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EXAMINATION NATIONAL SENIOR CERTIFICATE	
DATE	NOVEMBER 2024
SUBJECT	ENGINEERING GRAPHICS AND DESIGN
PAPER	2
MARKS	100
TIME	3 Hours
NUMBER OF PAGES	6



SOUTH AFRICAN COMPREHENSIVE ASSESSMENT INSTITUTE
SUID-AFRIKAANSE KOMPREENSIEWE ASSESSERINGSINSTITUUT

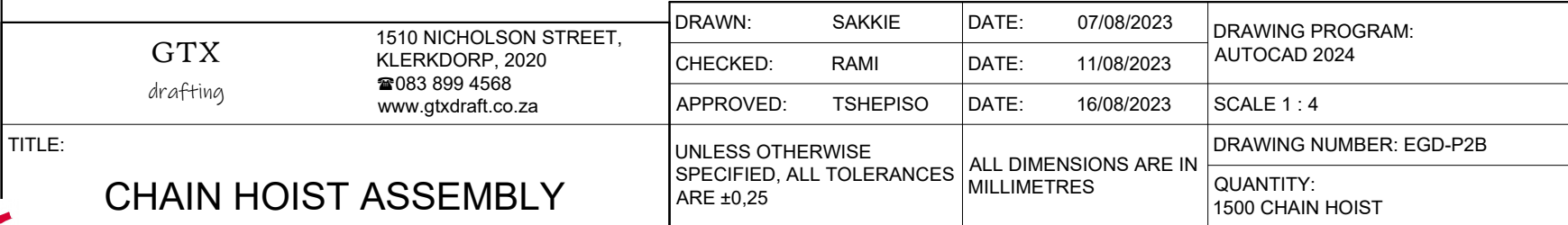
INSTRUCTIONS AND INFORMATION

- 1. This paper consists of FOUR questions.
- 2. Answer ALL the questions.
- 3. ALL drawings are in third-angle orthographic projection, unless otherwise stated.
- 4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
- 5. ALL answers must be drawn accurately and neatly.
- 6. ALL questions must be answered on the question paper, as instructed.
- 7. ALL pages must be placed in numerical order and stapled in ONLY the TOP LEFT CORNER, regardless whether the question was answered or not.
- 8. Time management is essential in order to complete all the questions.
- 9. Print your examination number in the block provided on each page.
- 10. Dimension detail not given must be estimated in good proportion.

FOR OFFICIAL USE ONLY															
QUESTION	MARK OBTAINED			½	SIGN	MODERATED			½	SIGN	RE-MARKING			½	SIGN
1															
2															
3															
4															
TOTAL:															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK	CHECKED
100	

CENTRE NUMBER	
CENTRE NUMBER	
IDENTIFICATION NUMBER	
IDENTIFICATION NUMBER	
EXAMINATION NUMBER	
EXAMINATION NUMBER	1



Given:
Three views of a chain hoist assembly, a title block and a table of questions. The drawing is not presented to the indicated scale.

Instructions:
Complete the table below by neatly answering the questions, which refer to the accompanying drawing, title block and mechanical content.

[30]

QUESTIONS		ANSWERS		
1	What is the web address for the company responsible for this drawing?		1	
2	Who is responsible for checking the drawing?		1	
3	On which date was the drawing prepared?		1	
4	The indicated scale for this drawing is 1 : 4. Is this drawing presented to this scale?		1	
5	How many chain hoists are required?		1	
6	What is VIEW 3 called?		2	
7	Measure the angle at A.		1	
8	Determine the dimensions at:	B:	1	
		C:	1	
		D:	1	
9	What type of line is at 1?		1	
10	What does the encircled feature at 2 indicate?		1	
11	Name the type of section at 3.		1	
12	What does the abbreviation at 4 stand for?		1	
13	Why is the area at 5 not hatched?		1	
14	With reference to the encircled feature at 6, what would be the purpose of the key?		2	
15	If a standard bolt is used, determine the across flat dimension for a M4 bolt. Show calculation.		2	
16	Insert the cutting plane on VIEW 2 for VIEW 3, and label it T-T.		3	
17	In the space provided (ANSWER 17), draw in neat freehand, the conventional representation of a BEARING.		4	
18	In the space provided (ANSWER 18), draw in neat freehand, the symbol for the projection system used.		3	
TOTAL:			30	

ANSWER 18: PROJECTION SYMBOL

EXAMINATION NUMBER

2



P

QUESTION 2: LOCI (CAM)

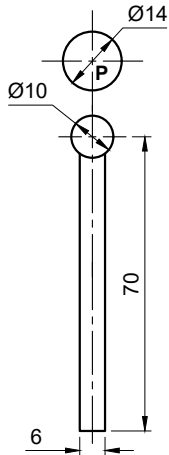
- Given:**
- The camshaft of a cam and the detail of a roller follower at the minimum distance from the camshaft.
 - The position of point P on the drawing sheet.

