

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

**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.

**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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	MODERATED MARK			
1				
2				
3				
4				
<b>TOTAL</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

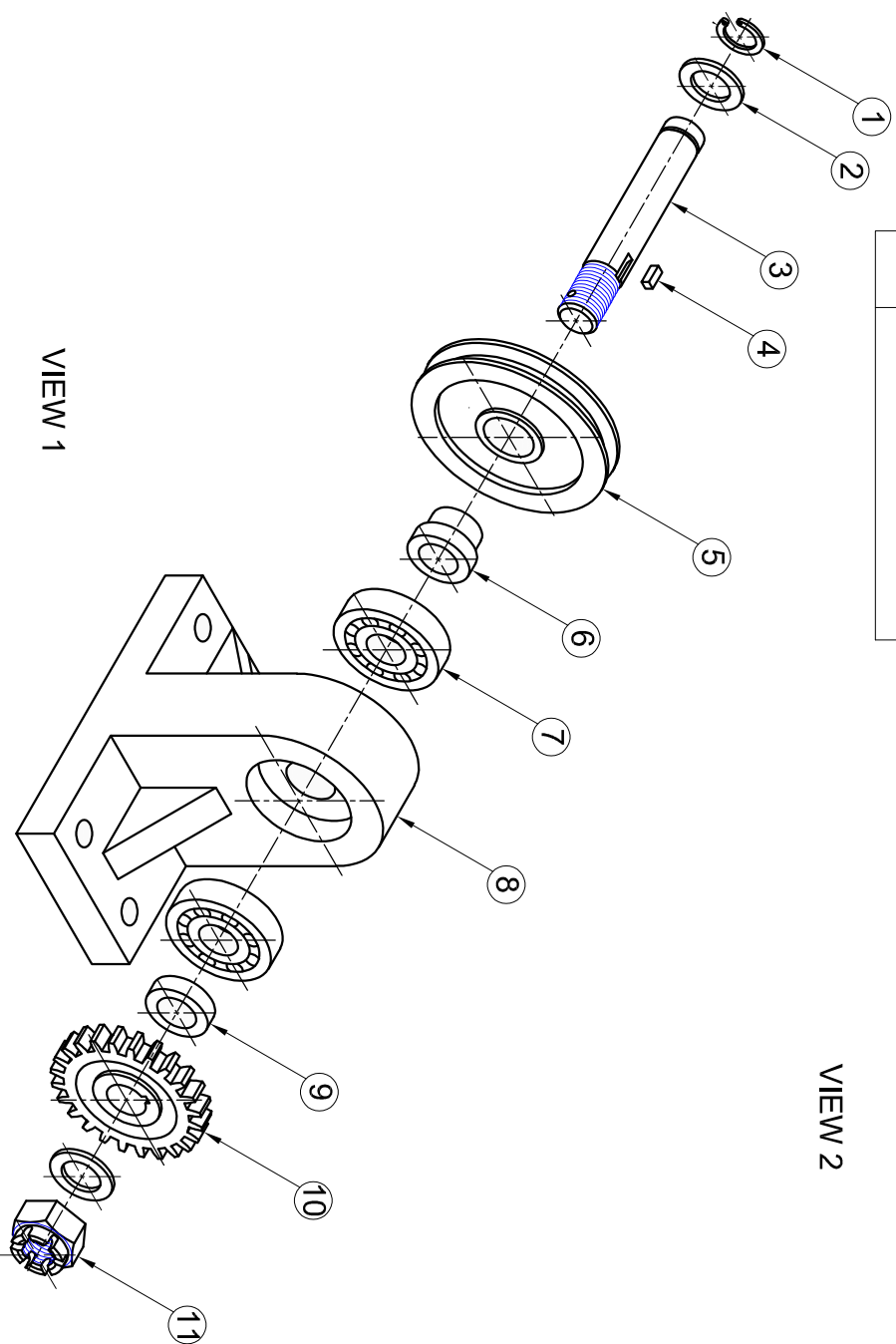
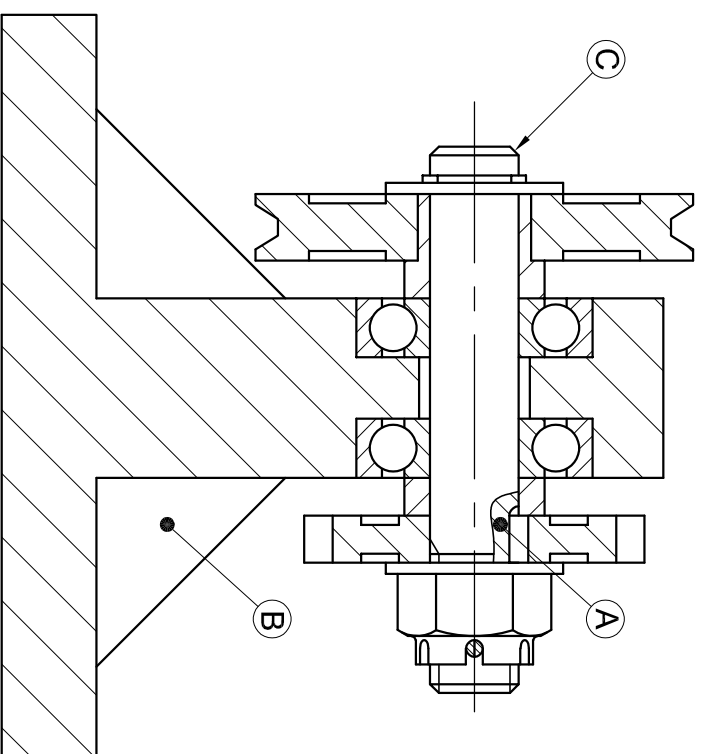
FINAL CONVERTED MARK	CHECKED BY
<b>100</b>	

