



**education**

Department of Education  
FREE STATE PROVINCE

PROVINSIALE VRAESTEL  
PROVINCIAL PAPER

GRAAD 12  
GRADE 12

**ENGINEERING GRAPHICS AND DESIGN P2**

**JUNE 2018**

**MARKS: 100**  
**TIME: 3 HOURS**

**INSTRUCTIONS AND INFORMATION**

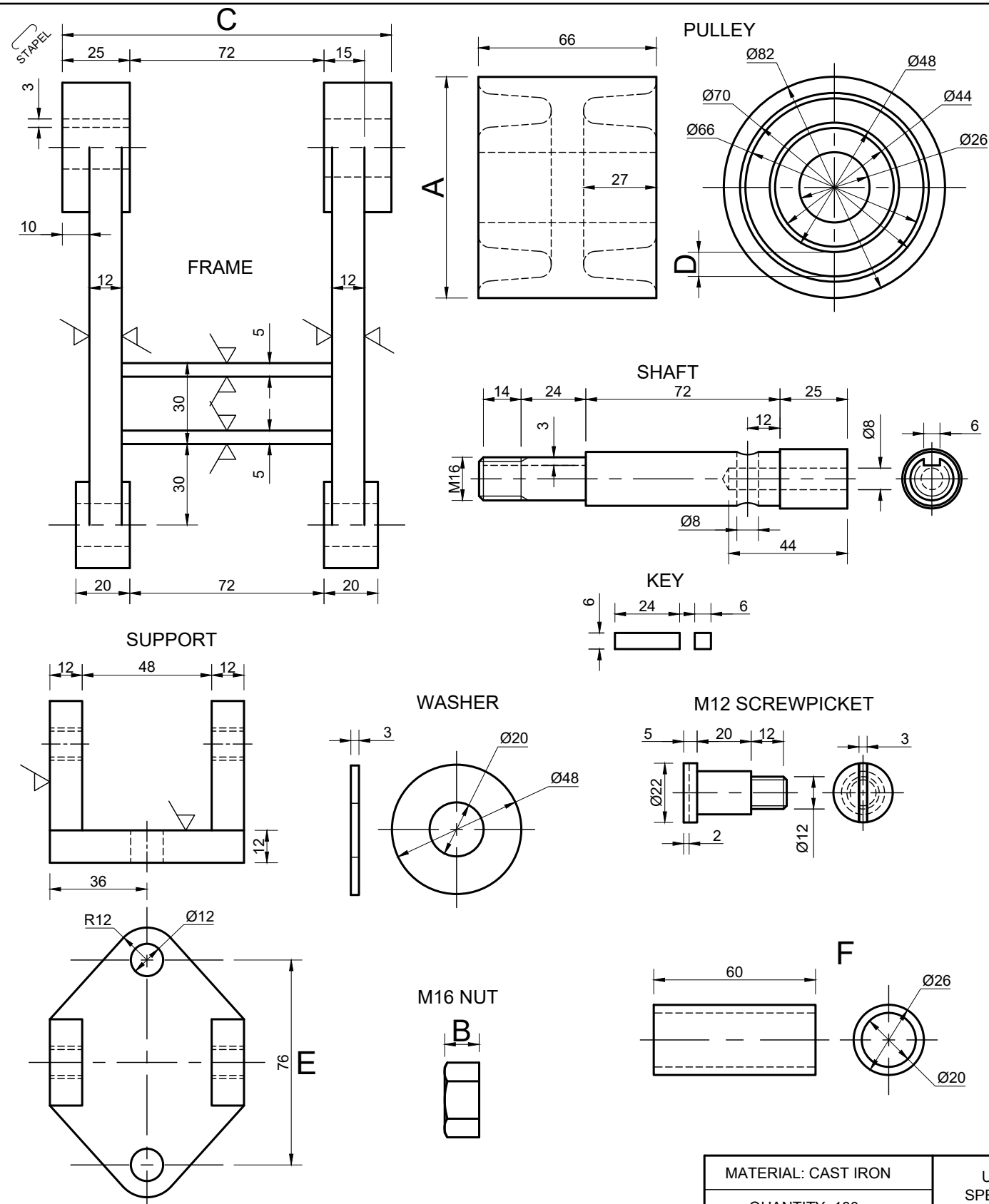
1. This question paper consist of FOUR questions
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless stated otherwise.
4. ALL drawings must be drawn to scale 1:1, unless stated otherwise.
5. ALL questions must be answered on the DIAGRAM SHEETS, as instructed.
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								
	2	0	0		2	0	0	

