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

NATIONAL SENIOR CERTIFICATE

GRADE 11

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2013

EXAMINATIONS

MARKS: 200

TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

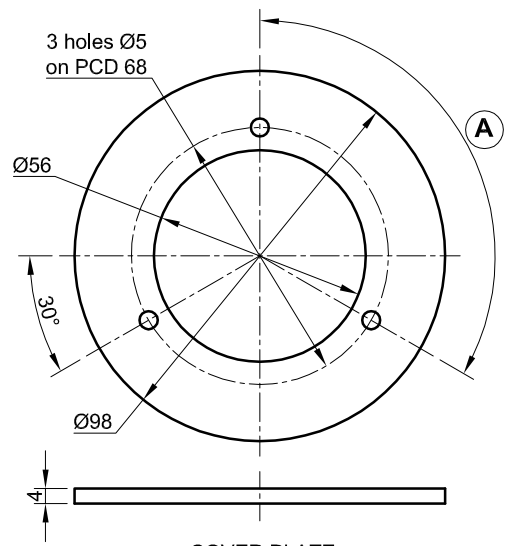
1. The paper consists of FOUR questions.
2. Answer ALL the questions.
3. All drawings must be drawn to scale 1:1, unless otherwise stated.
4. All questions must be answered on the answer sheets provided.
5. All the answer sheets must be re-stapled in numerical sequence and handed in irrespective of whether 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 assumed in good proportion.
10. All drawings are in Third Angle Ortographic Projection unless otherwise indicated.

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

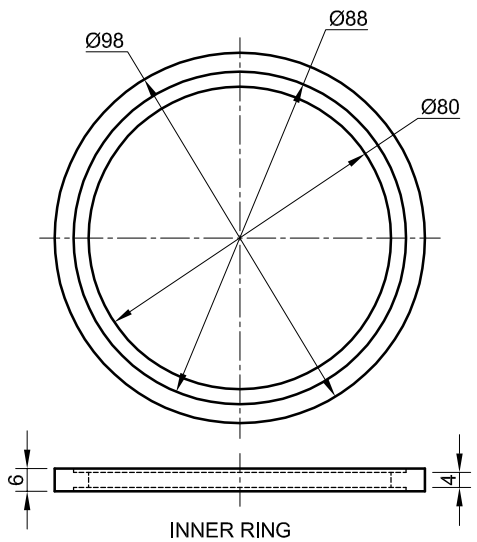
FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
EXAMINATION CENTRE

