

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

**NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**ENGINEERING GRAPHICS AND DESIGN P2**

**SEPTEMBER 2022**

**PREPARATORY EXAMINATION**

**MARKS: 200**

**TIME: 3 hours**

**This question paper consists of 6 pages.**

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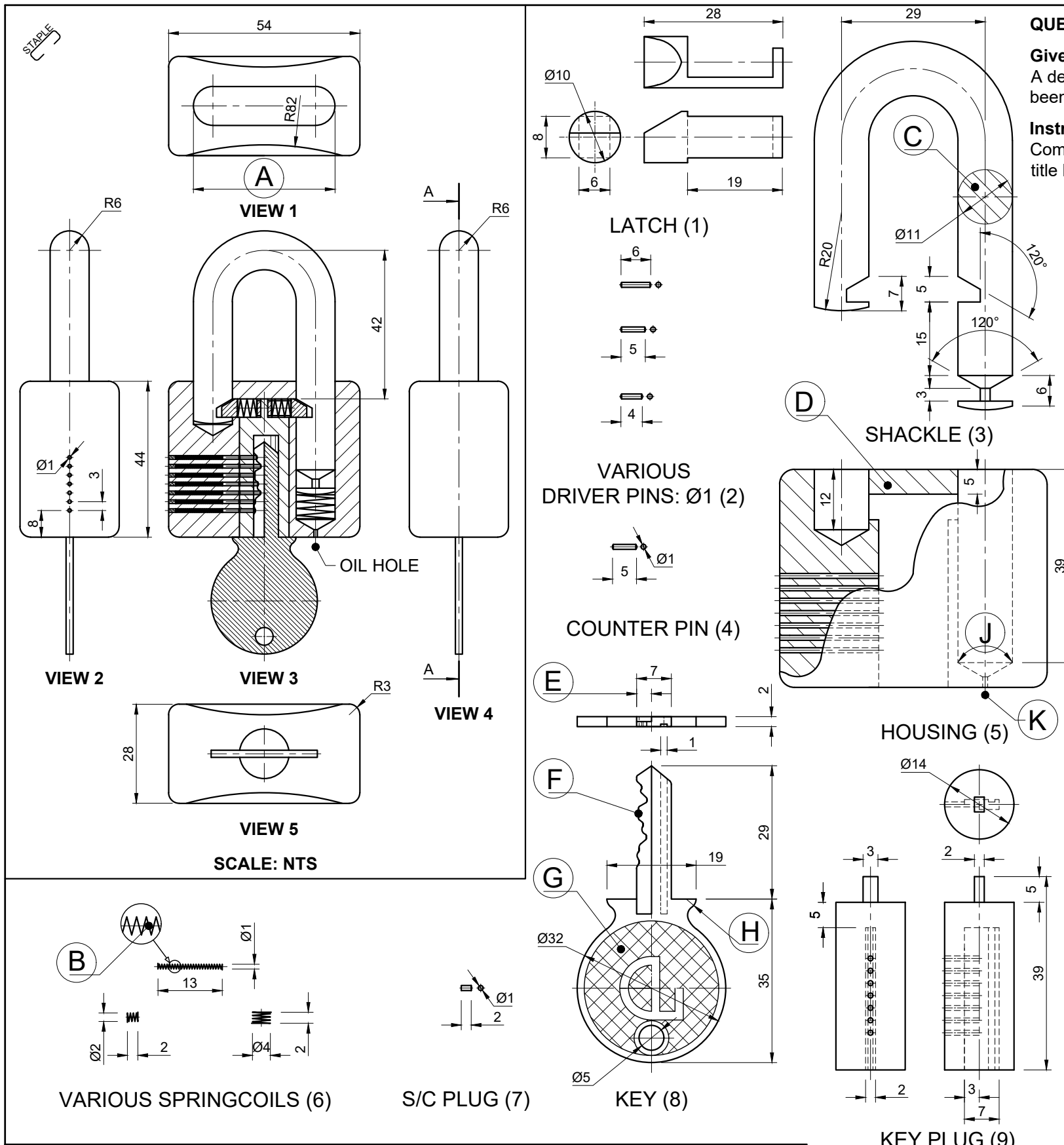
## INSTRUCTIONS AND INFORMATION

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 the 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				
	<b>2</b>	<b>0</b>	<b>0</b>	<b>2 0 0</b>

