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Department:  
**Basic Education**  
**REPUBLIC OF SOUTH AFRICA**

**SENIOR CERTIFICATE EXAMINATIONS/  
NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**ENGINEERING GRAPHICS AND DESIGN P2**  
**2019**

**MARKS: 100**

**TIME: 3 hours**

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

Barcode label



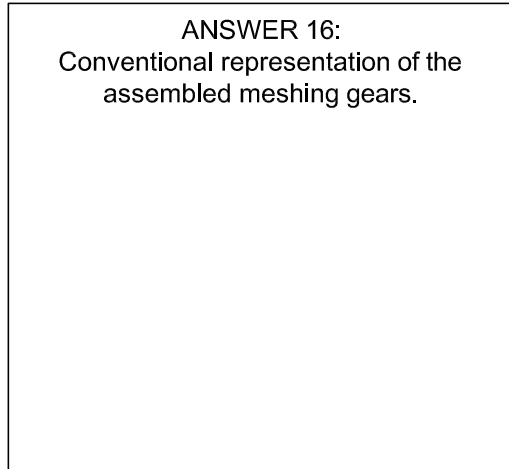
**INSTRUCTIONS AND INFORMATION**

- 1. This question 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 the questions must be answered on the QUESTION PAPER, as instructed.
- 7. ALL the pages, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
- 8. Time management is essential in order to complete all the questions.
- 9. Print your examination number in the block provided on every page.
- 10. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY											
QUESTION	MARKS OBTAINED			$\frac{1}{2}$	SIGN	MODERATED			$\frac{1}{2}$	SIGN	RE-MARKING
1											
2											
3											
4											
TOTAL											
	2	0	0			2	0	0			2 0 0

FINAL CONVERTED MARK	CHECKED BY
100	

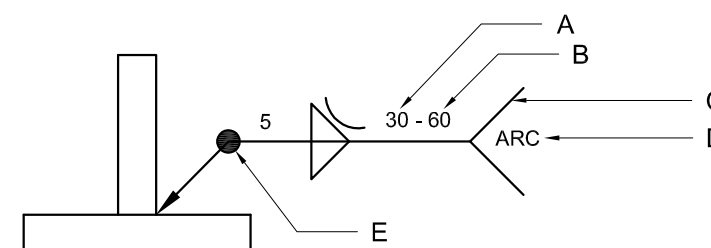
COMPLETE THE FOLLOWING:
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER



\* R A S T C = E D U C A T I O N \*

Complete the table below by neatly answering the questions which refer to the accompanying drawing, the title block and mechanical content. **[30]**

QUESTION 15: Welding symbol



EXAMINATION NUMBER

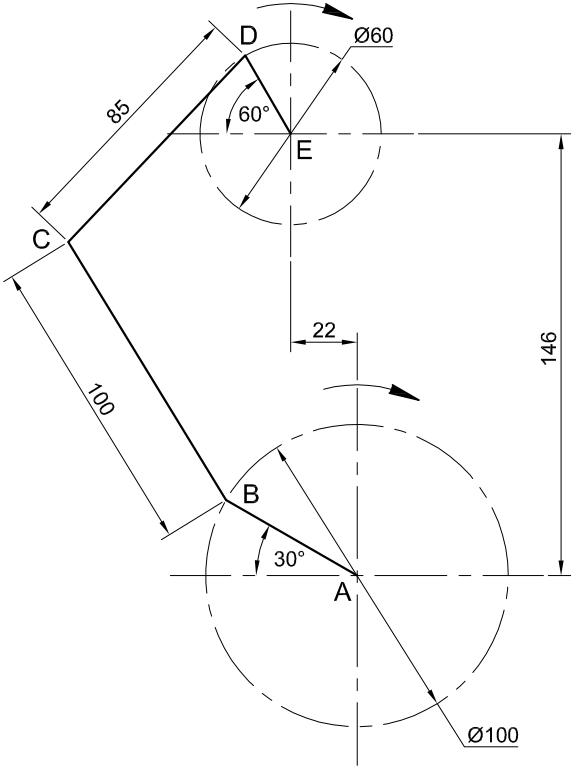


QUESTION 2: LOCI  
NOTE: Answer QUESTIONS 2.1 and 2.2.