**COMPLETE THE FOLLOWING:**

NAME	
NAME	
EXAMINATION CENTRE	
EXAMINATION CENTRE	



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



### 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	
<b>TOTAL</b>		<b>30</b>	

**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]**

TITLE	<b>PULLEY ASSEMBLY</b>	ALL DIMENSIONS ARE IN MILLIMETRES.	SCALE: 1 : 5
PROGRAMME:	72 CHURCH STREET GRAAFF-REINET 6280	MATERIAL: CAST IRON	1. BRACKET HOLE
FILE NAME:	T-SA FS AXLE.dwg	QUANTITY: 9500 UNITS	<b>REVISIONS</b>
DRAWING NO.:	RS 501 E	TREATMENT: HARDEN	DRAWN: REINCH
FINISH:	REMOVE ALL BURRS AND SHARP EDGES	TURNED 0,25	CHECKED: KEITH
APPROVED:	SAULS		2018/05/15

DATE	2018/05/13	ANSWER 16
DATE	2018/04/10	
DATE	2018/05/15	
DATE	2018/05/22	
SYMBOL		

ALL DIMENSIONS ARE IN MILLIMETRES.	ALL UNSPECIFIED RADI ARE R3.
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EXAMINATION NUMBER	
EXAMINATION NUMBER	<b>2</b>



**QUESTION 2: LOCI (CAMs)**

**Given:**

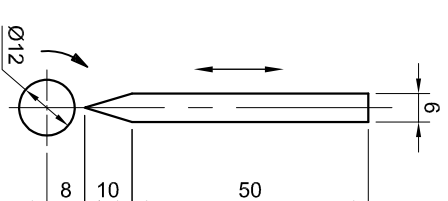
- The shaft and follower detail of a cam with the follower shown at its lowest position
- The vertical centre line of the cam shaft as reference on the drawing sheet

**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]**



CAM SHAFT AND FOLLOWER DETAIL

**ASSESSMENT CRITERIA**

1 GRAPH	11		
2 FOLLOWER + SHAFT + ARROW	5		
3 CONSTRUCTION	4		
4 CAM POINTS	7		
5 CURVE + QUALITY	6		
<b>TOTAL</b>	<b>33</b>		

