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

NATIONAL SENIOR CERTIFICATE

GRADE 11

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2022

FINAL EXAMINATION

MARKS: 200

TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

1. The question 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 estimated in good proportion.
10. ALL drawings are in third angle orthographic projection, unless otherwise stated.

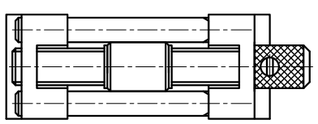
FOR OFFICIAL USE ONLY								
					MODERATED MARK			
1								
2								
3								
4								
TOTAL								
	2	0	0		2	0	0	

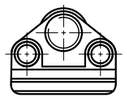
FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
SCHOOL

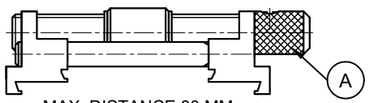
STAPLE

VIEW 1

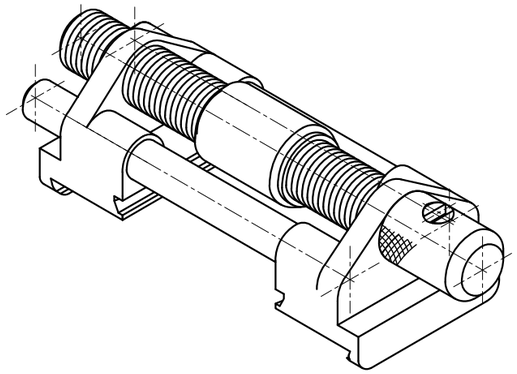




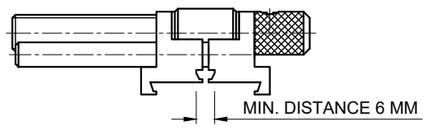
VIEW 2



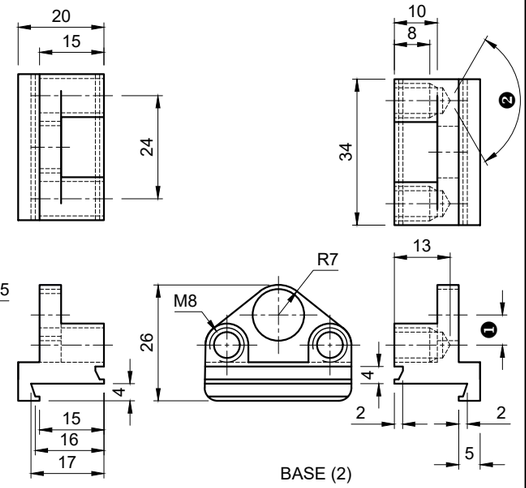
VIEW 3



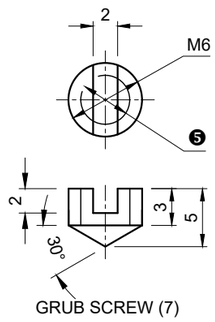
ISOMETRIC VIEW



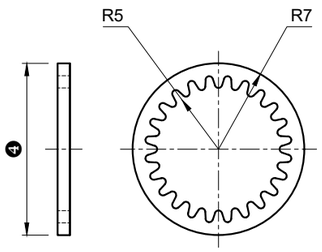
SCALE 2:1



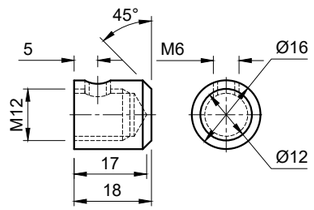
SLIDE (1) BASE (2)



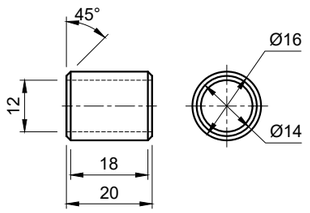
GRUB SCREW (7)



