

LEARNER SUPPORT MATERIAL

GRADE 12 NSC

PAST QUESTIONS ON

PAPER 2

WITH

MARKING GUIDELINES

PAPER 2

1. Analytical Mechanical
2. Loci
3. Isometric Drawing
4. Mechanical Assembly Drawings

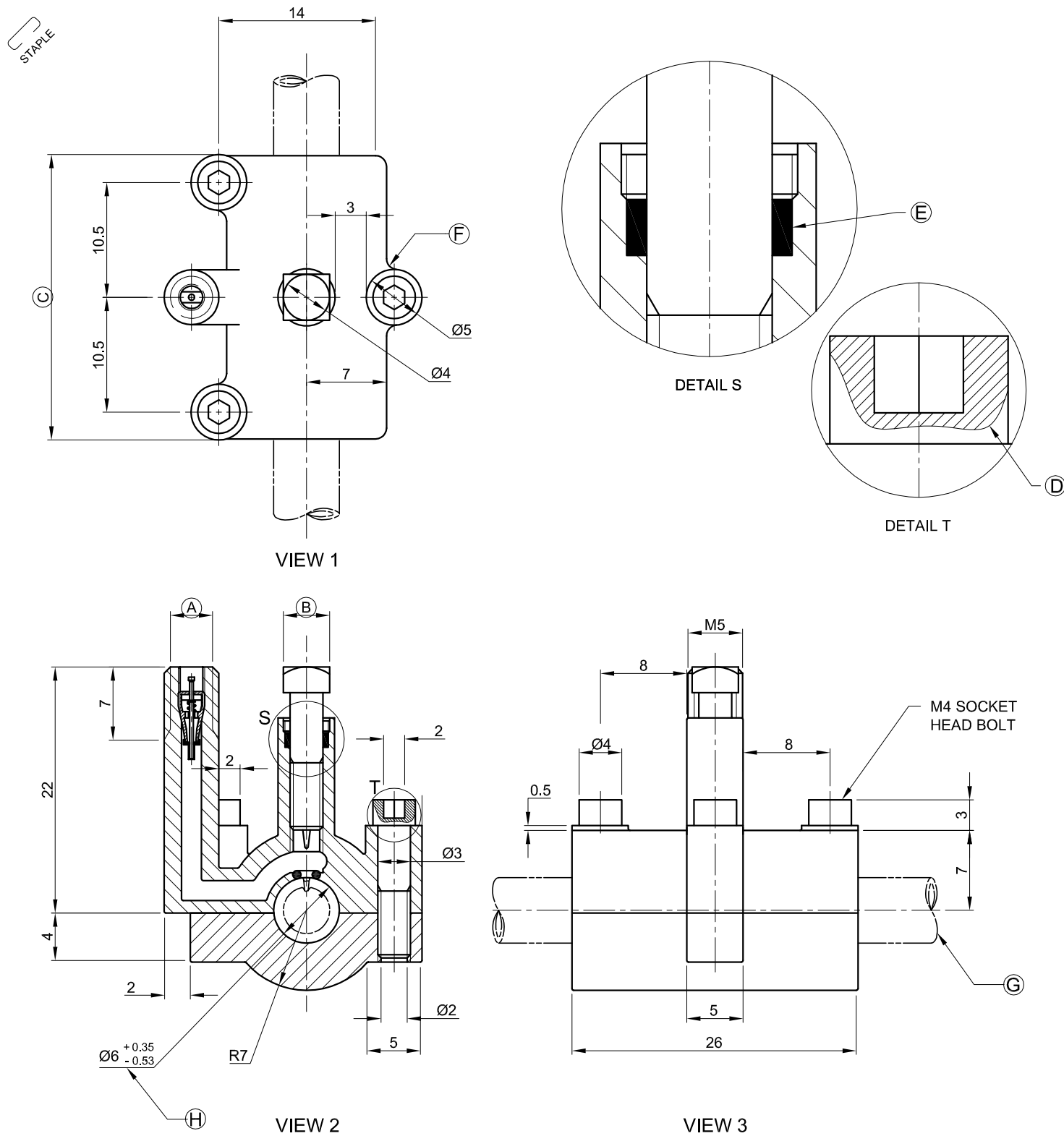
GRADE 12 NSC

PAST QUESTIONS ON

ANALYTICAL MECHANICAL PAPER 2

WITH

MARKING GUIDELINES



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 the title block. [30]

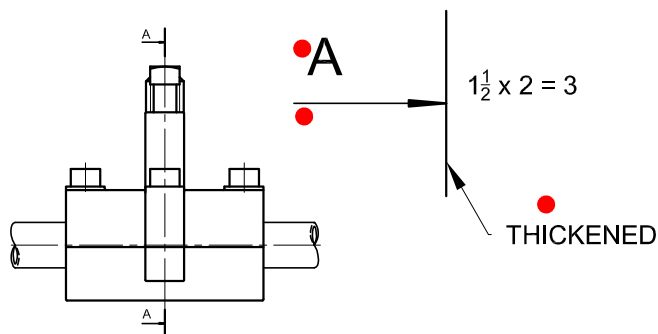
QUESTIONS		ANSWERS	
1	What is the title of the assembly?	1	
2	On what date was the drawing drawn?	1	
3	What is the drawing number?	1	
4	What scale is indicated for the drawing?	1	
5	Which drawing program was used?	1	
6	Who approved the drawing?	1	
7	What material is used to manufacture the main base?	1	
8	What would VIEW 2 be 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 total height of the assembly?	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 below, draw, in neat freehand, the symbol for the projection system used.	4	
TOTAL		30	

PARTS LIST				FILE NAME: RCO/VK 0002.dwg	TITLE		ANSWER 20
PART	QUANTITY	MATERIAL		DRAWING No. 2015 - A - 005	TAPPING VALVE		
1	VALVE ASSEMBLY	1	REF: DETAILED DRAWING	ALL DIMENSIONS ARE IN MILLIMETRES.	APPROVED: ANDREW BRAND	2015/01/23	<div style="text-align: center;"> <p>-----</p> <p>SYMBOL</p> <p>EXAMINATION NUMBER</p> <p>EXAMINATION NUMBER</p> </div>
2	SOCKET HEAD BOLT	3	TOOL STEEL	DRAWING PROGRAM: AUTOCAD 2015	CHECKED: SOON DENTON	2015/01/16	
3	SQUARE BOLT WITH PUNCH	1	TOOL STEEL	MATERIALS: STEEL, PEWTER AND RUBBER	DRAWN: CHRISTI GREEF	2015/01/05	
4	MAIN BASE	1	PEWTER	<p>ReCO REFRIGERATION</p> <p>15 EDISON BLVD INDUSTRIAL PARK 1911</p>	<p>TAP VALVE TO BE USED FOR TAPPING OF 134a, R11, R22 AND 501 REFRIGERANTS IN COPPER PIPE ONLY</p>		
5	CAP	1	PEWTER				
6	O-RING	1	RUBBER				
7	O-SEAL	1	RUBBER				
					SCALE 2 : 1		2

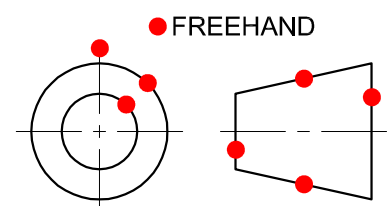


ANSWERS		
1	TAPPING VALVE	1
2	2015/01/05	1
3	2015 - A - 005	1
4	SCALE 2 : 1	1
5	AUTOCAD	1
6	ANDREW BRAND	1
7	PEWTER	1
8	SECTIONAL FRONT VIEW	1
9	3	1
10	A : Ø 4 B : 4 C : 26	3
11	FILLET	1
12	PART SECTION	1
13	SPECIFIC PART HATCHING e.g. RUBBER or THIN PART	1
14	29	1
15	TO SHOW DETAIL	2
16	INTERRUPTED VIEW/CONTINUES/S-BREAK	1
17	Ø6.35	2
18	Ø5.47	2
19	<i>See below</i>	3
20		4
TOTAL		30