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

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
SCHOOL



QUESTIONS		ANSWERS	
1	What model padlock must be manufactured?	1	
2	What is the file name of the drawing?	1	
3	What is the name of the programme that was used to draw the drawing?	1	
4	How many revisions were made?	1	
5	What does NTS stand for?	1	
6	What, according to the note, determined the shape of the key at F?	1	
7	What is the diameter for the DRIVER PINS?	1	
8	What type of method was used to draw the spring coils (B) ?	2	
9	How many total parts does the padlock consist of?	2	
10	Determine the degree at J.	1	
11	What is the dimension at E?	1	
12	What is the purpose of the hole at K?	1	
13	What would VIEW 3 be called?	2	
14	What would VIEW 5 be called?	1	
15	What type of section is at C?	1	
16	What type of section is at D?	1	
17	What is the purpose of the feature at G?	2	
18	What is the measurement at A?	2	
19	How long did it take to approve the drawing after it was drawn?	2	
20	In the space below (ANSWER 20), draw, in neat freehand, the SANS symbol for the projection system used.	4	
<b>TOTAL</b>		<b>29</b>	

<b>ANSWER 20</b>	
_____	
<b>NAME</b>	
_____	
<b>NAME</b>	
<b>2</b>	

STABLE

0°

**QUESTION 2.1: LOCI (CAM)**

**Given:**

- The starting position of the displacement diagram for a cam.
- The specifications for the motion of the cam.

**Specifications:**

The cam imparts the following motion to the follower:

- It dwells for a period of 45°.
- It rises 20 mm with uniform motion for a period of 45°.
- It rises 60 mm with uniform acceleration and retardation for a period of 180°.
- It returns to the original position with simple harmonic motion for the last 90°.

**Instructions:**

- Draw, to a displacement scale of 1 : 1 and horizontal scale of 360° = 150 mm, the complete displacement graph for the required motion.
- Label the graph and indicate the scale.
- Show ALL necessary construction.

[19]

ASSESSMENT CRITERIA		
1	CONSTRUCTION	2
2	DWELL + UNIFORM MOTION	1½
3	ACCELERATION AND RETARDATION	7
4	SIMPLE HARMONIC	7½
5	LABEL + SCALE	1
<b>SUB-TOTAL 2.1</b>		<b>19</b>

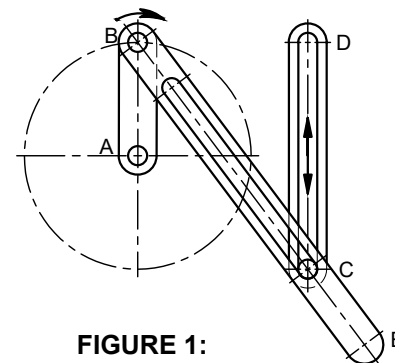


FIGURE 1:

**QUESTION 2.2: LOCI (MECHANISM)**

**Given:**

- Figure 1 shows the detail of a rotating crank AB, connecting rod BE and a fixed vertical groove CD.
- Figure 2 shows the schematic diagram of the drawing.
- Starting point A of the rotating crank.

**Motion:**

- The rotating crank AB moves clockwise for a full 360°.
- The connecting rod BE moves while it slides vertically, in equal segments, from C to D for the first 180° and back, in equal segment, to its original position for the last 180°.

**Instructions:**

- Draw the given schematic diagram (FIGURE 2).
- Project and draw the loci of point E to the given motion.
- Show ALL necessary construction.

[19]

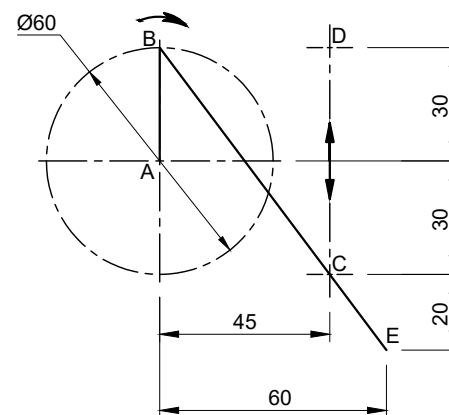


FIGURE 2:

A

ASSESSMENT CRITERIA		
1	CONSTRUCTION OF DIAGRAM	4
2	CONST. OF CIRCLE IN 12 EQUAL PARTS	2
3	CONSTRUCTION OF LOCI	5
4	LOCI OF POINT E	8
<b>SUB-TOTAL 2.2</b>		<b>19</b>
<b>SUB-TOTAL 2.1</b>		<b>19</b>
<b>TOTAL</b>		<b>38</b>