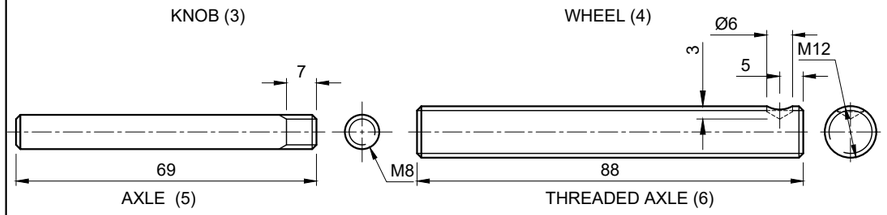
WASHER (8)
KEEPS WHEEL IN CENTER



KNOB (3)



WHEEL (4)



AXLE (5) THREADED AXLE (6)

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
A detailed drawing of a honing device, a title block, assembled views, isometric view 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.
[32]

	QUESTIONS		ANSWERS	
1	What is the title of the drawing?		1	
2	What is the shop number?		1	
3	What is the file name?		1	
4	On what date was the drawing drawn?		1	
5	Who checked the drawing?		1	
6	Who approved the drawing?		1	
7	Which drawing program was used?		1	
8	How many parts make up the honing device?		1	
9	How many axles must be manufactured?		2	
10	How many revisions were there?		1	
11	What is VIEW 1 called?		1	
12	What is VIEW 2 called?		1	
13	What is the maximum chisel width, in centimetres, that can be sharpened with the honing device?		2	
14	What is the purpose of the grub screw?		2	
15	Name the feature at A.		1	
16	Determine the complete dimensions and/or degrees at:	❶	1	
		❷	1	
		❸	1	
		❹	1	
		❺	2	
17	In the space below (ANSWER 17), draw, in neat freehand, the conventional method of the RIGHT section of the given ball bearing.		4	
18	In the space below (ANSWER 18), draw, in neat freehand, the SANS symbol for the projection system used.		4	
		TOTAL	32	

PARTS LIST

PART	QUANTITY	MATERIAL
1. SLIDE	1	CAST IRON
2. BASE	1	CAST IRON
3. KNOB	1	ALUMINUM
4. WHEEL	1	COPPER
5. AXLE	2	STEEL
6. THREADED AXLE	1	STEEL
7. GRUB SCREW	1	STEEL
8. WASHER	2	STEEL

GREAT KEI
TOOL MAKERS

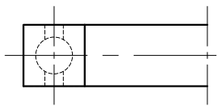
CROSSWAYS VILLAGE CENTRE
SHOP 11
KWELERA 5259
☎ 043 355 2274

TITLE:
HONING DEVICE

1. CHECK SCALE	2021/03/19
2. SHOW KNURLING ON KNOB	2021/03/20
3.	
4.	

REVISIONS	DATE

ANSWER 17



ANSWER 18

SURNAME		DATE	SURNAME		DATE	SURNAME		DATE
DRAWN	VAN WYK	2021/03/15	CHECKED	NAIKER	2021/03/20	APPROVED	FAKU	2021/03/28

NAME

NAME 2

ALL DIMENSIONS ARE IN MILLIMETRES. SCALE 1:1
ALL UNDIMENSIONED RADII ARE R3.

QUANTITY: 11 000
DRAWING NO.: HD 501
FILE NAME: hd207b.dwg
PROGRAM: AUTOCAD 2021

FINISH: MACHINED 0.05 C

STAPLE

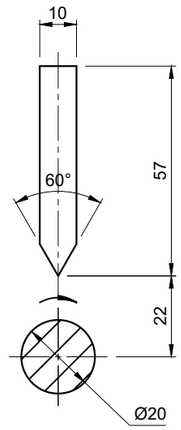
QUESTION 2: CAM

Given:
- The detail of a camshaft and a follower in its lowest position.
- The vertical centre line of the cam profile.

Specifications:
- The follower reciprocates on the vertical centre line of the camshaft.
- Minimum distance from the cam profile to the centre of the camshaft = 22 mm.
- Rotation = clockwise

Motion:
The cam imparts the following motion to the follower:
- It rises 24 mm with uniform motion over the first 60°.
- There is a dwell period for the next 90°.
- It rises 26 mm with uniform motion over the next 60°.
- There is a dwell period for the next 60°.
- It returns to the original position with uniform motion over the rest of the rotation.