ANSWER 19

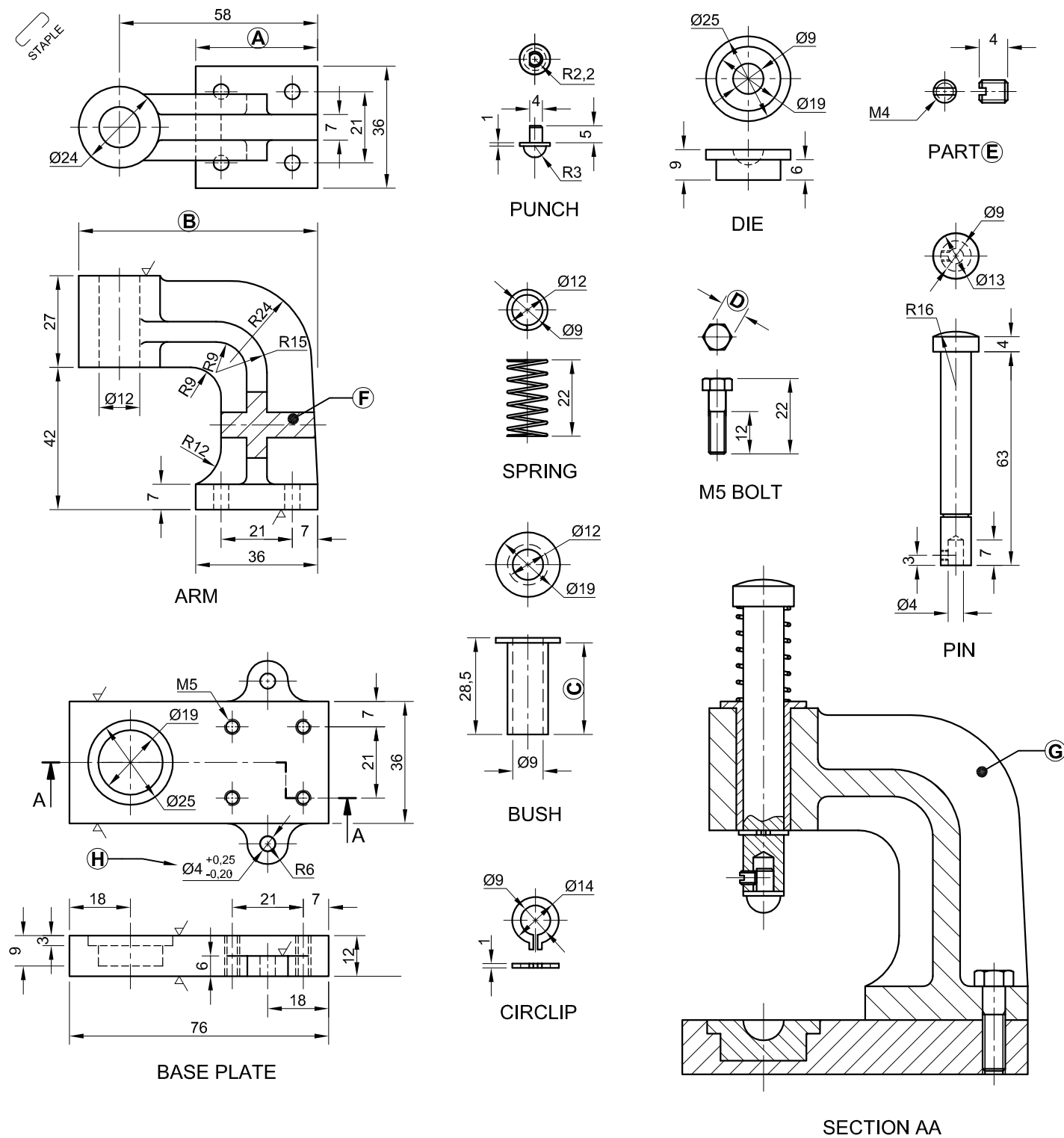


ANSWER 20



SYMBOL

PAPER 2 QUESTION 1
 GRADE 12
 November 2015
 MEMORANDUM



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

Drawings of the parts of a punch, a sectional view of the punch assembly, a title block and a table of questions. The drawings have not been prepared according to the indicated scale.

Instructions:

Complete the table below by neatly answering the questions, which all refer to the accompanying detailed drawings and the title block. [30]

QUESTIONS		ANSWERS	
1	On what date was the drawing checked?	1	
2	In which town is the engineering company situated?	1	
3	In which SI unit are the dimensions presented?	1	
4	What type of heat treatment is required?	1	
5	What is the file name?	1	
6	What material is used to manufacture the punch?	1	
7	On what date was the last revision made?	1	
8	How many surfaces require machining?	1	
9	What type of section is shown on the base plate?	1	
10	Determine the dimensions at: A: B: C: D:	4	
11	What is part E called?	1	
12	What type of section is shown at F on the arm?	1	
13	How many M5 bolts will be used to attach the arm to the base plate?	1	
14	What is the thickness of the feature at G?	1	
15	What is the purpose of the circlip in the assembly?	2	
16	With reference to the tolerance, determine the minimum size of the hole at H.	2	
17	With reference to the tolerance, determine the maximum size of the hole at H.	2	
18	In the box below (ANSWER 18), draw, in neat freehand, the symbol for the projection system used.	4	
19	In the box below (ANSWER 19), draw, in neat freehand, the convention of a spring.	3	
TOTAL		30	

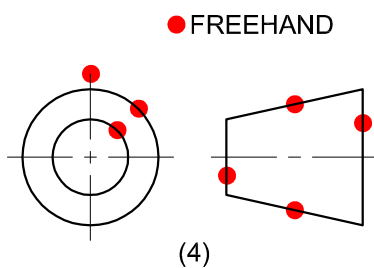
22/04/2015	ANDREW	INSERT CIRCLIP	3	DRAWING SET: 4 OF 5	DRAWN: PETER	07/03/2015
16/04/2015	ANDREW	INSERT GRUB SCREW	2	DRAWING PROGRAM: AutoCAD 2014	CHECKED: JOHN	13/03/2015
16/03/2015	ANDREW	CHANGE BUSH	1	DRAWING No. PUNCH/34/2015	APPROVED: ILSE	29/05/2015
DATE	CHANGED BY	REVISION DESCRIPTION	No.	FILE NAME: punch3.dwg	MATERIAL: CAST IRON	
PUNCH				UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETRES WITH A TOLERANCE OF 0,25.	HEAT TREATMENT: TEMPER	
WEST COAST ENGINEERS (SA) (Pty) Ltd					SCALE 2 : 1	
					QUANTITY: 200	
15 MAIN ROAD VELDDRIFT 7365 www.wce.co.za 022 959 5432				FOR SURFACE FINISHES		

ANSWER 18		ANSWER 19	
-----		-----	
EXAMINATION NUMBER		EXAMINATION NUMBER	
EXAMINATION NUMBER		2	

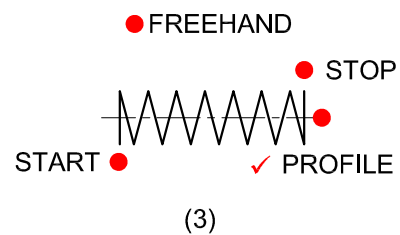


ANSWERS		
1	13/03/15	1
2	VELDDRIFT	1
3	METRIC / MILLIMETRE	1
4	TEMPER	1
5	punch3.dwg	1
6	CAST IRON	1
7	22/04/15	1
8	8	1
9	MULTI PLANE / STEPPED / OFFSET SECTION	1
10	A: 36 B: 70 C: 27 D: AF7,5 / Ø7,5	4
11	GRUB SCREW	1
12	REVOLVED SECTION	1
13	4	1
14	7	1
15	TO STOP THE SPRING FROM SHOOTING OUT OF THE SHAFT / STOP THE SHAFT FROM FALLING OUT	2
16	Ø 3.8	2
17	Ø 4.25	2
18	<i>See below</i>	4
19		3
	TOTAL	30

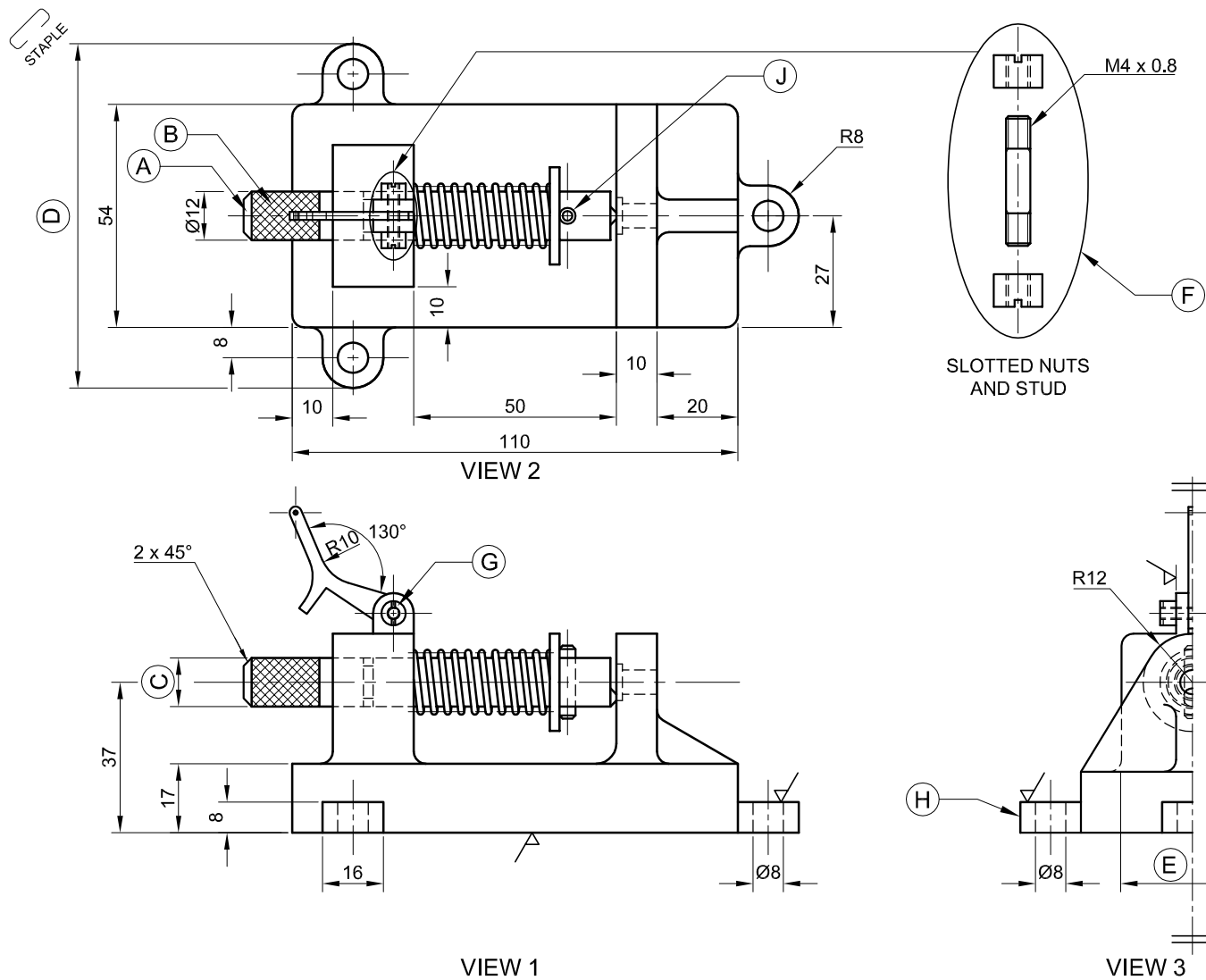
ANSWER 18



ANSWER 19



PAPER 2 QUESTION 1
 GRADE 12
 DBE/Feb.-Mar. 2016
 MEMORANDUM



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

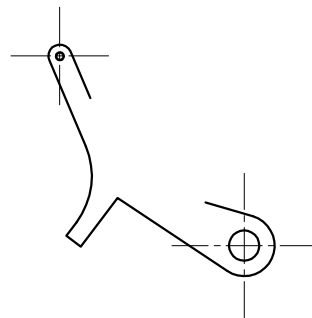
Three views of a trigger mechanism assembly, an enlarged view, a parts list, a title block and a table of questions. The drawings have not been prepared to the indicated scale.