2.1 MECHANISM

- Given:
- A schematic drawing of a mechanism consisting of crank AB, connecting rod BC, connecting rod CD and crank DE.
  - The position of centre point A on the drawing sheet
- Specifications:
- The positions of A and E are fixed
  - Connecting rod BC is pin-jointed to crank AB at B
  - Connecting rod CD is pin-jointed to connecting rod BC at C
  - Connecting rod CD is pin-jointed to crank DE at D
- Motion:
- During the motion, both crank AB and crank DE rotate in a clockwise direction and at the same velocity.
- Instructions:
- Draw, to scale 1 : 1, the given schematic drawing of the mechanism.
  - Trace the locus generated by point C for ONE complete rotation of the two cranks.

Show ALL construction. [19]

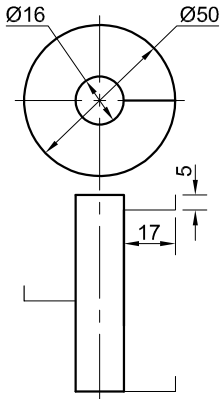


ASSESSMENT CRITERIA 2.1					
1	GIVEN	7			
2	CONSTRUCTION	5			
3	POINTS + CURVE	7			
PENALTIES					
TOTAL		19			



QUESTION 2.2: CHUTE (HELIX)

- Given:
- The top view and incomplete front view showing the starting position, mid-position and end position of a chute
  - The centre lines for the top view and the front view of the chute
- Specifications:
- Pitch: 60 mm
  - Turns: ONE
  - Rotation: LEFT HAND
- Instructions:
- Using the given centre lines, draw, to scale 1 : 1, the given top view and complete front view of the chute.
- NO hidden detail is required.
  - Show ALL construction.



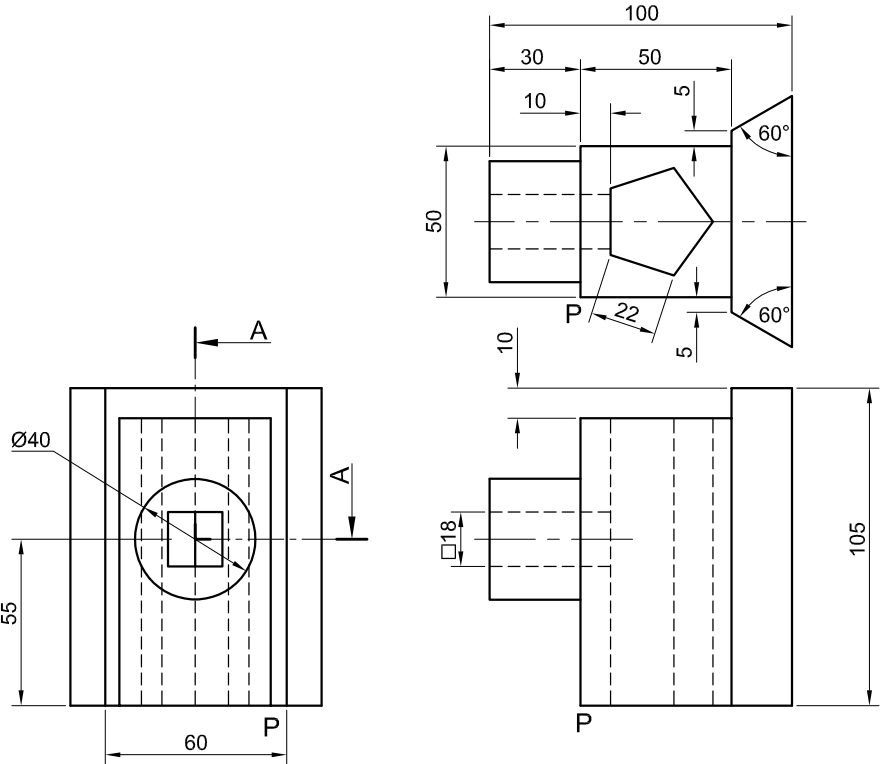
ASSESSMENT CRITERIA 2.2					
1	GIVEN TOP VIEW	1 1/2			
2	CONSTRUCTION	5			
3	OUTER HELIX	9			
4	INNER HELIX + SHAFT	3 1/2			
PENALTIES					
2.2 SUBTOTAL		19			
2.1 SUBTOTAL		19			
TOTAL		38			
EXAMINATION NUMBER					
EXAMINATION NUMBER					3