FINAL CONVERTED MARK	CHECKED BY
100	

This question paper consist of 6 pages

NAME & SURNAME		GRADE	12	1
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**QUESTION 1: ANALYTICAL (MECHANICAL)**

**Given:**

The working drawings of a BELT TENSION device in third-angle-orthographic-projection with a title block and a table of questions.

**Instructions:**

With a pencil, neatly print the correct answers in the corresponding answer column. All the questions refer to the accompanying drawings and the title block on diagram sheet 1. **[31]**

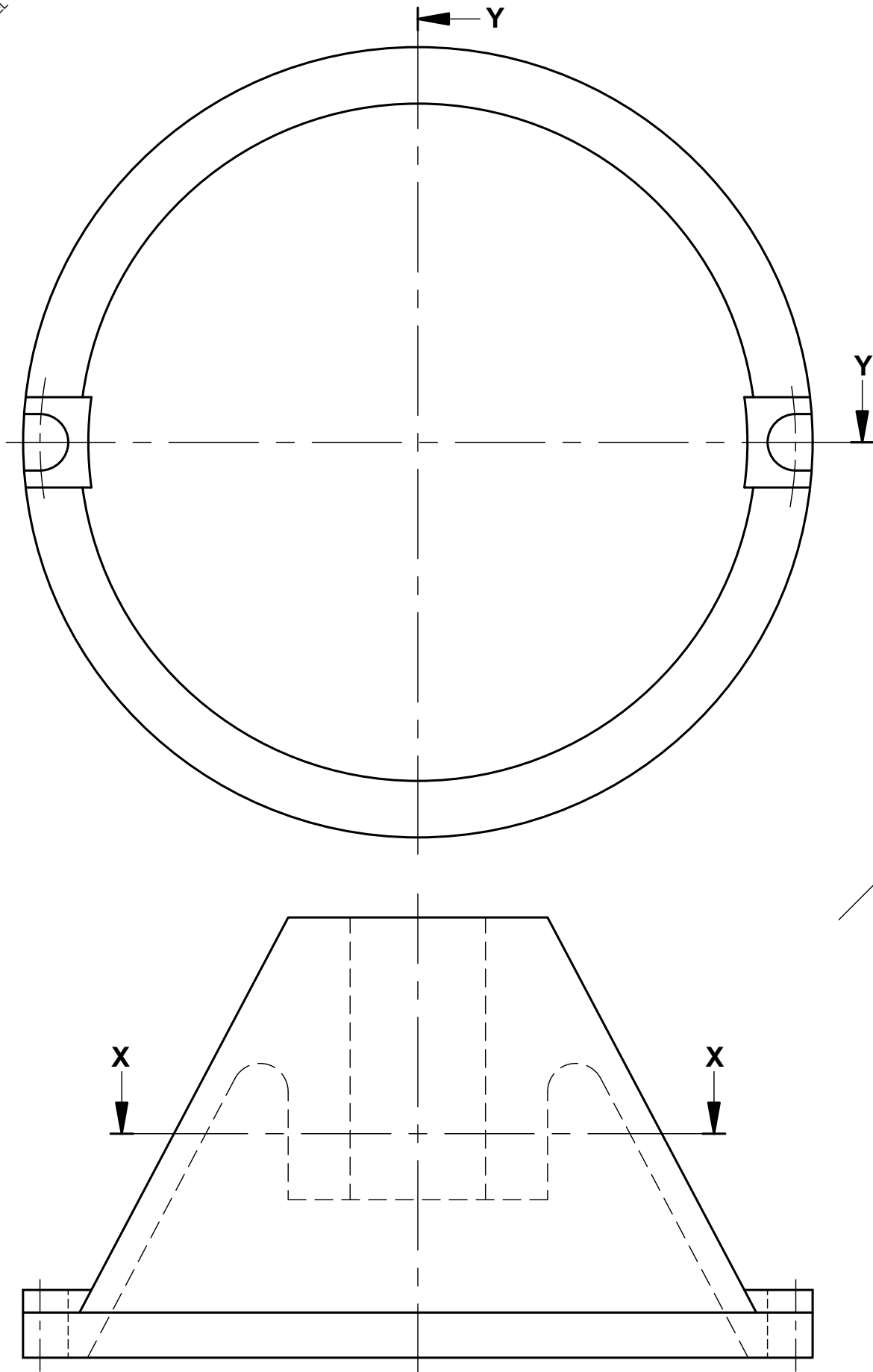
QUESTIONS		ANSWERS		
1	On what date was the drawing checked?		1	
2	What material is used to manufacture the parts?		1	
3	What is the manufacture's web address?		1	
4	How many sets of drawings are there for this belt tensioner?		1	
5	How many sets of drawings of these parts, have been signed?		1	
6	How many surfaces must be machined?		1	
7	Who revised the drawing?		1	
8	On which date was the drawing revised?		1	
9	Determine the dimensions at:	A:	B:	C:
10	What will the dimension at E be, if the scale is 5 : 1?		2	
11	What kind of part is F?		1	
12	What kind of key must be used?		2	
13	What drawing program is used?		1	
14	How many parts are there in this assembly?		1	
15	How many of each part must be manufactured?		1	
16	What is the formula to calculate the size of a screw thread?		2	
17	With reference to the tolerance, determine the maximum dimension of 20 mm.		2	
18	With reference to the tolerance, determine the minimum dimension of 20 mm.		2	
19	In the space below (ANSWER 19), draw, in neat freehand, the symbol for the projection system used.		5	
TOTAL			31	

