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

NATIONAL SENIOR CERTIFICATE

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P2

SEPTEMBER 2013

PREPARATORY EXAMINATIONS

MARKS: 200

TIME: 3 hours

This question paper consists of 7 pages.

INSTRUCTIONS AND INFORMATION

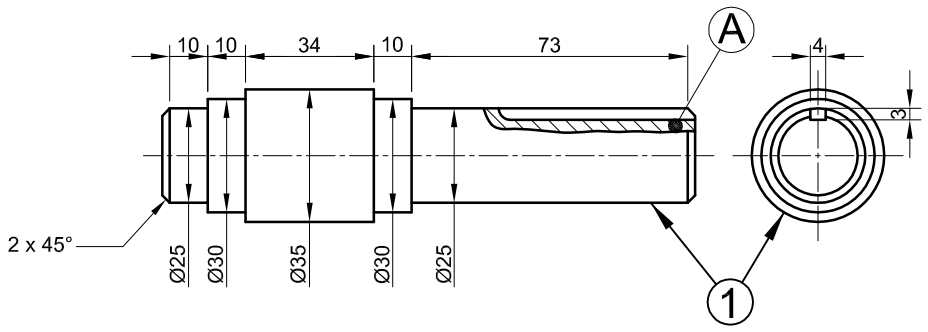
1. The paper consists of FOUR questions.
2. Answer ALL the questions.
3. All drawings must be drawn to scale 1:1, unless otherwise stated.
4. All questions must be answered on the answer sheets provided.
5. All the answer sheets must be re-stapled in numerical sequence and handed in irrespective of whether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

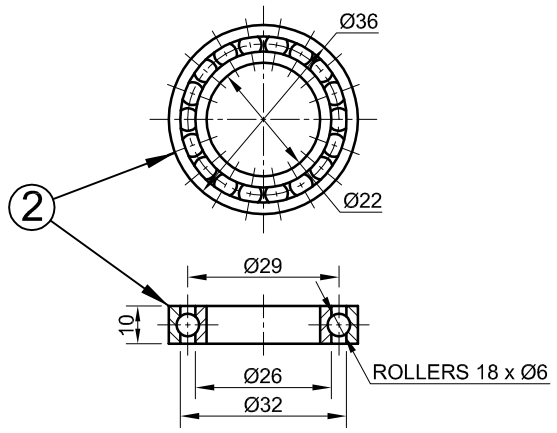
FOR OFFICIAL USE ONLY							
					MODERATED MARK		
1							
2							
3							
4							
TOTAL							
	2	0	0				

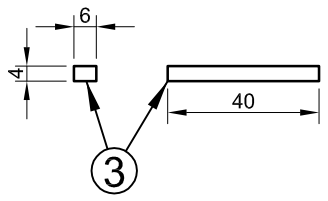
FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
EXAMINATION CENTRE

