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EASTERN CAPE EDUCATION DEPARTMENT
OOS-KAAP ONDERWYSDEPARTEMENT**

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11



**ENGINEERING GRAPHICS AND DESIGN P2
NOVEMBER 2018
EXAMINATIONS**

MARKS: 200

TIME: 3 hours

This question paper consists of 6 pages.

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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. The questions must be answered on the answer sheets provided.
5. All the answers 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.

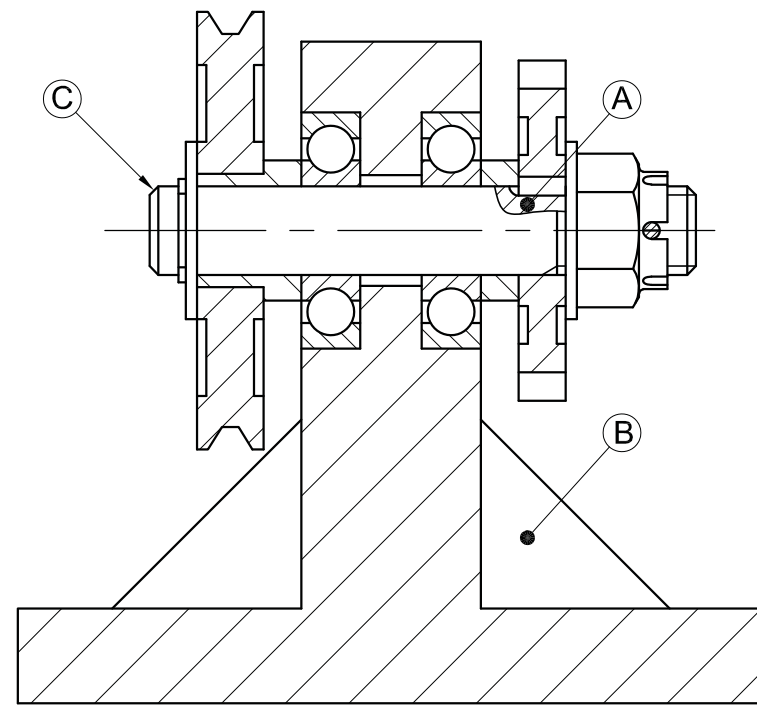
FOR OFFICIAL USE ONLY				
				MODERATED MARK
1				
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	2	0	0	

FINAL CONVERTED MARK	CHECKED BY
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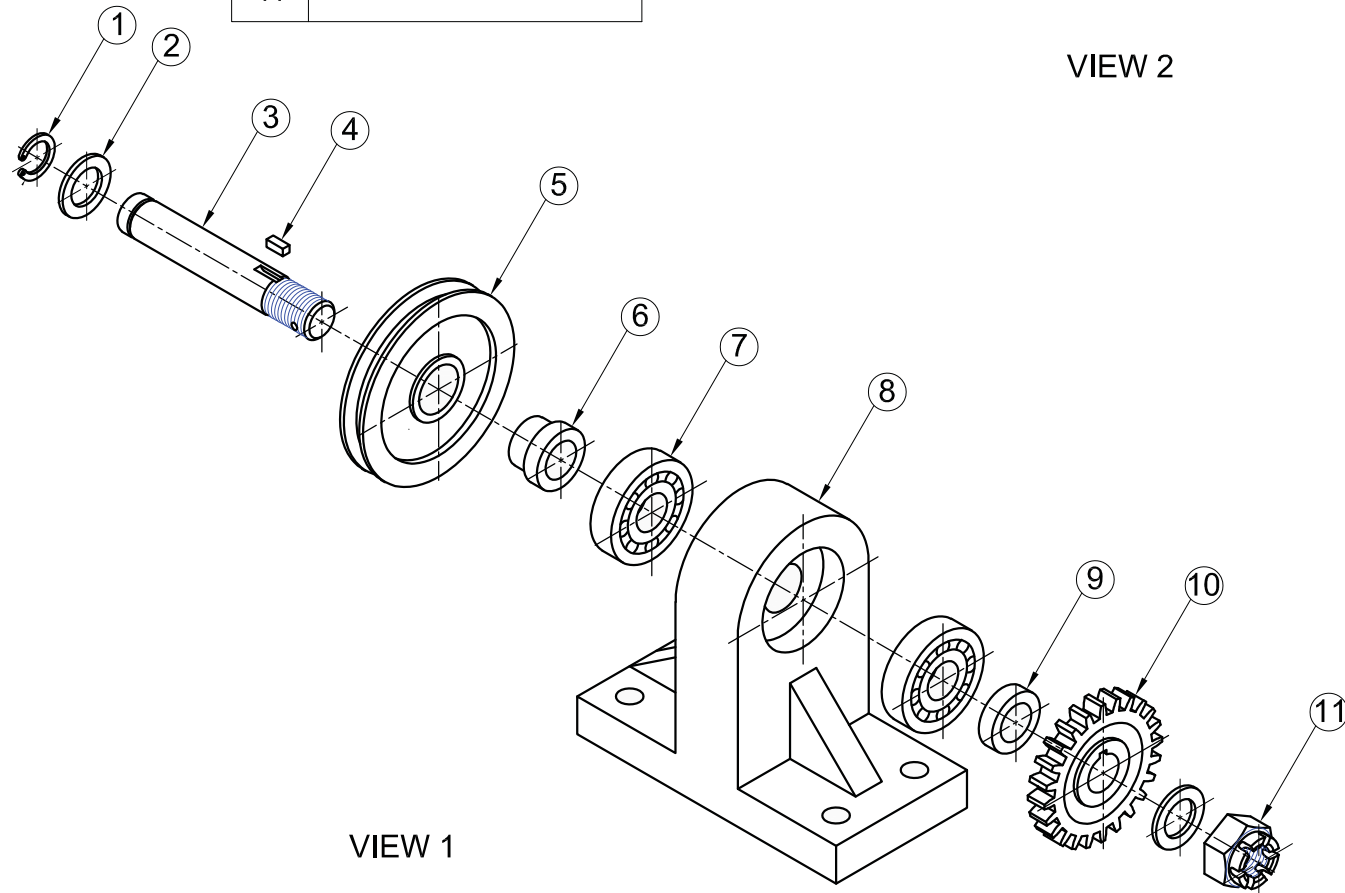
COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
EXAMINATION CENTRE