MATERIAL: CAST IRON	UNLESS OTHERWISE SPECIFIED, TOLERANCES ON DIMENSIONS ARE ± 0.15.	MILLING
QUANTITY: 100		
SCALE 1 : 1	HEAT TREATMENT : NONE	TITLE:
FILE NAME: JD/2018	DRAWING SET NO.3 OF 4	<b>BELTTENSIONER</b>
VD BERGS	CHURCH STREET	13/05/2017
ENGINEERING WORKS	WELKOM 9460	JAN-HENDRIK
	www.jdvdb.co.za	INSERT KEY
		DATE
		CHANGED BY
		REVISION DESCRIPTION
		DRAWING PROGRAM: AUTOCAD 2018
		APPROVED: SCHALK
		DATE: 28/05/2017

**ANSWER 19** : PROJECTION SYMBOL

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STAPEL



**QUESTION 2: MECHANICAL SECTION**

**Given:**

- The incomplete top view.
- The complete front view.
- The center line of the right view.

**Instructions:**

Complete, according to scale 1:1, the following:

- 2.1 A sectional top view according to cutting plane X-X.
- 2.2 A half-sectional right view according to cutting plane Y-Y.

**Note:**

- NO hidden detail is required.

**[36]**

ASSESSMENT CRITERIA			
1	TOP VIEW	15	
2	RIGHT VIEW	21	
TOTAL		36	

STAPEL

**QUESTION 3: ISOMETRIC DRAWING**

**Given:**

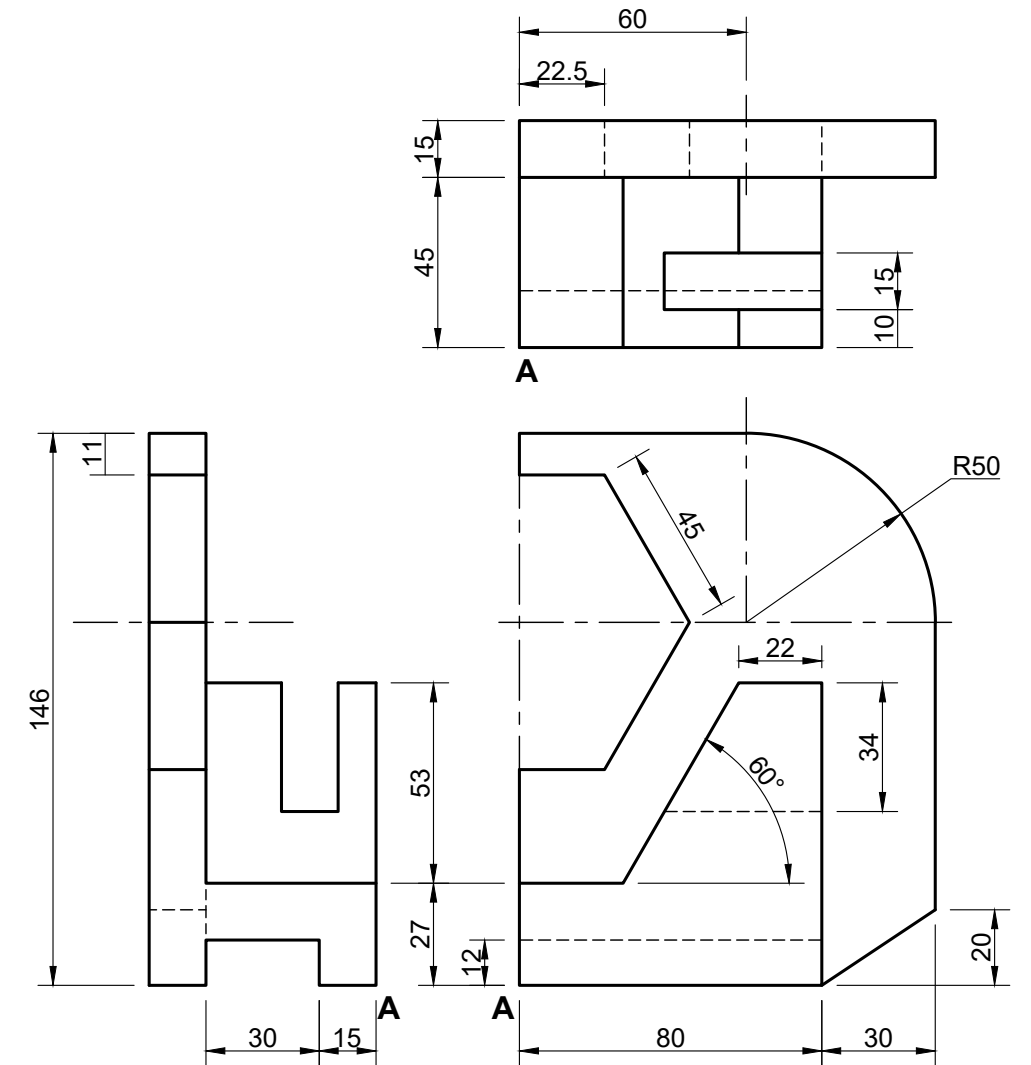
The front view, top view and left view of a casting.  
The position of point A on diagram sheet 3 (page 4).

**Instructions:**

Use scale of 1:1 to convert the orthographic view of the casting into an isometric drawing.

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

**[35]**

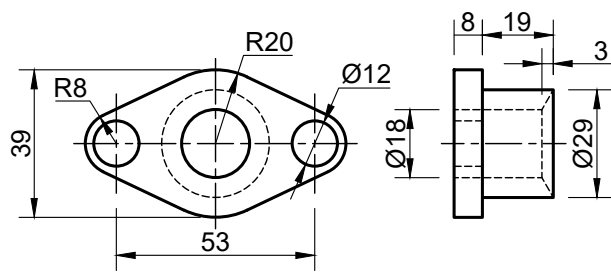


↓  
**A**

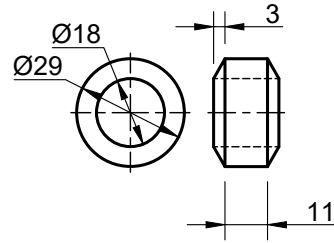
ASSESSERINGSKRITERIA			
1	PLACEMENT	2	
2	AUXILIARY VIEW(S) (½)	2	
3	ISO- + NON-ISOMETRIC LINES (4/2)	23.5	
4	CIRCLE + CONST + SL (Full) (½)	7.5	
TOTAL		35	