STAPLE



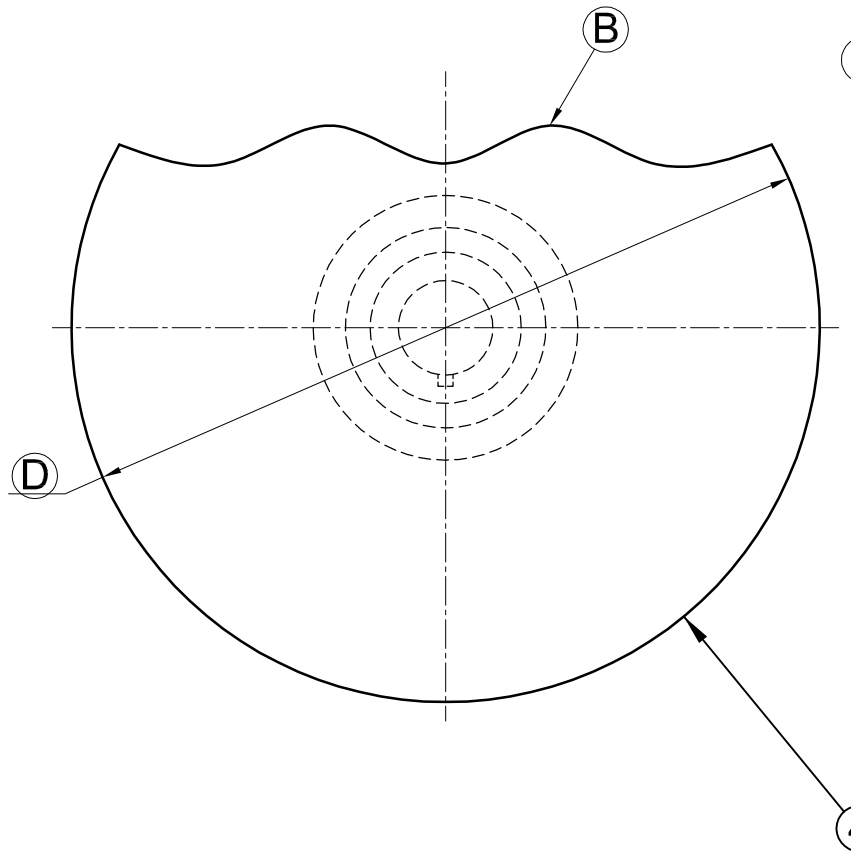


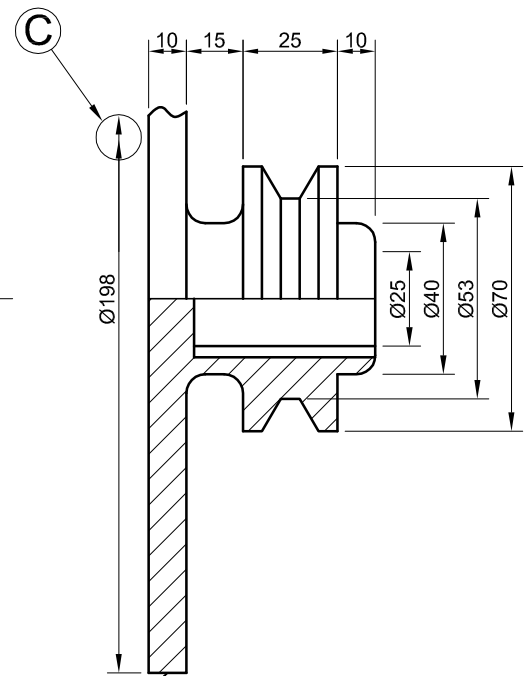


QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
Four parts of a sanding disc 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. **[24]**





	QUESTIONS	ANSWERS		
1	On what date was the drawing drawn?		1	
2	From what material is the disc manufactured?		1	
3	Which drawing method was used to create these drawings?		1	
4	How many changes were made to these drawings?		1	
5	What is the tolerance allowed on the dimensions?		1	
6	What type of sectioning is indicated by A?		1	
7	What is feature B called?		1	
8	What is the purpose of feature B?		1	
9	What is purpose of feature C?		1	
10	Determine the dimension at D.		1	
11	Determine the total length of the shaft.		1	
12	Draw the arrows for the cutting plane located on part 4 and label it A-A.		4	
13	In the box below (ANSWER 13), draw, in neat freehand, the symbol for the projection system used.		4	
14	In the box below (ANSWER 14), draw, in neat freehand, the convention for the front view of the bearing.		5	
	TOTAL		**24**	

ANSWER 13

ANSWER 14

	15/05/2013	PETER	TYPE OF KEY	A
ALL DIMENSIONS ARE IN MILLIMETRES.	DATE	CHANGED BY	REVISION DESCRIPTION	№

UNLESS OTHERWISE SPECIFIED, TOLERANCES ON DIMENSIONS ARE ± 0,25.	DRAWN BY: AKONA	DRAWING SET NO. 2 OF 4	MATERIAL: VARIOUS
	DATE: 20/04/2013	FILE NAME: P-S2-B4	HEAT TREATMENT: NONE
ALL UNSPECIFIED RADII ARE R5.	CHECKED BY: PIERRE	MICRO STEEL MANUFACTURING	SUTTON ROAD SYDENHAM 6001 www.microsteel.co.za
	DATE: 26/04/2013		
DRAWING PROGRAM: AUTOCAD 2013	APPROVED BY: IAN	SANDING DISC	
	DATE: 01/05/2013		
	SCALE: 1 : 2		

PARTS LIST

PART	QUANTITY	MATERIAL
1. SHAFT	1	MILD STEEL
2. BEARING	2	MILD STEEL
3. KEY	1	MILD STEEL
4. DISC	1	CAST IRON

EXAMINATION NUMBER

EXAMINATION NUMBER 2

STAPLE

QUESTION 2.1: LOCI (MEGANISM)