Instructions:

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

QUESTIONS		ANSWERS	
1	What was Francu's responsibility?	1	
2	What drawing method was used to prepare the drawings?	1	
3	What scale is indicated for the drawing?	1	
4	What should all the unspecified radii be?	1	
5	What material is used to manufacture the striking pin?	1	
6	Name the type of finish at A.	1	
7	Name the type of finish at B.	1	
8	What is VIEW 3 called?	1	
9	Determine the complete dimensions at C: D: E:	3	
10	How many parts make up the trigger mechanism assembly?	1	
11	What is the purpose of the enlarged view at F?	1	
12	How many surfaces need to be machined?	1	
13	What direction of lay must be applied to the machined surfaces?	1	
14	What is the screw thread specification of the stud nut at G?	2	
15	With reference to the tolerance, determine the maximum height of the feature at H.	2	
16	Referring to the parts list, identify the part at J.	1	
17	In the space above the parts list (ANSWER 17), complete the view of the trigger plate by neatly constructing the R10 fillet. Show ALL construction.	3	
18	In the space below (ANSWER 18), draw, in neat freehand, the convention for a coil spring.	3	
19	In the space below (ANSWER 19), draw, in neat freehand, the symbol for the projection system used.	4	
TOTAL		30	

ANSWER 17:
Construction



APPROVED: DELISE	DATE: 2015-10-31
CHECKED: FRANCU	DATE: 2015-10-15
DRAWN: CARLOS	DATE: 2015-10-12

DRAWING PROGRAMME: AUTOCAD 2016
 ALL UNSPECIFIED RADII ARE R3.
 TOLERANCE ON ALL DIMENSIONS: ± 0,25 mm
 SURFACE TREATMENT $\nabla =$

HOME SECURITY PRODUCTS
 1 ZIRK BAARD STREET
 PRETORIA 0001
 www.homesecure.co.za
 ☎ 012 341 0810

TITLE
TRIGGER MECHANISM

ANSWER 18:
Convention for coil spring.

ANSWER 19:
Projection symbol

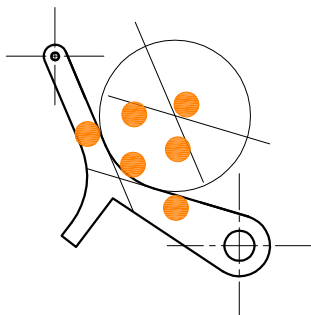


PARTS LIST			
PART	QUANTITY	MATERIAL	
1	BASE	1	CAST IRON
2	STRIKING PIN	1	STAINLESS STEEL
3	COIL SPRING	1	SPRING STEEL
4	WASHER	1	STAINLESS STEEL
5	DOWEL PIN	1	SPRING STEEL
6	TRIGGER PLATE	1	STAINLESS STEEL
7	SLOTTED NUT	2	HIGH TENSILE STEEL
8	STUD	1	EN 21 STEEL

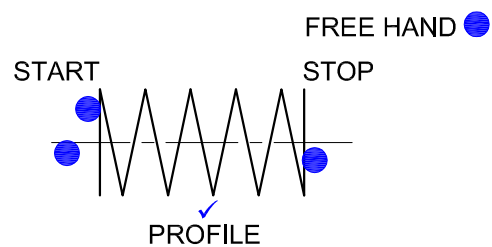


ANSWERS		
1	TO CHECK THE DRAWING	1
2	CAD / AUTOCAD	1
3	1 : 1	1
4	R 3	1
5	STAINLESS STEEL	1
6	CHAMFER	1
7	KNURLING	1
8	(PARTIAL) RIGHT VIEW	1
9	C: Ø12 D: 86 E: 34	3
10	9	1
11	SHOW DETAIL	1
12	6	1
13	PARALLEL	1
14	M4 x 0,8	2
15	8,25	2
16	DOWEL PIN	1
17	<i>See below</i>	3
18		3
19		4
TOTAL		30

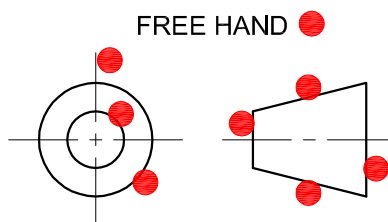
ANSWER 17:
Construction



ANSWER 18:
Convention for coil spring

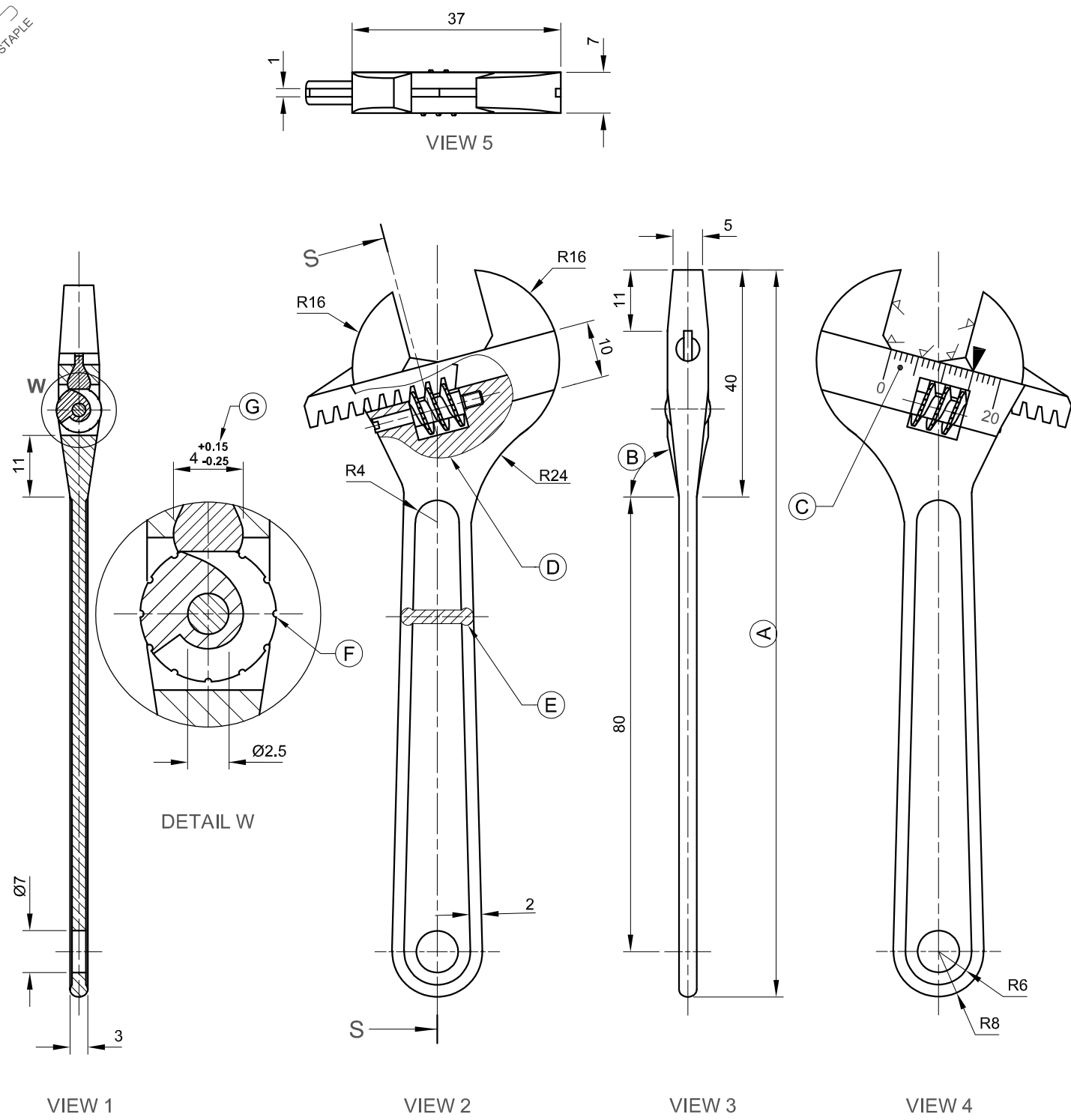


ANSWER 19:
Projection symbol



PAPER 2 QUESTION 1
GRADE 12
November 2016
MEMORANDUM

STAPLE



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

Five views and a detailed enlargement of a shifting spanner assembly, a parts list, 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 drawing and the title block. [28]