Instructions:
- Draw, to scale 1 : 1, the given camshaft and the wedge-shaped follower detail at its minimum position.
- Show the direction of rotation on the cam profile.
- Draw to a rotational scale of 360° = 120 mm and a displacement scale of 1 : 1, the complete displacement graph for the required motion.
- Label the displacement graph and include the scale.
- Project and draw the cam profile that would generate the given motion.
- Show ALL necessary constructions and projections. **[37]**



ASSESSMENT CRITERIA				
1	GIVEN + MIN. DISTANCE	5½		
2	GRAPH CONSTRUCTION	3		
3	UNIFORM MOTION + DWELL	6½		
4	GRAPH LABEL + SCALE	2		
5	CAM CONSTRUCTION	10		
6	CAM + CURVE QUALITY	10		
	TOTAL	**37**		

NAME

NAME 3

STAPLE

QUESTION 3: ISOMETRIC DRAWING

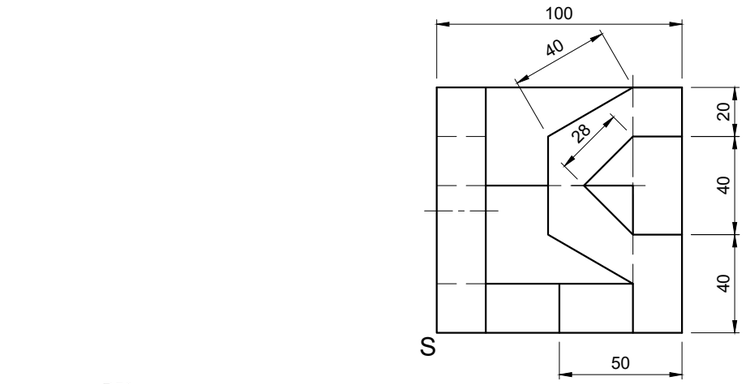
Given:

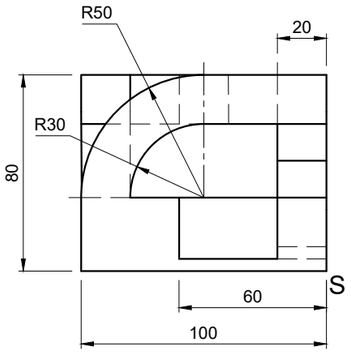
- The front view, top view and left view of a paper weight.
- The position of point S on the drawing sheet.

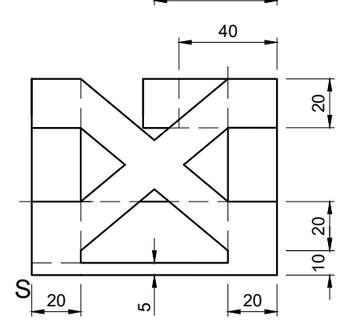
Instructions:

Using scale 1 : 1, convert the orthographic views of the paper weight into an isometric drawing.

- Make S the lowest point of the drawing.
- Show ALL necessary construction.
- NO hidden detail is required. **[44]**