Given:

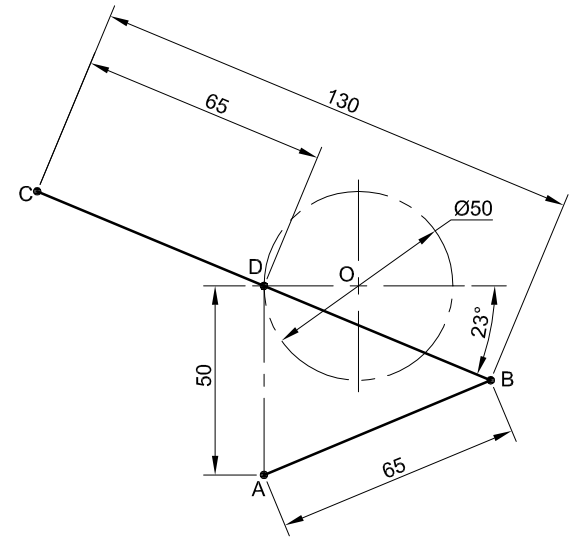
- A and O are fixed points and AB and BC are two links which pivot at B
- Point D is attached to a crank pin which moves on the pitch circle as indicated

Instructions:

- Copy, to scale 1:1, the given view.
- Construct the locus of B and C for one complete revolution of the crank pin.

Note:

- Study the given diagrams carefully before you start drawing.
- Show ALL necessary constructions. **[24]**



ASSESSMENT CRITERIA				
1. COPY	3			
2. CONSTRUCTION	4			
3. POINTS	11			
4. CURVE	6			
TOTAL	**24**			

EXAMINATION NUMBER

EXAMINATION NUMBER 3

STAPLE

QUESTION 2.2: CAMS

Given:
A cam displacement diagram of which the first 240° moves at constant velocity and the last 120° moves at a simple harmonic motion.

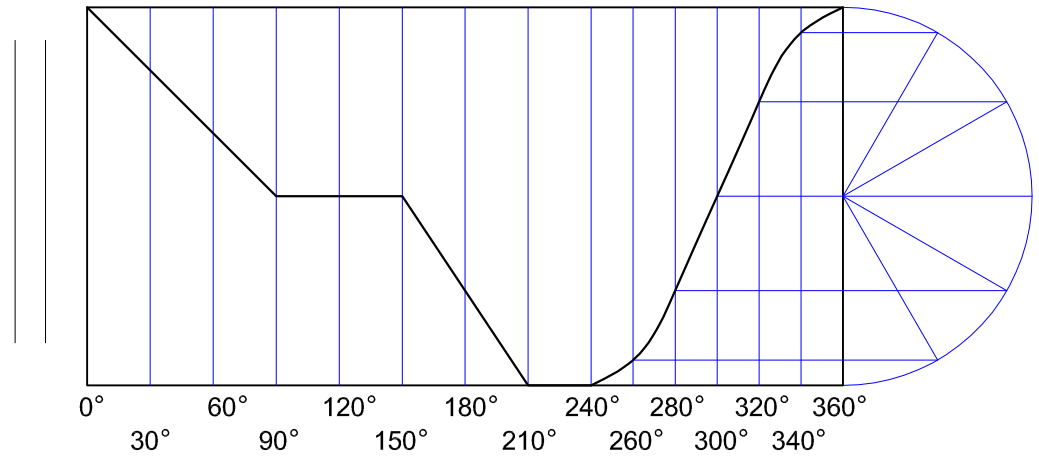
Instructions:
Using the given cam displacement diagram, determine the cam profile of a wedge shaped follower. The cam rotates in a clockwise direction. Complete the cam profile by using the following specifications:

- Minimum radius R20
- Camshaft diameter Ø20

Notes:

- Show all the necessary constructions.
- Show the direction of the cam rotation.
- Show the camshaft.
- Name the horizontal and vertical axes of the displacement diagram. **[22]**

DISPLACEMENT DIAGRAM



ASSESSMENT CRITERIA				
1. CONSTR. & DIRECTION	4			
2. POINTS	7			
3. CURVE	6			
4. SHAFT, MIN RADIUS & ARROW	3			
5. LABELS	2			
TOTAL	**22**			