EXAMINATION NUMBER

EXAMINATION NUMBER

**3**



**QUESTION 3: ISOMETRIC DRAWING**

**Given:**

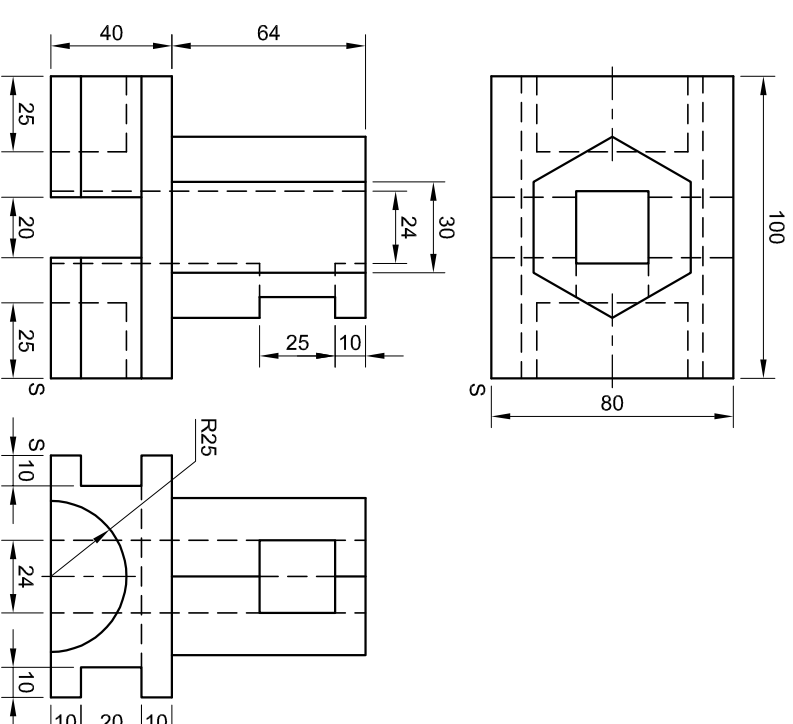
- The front view, top view and right view of a bracket
- The position of point S on the drawing sheet