QUESTION 3: ISOMETRIC DRAWING

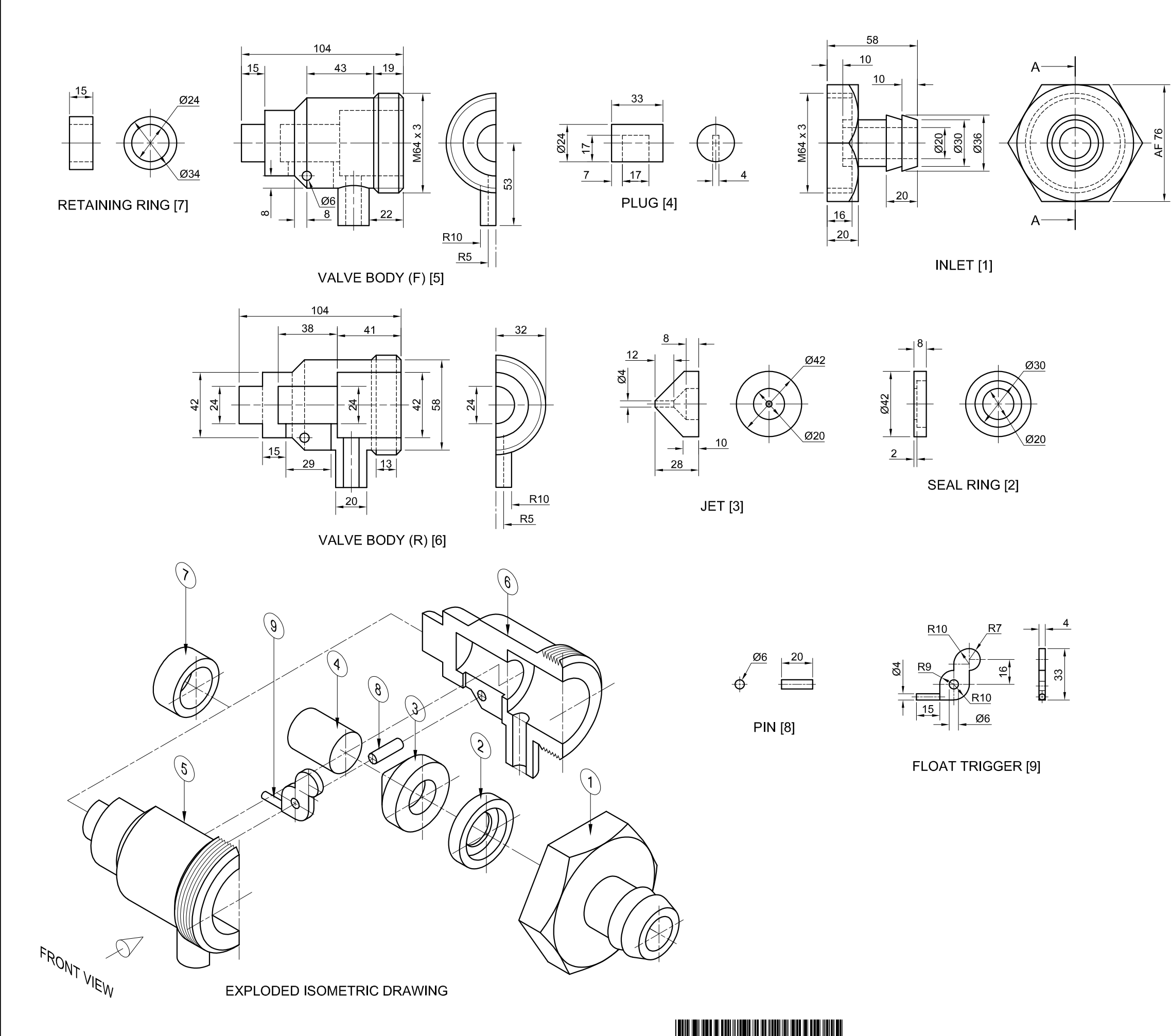
- Given:**
- The front view, top view and left view of a punch guide with a regular pentagonal hole
  - The position of point P on the drawing sheet

