STAPEL

education

Department of Education
FREE STATE PROVINCE

ENGINEERING GRAPHICS AND DESIGN

GRADE 12

PAPER 2

SEPTEMBER 2017

TIME: 3 HOURS

TOTAL: 100

This question paper consists of 6 pages

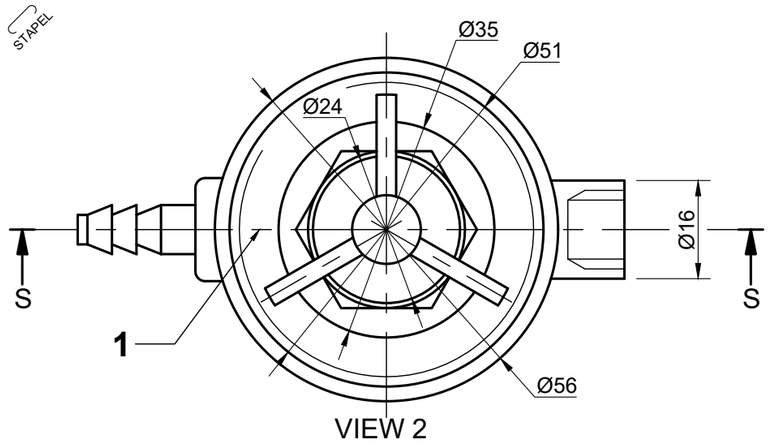
INSTRUCTIONS AND INFORMATION

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

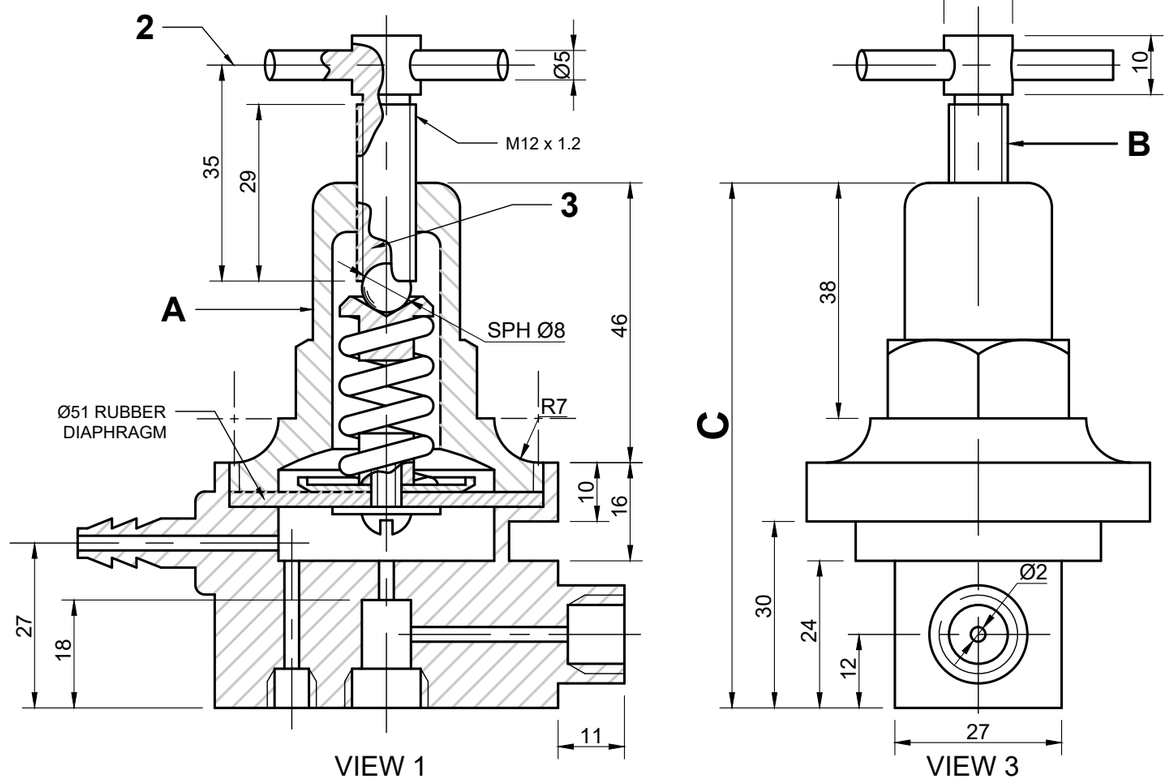
FOR OFFICIAL USE ONLY								
QUESTION	MARKS OBTAINED			½	MODERATED			½
1								
2								
3								
4								
TOTAL								
	2	0	0		2	0	0	

FINAL CONVERTED MARK	CHECKED BY
100	

NAME & SURNAME	MEMORANDUM	GRADE	12	1



VIEW 2



VIEW 1

VIEW 3

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
The working drawings of a diaphragm regulator with a title block and a table of questions.