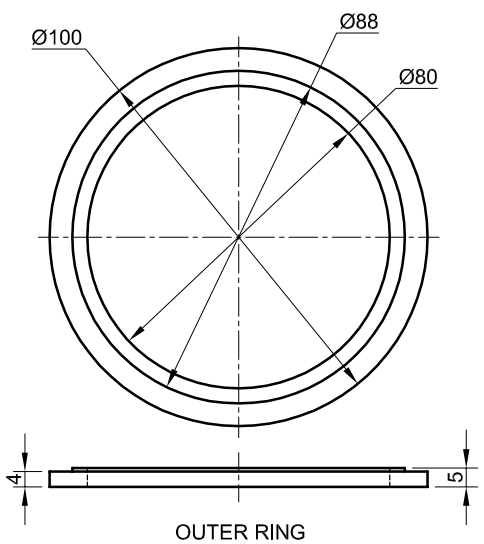
STAPLE



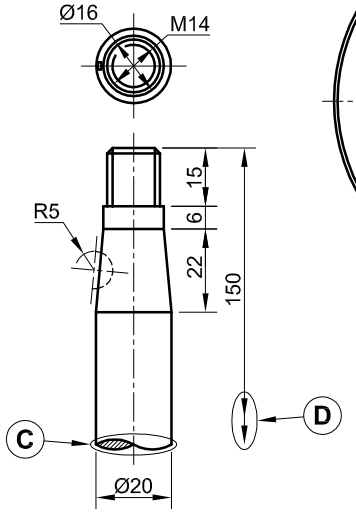
COVER PLATE



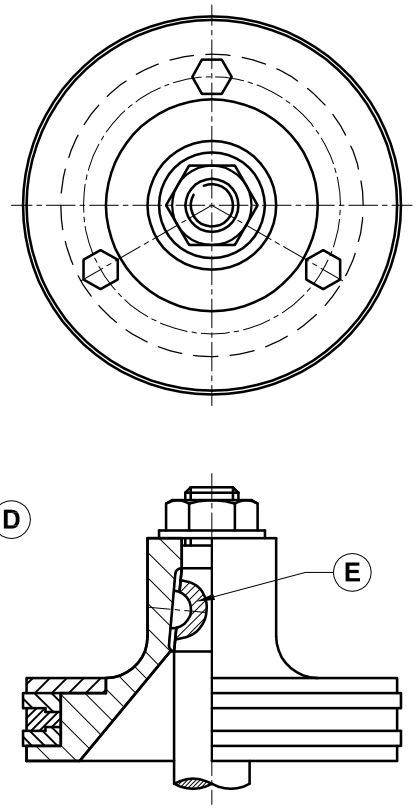
INNER RING



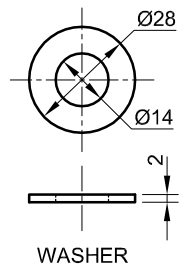
OUTER RING



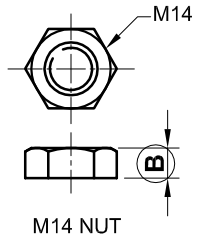
SHAFT



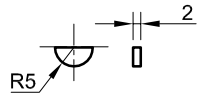
ASSEMBLED VIEWS



WASHER



M14 NUT



WOODRUFF KEY

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
Some parts of a piston, the sectional front view and top view of the assembled parts with a title block and a table of questions

Instructions:
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and title block.
Show all calculations. **[28]**

QUESTIONS		ANSWERS		
1	On what date was the drawing first checked?		1	
2	From what material is the cover plate manufactured?		1	
3	Which drawing method was used to create these drawings?		1	
4	What is the indicated scale that was used to draw the assembly?		1	
5	What is the tolerance allowed on the dimensions?		1	
6	On the COVER PLATE, what does the abbreviation 'PCD' stand for in the dimension?		2	
7	Calculate the degree of the angle at A?		2	
8	If a standard size M14 nut was used, calculate what would the thickness (B) of the nut be?		2	
9	What is feature C called?		1	
10	What is the reason for the double arrows at D?		2	
11	What type of section is shown at E?		1	
12	What type of section is shown on the assembled front view?		1	
13	How many parts are used in the complete assembly of the piston?		1	
14	What is the purpose of a key on a shaft in an assembly?		2	
15	Was the suggested revision on the drawing implemented?		1	
16	Draw the arrows for the cutting plane located on the top view of the assembly and label it A-A.		4	
17	In the box below (ANSWER 17), draw, in neat freehand, the symbol for the projection system used.		4	
	TOTAL		**28**	

ANSWER 17

09/01/2013	TULANI	REMOVE KEY ON SHAFT	1
DATE	CHANGED BY	REVISION DESCRIPTION	№

ALL DIMENSIONS ARE IN MILLIMETRES.

UNLESS OTHERWISE SPECIFIED, TOLERANCES ON DIMENSIONS ARE ± 0,35.

ALL UNSPECIFIED RADII ARE R3.

DRAWING PROGRAM: AUTOCAD 2013

DRAWN BY: PAULA
DATE: 20/11/2012
CHECKED BY: PETER
DATE: 30/11/2012
APPROVED BY: CHRIS
DATE: 14/12/2012
SCALE: 1 : 2

DRAWING SET NO. 2 OF 3
FILE NAME: SH-03-2011
MATERIAL: VARIOUS
HEAT TREATMENT: NONE

MICRO STEEL
MANUFACTURING

SUTTON ROAD
SYDENHAM
6001
www.microsteel.co.za

PISTON

PARTS LIST

PART	QUANTITY	MATERIAL
1. PISTON (not shown)	1	CAST IRON
2. SHAFT	1	MILD STEEL
3. COVER PLATE	1	CAST IRON
4. OUTER RING	2	MILD STEEL
5. INNER RING	1	MILD STEEL
6. WASHER	1	MILD STEEL
7. M14 NUT	1	MILD STEEL
8. M5 BOLT (not shown)	3	MILD STEEL
9. WOODRUFF KEY	1	MILD STEEL

