



education

Department of
Education
FREE STATE PROVINCE

ENGINEERING GRAPHICS AND DESIGN P2

GRADE 12

SEPTEMBER 2019

TIME: 3 HOURS

TOTAL: 100

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

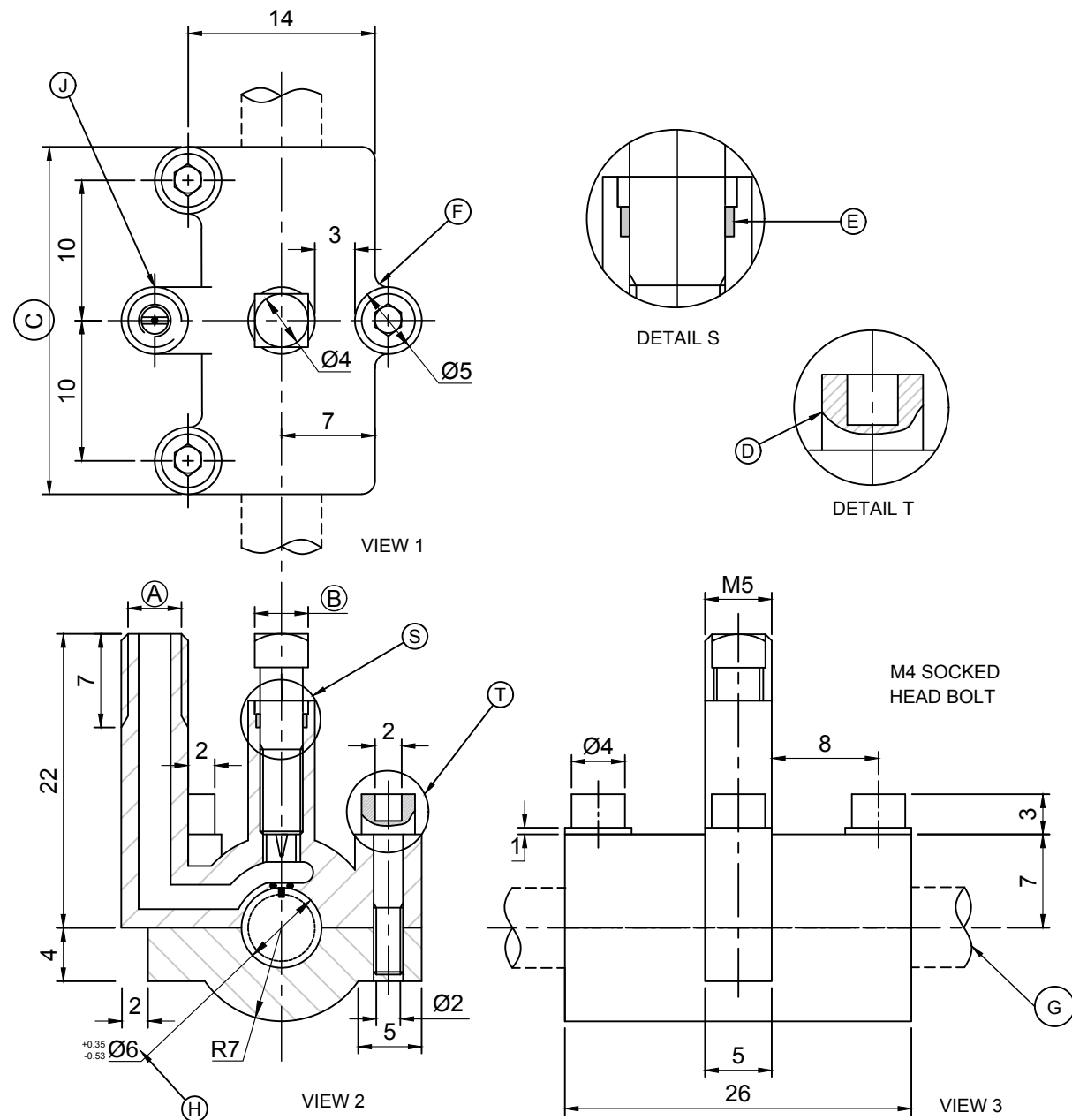
1. This question paper consists of FOUR questions
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless stated otherwise.
4. ALL drawings must be drawn to scale 1:1, unless stated otherwise.
5. ALL questions must be answered on the DIAGRAM SHEET, as instructed.
6. ALL the pages must be restapled in numeric sequence, irrespective of whether the question was attempted or not.
7. Time management is essential in order to complete all the questions.
8. Print your name and surname as well as the grade in the space provided on each page.
9. ALL answers must be drawn accurately and neatly.
10. ALL necessary construction and projection lines must be shown.
11. Plan each drawing carefully from the given position, which is indicated on the diagram sheets.
12. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY								
QUESTION	MARKS OBTAINED			½	MODERATED			½
1								
2								
3								
4								
TOTAL								
	2	0	0		2	0	0	