EXAMINATION NUMBER	
EXAMINATION NUMBER	4

STAPLE

QUESTION 3: ISOMETRIC DRAWING

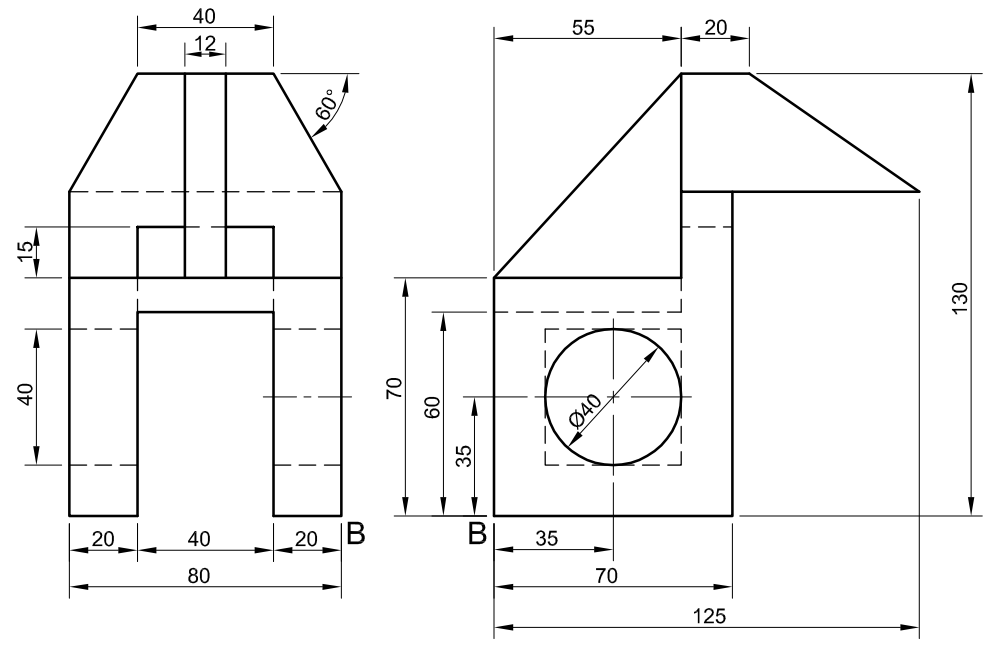
Given:

- The front view and left view of a channel jig
- The position of point B on the drawing sheet

Instructions:

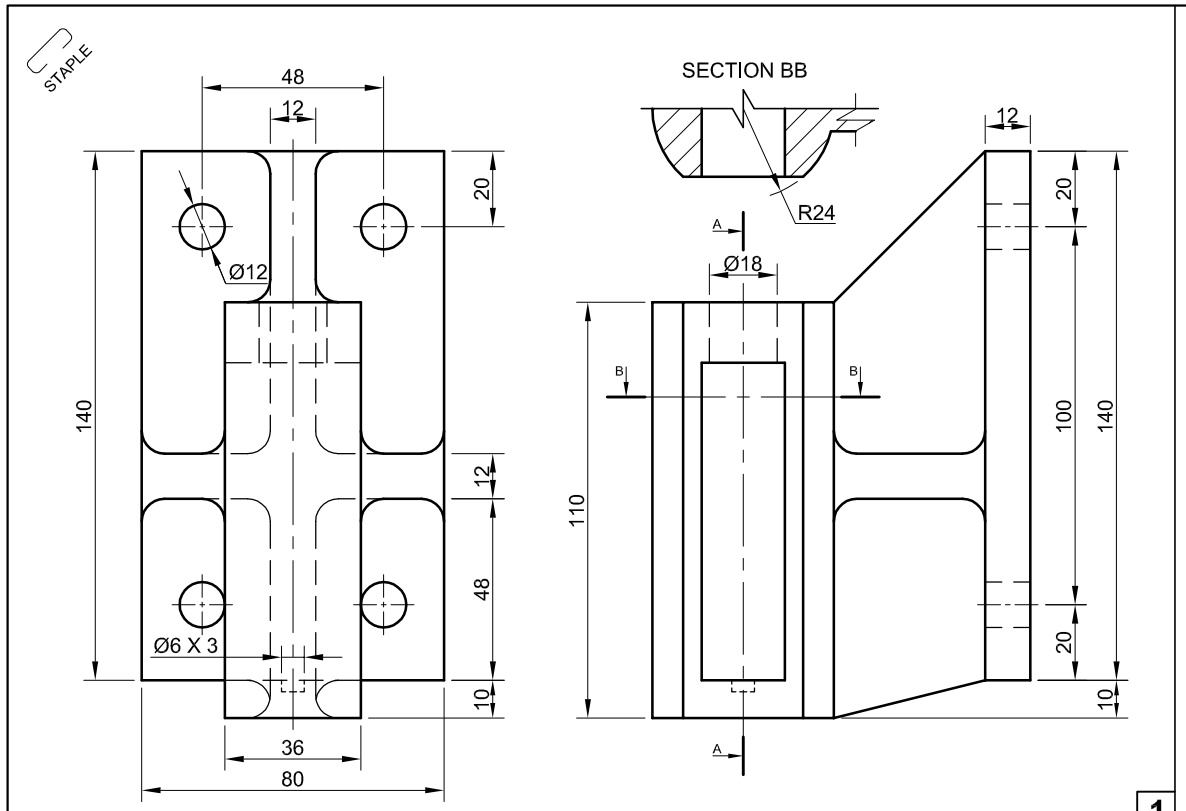
Convert the orthographic views of the channel jig into a scale 1 : 1 isometric drawing.