EXAMINATION NUMBER

EXAMINATION NUMBER 2

STAPLE

QUESTION 2: LOCI (HELIX)

Given:

- The incomplete front view of a square helix showing the start and end points
- The top view of the square helix

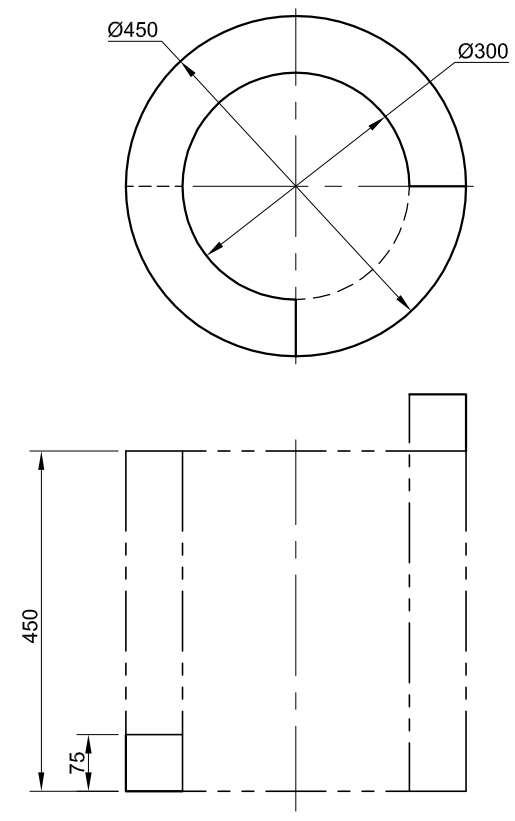
Instructions:

Draw, to scale 1:5, the complete front view and the top view of the square helix according to the following specifications:

- Left-hand square helix
- Pitch 300 mm
- 1½ turns

Note:

- NO hidden detail is required in the front view.
- Study the given diagrams carefully before you start drawing.
- Show ALL necessary constructions. **[38]**



ASSESSMENT CRITERIA				
1. CONSTRUCTION	6			
2. TOP VIEW	4			
3. DIRECTION	3			
4. CENTRE LINES	1½			
5. HELIX	23½			
TOTAL	**38**			

EXAMINATION NUMBER

EXAMINATION NUMBER 3

STAPLE

QUESTION 3: ISOMETRIC DRAWING

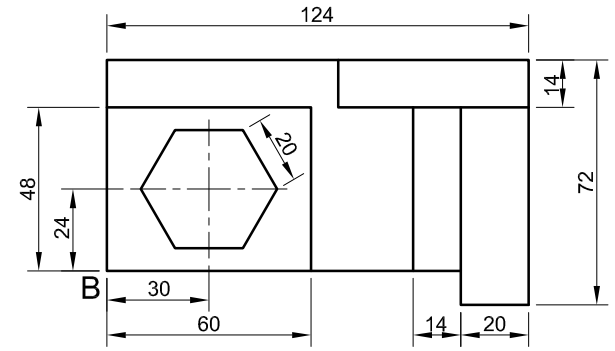
Given:

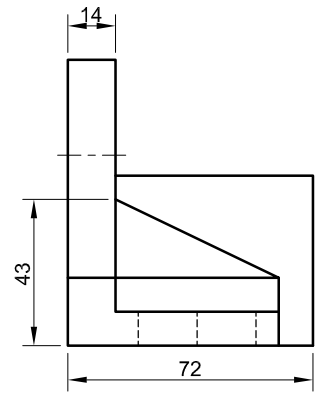
- The front view, top view and left view of a model
- The position of point B on the drawing sheet

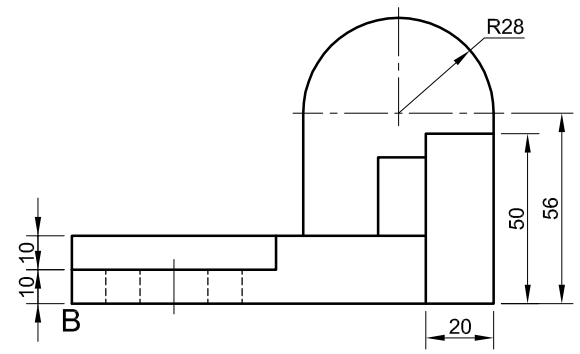
Instructions:

Convert the orthographic views of the model into a scale 1 : 1 isometric drawing.