STAPEL

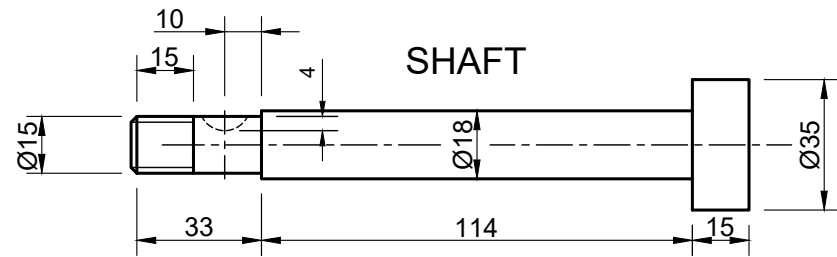
GLAND



PACKING

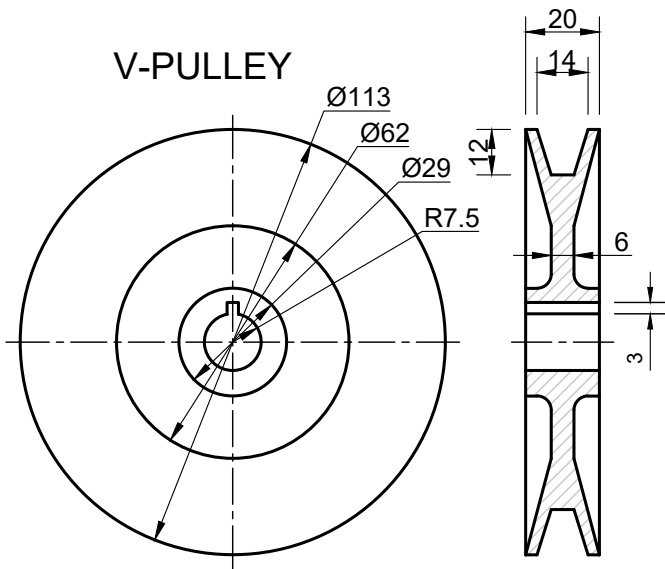


SHAFT

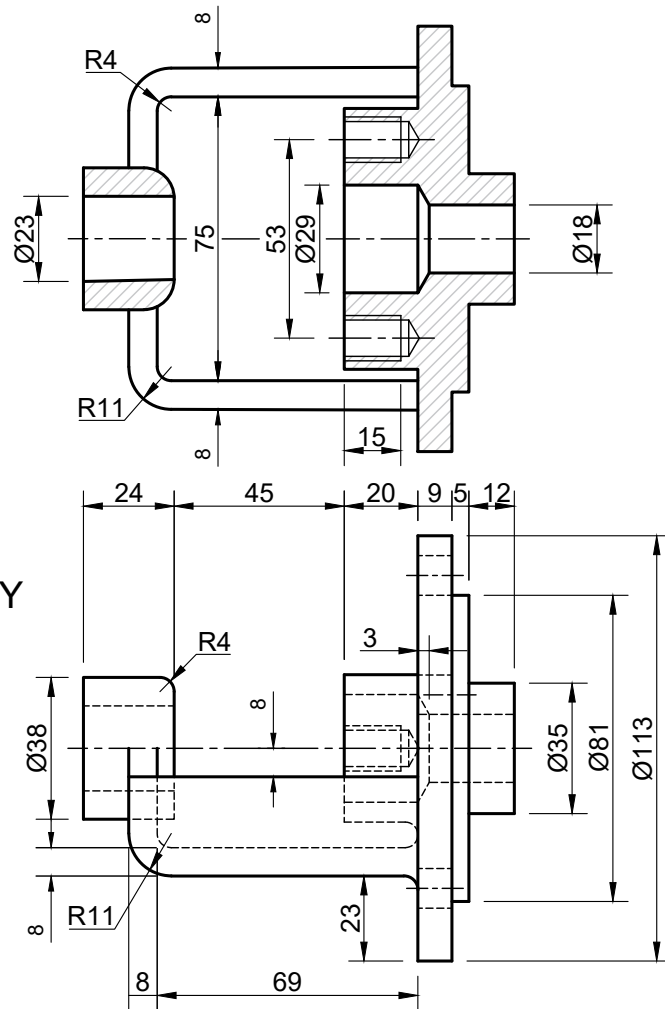
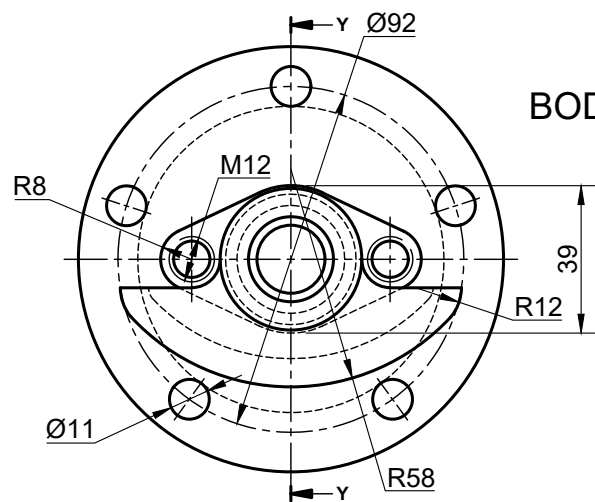


