5	ENGINEERING GRAPHICS AND DESIGN	JUNE 2019 - PAPER 2	NAME & SURNAME		GRADE	12	6
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