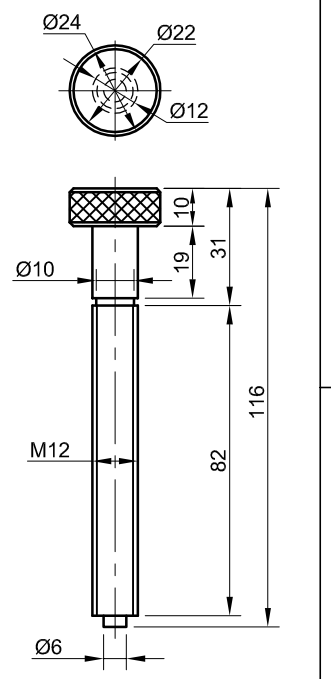
- Make corner B the lowest point of the drawing.
- Show ALL necessary circle and other construction.
- NO hidden detail is required. **[33]**

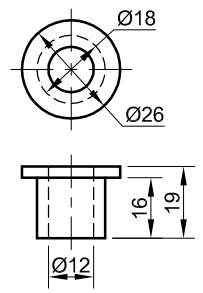


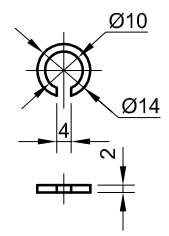
B

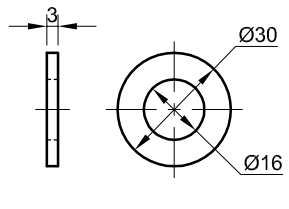
ASSESSMENT CRITERIA					
1. AUX. VIEW + PLACING	3				
2. ISOMETRIC LINES	$14\frac{1}{2}$				
3. NON-ISOMETRIC LINES	7				
4. ISOMETRIC CIRCLES	5				
5. CIRCLE CONSTRUCTION	2				
6. CENTRE LINES	$1\frac{1}{2}$				
TOTAL	**33**				
EXAMINATION NUMBER					
EXAMINATION NUMBER					5