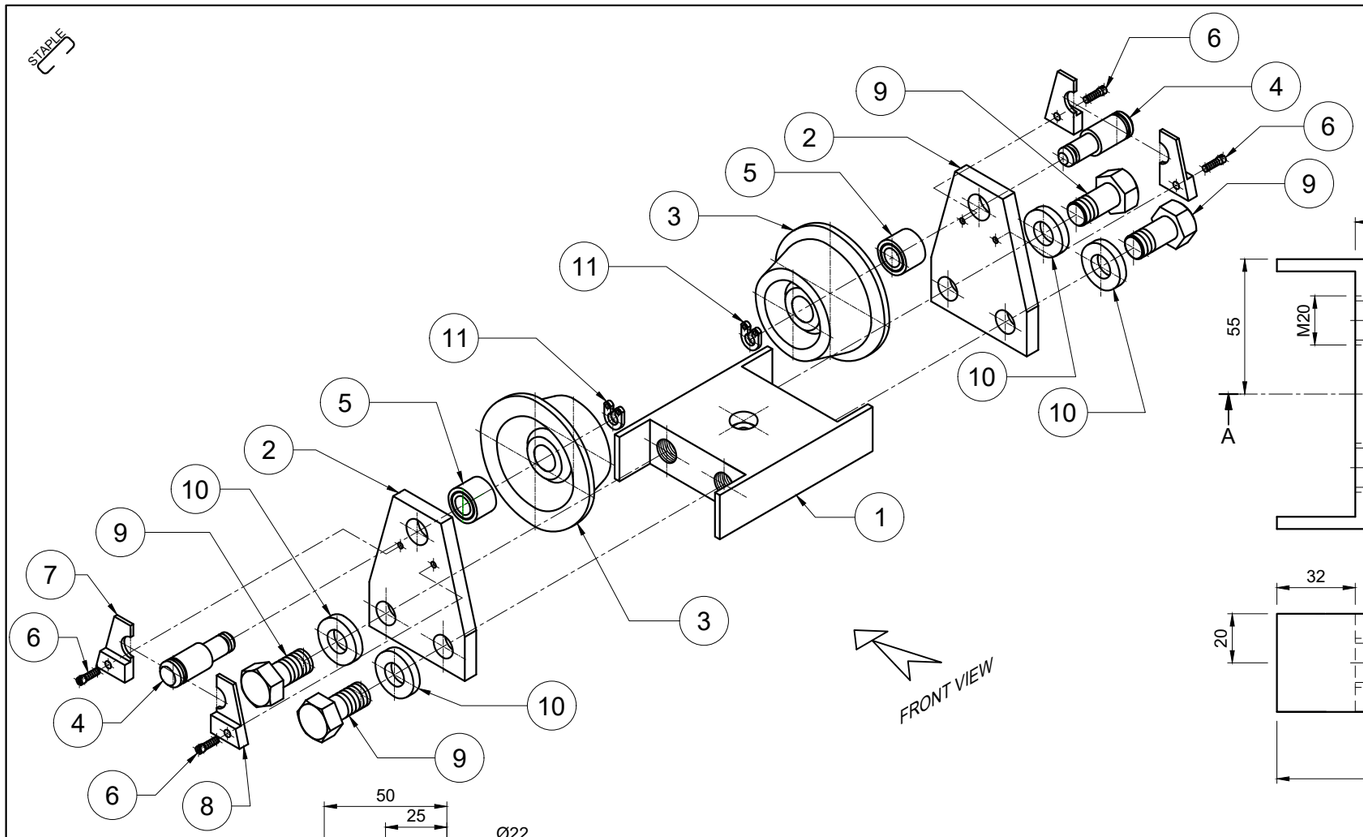


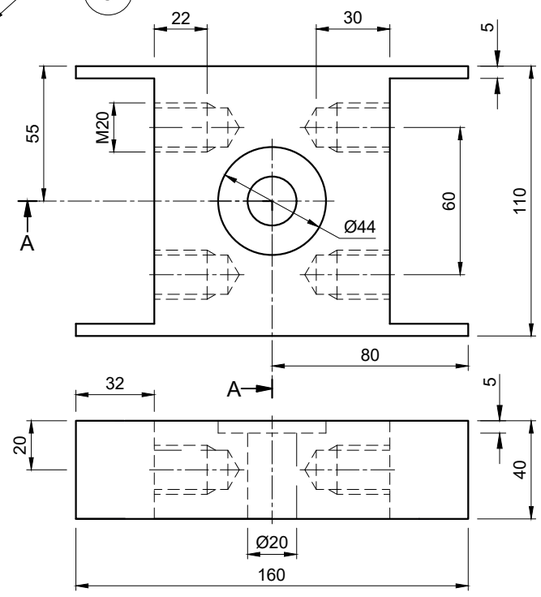
S

ASSESSMENT CRITERIA				
1	AUX' VIEW + PLACING	3		
2	ISOMETRIC LINES	22		
3	NON-ISOMETRIC LINES	5		
4	HEXAGON + SQUARE	4½		
5	CIRCLE + CIRCLE CONST.	7½		
6	CENTRE LINES	2		
	TOTAL	**44**		