PARTS		
	DESCRIPTION	AMOUNT
1	BODY	1
2	V-PULLEY	1
3	GLAND	1
4	BUSH	1
5	WOODRUFF KEY	1
6	SHAFT	1
7	PACKING	1

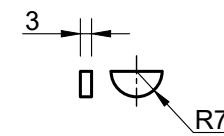
V-PULLEY



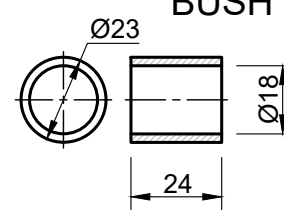
BODY



WOODRUFF KEY



BUSH



QUESTION 4: MECHANICAL ASSEMBLY

GIVEN:

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

INSTRUCTIONS:

- Answer this question on page 6 (diagram sheet 5).
- Draw, to scale 1:1 and in third-angle orthographic projection, the following views of the assembled parts of the centrifugal pump assembly.

- A sectional front view on cutting plane Y-Y, as seen from the direction of the arrow shown on the exploded isometric drawing.
- A left view.

NOTE:

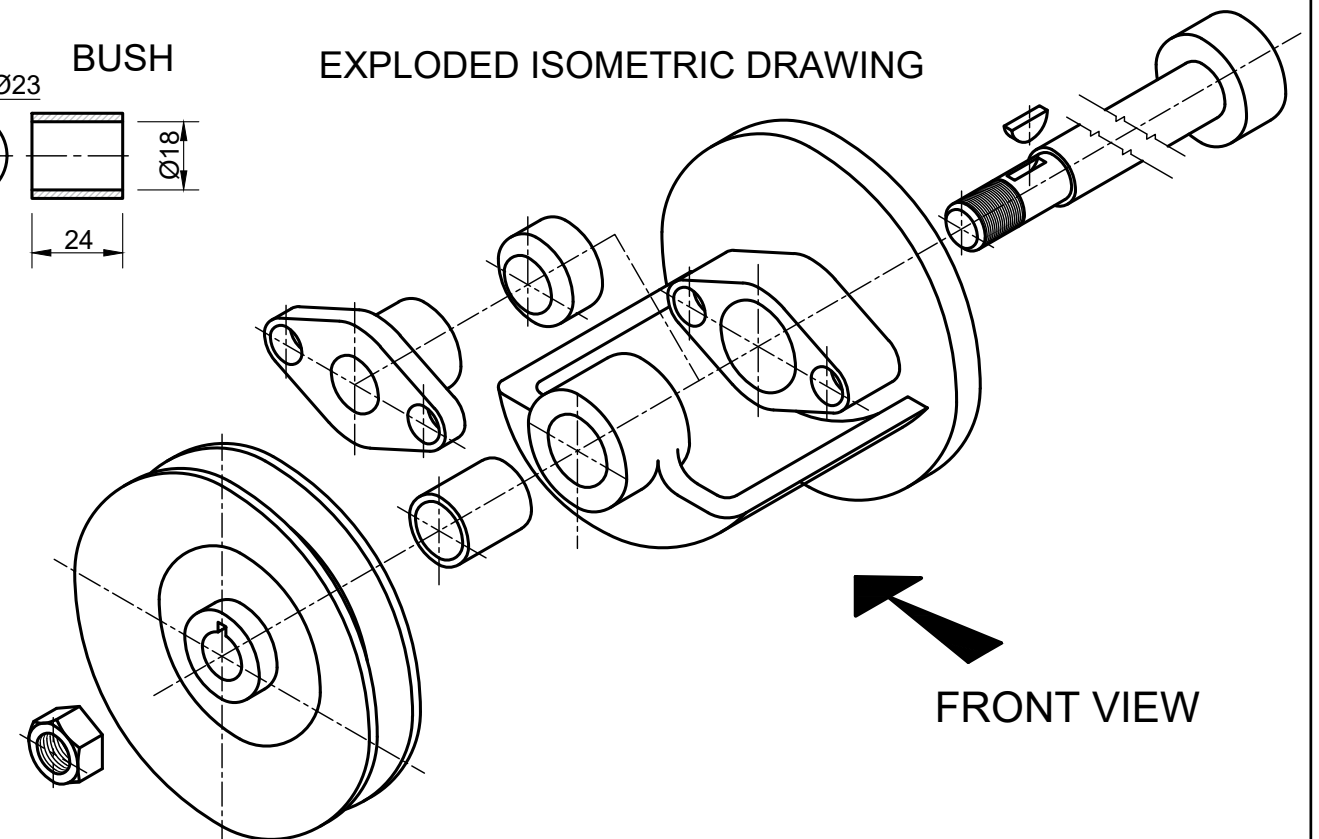
Planning is necessary.  
No hidden detail is required.  
All drawings must comply with the guidelines contained in the SANS 10111.  
The M15 nut is not shown. (Show THREE faces of the M15 nut on the sectional front view).

Add the following to the drawing:

- The cutting plane Y-Y.
  - The projection symbol of the system used for this drawing.