<b>NAME</b>	
<b>NAME</b>	3

STAPLE

**QUESTION 3: ISOMETRIC**

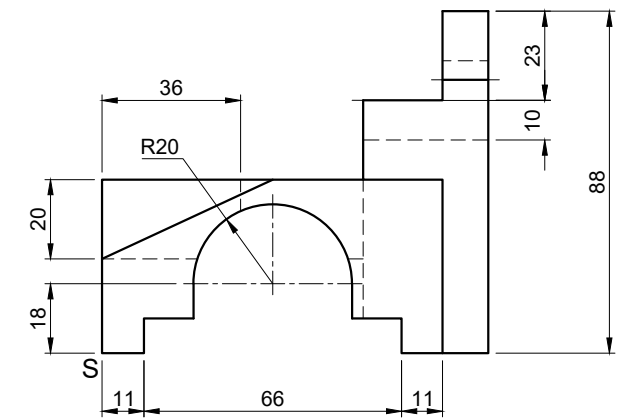
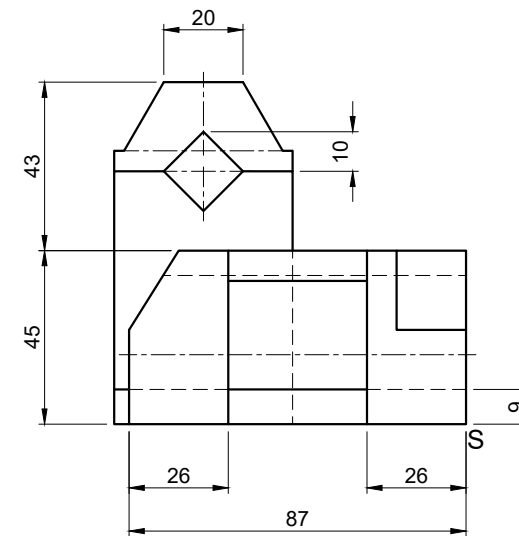
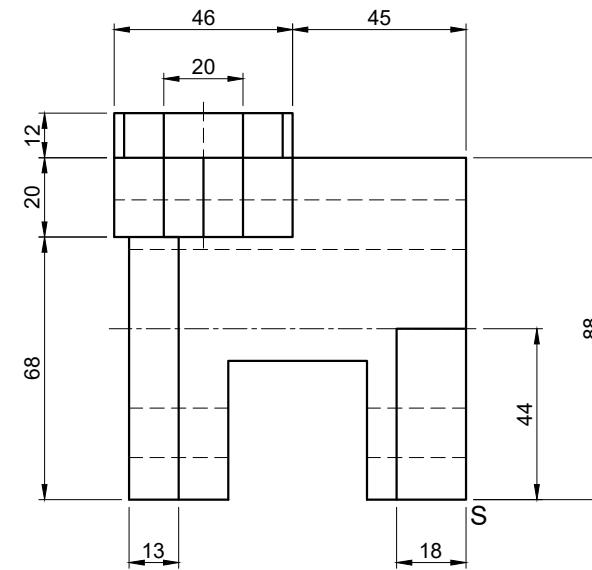
**Given:**

- Three views of a MACHINE PART in third angle orthographic projection.
- Starting point S.

**Instructions:**

- Draw, to scale 1 : 1, an isometric view of the MACHINE PART.
- Make point S the lowest point of the drawing.
- Show ALL necessary construction.
- NO hidden detail is required.

[42]



S

ASSESSMENT CRITERIA			
1	CONSTR. + PLACEMENT	2½	
2	ISOMETRIC LINES	30	
3	NON ISOMETRIC LINES	5	
4	HALF CIRCLE + CONSTR.	3½	
5	CENTRE LINES	1	
<b>TOTAL</b>		<b>42</b>	

<b>NAME</b>	
<b>NAME</b>	<b>4</b>



STABLE

S

ASSESSMENT CRITERIA			
TOP VIEW			
1	M14 NUT + WASHER	4½	
2	HANDLE	1	
3	CUTTING PLANE	3	
4	CENTRE LINES + CONVEN. SYMMETRY LINES	2	
<b>SUB-TOTAL</b>		<b>10½</b>	
SECTIONAL FRONT VIEW			
1	M14 NUT	5½	
2	M14 WASHER	2½	
3	GLAND	5	
4	GLAND SEAL	2½	
5	HANDLE	12½	
6	SHAFT	11½	
7	SEAL	2	
8	HOUSING	28½	
9	ASSEMBLY	7	
10	TITLE + SCALE	1	
11	CENTRE LINES	2½	
<b>SUB-TOTAL</b>		<b>80½</b>	
<b>TOTAL</b>		<b>91</b>	

NAME	
NAME	
	6