Instructions:
With a pencil, complete the table by neatly printing the correct answers in the corresponding answer column. All the questions refer to the accompanying drawings and the title block on diagram sheet A. **[26]**

QUESTIONS		ANSWERS	
1	On what date was the revision completed?	2017/05/06	1
2	Who checked the drawing?	A.C. NEL	1
3	What is the title of the drawing?	DIAPHRAGM REGULATOR	1
4	What scale is indicated for the drawing?	SCALE 1:2	1
5	How many internal screw threads are there in the assembly?	6	1
6	From what material are the metal components of the regulator made?	BRASS	1
7	How many parts make up the assembly?	11	1
8	What orthographic projection system has been used?	Third Angle Orthographic Projection	1
9	What would VIEW 3 be called?	RIGHT VIEW	1
10	What would VIEW 2 be called?	TOP VIEW	1
11	What is the outer diameter of the rubber diaphragm?	Ø51	1
12	What is the Diameter of the sphere?	Ø 8	1
13	Determine the dimensions at: A B C D E	A: Ø11 B: Ø24 C: M12 D: 85 E: Ø16	5
14	What drawing feature is shown at 1?	SECTION LINE (CENTER LINE)	1
15	What drawing feature is shown at 2?	DIMENSION (EXTENSION) LINE	1
16	What type of section is shown at 3?	PARTLY SECTIONED	1
17	What does the machining symbol ✓ mean?	NO MACHINING ALLOWED	1
18	In the block below, draw, in neat freehand, the simplified SABS 0111 convention for diamond knurling.		4
19	What is the permissible tolerance on the components of the regulator?	0,2500	1
TOTAL			26

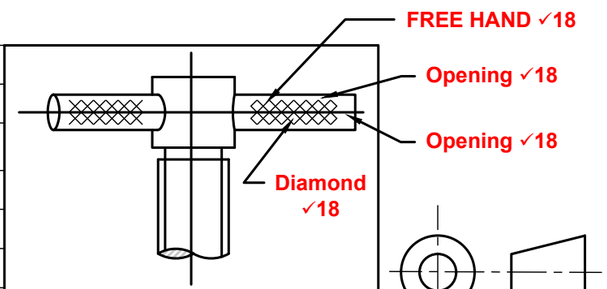
DATE	CHANGED BY	REVISION DESCRIPTION	No
2017/05/06	E. POTGIETER	DIAMOND KNURLING ON HANDLES	A