QUESTIONS		ANSWERS	
1	What is the title of the drawing?	1	
2	What scale is indicated for the drawing?	1	
3	What drawing program was used?	1	
4	On what date was the drawing drawn?	1	
5	Who approved the drawing?	1	
6	What is the radius of the unspecified curves?	1	
7	What material is used to manufacture the adjustable jaw?	1	
8	What type of heat treatment is required for the jaws?	1	
9	Which projection system has been used for the drawing?	1	
10	Determine the dimension at A.	1	
11	Measure the angle at B.	1	
12	What is the purpose of the measurements on the fixed jaw and handle at C?	2	
13	Name the type of section at D.	1	
14	Name the type of section at E.	1	
15	What is purpose of the grooves at F?	1	
16	If view 2 is the front view, what would view 4 be called?	1	
17	What is the purpose of the enlarged detailed view?	1	
18	What type of section resulted from cutting plane S-S?	1	
19	With reference to the tolerance, determine the minimum dimension at G.	2	
20	How many surfaces of the fixed jaw and handle must be machined?	1	
21	What direction of lay must be applied to the machined surfaces?	1	
22	In the space below (ANSWER 22), draw, in neat freehand, the conventional representation of a bearing on a section of a shaft.	5	
TOTAL		28	

PARTS LIST				DRAWING PROGRAM: AUTOCAD 2017	
PART	QUANTITY	MATERIAL	ALL UNSPECIFIED RADII ARE R2.		SCALE 1 : 1
1	FIXED JAW AND HANDLE	1	CHROME VANADIUM CASTING	APPROVED: STEYN	DATE: 2017-02-28
2	ADJUSTABLE JAW	1	TOOL STEEL	CHECKED: JOHN	DATE: 2017-02-10
3	WORM SCREW	1	EN 19	DRAWN: WERNER	DATE: 2017-01-08
4	WORM SHAFT	1	TOOL STEEL	TITLE SHIFTING SPANNER	
HEAT TREATMENT ON ALL JAWS		HARDENING			
METHOD OF MACHINING		MILLING			

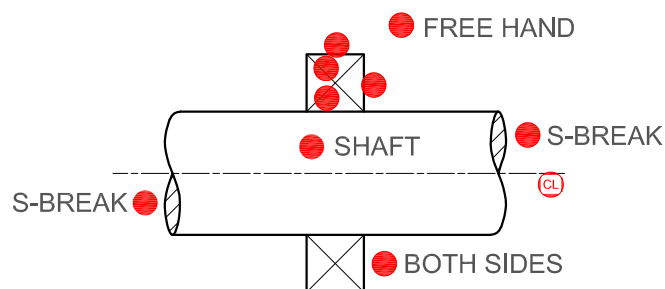
ANSWER 22: Conventional representation of a bearing on a section of a shaft

EXAMINATION NUMBER	
EXAMINATION NUMBER	2

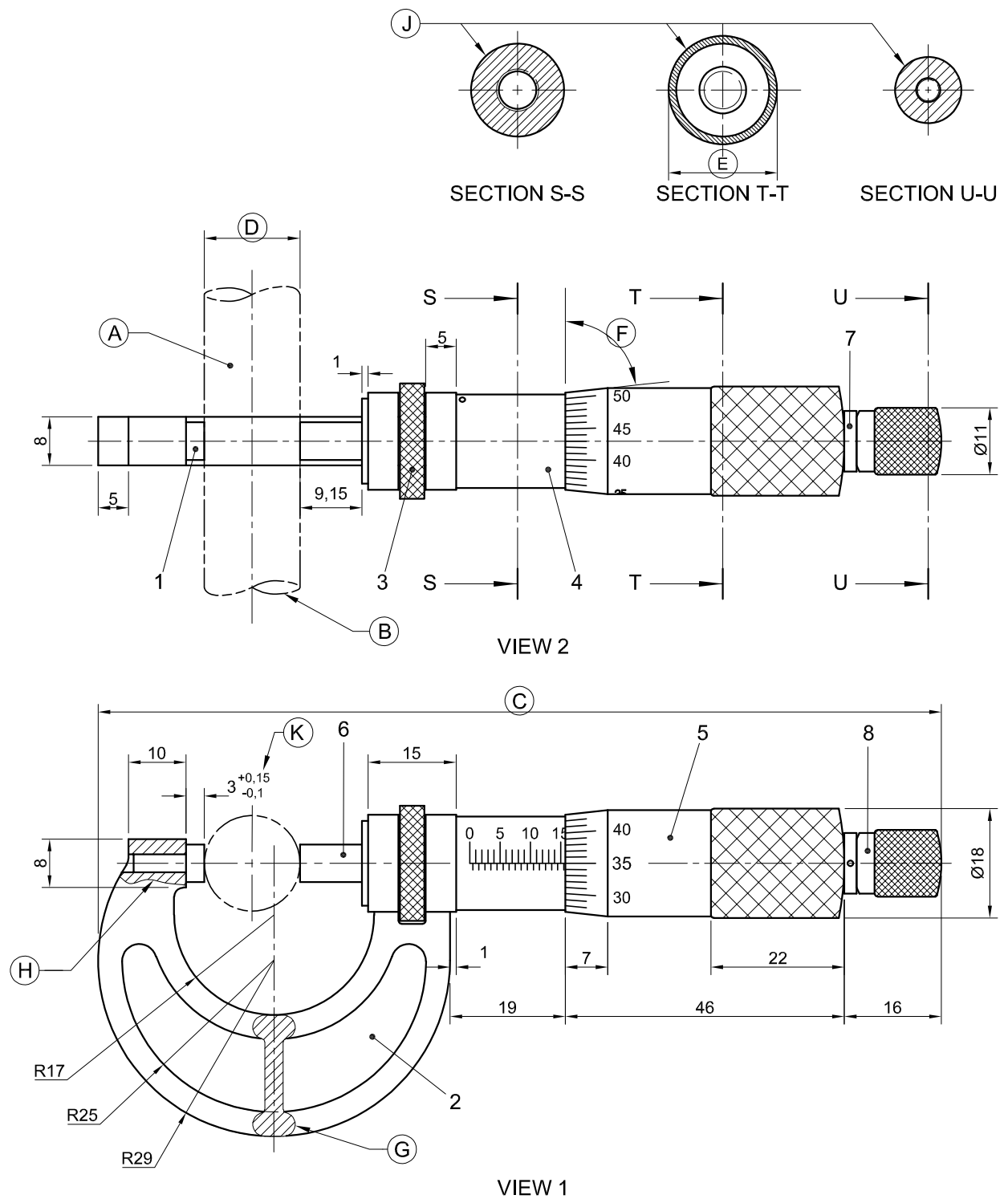


ANSWERS		
1	SHIFTING SPANNER	1
2	1 : 1	1
3	AUTOCAD 2017	1
4	2017-01-08	1
5	STEYN	1
6	R2	1
7	TOOL STEEL	1
8	HARDENING	1
9	THIRD ANGLE PROJECTION	1
10	128	1
11	79° WITH A VARIANCE OF 1° EITHER WAY	1
12	TO SET AT A SPECIFIC SIZE/ TO VERIFY OR DETERMINE A SPECIFIC SIZE/ JAW OPENING SIZE	2
13	PARTIAL SECTION	1
14	REVOLVED SECTION	1
15	BETTER GRIP/TURN EASIER	1
16	REAR VIEW/BACK VIEW	1
17	SHOW DETAIL	1
18	ALIGNED SECTION	1
19	3.75	2
20	7	1
21	PERPENDICULAR	1
22	<i>See below</i>	5
TOTAL		28

ANSWER 22: Conventional representation of a bearing on a section of a shaft



PAPER 2 QUESTION 1
GRADE 12
November 2017
MARKING GUIDELINES



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

The front view and top view of a micrometer, sections, a parts list, a title block and a table of questions. The drawing has not been prepared to the indicated scale.

Instructions:

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

QUESTIONS		ANSWERS	
1	Who prepared the drawing?	1	
2	On what date was the drawing checked?	1	
3	What was Siyabongi's responsibility?	1	
4	What is the drawing number?	1	
5	What material is used to manufacture the anvil?	1	
6	How many parts make up this micrometer?	1	
7	At what temperature will the micrometer be accurate?	1	
8	What is the maximum size that this micrometer can measure?	1	
9	Why is the shaft at A drawn as a phantom line (double chain line)?	1	
10	What does the S-break at B indicate?	1	
11	Give TWO uses of chain lines on mechanical drawings.	2	
12	How many surfaces on this micrometer are knurled?	1	
13	What is VIEW 1 called?	1	
14	Determine the complete dimensions at: C: D: E:	5	
15	Measure the angle at F.	1	
16	Name the type of section at G.	1	
17	Name the type of section at H.	1	
18	Name the type of section at J.	2	
19	With reference to the tolerance at K, determine the minimum dimension.	2	
20	In the space below (ANSWER 20), draw, in neat freehand, the symbol for the projection system used.	4	
TOTAL		30	