FINAL CONVERTED MARK	CHECKED BY
100	

NAME & SURNAME		GRADE		1
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STAPEL



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

Three views and two detailed enlargements of a tapping valve 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 title block.

[30]

QUESTIONS		ANSWERS	
1	What is the title of the assembly?	1	
2	On what date was the drawing drawn?	1	
3	What is the drawing number?	1	
4	What scale is indicated for the drawing?	1	
5	Which drawing program was used?	1	
6	Who approved the drawing?	1	
7	What material is used to manufacture the main base?	1	
8	What is VIEW 2 called?	1	
9	How many socket head bolts are there in the assembly?	1	
10	Give the complete dimensions at:	A: B: C: .	3
11	Name the feature at F.	1	
12	Name the type of section at D.	1	
13	Why is the component at E filled in solid?	1	
14	What is the outer diameter of the shaft at J?	1	
15	What is the purpose of the two enlarged detailed views?	2	
16	What is indicated by the convention at G?	1	
17	With reference to the tolerance, determine the maximum dimension at H.	2	
18	With reference to the tolerance, determine the minimum dimension at H.	2	
19	Insert the cutting plane on VIEW 3 and label it A-A.		3
20	In the space provided blow, draw, in neat freehand, the symbol for the projection system used.		4
TOTAL		30	

PARTS LIST				FILENAME: RCO/VK 002	APPROVED: RIAAN	DATE: 2017-02-21	<p style="text-align: center;">JP ENGINEERING</p> <p>680 De Beer Street Wonderboom 0031 Gauteng</p>	ANSWER 20
	PART	QUANTITY	MATERIAL	DRAWING NO. 2017-A-007	CHECKED: JOHANN	DATE: 2017-01-17		
1	VALVE ASSEMBLY	1	REF: DETAILED DRAWING	ALL DIMENSIONS ARE IN MILLIMETERS	DRAWN: PIETER	DATE: 2017-01-07		
2	SOCKET HEAD BOLT	3	TOOL STEEL	DRAWING PROGRAM: AUTOCAD	TAP VALVE TO BE USED FOR 134a, R11, R22 & 501 REFRIGERANTS IN COPPER PIPE ONLY			
3	SQUARE BOLT WITH PUNCH	1	TOOL STEEL	MATERIALS: STEEL, PEWTER AND RUBBER				
4	MAINE BASECAP	1	PEWTER	SCALE 2 : 1				
5	CAP	1	PEWTER	TITLE:				
6	O-RING	1	RUBBER	TAPPING VALVE				
7	O-SEAL	1	RUBBER					

DIAGRAM SHEET 1	ENGINEERING GRAPHICS AND DESIGN	SEPTEMBER 2019 PAPER 2	NAME & SURNAME		GRADE		2
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STAPEL

QUESTION 2: LOCUS

Given:

A mechanism that consists of wheel AB. Link BG is joined with pin B to the wheel AB. The link BG slide through the fixed point C. Link GP is joined at BG at point G. Link GP slide through the fixed point at D.

Movement:

Wheel AB rotates in a clockwise direction with link BG that slides through point C. Link GP rotates with AB and link GP that slides through point D.