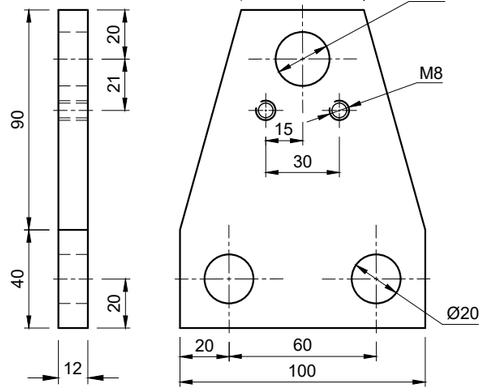
NAME	
NAME	4

STAPLE

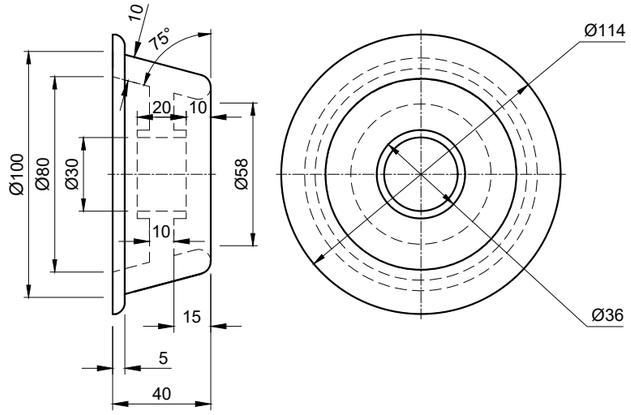




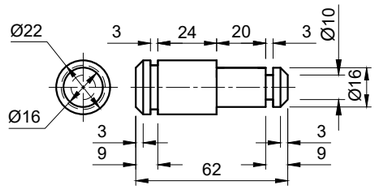
BASE [1]



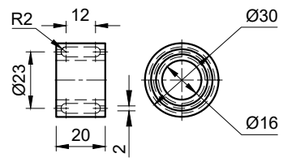
BRACE X 2 [2]



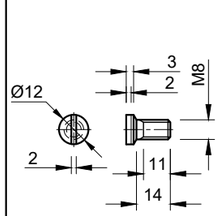
PULLEY X 2 [3]



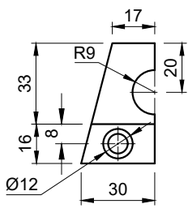
AXLE X 2 [4]



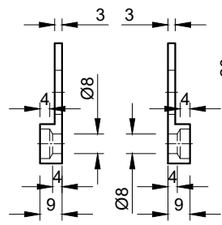
ROLLER BEARING X 2 [5]



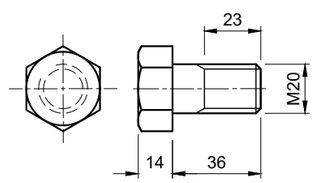
M8 SCREW X 4 [6]



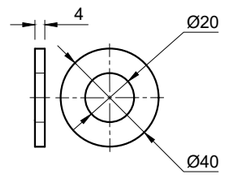
LEFT BRACE X 2 [7]



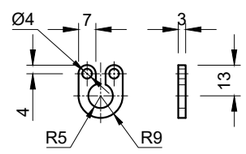
RIGHT BRACE X 2 [8]



M20 BOLT X 4 [9]



M20 WASHER X 4 [10]



CIRCLIP X 2 [11]

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- Orthographic views of each of the parts of a chain pulley assembly.
- The exploded isometric drawing of the parts of a chain pulley assembly, showing the position of each part relative to all the others.
- The incomplete half-sectional front view and the centerlines of the pulley in 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 view of the assembled parts of the chain pulley assembly:
  - 4.1 **The half-sectional front view** on cutting plane A-A of the assembly as seen from the direction of the arrow on the exploded isometric drawing.
    Show the left half in section.
    The cutting plane is shown on the top view of the base (part 1).
  - 4.2 **The left view**