DIAPHRAGM REGULATOR

EXCELLED ENGINEERING
(SA) (PTY) LTD

141 OXFORD STREET
PRETORIA 0001
www.exengineering.co.za Tel.No: 012 211 2345

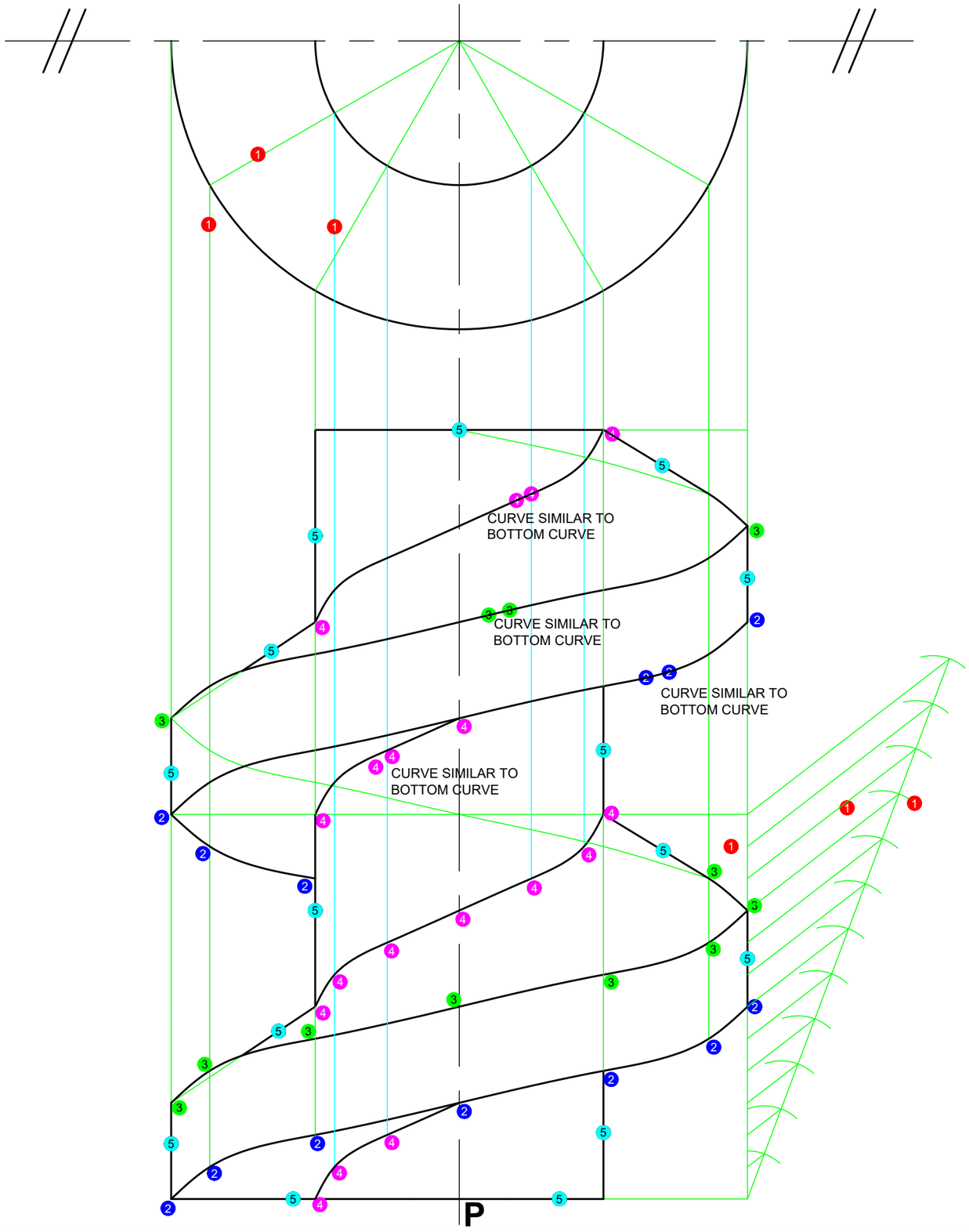
DRAWING METHOD: AutoCAD 2018	DRAWN: M.A. HALA	2017/08/20
DRAWING No: LFN/304/2017	CHECKED: A.C. NEL	2017/09/01
FILE NAME: D5-Y2	APPROVED: R. SMITH	2017/09/09
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS WITH A TOLERANCE OF ±0.25	MATERIAL: BRASS RUBBER	
	HEAT TREATMENT: NORMAL	
UNLESS OTHERWISE SPECIFIED, ALL SURFACE TEXTURE FINISHERS ARE ✓	SCALE 1:2	
	DRAWN TO SCALE	



CONVENTION FOR DIAMOND KNURLING

DIAGRAM SHEET 1	ENGINEERING GRAPHICS AND DESIGN	SEPTEMBER 2017 PAPER 2	NAME & SURNAME	MEMORANDUM	GRADE 12 2

STAPEL

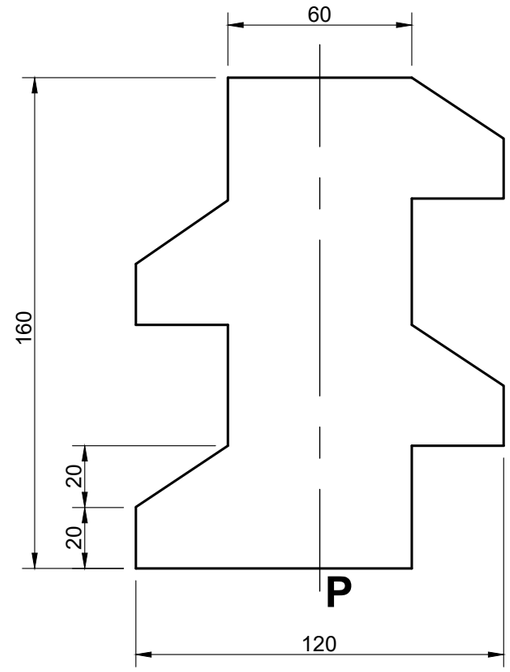


QUESTION 2: LOCI

Given:
An incomplete profile of a right hand worm gear with a pitch of 80 mm.
The bottom half of the top view, the center lines and the starting position P is also shown as reference lines on diagram sheet 2 (page 3).