Instructions:

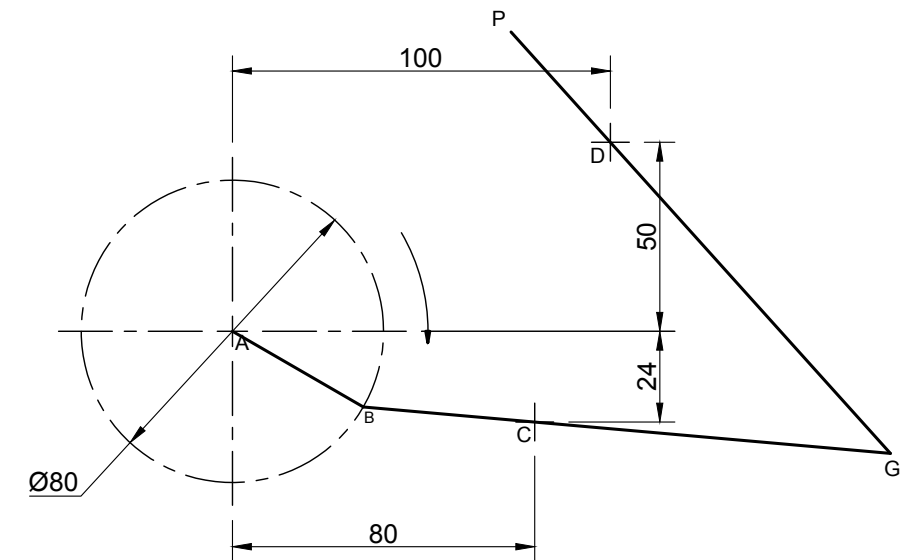
- 2.1 Draw to scale 1:1, the given schematic drawing, using point A as the starting point. Include all labels.
- 2.2 Determine the locus of point G for one rotation.
- 2.3 Determine the locus of point P for one rotation.

Note:

ALL constructions must be shown.

[40]

A



LINK BG = 140mm
LINK GP = 150mm

ASSESSMENT CRITERIA

1	GIVEN	5		
2	CONSTRUCTION	9		
3	POINTS + CURVES	26		
TOTAL		40		

STAPEL

QUESTION 3: ISOMETRIC DRAWING

Given:

- The front-, left- and top view of a CASTING with cutting plane X-X.
- The position of point A on the drawing sheet.

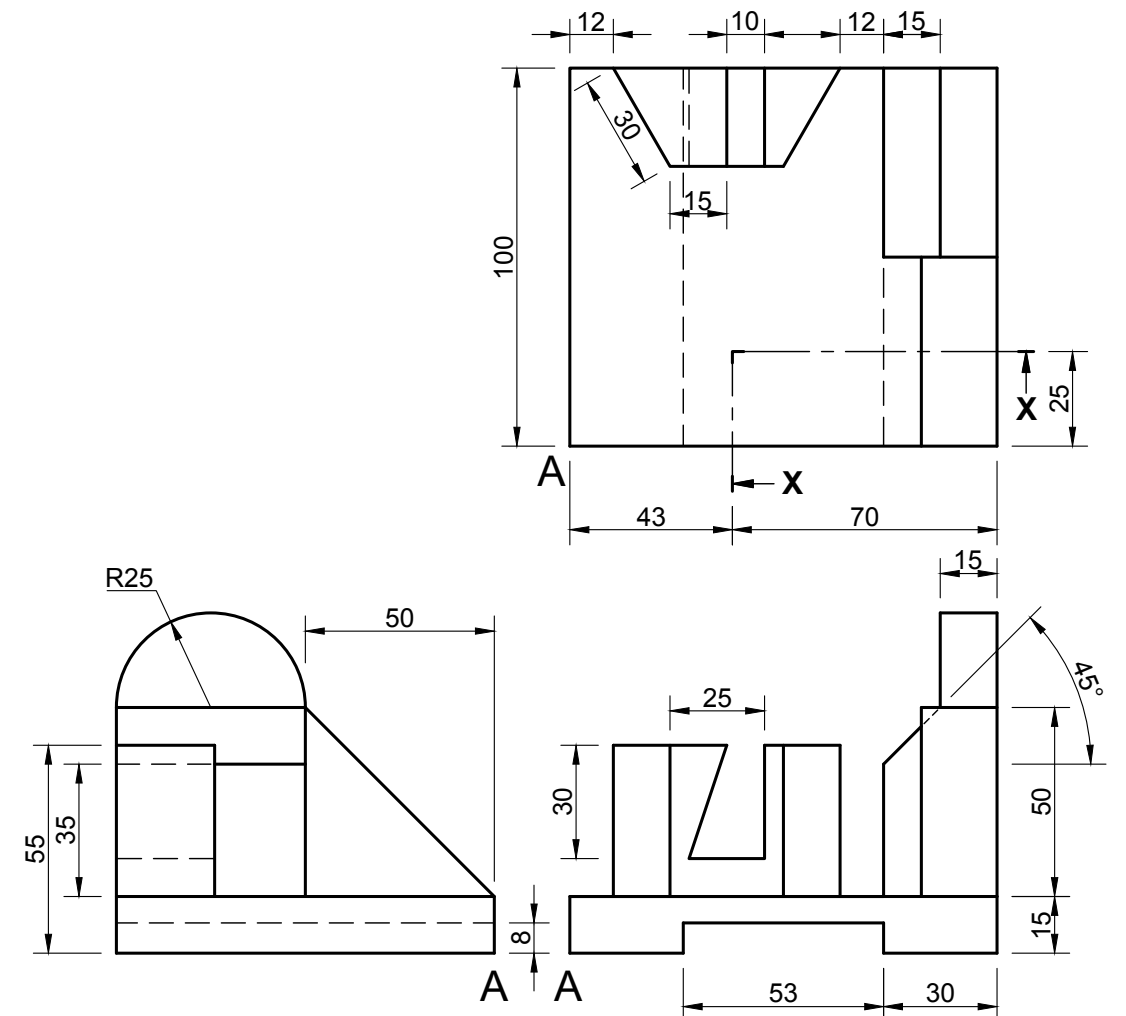
Instructions:

Using scale 1:1, convert the orthographic view of the casting into a sectional isometric drawing in cutting plane X-X.

Note:

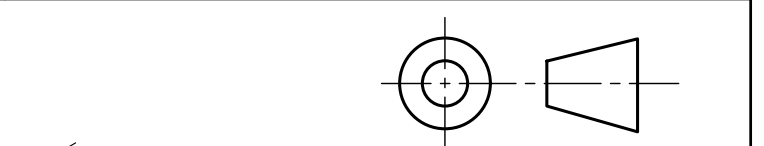
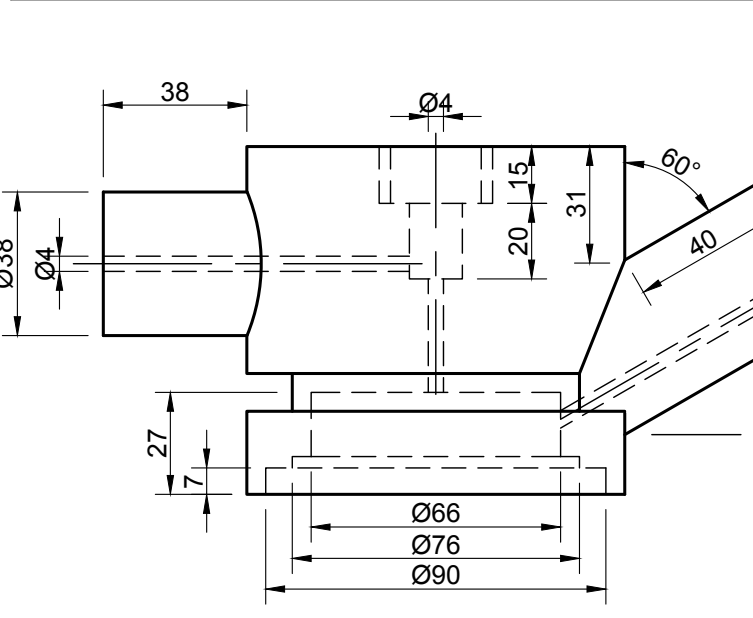