PARTS LIST			DRAWING PROGRAM: AUTOCAD 2018	SCALE 1 : 1
PART	QUANTITY	MATERIAL	DIMENSIONS ARE ACCURATE AT 20 °C	DRAWING NUMBER MC 25-V2018
1 ANVIL	1	TUNGSTEN	ACCURACY: 1 TURN OF THE OUTER SLEEVE = 0,5 mm	
2 FRAME	1	CAST IRON	MEASUREMENT RANGE: MINIMUM = 0,01 & MAXIMUM = 25,00	
3 SPINDLE LOCKNUT	1	TOOL STEEL	APPROVED: SIYABONGI	DATE: 2018-02-28
4 INNER SLEEVE	1	TOOL STEEL	CHECKED: JACQUES	DATE: 2018-02-10
5 OUTER SLEEVE	1	TOOL STEEL	DRAWN: WENDY	DATE: 2018-01-08
6 SPINDLE	1	SILVER STEEL	TITLE MICROMETER	
7 SCREW	1	TOOL STEEL		
8 RATCHET	1	TOOL STEEL		

ANSWER 20: Projection symbol

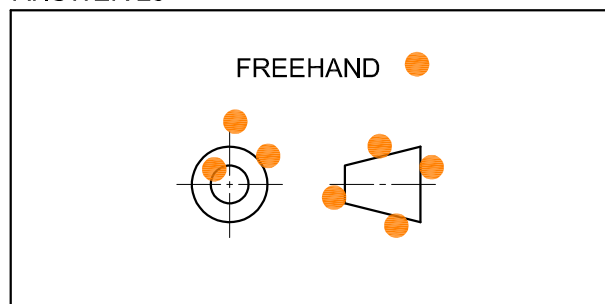


EXAMINATION NUMBER	
EXAMINATION NUMBER	2

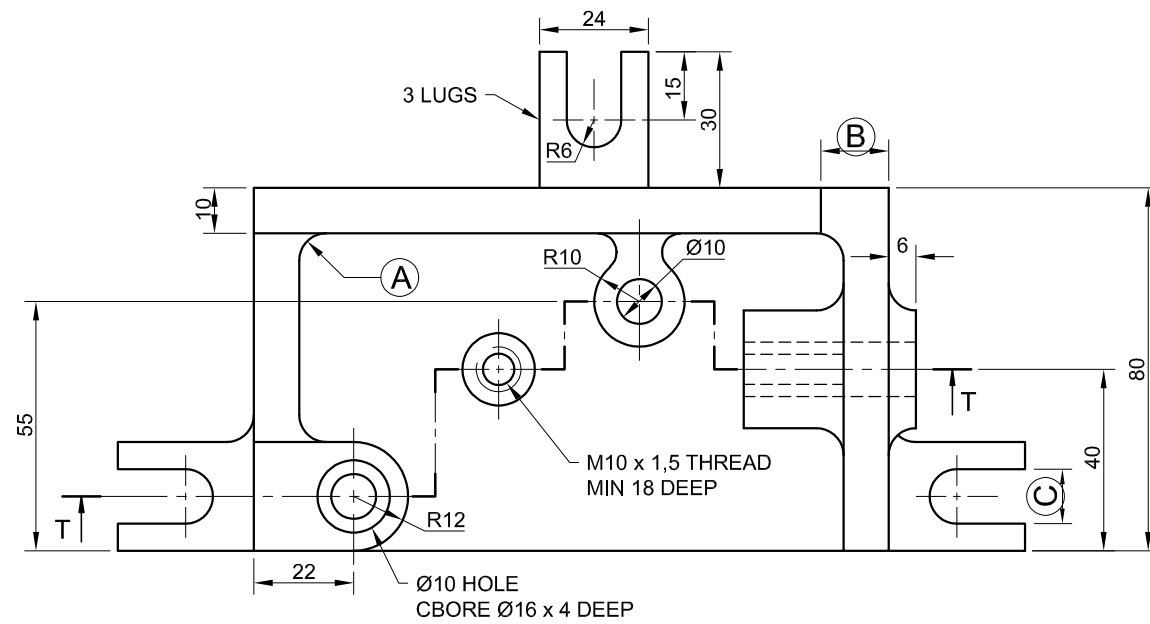


ANSWERS		
1	WENDY	1
2	2018-02-10	1
3	APPROVING THE DRAWING	1
4	MC 25-V2018	1
5	TUNGSTEN	1
6	8	1
7	20 °C	1
8	25 or 25,00	1
9	REPRESENTING A PART NOT THERE	1
10	SHAFT CONTINUES/PART OF SHAFT	1
11	CENTRE OF CIRCLES OR ARCS - SHAFTS - SYMMETRY - PCD - POSITION - A CUTTING PLANE - ASSEMBLY	2
12	3	1
13	FRONT VIEW	1
14	C: 139 ✓ D: Ø15,85 ✓ E: Ø18 ✓	5
15	84°	1
16	REVOLVED SECTION	1
17	PART SECTION	1
18	SUCCESSIVE SECTIONS	2
19	2,9 mm	2
20	<i>See below</i>	4
TOTAL		30

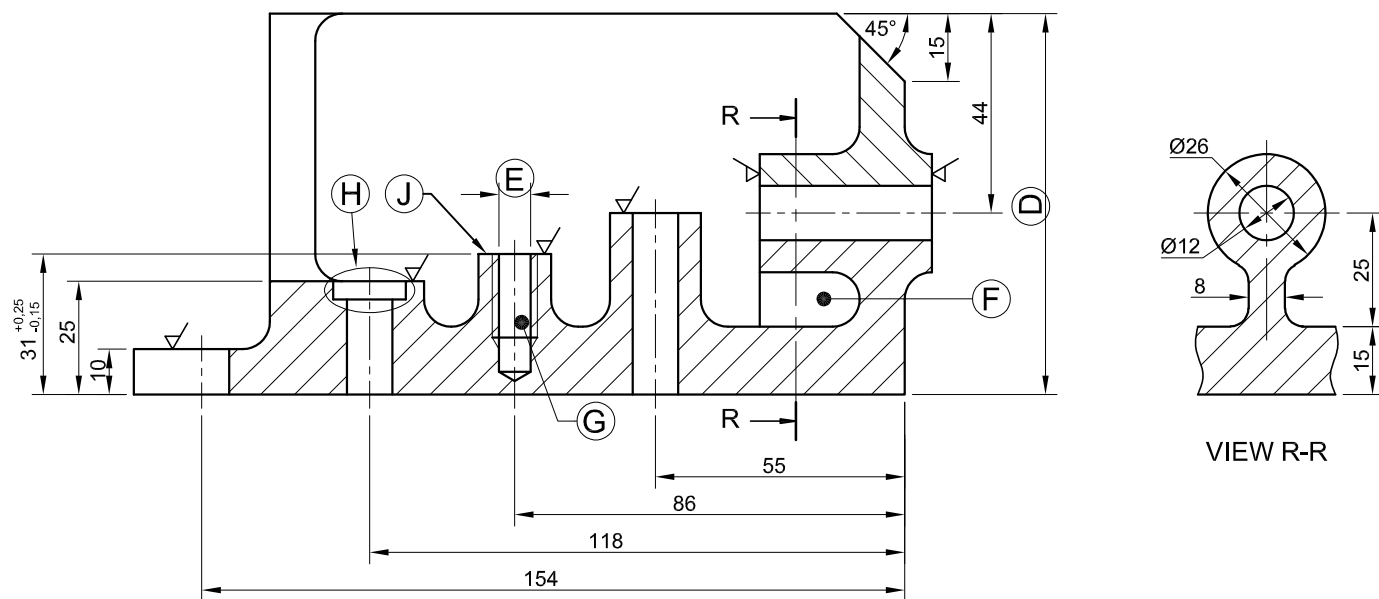
ANSWER 20



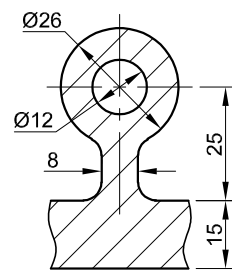
PAPER 2 QUESTION 1
GRADE 12
NOVEMBER 2018
MARKING GUIDELINE



VIEW 2



VIEW 1



VIEW R-R

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

Two views and a section of a mechanical jig, a title block and a table of questions. The drawing has not been prepared to the indicated scale.

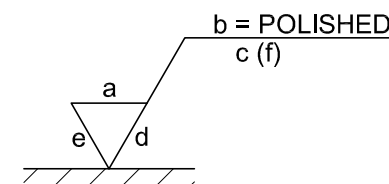
Instructions:

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

QUESTIONS		ANSWERS	
1	What was Ingrid's responsibility?	1	
2	What is the manufacturer's website address?	1	
3	What is the file name?	1	
4	Who is the client?	1	
5	How many jigs must be manufactured?	1	
6	What is VIEW 1 called?	2	
7	What type of section is VIEW R-R?	1	
8	Name the type of section produced by cutting plane T-T.	1	
9	Determine the complete dimensions at: A: B: C: D: E:	5	
10	Determine the total length of the jig.	1	
11	Name the feature at F.	1	
12	What is the minimum depth of the thread required for the hole at G?	1	
13	Name the feature at H.	1	
14	How many surfaces of the jig must be machined?	1	
15	Describe the hatching mistake on VIEW 1.	2	
16	With reference to the tolerance, determine the minimum height at J.	1	
17	With reference to the machining symbol below, match the letter on the symbol with the correct label in the column to the right of this question.	4	
		DIRECTION OF LAY	
		ROUGHNESS VALUE	
		SAMPLING LENGTH	
		MACHINING ALLOWANCE	
18	In the space below (ANSWER 18), draw, in neat freehand, the symbol for the projection system used.	4	
TOTAL		30	

QUESTION 17:

ANSWER 18:

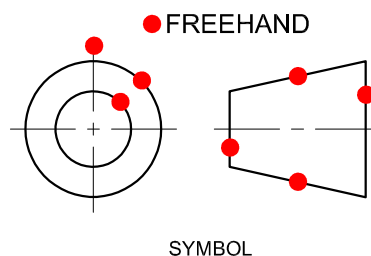


FILE NAME: MJIG-12-V5	MATERIAL: CAST IRON	QUANTITY: 30 UNITS	FINISH: POLISHED
DRAWING No. 3	SCALE 1 : 2	ALL DIMENSIONS ARE IN MILLIMETRES	
COMMISSIONED BY: JR MANUFACTURES 105 FIRST AVENUE, BRITS	DRAWING PROGRAMME: AUTOCAD 2018	ALL UNSPECIFIED RADII ARE 4 mm	
CASTFORM ENGINEERING	98 BROAD STREET MIDDELFONTEIN 4070 www.foundry.co.za 003 645 7820	DRAWN BY: SIPHO	DATE: 2018-11-13
		CHECKED BY: INGRID	DATE: 2018-12-14
		APPROVED BY: Ndingi	DATE: 2019-01-21
TITLE	MECHANICAL JIG		

EXAMINATION NUMBER	
EXAMINATION NUMBER	2



ANSWERS			
1	TO CHECK THE DRAWING	1	
2	www.foundry.co.za	1	
3	MJIG-12-V5	1	
4	JR MANUFACTURES	1	
5	30	1	
6	SECTIONAL FRONT VIEW ON T-T	2	
7	REMOVED SECTION	1	
8	OFFSET or MULTI-PLANE	1	
9	A: R4 B: 15 C: 12 D: 84 E: $\varnothing 7$	5	
10	199	1	
11	WEB or RIB	1	
12	18 mm	1	
13	COUNTER BORE	1	
14	8	1	
15	HATCHING IN OPPOSITE DIRECTIONS	2	
16	30.85	1	
17	DIRECTION OF LAY	d	4
	ROUGHNESS VALUE	a	
	SAMPLING LENGTH	c	
	MACHINING ALLOWANCE	e	
18	<i>See below</i>	4	
TOTAL		30	

ANSWER 18

GRADE 12 NSC

PAST QUESTIONS ON

LOCI PAPER 2

WITH

MARKING GUIDELINES

EC LEARNERS



QUESTION 2: LOCI

NOTE: Answer QUESTIONS 2.1 and 2.2.

2.1 MECHANISM

Given:

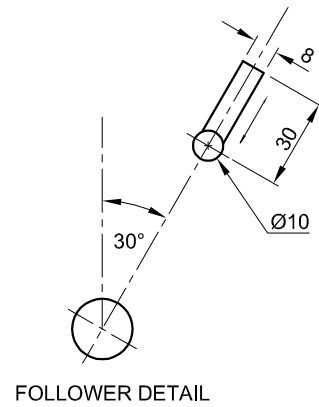
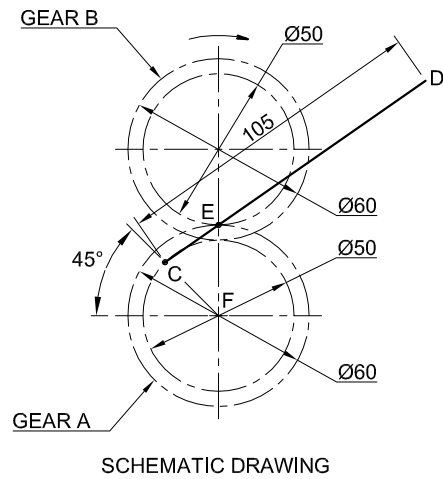
- A schematic drawing of a mechanism consisting of gear A and gear B as well as a slotted bar CD, attached at C to gear A
- The position of pin E on gear B
- The position of centre point F

Motion:

As gear A rotates in an anti-clockwise direction, it drives gear B in a clockwise direction. The slotted bar CD slides over pin E during the rotation.

Instructions:

- Draw, to scale 1 : 1, the given schematic drawing of the mechanism.
- Trace the locus generated by point D for ONE complete revolution of the mechanism.
- Show ALL necessary construction. **[19]**



2.2 CAM

Given:

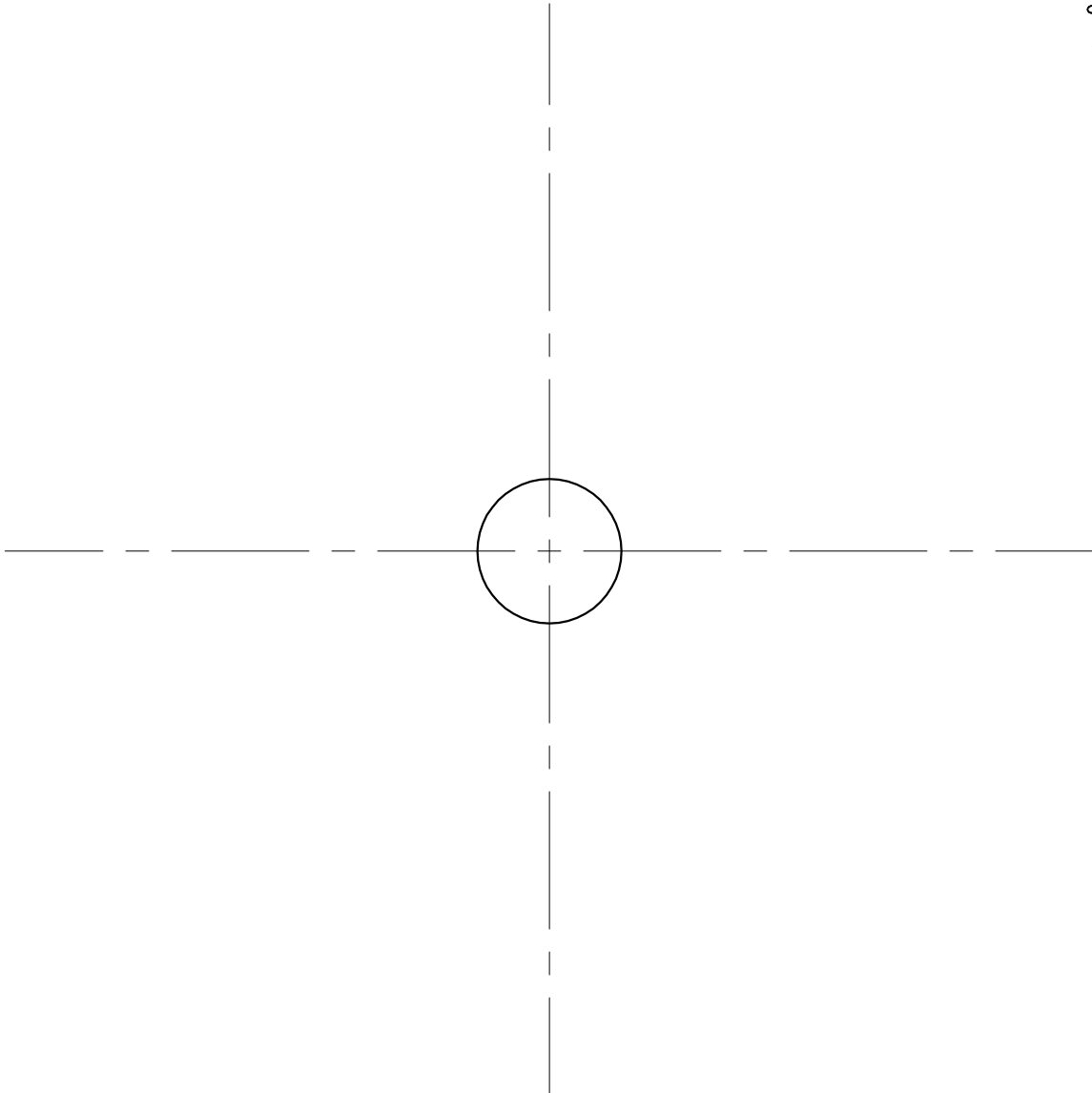
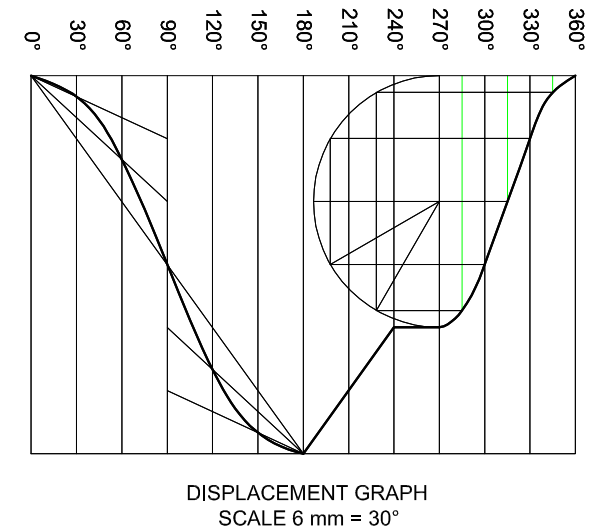
- The detail of a roller-ended follower, drawn to a reduced scale
- The displacement graph and the cam shaft, drawn to scale 1 : 1, in the correct position

Specifications:

- The follower reciprocates along the 30° centre line that runs through the centre of the cam shaft
- Rotation = clockwise