- Make corner B the lowest point of the drawing.
- Show ALL necessary circle and other construction.
- NO hidden detail is required. **[38]**





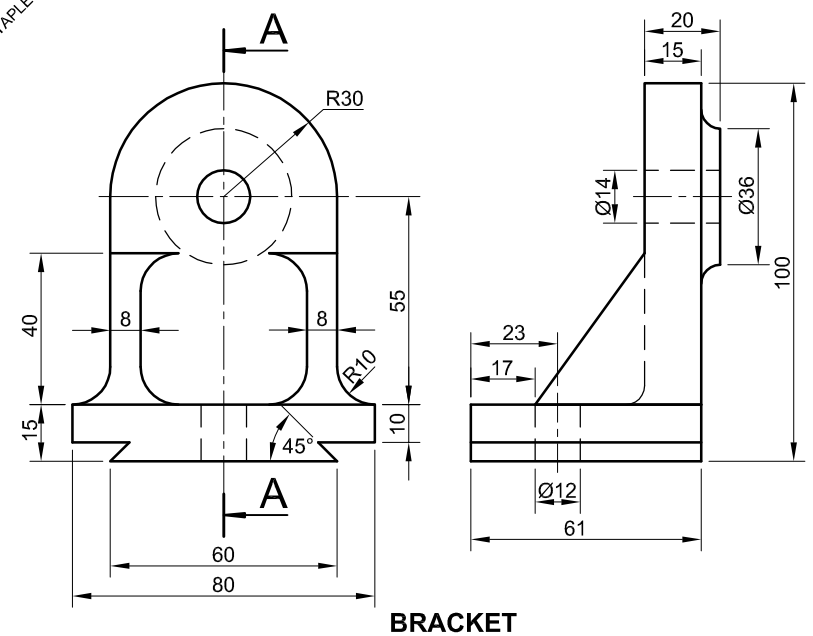


B

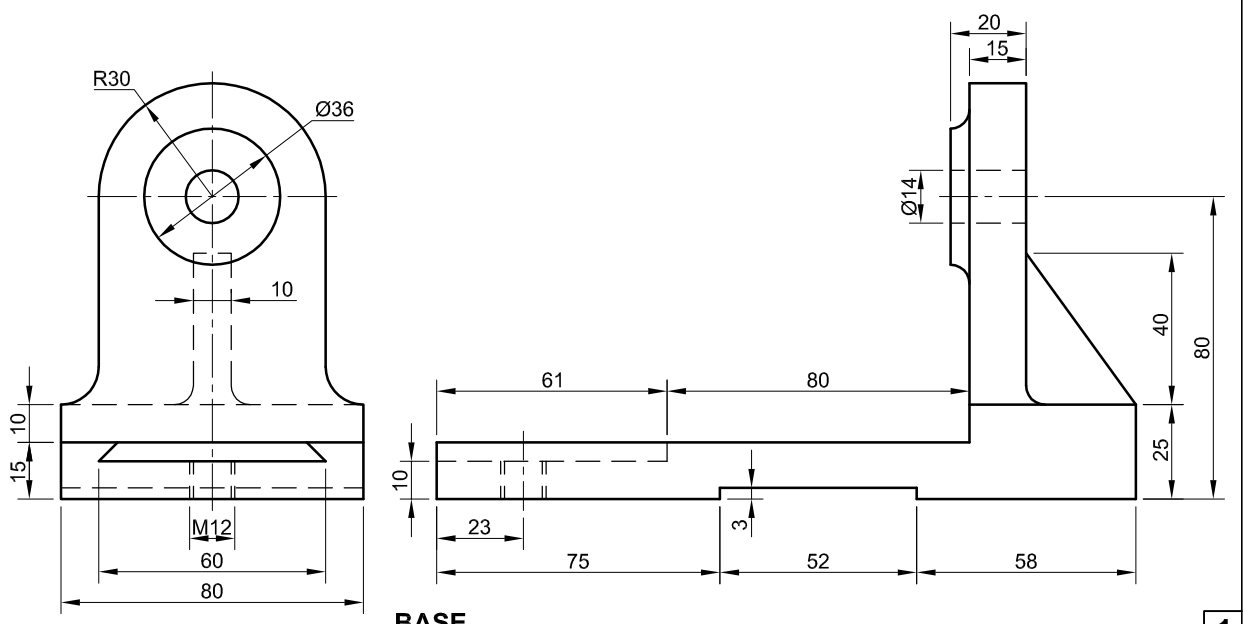
ASSESSMENT CRITERIA				
1. AUX. VIEW + PLACING	3			
2. ISOMETRIC LINES	17			
3. NON-ISOMETRIC LINES	9½			
4. ISOMETRIC CIRCLES	5			
5. CIRCLE CONSTRUCTION	1½			
6. CENTRE LINES	2			
TOTAL	**38**			
EXAMINATION NUMBER				