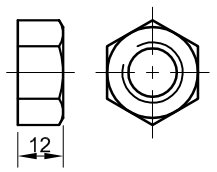


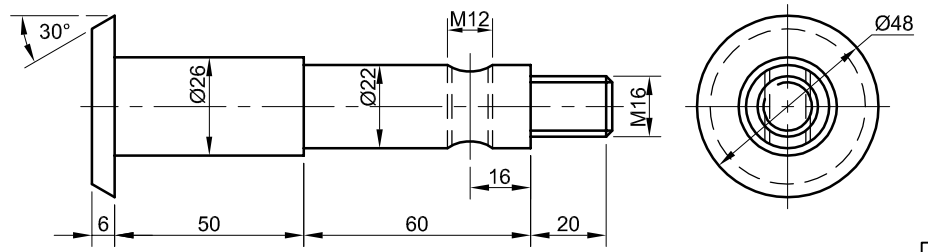


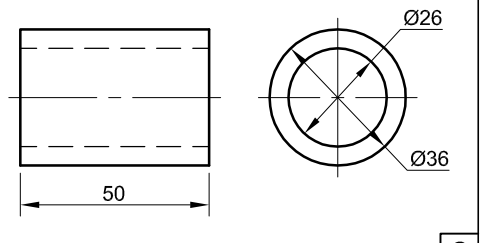


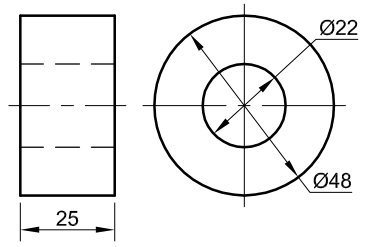












QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a pulley tensioner, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the pulley tensioner
- The incomplete right view on page 7

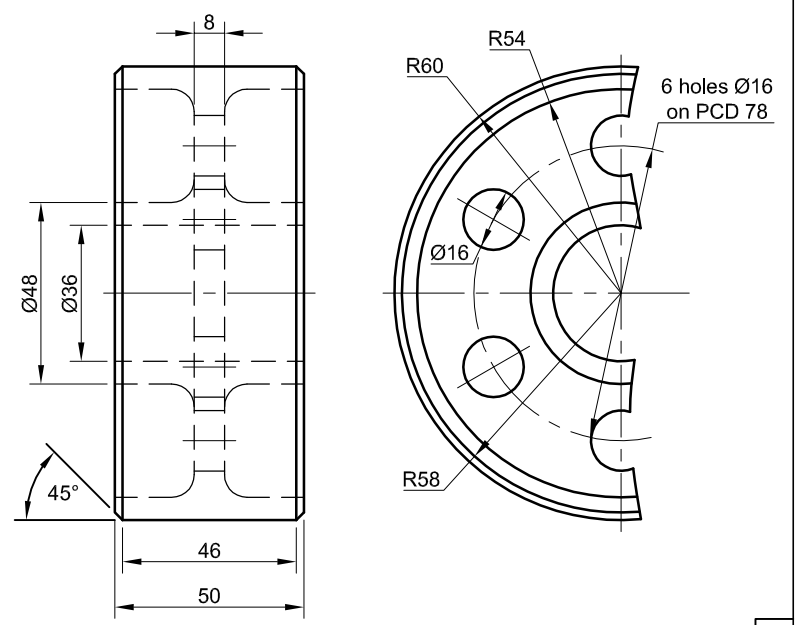
Instructions:

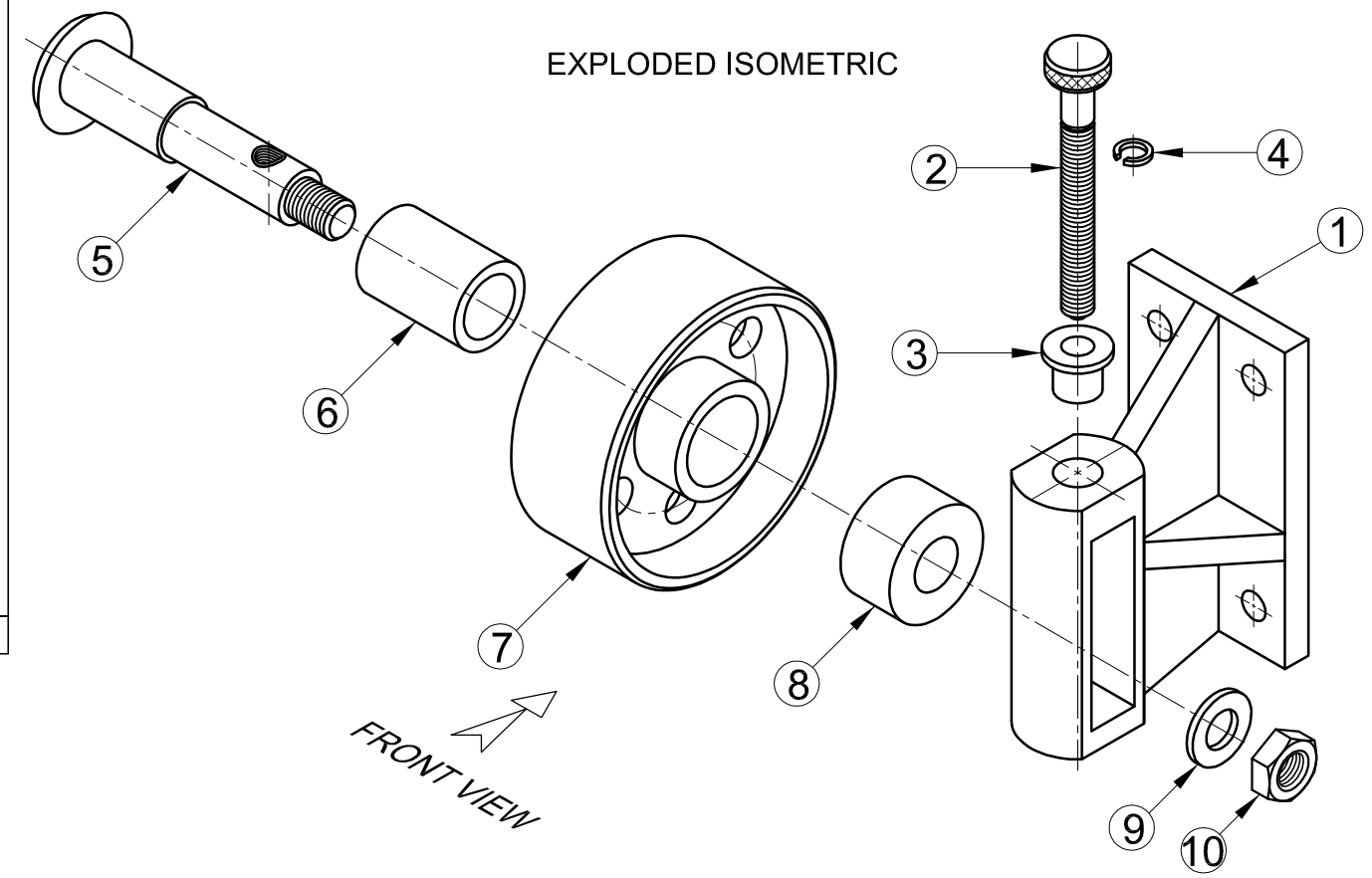
- Answer this question on page 7.
- Draw, to scale 1 : 1 and in third-angle orthographic projection, the following views of the assembled parts of the pulley tensioner assembly:
  - **4.1 A sectional front view**, on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane is shown on the right view of the base (part 1).
  - **4.2** Complete the **right 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. **[97]**

PARTS LIST		
PART	QUANTITY	MATERIAL
1. BASE	1	CAST IRON
2. BOLT	1	MILD STEEL
3. BUSH	1	BRONZE
4. CIRCLIP	1	CAST IRON
5. SHAFT	1	MILD STEEL
6. BUSH	1	BRONZE
7. PULLEY	1	MILD STEEL
8. SPACER	1	MILD STEEL
9. WASHER	1	MILD STEEL
10. M16 NUT	1	MILD STEEL