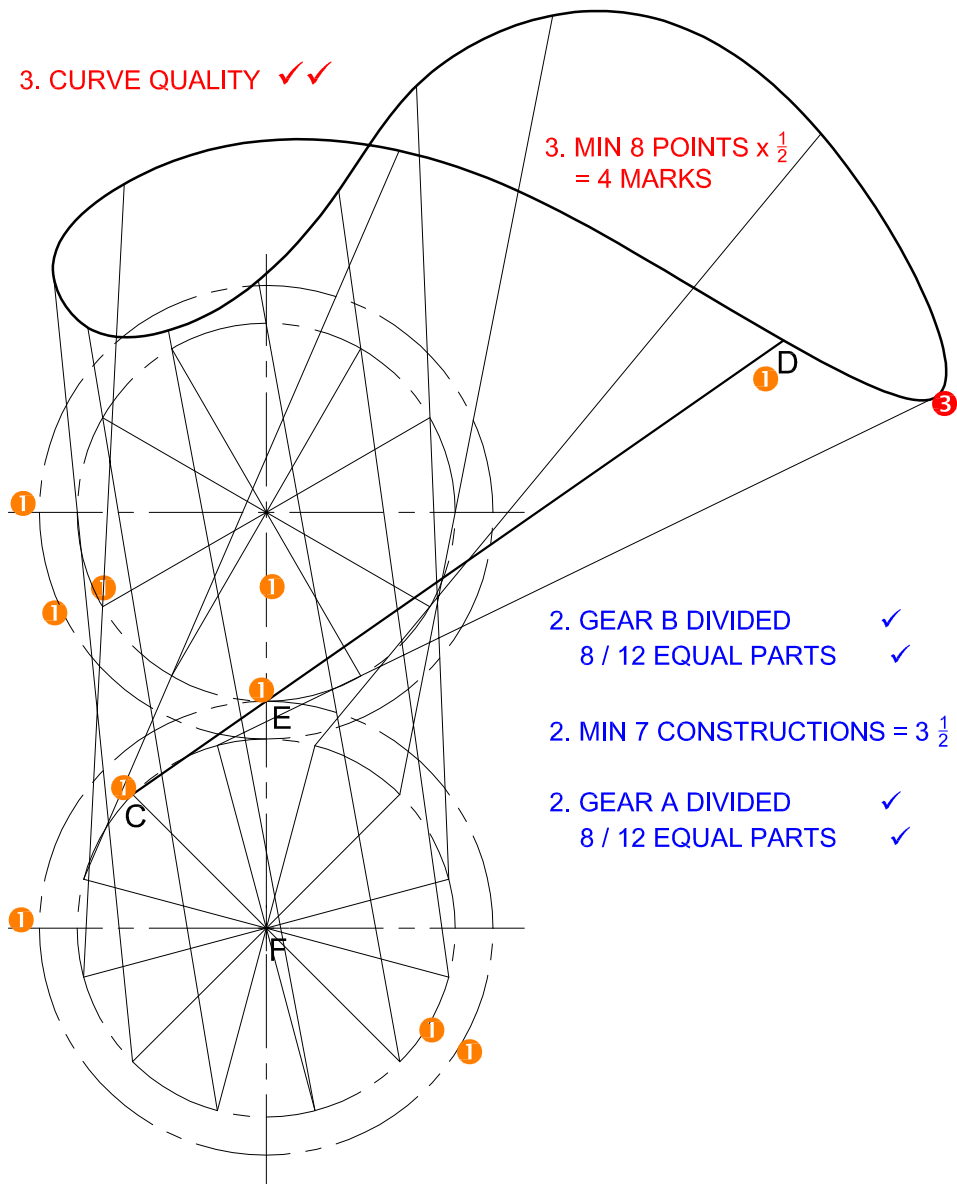
Instructions:

- Draw, to scale 1 : 1, the roller-ended follower in its correct position.
- Project and draw the cam profile from the given displacement graph.
- Show the direction of rotation on the cam profile.
- Show ALL necessary construction. **[21]**



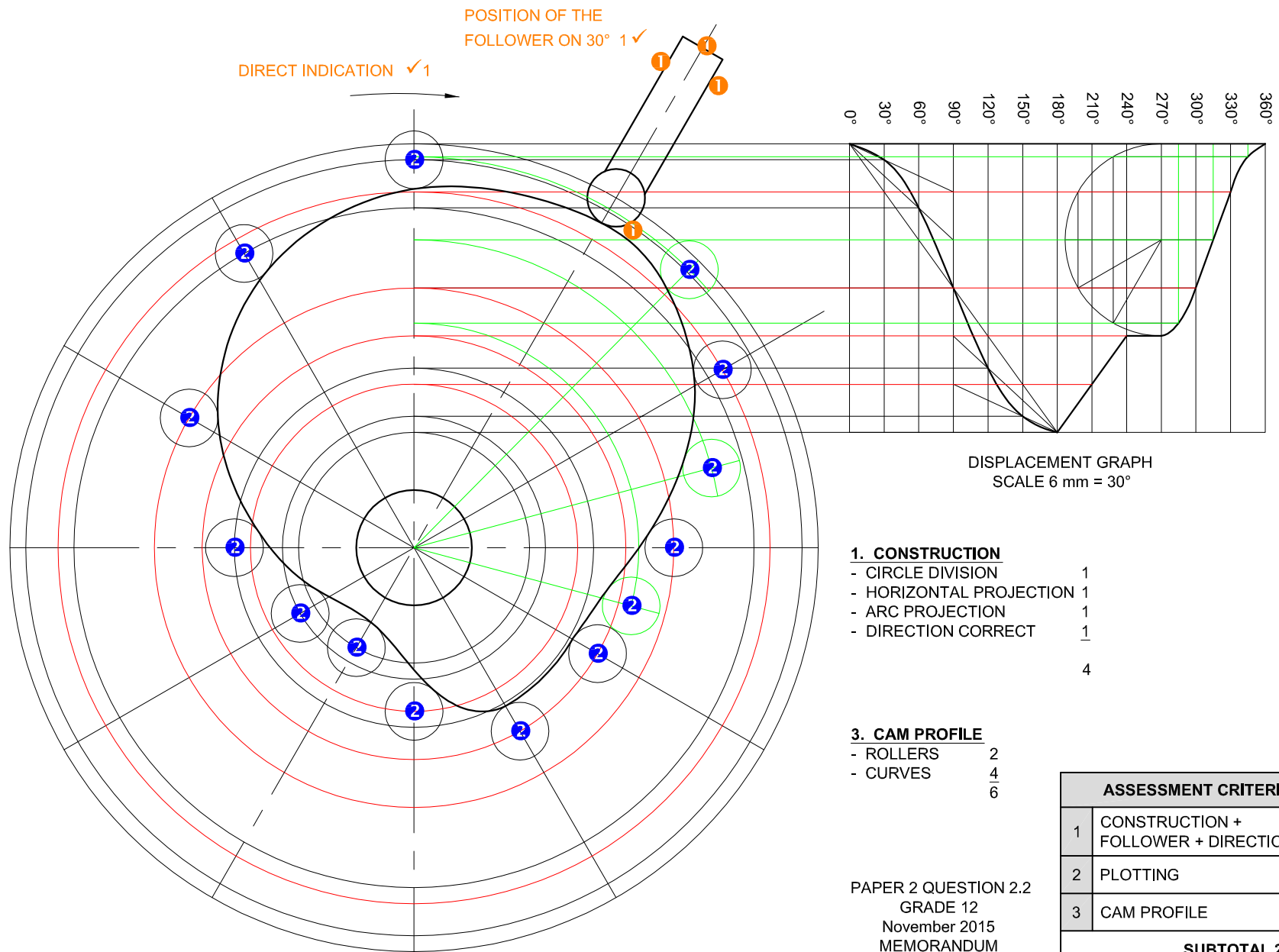
ASSESSMENT CRITERIA 2.1			
1	GIVEN + CENTRE LINES	5	
2	CONSTRUCTION	6	
3	POINTS + CURVE	8	
SUBTOTAL 2.1		19	
ASSESSMENT CRITERIA 2.2			
1	CONSTRUCTION + FOLLOWER + DIRECTION	8	
2	PLOTTING	7	
3	CAM PROFILE	6	
SUBTOTAL 2.2		21	
PENALTIES (-)			
TOTAL		40	
EXAMINATION NUMBER			
EXAMINATION NUMBER			
			3





PAPER 2 QUESTION 2.1
GRADE 12
November 2015
MEMORANDUM

ASSESSMENT CRITERIA 2.1		
1	GIVEN + CENTRE LINES	5
2	CONSTRUCTION	$7 \frac{1}{2}$
3	POINTS + CURVE	$6 \frac{1}{2}$
SUBTOTAL 2.1		19



- 1. CONSTRUCTION**
- CIRCLE DIVISION 1
 - HORIZONTAL PROJECTION 1
 - ARC PROJECTION 1
 - DIRECTION CORRECT 1
- 4

- 3. CAM PROFILE**
- ROLLERS 2
 - CURVES 4
- 6

ASSESSMENT CRITERIA 2.2		
1	CONSTRUCTION + FOLLOWER + DIRECTION	8
2	PLOTTING	7
3	CAM PROFILE	6
SUBTOTAL 2.2		21

PAPER 2 QUESTION 2.2
 GRADE 12
 November 2015
 MEMORANDUM



QUESTION 2: LOCI (HELIX)

Given:

- The core and the profile of the incomplete front view as well as the right view of a shaft with a unique single-start right-handed thread
- The position of S on the drawing sheet

Specifications:

- Pitch = 96
- Turns = ONE and a HALF
- Direction = Right-handed

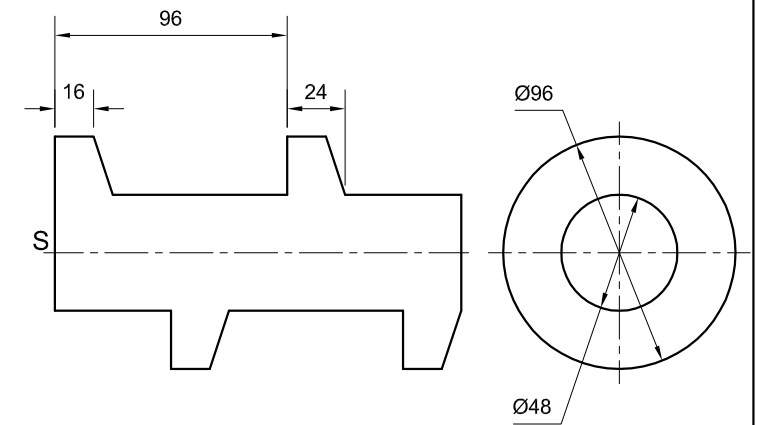
Instructions:

Draw, to scale 1 : 1, the following views of the shaft with a unique single-start right-handed thread:

- 2.1 The given right view
- 2.2 The complete front view

- Show ALL necessary construction.
- NO hidden detail is required.