EXAMINATION NUMBER 4

STAPLE



BRACKET 2



BASE 1

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a pulley assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the pulley assembly
- The centerlines of the left view on page 6

Instructions:

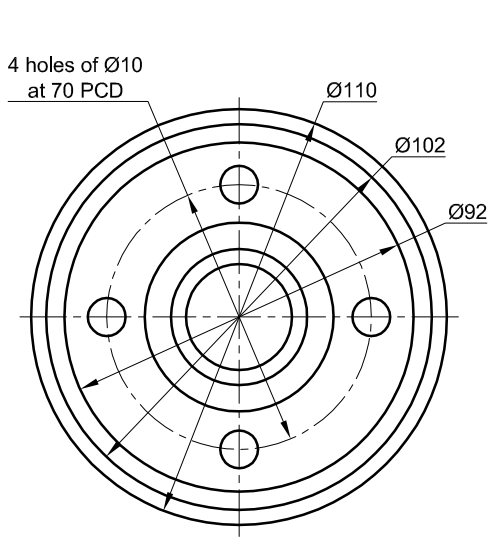
- Answer this question on page 6.
- Draw, to scale 1 : 1 and in third-angle orthographic projection, the following views of the assembled parts of the pulley assembly:
  - •• **A sectional front view**, on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane is shown on the left view of the bracket (part 2).
  - •• The **left view**.
- ALL drawings must comply with the guidelines contained in the *SABS 0111*.

NOTE:

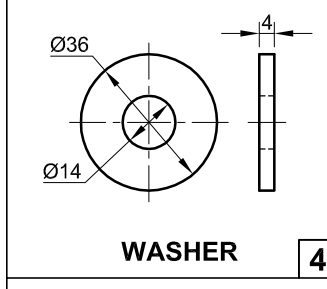
- Show three sides of the nut in the sectional front view.
- No hidden detail is required.

Insert the following detail to the drawing

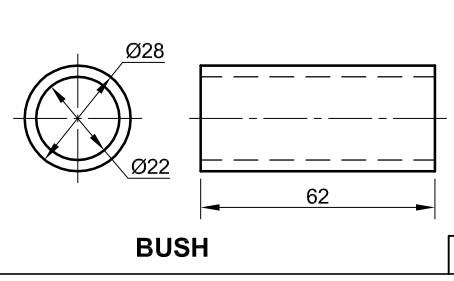
- The cutting plane A-A
- Label the sectional view: SECTION A-A **[96]**