QUESTION 15	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	



VIEW 2



VIEW 1

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

Multiple views of a pulley assembly, a title block 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. **[30]**

QUESTIONS		ANSWERS	
1	On what date was the drawing checked?	1	
2	What is the name of the engineering firm?	1	
3	What indicated scale has been used?	1	
4	What treatment must the assembly undergo?	1	
5	On what date was the bracket hole revised?	1	
6	What is the drawing number?	1	
7	What would view 1 be called?	1	
8	What would view 2 be called?	1	
9	What roughness value is required on the machined surfaces?	1	
10	What type of section is shown at A?	1	
11	At what angle is the hatching done?	1	
12	Name the feature at B.	1	
13	Name the feature at C.	1	
14	If a dimension reads 18 on the drawing, what would be the true size?	2	
15	Complete the given table, for question 15, by inserting the part names for each of the numbered parts in View 1.	11	
16	In the box below, draw, in neat freehand, the symbol for the projection system used.	4	
TOTAL		30	

TITLE		PULLEY ASSEMBLY		ALL DIMENSIONS ARE IN MILLIMETRES.		SCALE: 1 : 5		ANSWER 16	
REINSTEEL ENGINEERING 72 CHURCH STREET GRAAFF-REINET 6280 www.aqua.co.za 049 898 2345		PROGRAMME: AUTOCAD 2008		MATERIAL: CAST IRON		1. BRACKET HOLE		2018/05/13	
		FILE NAME: T-SA FS AXLE.dwg		QUANTITY: 9500 UNITS		REVISIONS		DATE	
ALL DIMENSIONS ARE IN MILLIMETRES. ALL UNSPECIFIED RADI ARE R3.		DRAWING No. RS 501 E		TREATMENT: HARDEN		DRAWN: REINCH		2018/04/10	
		FINISH: REMOVE ALL BURRS AND SHARP EDGES		TURNED 0,25		CHECKED: KEITH		2018/05/15	
						APPROVED: SAULS		2018/05/22	
						SYMBOL		EXAMINATION NUMBER	
								EXAMINATION NUMBER	
								2	



QUESTION 2: LOCI (CAMS)

Given:

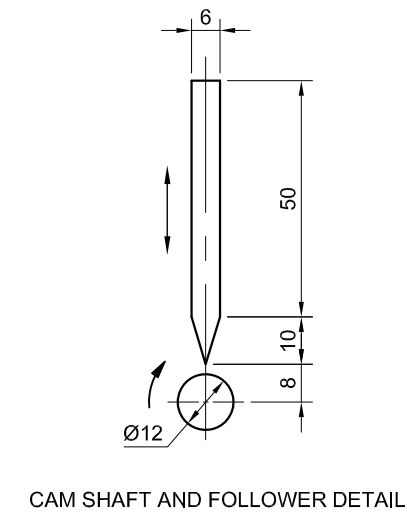
- The shaft and follower detail of a cam with the follower shown at its lowest position
- The vertical centre line of the cam shaft as reference on the drawing sheet

The specifications for the movement are as follows:

- The cam shaft rotates clockwise at uniform velocity
- Over the first 60° the follower rises 20 mm
- There is a dwell period for the next 30°
- Over the next 30° the follower rises a further 20 mm
- Over the next 60° the follower rises a further 20 mm
- There is a dwell period for the next 45°
- Over the next 45° the follower falls 50% of the displacement
- There is a dwell period for the next 30°
- Over the final 60° the follower returns to its original position

Instructions:

- 2.1 Draw, to scale 1 : 1, the given view of the cam shaft and follower using the vertical centre line as reference. The arrow indicating the direction of rotation must be shown.
 - 2.2 Draw a displacement graph with a rotational scale of 30° equal 8 mm and a follower displacement scale of 1 : 1 for the given motion. Label the graph.
 - 2.3 Project and draw the cam profile that would generate the given motion.
- Show ALL necessary construction. **[33]**



ASSESSMENT CRITERIA			
1 GRAPH	11		
2 FOLLOWER + SHAFT + ARROW	5		
3 CONSTRUCTION	4		
4 CAM POINTS	7		
5 CURVE + QUALITY	6		
TOTAL	33		

EXAMINATION NUMBER	
EXAMINATION NUMBER	3



QUESTION 3: ISOMETRIC DRAWING

Given:

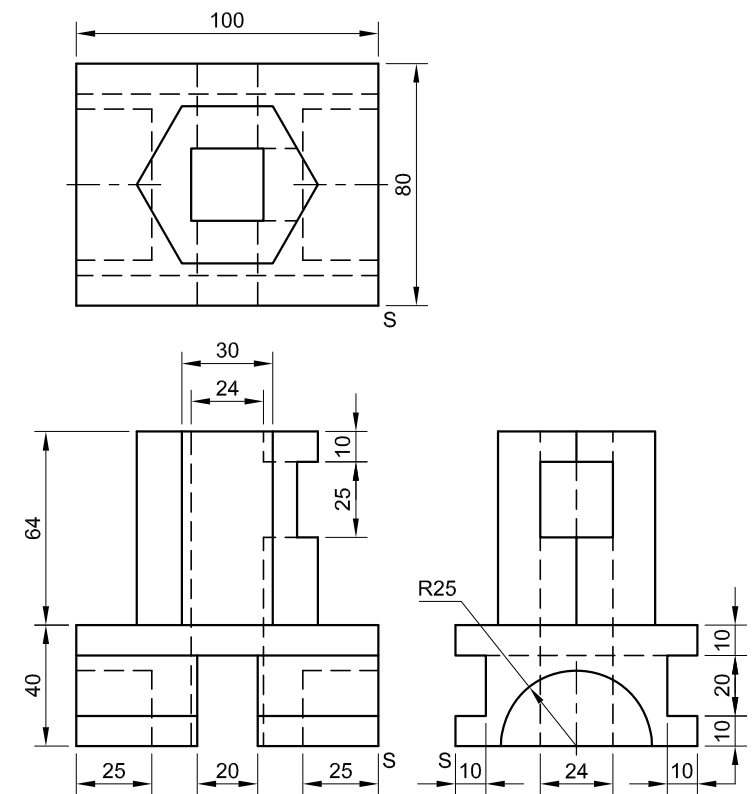
- The front view, top view and right view of a bracket
- The position of point S on the drawing sheet

Instructions:

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

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

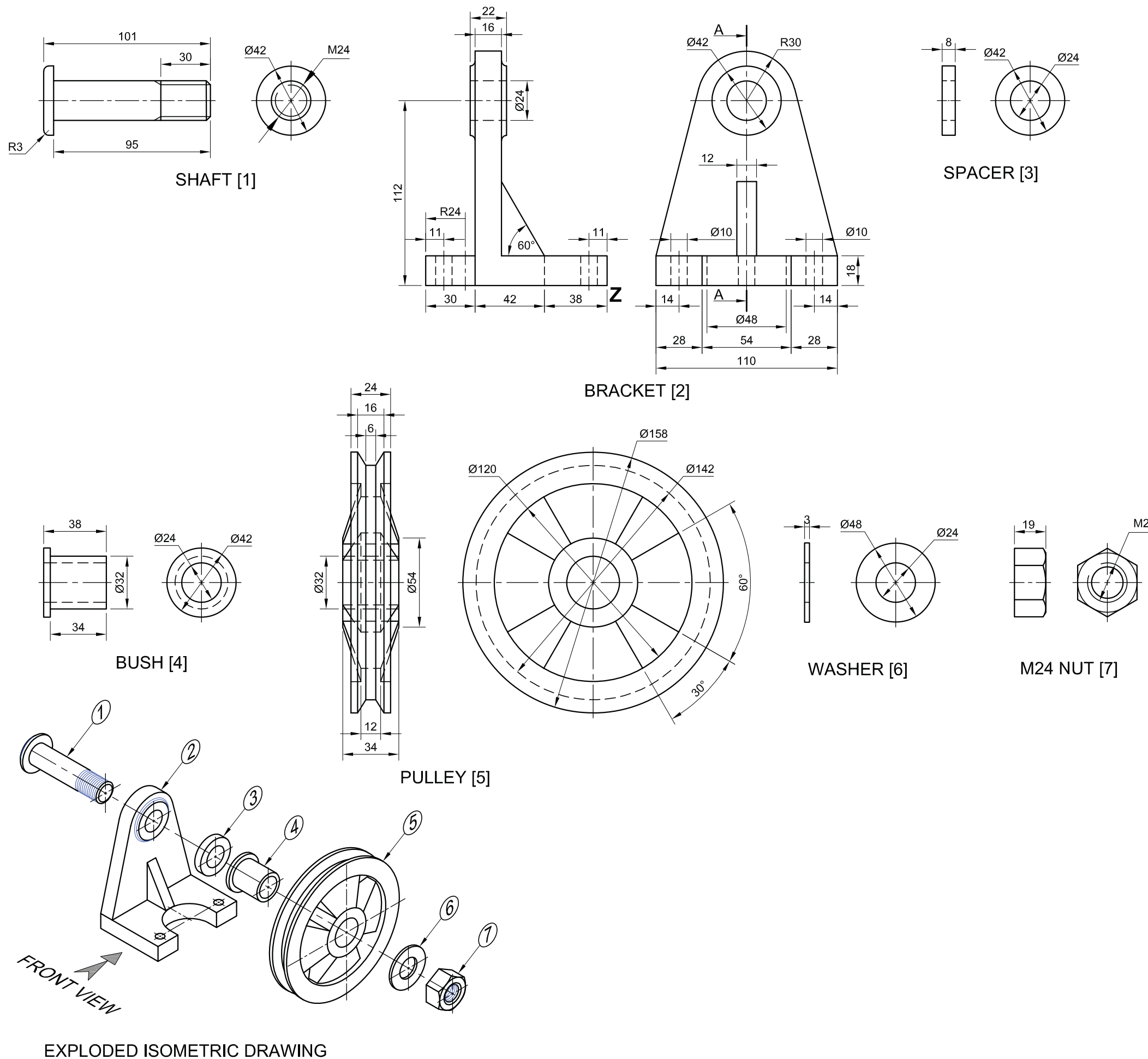
[42]



S ↙

ASSESSMENT CRITERIA			
1. AUXILIARY VIEW + PLACEMENT	2		
2. BASE	18½		
3. HEXAGONAL PRISM	17½		
4. CIRCLE + CL	4		
TOTAL	42		

EXAMINATION NUMBER	
EXAMINATION NUMBER	4



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

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:

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, which passes through the vertical centre line of the assembly, is shown on the right view of the bracket (part 2). Use point Z as a reference point to start the drawing.

4.2 The right view

- ALL drawings must comply with the guidelines contained in the SANS 10111.

NOTE:

- Show THREE faces of the M24 nut and ALL necessary construction.
- NO hidden detail is required.

Add the following features to the drawing:

- The cutting plane A-A
- Label the sectional view SECTION A-A. [95]

PARTS LIST		
PART	QUANTITY	MATERIAL
1. SHAFT	1	MILD STEEL
2. BRACKET	1	CAST IRON
3. SPACER	1	MILD STEEL
4. BUSH	1	BRONZE
5. PULLEY	1	CAST IRON
6. WASHER	1	MILD STEEL
7. M24 NUT	1	MILD STEEL

TITLE **PULLEY ASSEMBLY**

REINSTEEL
ENGINEERING

72 CHURCH STREET
GRAAFF-REINET
6280
www.aqua.co.za
049 898 2345

ALL DIMENSIONS ARE IN MILLIMETRES. ALL UNSPECIFIED RADII ARE R3.

5



Z

ASSESSMENT CRITERIA				
SECTIONAL FRONT VIEW				
1	SHAFT	11½		
2	BRACKET	14		
3	SPACER	3		
4	BUSH	3		
5	PULLEY	20		
6	M 24 NUT + WASHER	8½		
7	CENTRE LINES + LABEL	3		
8	ASSEMBLY	6		
SUBTOTAL		69		
RIGHT VIEW				
1	M 24 NUT + WASHER	7		
2	PULLEY	7		
3	BRACKET	8		
4	CUTTING PLANE + CL	4		
SUBTOTAL		26		
TOTAL		95		
EXAMINATION NUMBER				
EXAMINATION NUMBER				
EXAMINATION NUMBER				6