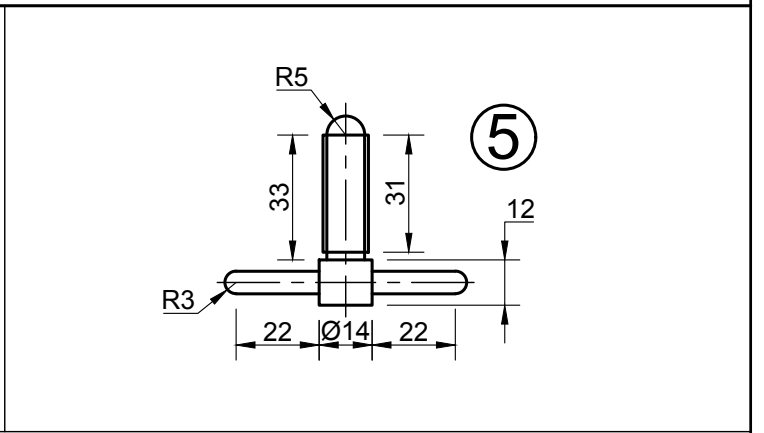
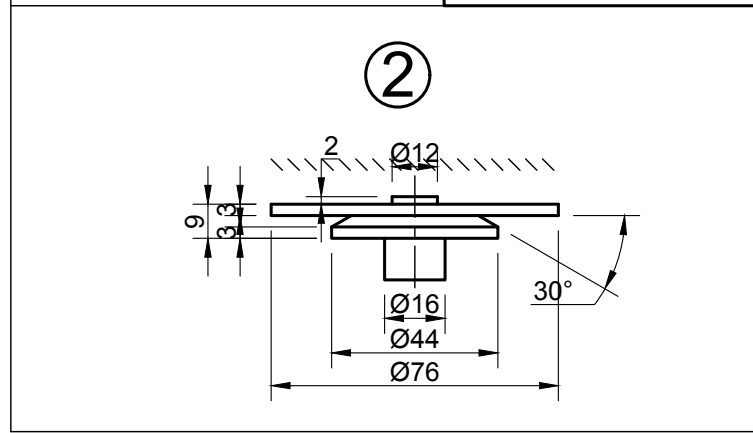
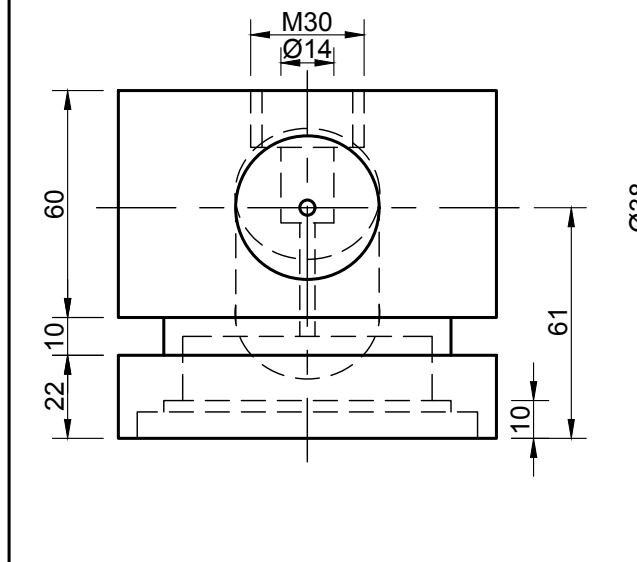
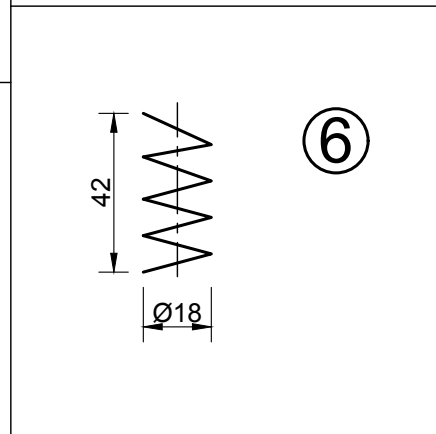
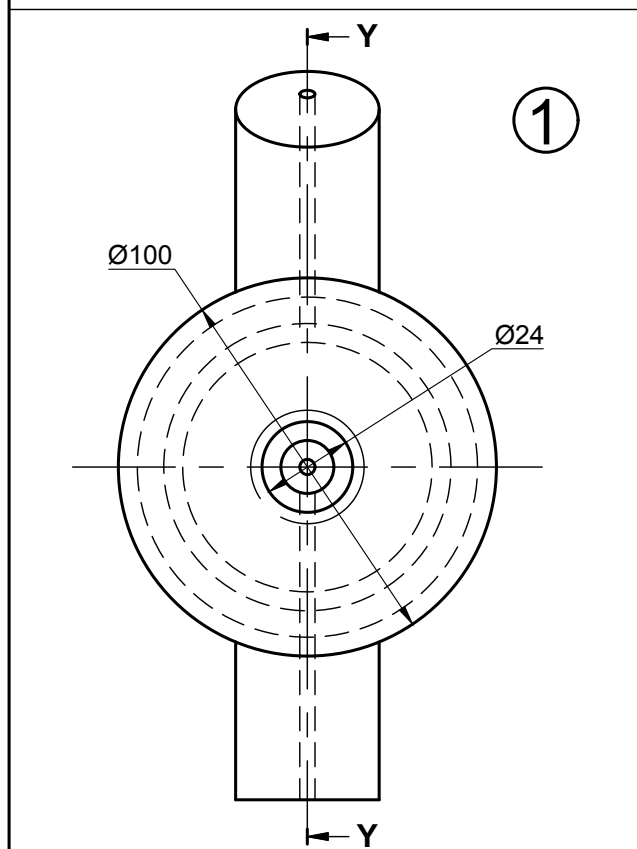