NOTE:

- Planning of the layout of the views is essential.
- All drawings must comply with the guidelines as contained in the *SANS 10111*.
- Show, in the half-sectional front view, THREE faces of the M20 bolt.
- Draw the section of the roller-bearing according to the conventional method.
- Show all constructions.
- NO hidden detail is required. **[87]**

PARTS LIST

PART	MATERIAL	QUANTITY
1. BASE	CAST IRON	1
2. BRACE	STEEL	2
3. PULLEY	CAST IRON	2
4. AXLE	STEEL	2
5. ROLLER BEARING	STEEL	2
6. M8 SCREW	MS	4
7. LEFT SIDE AXLE HOLDER	CAST IRON	2
8. RIGHT SIDE AXLE HOLDER	CAST IRON	2
9. M20 BOLT	MS	4
10. M20 WASHER	MS	4
11. CIRCLIP	MS	2

TITLE:

CHAIN PULLEY

GREAT KEI
TOOL MAKERS

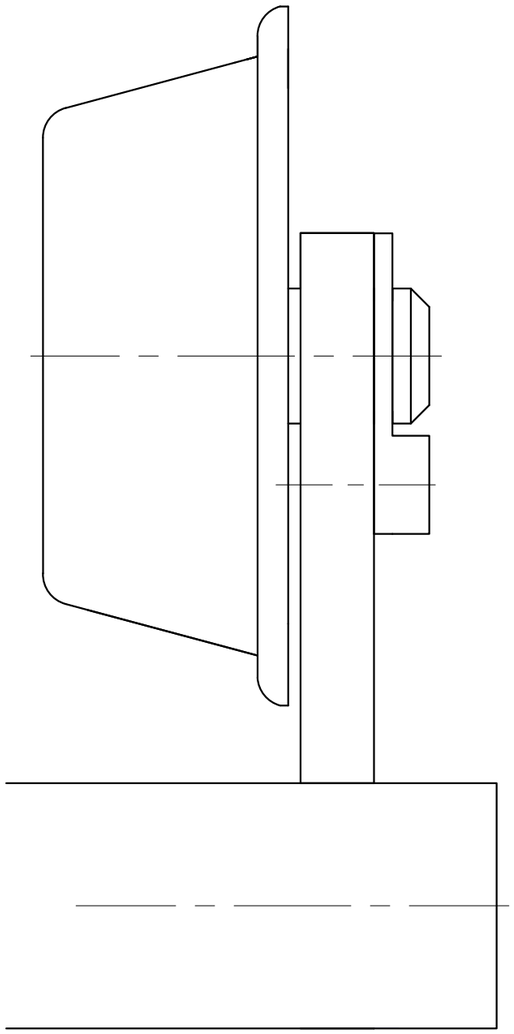
CROSSWAYS VILLAGE CENTRE
SHOP 11
KWELERA 5259
043 355 2274

ALL DIMENSIONS ARE METRIC.

ALL UNDIMENSIONED RADII ARE R5.

Please turn over

STAPLE



ASSESSMENT CRITERIA				
LEFT VIEW				
1	BASE	3		
2	BRACES	3		
3	PULLEYS	1½		
4	AXLES	1		
5	AXLE HOLDERS	3½		
6	M20 BOLTS AND WASHER	7		
7	M8 SCREWS	5		
SUB-TOTAL		**24**		
HALF SECTIONAL FRONT VIEW				
1	BASE	5		
2	BRACES	3		
3	PULLEYS	17		
4	AXLES	13½		
5	ROLLER BEARING	4		
6	AXLE HOLDERS	4		
7	M20 BOLT	7½		
8	M20 WASHER	2		
9	CIRCLIP	3		
10	ASSEMBLY	4		
SUB-TOTAL		**63**		
PENALTIES (-)				
TOTAL				
NAME				
NAME				6