  - Supply the drawing with a title and scale in the title block provided:
- CENTRIFUGAL PUMP**  
**SCALE 1:1**

[98]

EXPLODED ISOMETRIC DRAWING





ASSESSMENT CRITERIA				
SECTIONAL FRONT VIEW			Mark	Mod.
1	BODY ( $\frac{40}{2}$ )	20		
2	V-PULLEY ( $\frac{40}{2}$ )	20		
3	GLAND ( $\frac{10}{2}$ )	5		
4	BUSH ( $\frac{4}{2}$ )	2		
5	WOODRUFF KEY ( $\frac{6}{2}$ )	2.5		
6	SHAFT ( $\frac{18}{2}$ )	9		
7	PACKING ( $\frac{6}{3}$ )	3		
8	M15-NUT ( $\frac{15}{2}$ )	7.5		
SUB TOTAL 1		11		
SUB TOTAL 2		69		

ASSESSMENT CRITERIA				
TECHNICAL PROVISION			Mark	Mod.
1	CENTER LINES	5		
2	CUTTING PLANE Y-Y ( $\frac{6}{2}$ )	3		
3	TITLE	2		
	SCALE	2		
4	PROJECTION SYMBOL	6		
SUB TOTAL 3		18		
GRAND TOTAL		98		

ASSESSMENT CRITERIA			
LEFT VIEW		Mark	Mod.
2	V-PULLEY ( $\frac{6}{2}$ )	3	
6	SHAFT ( $\frac{2}{2}$ )	1	
8	M15-NUT	7	
SUB TOTAL 1		11	

TITLE
SCALE
PROJECTION SYMBOL

DIAGRAM SHEET 5	ENGINEERING GRAPHICS AND DESIGN	JUNE 2018 - PAPER 2	NAME & SURNAME	GRADE	12	6
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