- Specifications:**
- The minimum distance from the cam profile to the centre of the camshaft = 13 mm
 - Rotation = clockwise

- Motion:**
- A cam rotates at constant velocity, imparting the following motion to the follower:
- Over the first 90° the follower falls 64 mm with uniform acceleration and retardation
 - For the next 45° the follower remains in rest
 - It rises 24 mm over the next 45° with uniform motion
 - It returns to the original position with simple harmonic motion over the remainder of the rotation

- Instructions:**
- Using the given centre point P, draw, to a scale of 1 : 1, the given camshaft and follower at the minimum distance.
 - Draw, to a rotational scale of 108 mm = 360° and a displacement scale of 1 : 1, the complete displacement graph for the given motion.
 - Label the displacement graph and include the rotational scale.
 - Using the given position of the follower as 0°, project and draw the cam profile from the displacement graph.
 - Show the direction of rotation on the cam profile.
 - Show ALL construction.

[38]



ASSESSMENT CRITERIA					
1	FOLLOWER + MIN. DIST. + CAMSHAFT + CENT. LINE	4			
2	DISPLACEMENT GRAPH + CONSTRUCTION	16 ½			
3	CONSTR + DIRECTION	5			
4	PLOTTING + CURVES	12 ½			
PENALTIES(-):					
TOTAL:		38			
EXAMINATION NUMBER					
EXAMINATION NUMBER					3



QUESTION 3: ISOMETRIC DRAWING

Given:

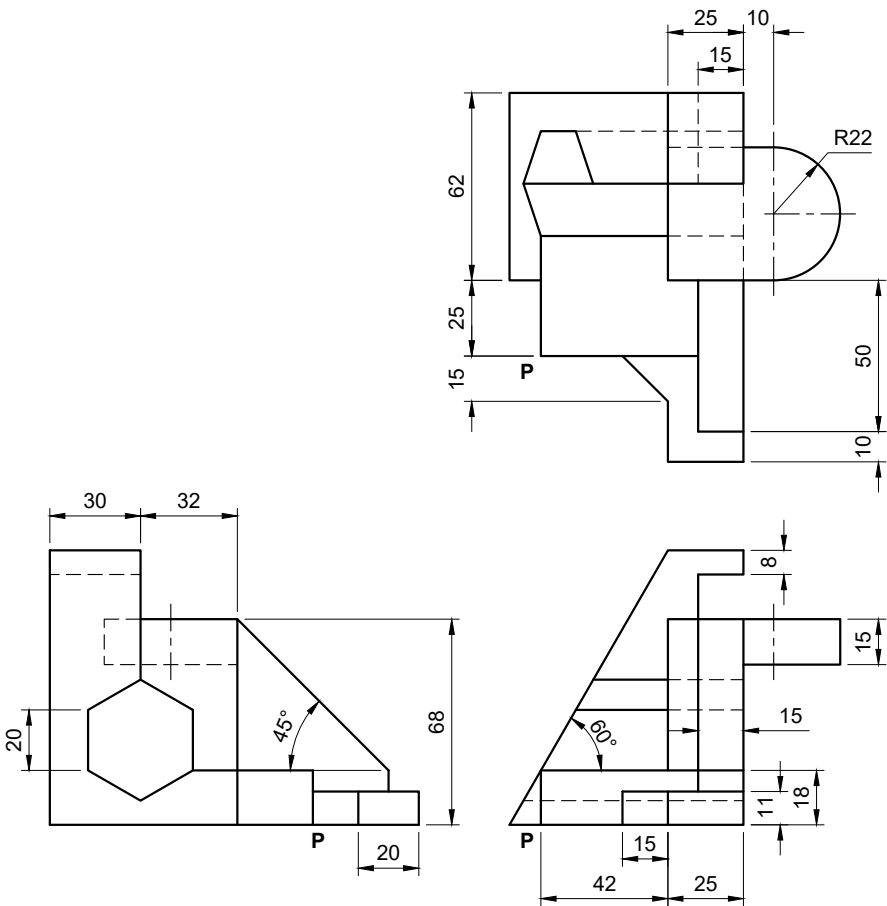
- The front view, top view and left view of a casting.
- The position of point P on the drawing sheet.

Instructions:

Using scale 1 : 1, convert the given orthographic views of the casting into an isometric drawing.

- Make point P the lowest point of the drawing.
- Show ALL construction.
- No hidden detail is required.

[38]



ASSESSMENT CRITERIA				
1	AUXILIARY VIEWS + PLACEMENT	3		
2	LOWER PORTION	21½		
3	UPPER PORTION	8		
4	CIRCLE+ CENTRE LINES + CONSTRUCTION	5½		
PENALTIES(-):				
TOTAL:		38		
EXAMINATION NUMBER				
EXAMINATION NUMBER				4





FOR OFFICIAL USE ONLY	
INCORRECT ORTHOGRAPHIC PROJECTION	
INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL:	

ASSESSMENT CRITERIA					
RIGHT VIEW					
1	CRANK SHAFT + M14 NUT	5			
2	GEAR	4			
3	HOUSING + HOUSING CAP	5 ½			
SUBTOTAL:		14 ½			
SECTIONAL FRONT VIEW					
1	GEAR	11			
2	M14 NUT	4			
3	CRANK SHAFT	11 ½			
4	CONNECTING ROD	2 ½			
5	PIN	1 ½			
6	SHAFT	4 ½			
7	HOUSING CAP	4 ½			
8	M8 SCREW	5 ½			
9	HOUSING	18			
10	END CAP	4 ½			
SUBTOTAL:		67 ½			
GENERAL					
1	CENTER LINES	3			
2	ASSEMBLY	9			
SUBTOTAL:		12			
TOTAL:		94			
PENALTIES(-):					
GRAND TOTAL:					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6