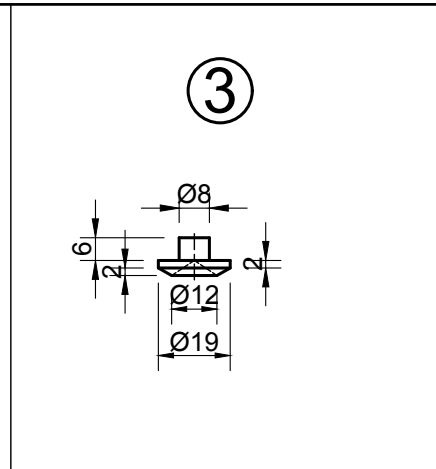
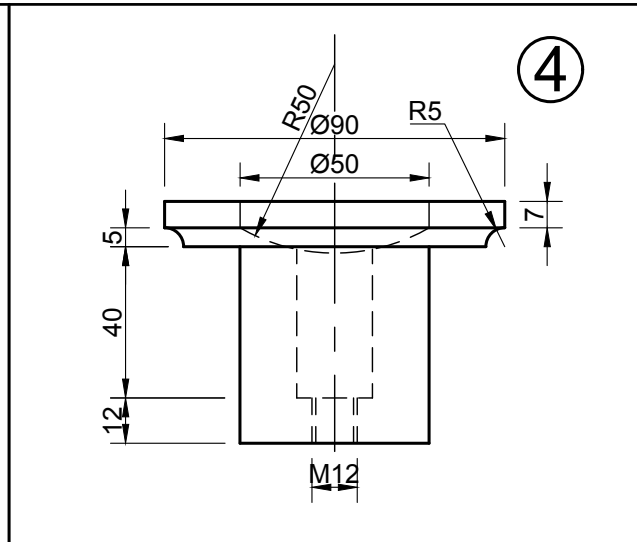
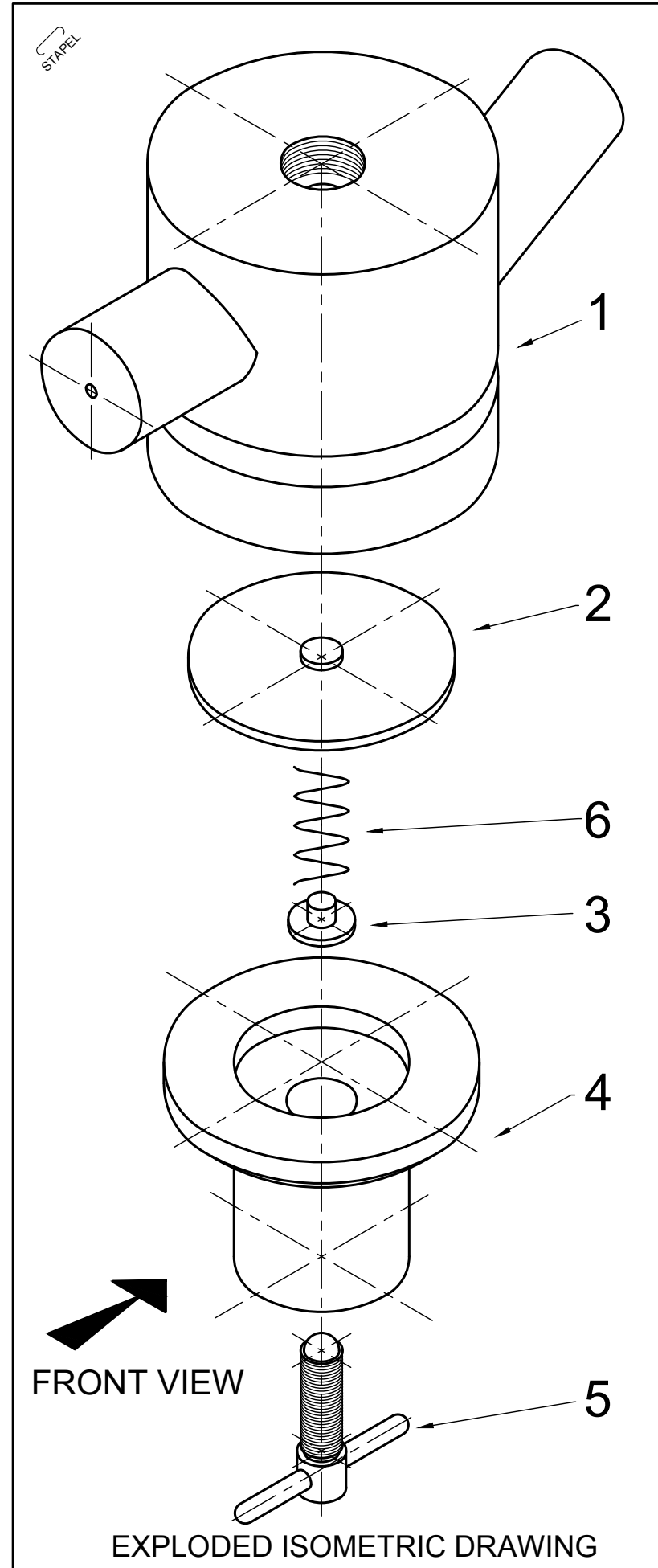
- Make A the lowest point of the drawing.
- Show ALL necessary constructions.
- NO hidden detail is required.