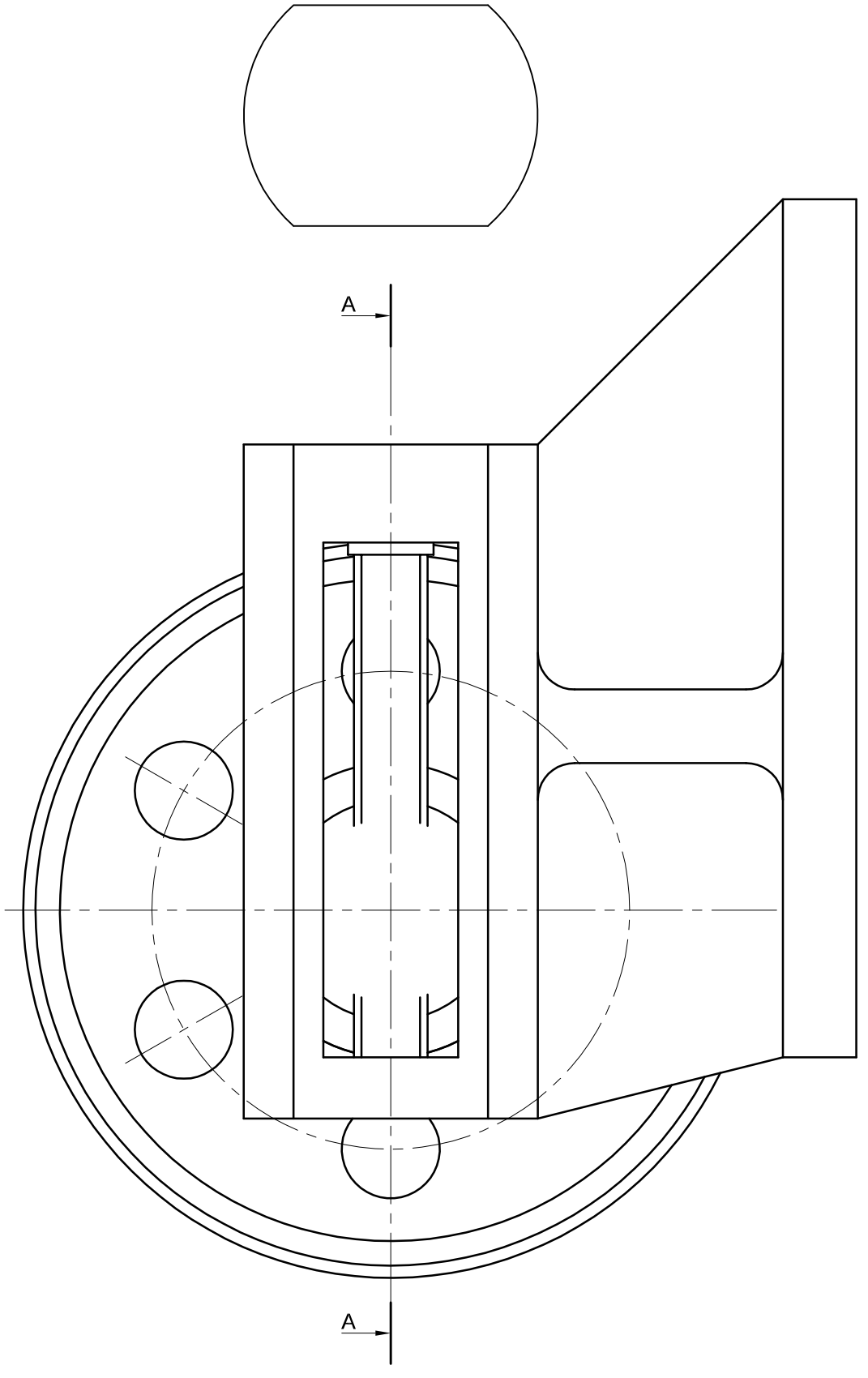




ALL DIMENSIONS ARE IN MILLIMETRES.	DRAWN BY: JOHAN	MICRO STEEL MANUFACTURING SUTTON ROAD SYDENHAM 6001 www.microsteel.co.za
	DATE: 17/05/2013	
	CHECKED BY: BEYERS	
ALL UNSPECIFIED RADII ARE R6.	DATE: 30/05/2013	
	APPROVED BY: JOSEPH	
DRAWING PROGRAM: CAD 2013	DATE: 25/06/2013	TITLE: PULLEY TENSIONER
	SCALE 1 : 2	

Please turn over

STAPLE



ASSESSMENT CRITERIA				
SECTIONAL FRONT VIEW				
	POSSIBLE	OBTAINED	SIGN	MODERATE
1. BASE	15			
2. CIRCLIP	$2\frac{1}{2}$			
3. BOLT	$8\frac{1}{2}$			
4. BUSH	$2\frac{1}{2}$			
5. PULLEY	17			
6. SHAFT	7			
7. BUSH	1			
8. SPACER	2			
9. WASHER	$1\frac{1}{2}$			
10. M16 NUT	5			
11. CENTRE LINES	3			
SUBTOTAL	**65**			
RIGHT VIEW				
1. BASE				
2. CIRCLIP				
3. BOLT	5			
4. BUSH	$1\frac{1}{2}$			
5. PULLEY				
6. SHAFT	$2\frac{1}{2}$			
7. BUSH				
8. SPACER				
9. WASHER	1			
10. M16 NUT	4			
11. HATCHING	18			
SUBTOTAL	**32**			
TOTAL	**97**			

EXAMINATION NUMBER	
EXAMINATION NUMBER	7