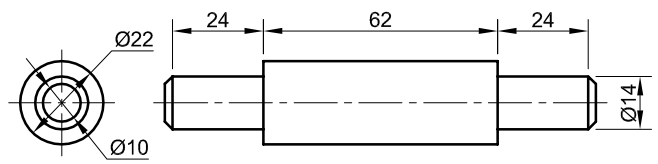
PULLEY 5



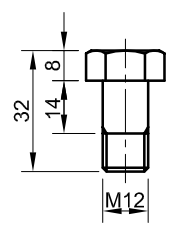
WASHER 4



BUSH 6



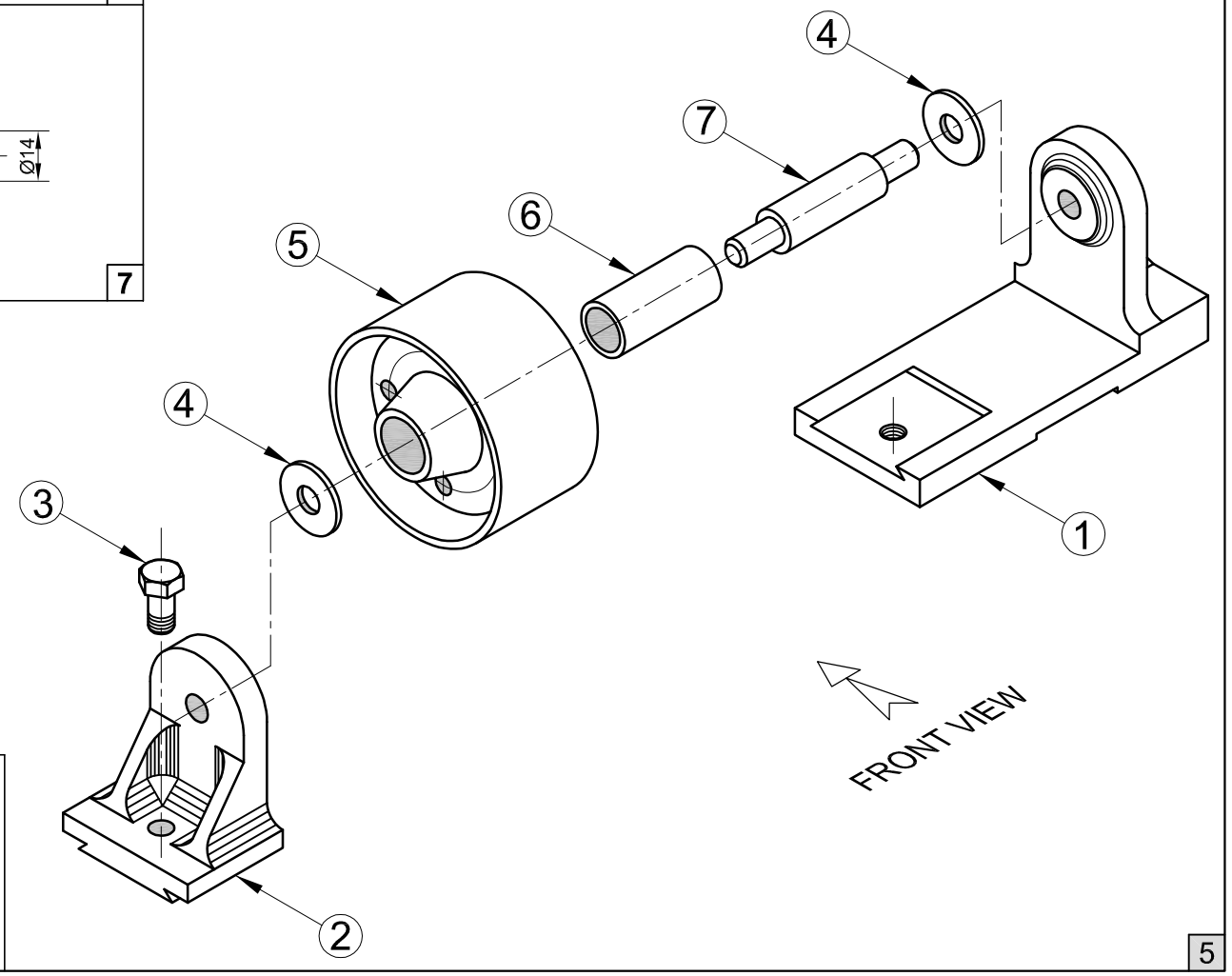
SHAFT 7



M12 BOLT 3

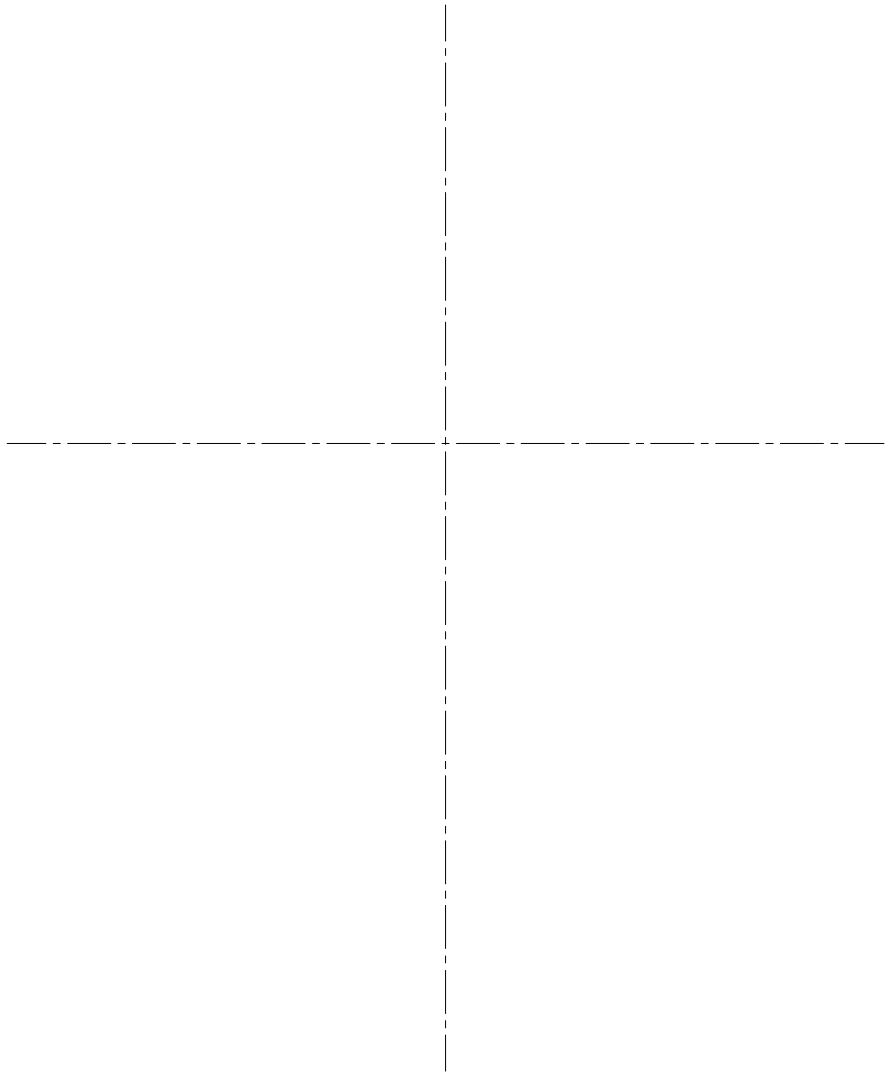
PARTS LIST		
PART	QUANTITY	MATERIAL
1. BASE	1	CAST IRON
2. BRACKET	1	CAST IRON
3. BOLT	1	MILD STEEL
4. WASHER	2	MILD STEEL
5. PULLEY	1	CAST IRON
6. BUSH	1	BRONZE
7. SHAFT	1	MILD STEEL

ALL DIMENSIONS ARE IN MILLIMETRES.	DRAWN BY: JOHAN	MICRO STEEL MANUFACTURING	SUTTON ROAD SYDENHAM 6001 www.microsteel.co.za	EASTERN CAPE DEPARTMENT BASIC EDUCATION GRADE 11 NOVEMBER 2013
	DATE: 10/12/2012			
	CHECKED BY: BEYERS			
ALL UNSPECIFIED RADII ARE R5.	DATE: 30/01/2013			
	APPROVED BY: JOSEPH			
DRAWING PROGRAM: CAD 2013	DATE: 25/02/2013	TITLE PULLEY ASSEMBLY		
	SCALE 1 : 2			



5

STAPLE



ASSESSMENT CRITERIA				
TOP VIEW + GENERAL				
	POSSIBLE	OBTAINED	SIGN	MODERATE
1. BASE	11			
2. BRACKET	$5\frac{1}{2}$			
3. BOLT	$10\frac{1}{2}$			
4. WASHER	3			
5. BUSH	2			
6. PULLEY	11			
7. SHAFT	6			
8. CENTERLINES	2			
LABEL	1			
HATCHING	15			
SUBTOTAL	**67**			
SECTIONAL FRONT VIEW				
1. BASE	4			
2. BRACKET	$7\frac{1}{2}$			
3. BOLT	3			
4. WASHER				
5. BUSH				
6. PULLEY	6			
7. SHAFT	2			
8. CENTERLINE	1			
9. SECTION AA	3			
10. AUX VIEW	$2\frac{1}{2}$			
SUBTOTAL	**29**			
TOTAL	**96**			

EXAMINATION NUMBER	
EXAMINATION NUMBER	6