Instructions:
Complete, according to scale 1:1, the loci of the worm gear for one and a half rotation in a clockwise direction.

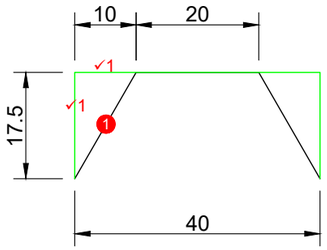
* Show all construction lines.
* NO hidden detail is required. [32]



ASSESSMENT CRITERIA				
1	PROJ + CONTRUCTIONS ($\frac{6}{2}$) 1	3		
2	LOCI 1 - OUTER BOTTOM ($\frac{13}{2}$) 2	6.5		
3	LOCI 2 - OUTER TOP ($\frac{12}{2}$) 3	6		
4	LOCI 3 - INNER ($\frac{18}{2}$) 4	9		
5	SHAFT & SIDES ($\frac{15}{2}$) 5	7.5		
	TOTAL	32		

DIAGRAM SHEET 2	ENGINEERING GRAPHICS AND DESIGN	SEPTEMBER 2017 PAPER 2	NAME & SURNAME	MEMORANDUM	GRADE	12 3

STAPEL

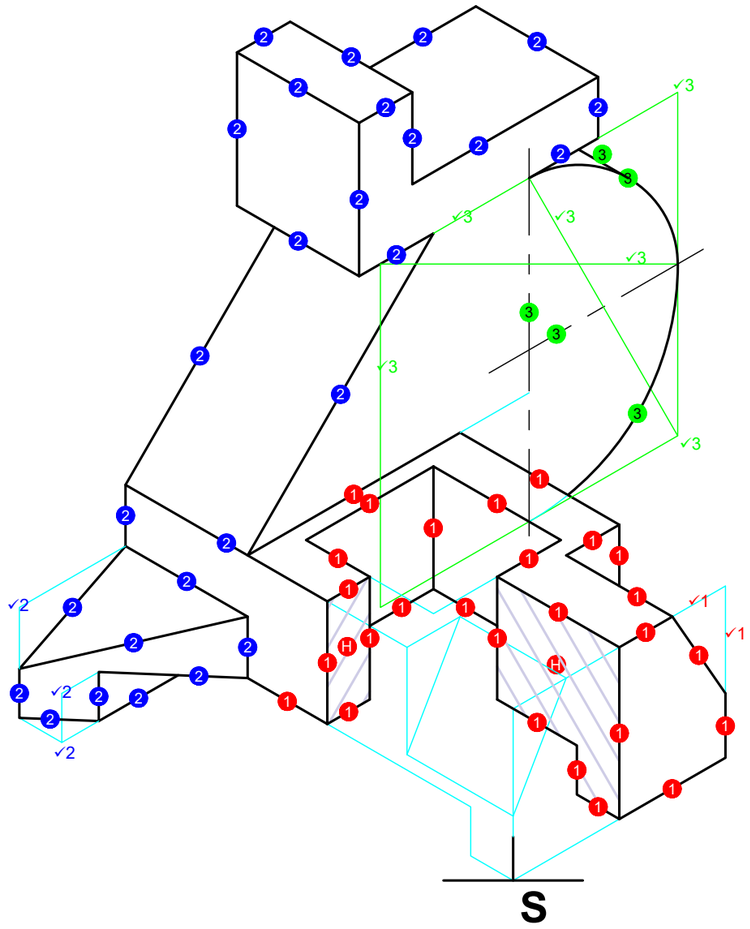


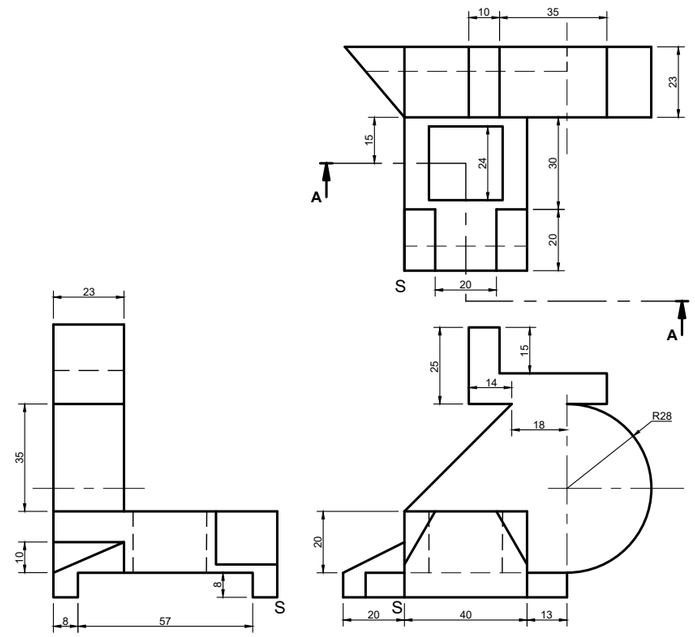
QUESTION 3: ISOMETRIC DRAWING

Given:
The front view, top view and left view of a casting.
The position of point S on the diagram sheet 3 (page 4).

Instructions:
Use a scale of 1:1 to convert the orthographic view of the casting into a sectional isometric drawing on cutting plane A-A.

- Make S the lowest point of the drawing.
- Show ALL necessary constructions.
- NO hidden detail is required. **[39]**





ASSESSMENT CRITERIA				
1	AUXILIARY VIEW ✓1 1	3		
2	FRONT (HEXAGON & SQUARE ($\frac{31}{2}$)) ✓1 1	15.5		
3	BACK ($\frac{30}{2}$) ✓2 2	15		
4	CIRCLE ($\frac{11}{2}$) ✓3 3	5.5		
	TOTAL	39		

DIAGRAM SHEET 3	ENGINEERING GRAPHICS AND DESIGN	SEPTEMBER 2017 PAPER 2	NAME & SURNAME	MEMORANDUM	GRADE	12	4

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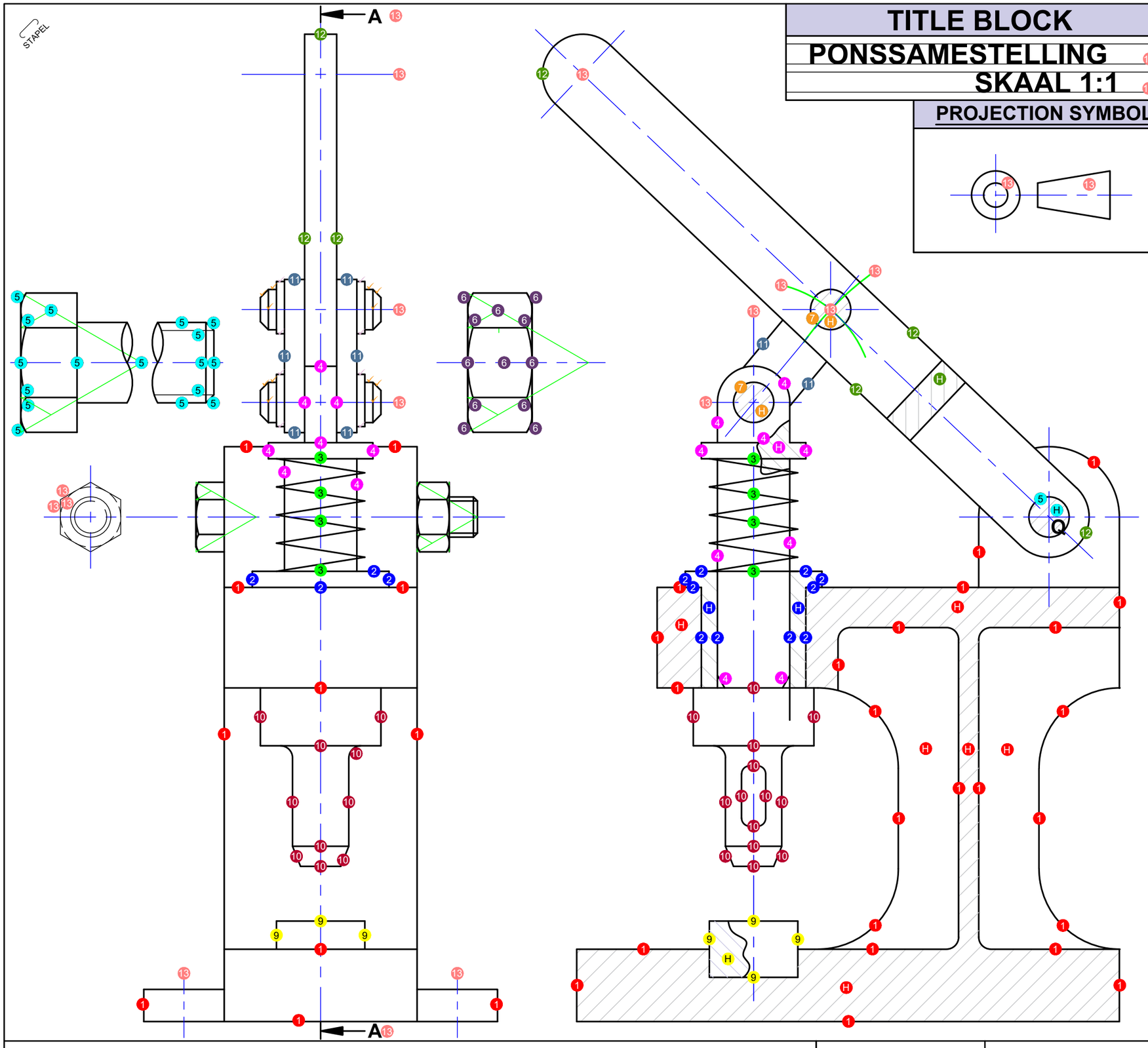
TITLE BLOCK