**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 ←

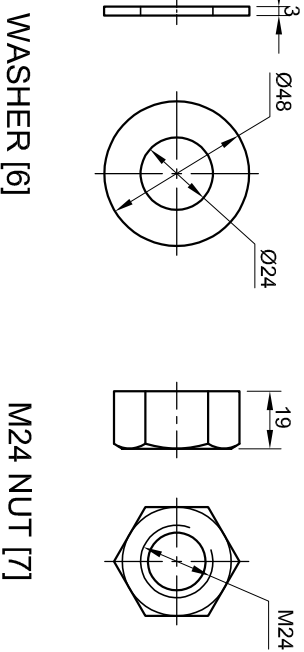
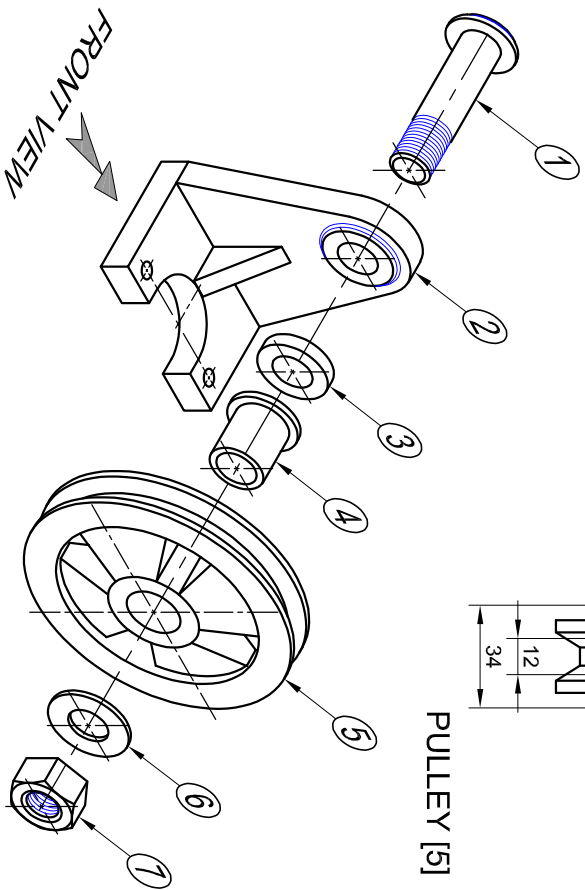
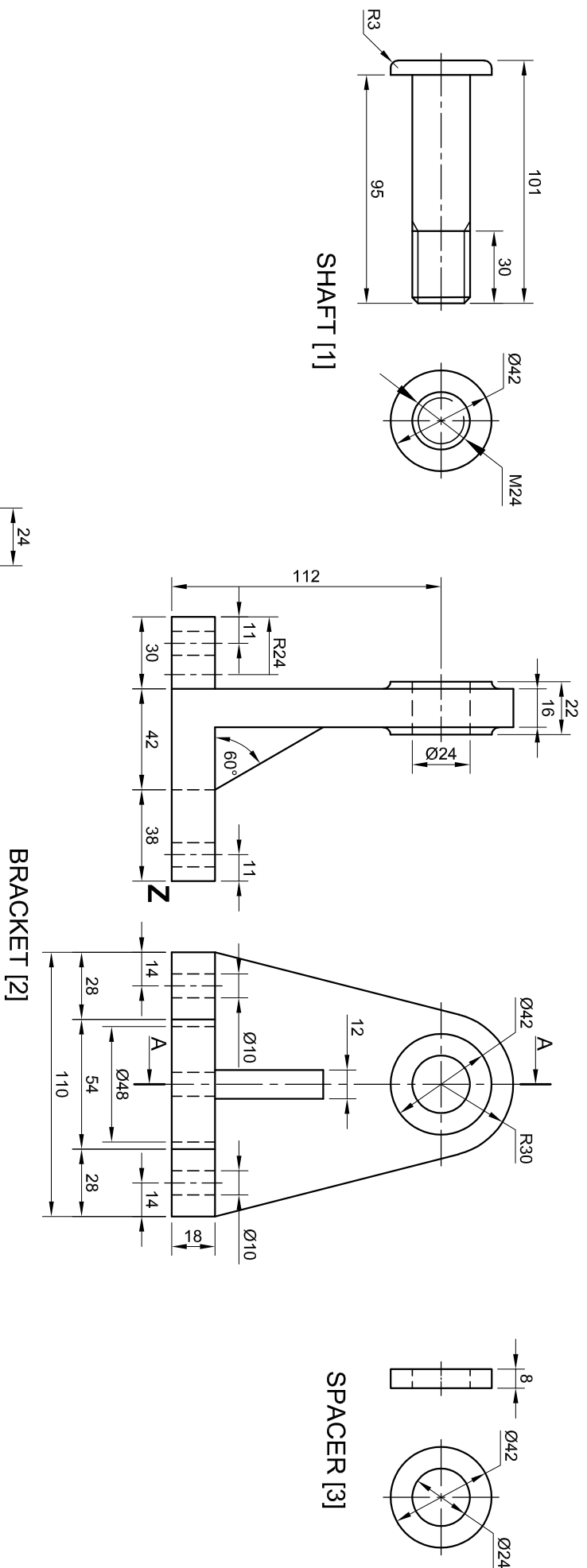
**ASSESSMENT CRITERIA**

1. AUXILIARY VIEW + PLACEMENT	2	
2. BASE	18½	
3. HEXAGONAL PRISM	17½	
4. CIRCLE + CL	4	
<b>TOTAL</b>	<b>42</b>	

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 SANUS 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

**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.		
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2

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

EXAMINATION NUMBER

EXAMINATION NUMBER

6