- Instructions:**
- Using scale 1 : 1, convert the orthographic views of the punch guide into a sectional isometric drawing on cutting plane A-A.
- Make P the lowest point of the drawing.
  - Show ALL construction.
  - NO hidden detail is required.
- [38]



P

ASSESSMENT CRITERIA				
1	AUX. VIEW + PLACING	3		
2	ISOMETRIC + NON-ISO' LINES	14		
3	ISOMETRIC CIRCLES + CIRCLE CONSTR'	7		
4	SECTIONED SURFACES + HATCHING	14		
PENALTIES				
TOTAL		38		
EXAMINATION NUMBER				
EXAMINATION NUMBER				4



QUESTION 4: MECHANICAL ASSEMBLY

- Given:**
- The exploded isometric drawing of the parts of a float control assembly, showing the position of each part relative to all the others
  - Orthographic views of each of the parts of the float control 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 float control 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 is shown on the right view of the inlet (part 1).
    - 4.2 The right view**
    - 4.3 The bottom view**

- NOTE:**
- Planning is essential.
  - ALL drawings must comply with the guidelines as contained in the *SANS 10111*.
  - The convention of symmetry may NOT be applied.
  - Show THREE faces of the inlet in the bottom view.
  - The plug (part 4) must be placed against the jet (part 3).
  - Add cutting plane A-A in the right view.
  - NO hidden detail is required.
- [94]

PARTS LIST			
PART		QUANTITY	MATERIAL
1	INLET	1	PLASTIC
2	SEAL RING	1	RUBBER
3	JET	1	LTA PLASTIC
4	PLUG	1	PLASTIC
5	VALVE BODY (F)	1	PLASTIC
6	VALVE BODY (R)	1	PLASTIC
7	RETAINING RING	1	PLASTIC
8	PIN	1	PLASTIC
9	FLOAT TRIGGER	1	PLASTIC
WR PROJECTS		8 QUARRY STREET DELTA PARK 1807 www.waterproducts.co.za 012 543 6879	
TITLE		FLOAT CONTROL	

FOR OFFICIAL USE ONLY	
INCORRECT ORTHOGRAPHIC PROJECTION	
INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL PENALTIES (-)	

ASSESSMENT CRITERIA					
RIGHT VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	INLET + JET	4			
2	VALVE BODY	2			
SUBTOTAL		6			
SECTIONAL FRONT VIEW					
1	INLET	14 <sup>1</sup> / <sub>2</sub>			
2	SEAL RING	2			
3	VALVE BODY + RETAINING RING	22			
4	JET	6 <sup>1</sup> / <sub>2</sub>			
5	FLOAT TRIGGER + PIN + PLUG	9			
SUBTOTAL		54			
BOTTOM VIEW					
1	INLET	9 <sup>1</sup> / <sub>2</sub>			
2	VALVE BODY + RETAINING RING + JET	9 <sup>1</sup> / <sub>2</sub>			
SUBTOTAL		19			
GENERAL					
1	CENTRE LINES	4			
2	SECTION A-A	3			
3	ASSEMBLY	8			
SUBTOTAL		15			
TOTAL		94			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6