[35]



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A

ASSESSMENT CRITERIA				
1	PLACEMENT + AUXILIARY VIEW	3		
2	ISO- & NON ISOMETRIC LINES	11		
3	HEXAGON	8½		
4	CIRCLE + CIRCLE CONST. + CL	6½		
5	SECTION	6		
TOTAL		35		



QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a gas regulator, showing the position of each part relative to all the others.
- Orthographic views of each of the parts of the gas regulator assembly.

Instructions:

- Answer this question on page 6 (diagram sheet 5).
- Draw, to scale 1:1 and in third-angle orthographic projection, the following views of the assembled parts of the gas regulator assembly:

- 4.1 **A sectional right view** on cutting plane Y-Y
- 4.2 **A front view**, as seen from the direction of the arrow shown on the exploded isometric drawing

Note:

- Planning is essential.
- NO hidden detail is required.
- ALL drawings must comply with the guidelines contained in the SANS 10111.

- Add the following to the drawing:
 - The cutting plane Y-Y
 - The projection symbol of the system for this drawing used
 - Neatly supply the drawing with a title and scale in the title block provided.

[95]

PARTS		
	DESCRIPTION	AMOUNT
1	BODY	1
2	DIAPHRAGM ASSEMBLY	1
3	LOCATER	1
4	COVER	1
5	SCREW	1
6	SPRING	1



ASSESSMENT CRITERIA					ASSESSMENT CRITERIA					ASSESSMENT CRITERIA					TITLE	
LEFT VIEW					SECTIONAL FRONT VIEW					TECHNICAL PROVISION					SCALE	
1	BODY	10½			1	BODY	20			1	CENTER LINES + CUTTING PLANE Y-Y	10½			PROJECTION SYMBOL	
4	COVER	3			2	DIAPHRAGM	10			2	TITLE + SCALE	2			-----	
5	SCREW	5			3	LOCATER	7			3	PROJECTION SYMBOL	4				
SUB TOTAL 1		18½			4	COVER	9			SUB TOTAL 3		16½				
SUB TOTAL 2		60			5	SCREW	13			GRAND TOTAL		95				
SUB TOTAL 3		95			6	SPRING	1									

DIAGRAM SHEET 5	ENGINEERING GRAPHICS AND DESIGN	SEPTEMBER 2019 PAPER 2	NAME & SURNAME	GRADE	6
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