PONSSAMESTELLING

SKAAL 1:1

PROJECTION SYMBOL



ASSESSMENT CRITERIA				
FRONT VIEW			Mark	Mod.
1	BASE ($\frac{30}{2}$) 1	15		
2	BUSCH ($\frac{12}{2}$) 2	6		
3	HELICAL SPRING ($\frac{4}{2}$) 3	2		
4	SHAFT ($\frac{10}{2}$) 4	5		
5	BOLT ($\frac{2}{2}$) 5	1		
6	NUT 6			
7	SHAFT COUPLING ($\frac{4}{2}$) 7	2		
8	CIRCLIP 8			
9	PUNCH BED ($\frac{5}{2}$) 9	2.5		
10	PUNCH ($\frac{14}{2}$) 10	7		
11	BAR COUPLINIG ($\frac{2}{2}$) 11	1		
12	ARM MECHANISM ($\frac{5}{2}$) 12	2.5		
	SUB TOTAL 1	44		
LEFT VIEW			Mark	Mod.
1	BASE ($\frac{10}{2}$) 1	5		
2	BUSCH ($\frac{4}{2}$) 2	2		
3	HELICAL SPRING ($\frac{4}{2}$) 3	2		
4	SHAFT ($\frac{8}{2}$) 4	4		
5	BOLT ($\frac{18}{2}$) 5	9		
6	NUT ($\frac{12}{2}$) 6	6		
7	SHAFT COUPLING ($\frac{12}{2}$) ✓	6		
8	CIRCLIP ($\frac{8}{2}$) ✓	4		
9	PUNCH BED ($\frac{3}{2}$) 9	1.5		
10	PUNCH ($\frac{10}{2}$) 10	5		
11	BAR COUPLING ($\frac{6}{2}$) 11	3		
12	ARM MECHANISM ($\frac{3}{2}$) 12	1.5		
	SUB TOTAL 2	49		
GENRAL			Mark	Mod.
1	CENTER LINES ($\frac{11}{2}$)	5.5		
2	SECTION LINE ($\frac{2}{2}$)	1		
3	TITLE & SCALE ($\frac{2}{2}$)	1		
4	PROJECTION SYMBOL ($\frac{2}{2}$)	1		
5	AUXILIARY VIEW ($\frac{3}{2}$)	1.5		
	SUB TOTAL 3	10		
	TOTAL	103		

DIAGRAM SHEET 5	ENGINEERING GRAPHICS AND DESIGN	SEPTEMBER 2017 PAPER 2	NAME & SURNAME	MEMORANDUM	GRADE	12	6