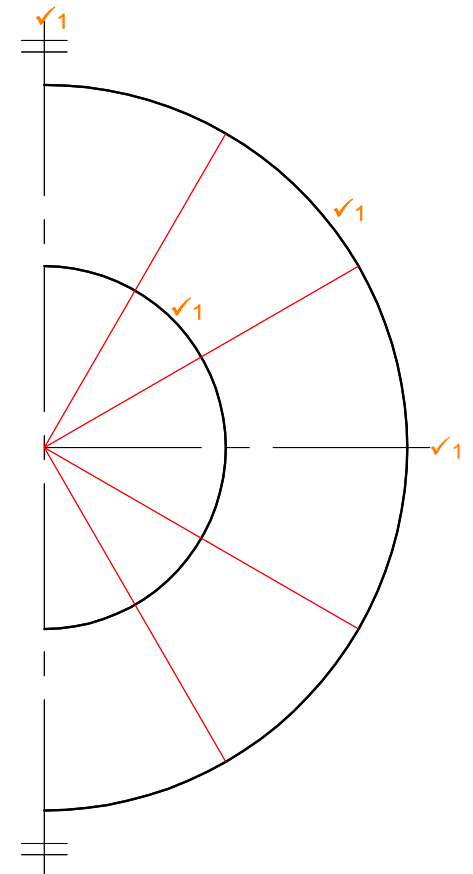
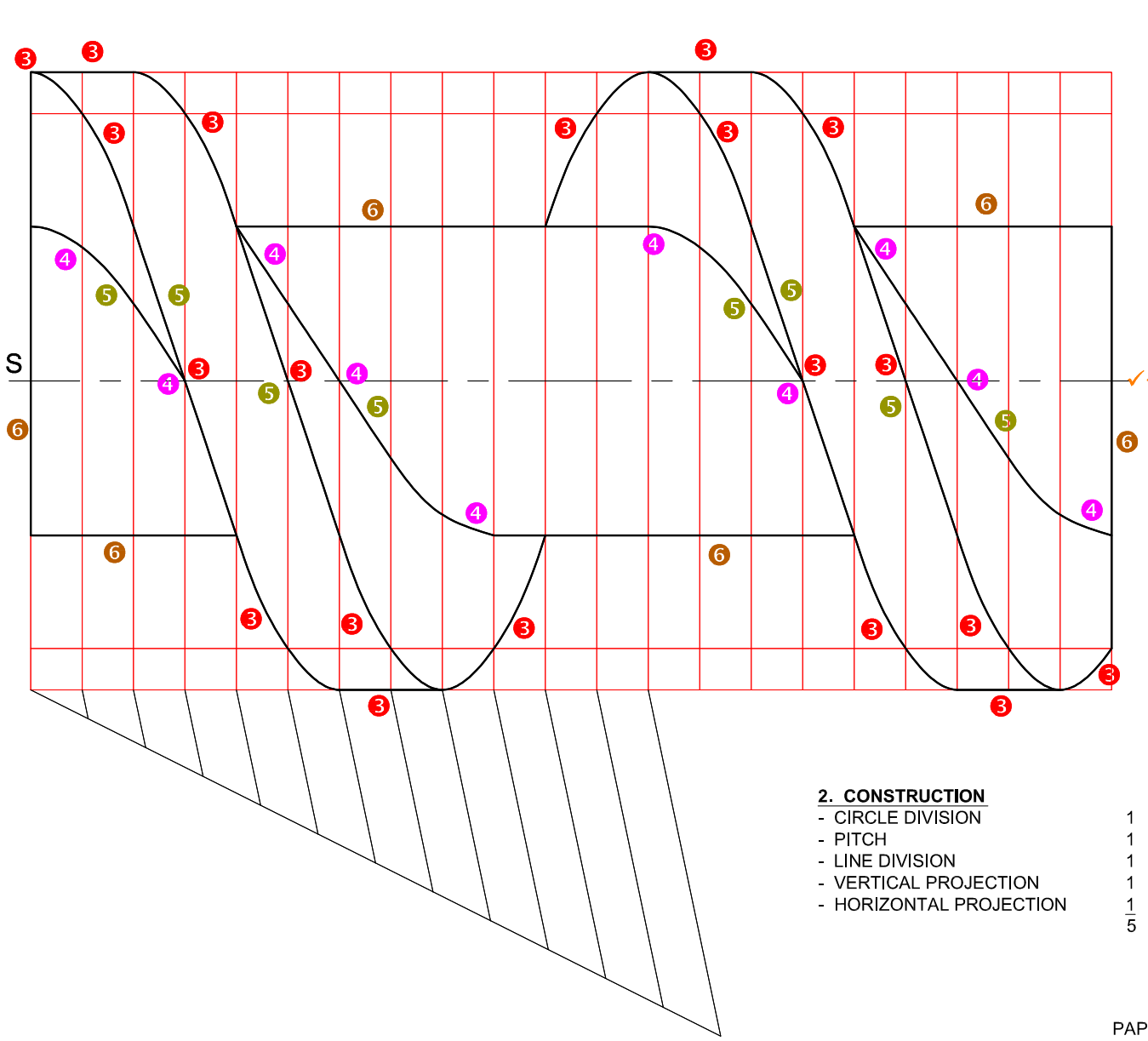
[32]



S

ASSESSMENT CRITERIA					
1	RIGHT VIEW + CENTRE LINES	5			
2	CONSTRUCTION	5			
3	OUTER CURVE POINTS	10			
4	INNER CURVE POINTS	5			
5	CURVE QUALITY	4			
6	STRAIGHT LINES	3			
TOTAL		32			
EXAMINATION NUMBER					
EXAMINATION NUMBER					
EXAMINATION NUMBER					3





2. CONSTRUCTION

- CIRCLE DIVISION
- PITCH
- LINE DIVISION
- VERTICAL PROJECTION
- HORIZONTAL PROJECTION

1
1
1
1
1
1/5

PAPER 2 QUESTION 2
GRADE 12
DBE/Feb.-Mar. 2016
MEMORANDUM

ASSESSMENT CRITERIA		
1	RIGHT VIEW + CENTRE LINES	5
2	CONSTRUCTION	5
3	OUTER CURVE POINTS	10
4	INNER CURVE POINTS	5
5	CURVE QUALITY	4
6	CORE	3
TOTAL		32



QUESTION 2: LOCI

NOTE: Answer QUESTIONS 2.1 and 2.2.

2.1 MECHANISM

Given:

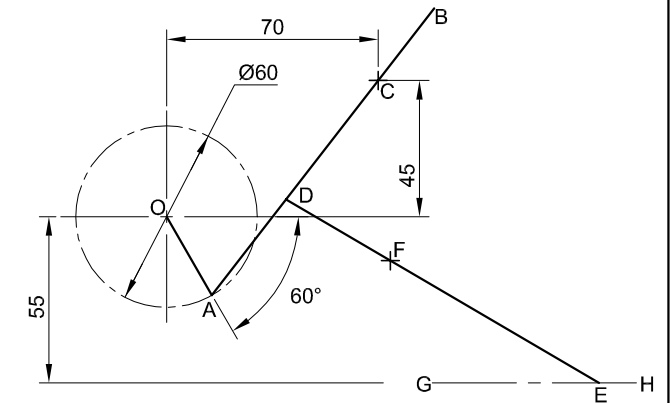
- A schematic drawing of a mechanism consisting of crank OA, connecting rod AB, swivel guide C, sliding rod DE, pin F and horizontal groove GH
- The position of centre point O on the drawing sheet

Specifications:

- The positions of O, C and groove GH are fixed
- Connecting rod AB is pin joined to crank OA at A
- Sliding rod DE is pin-joined to connecting rod AB at D
- Pin F is fixed to sliding rod DE
- AB = 120 mm
- DE = 120 mm
- AD = 40 mm
- DF = 40 mm

Motion:

As crank OA rotates in a clockwise direction, connecting rod AB freely slides through swivel guide C. Point E of sliding rod DE reciprocates along groove GH during the rotation.



Instructions:

- Draw, to scale 1:1, the given schematic drawing of the mechanism.
- Trace the locus generated by point F for ONE complete rotation of crank OA.

Show ALL necessary construction.

ASSESSMENT CRITERIA 2.1				
1	GIVEN	5		
2	CONSTRUCTION	7		
3	POINTS + CURVE	8		
SUBTOTAL		20		

[20]

O+

2.2 AUGER (HELIX)

Given:

- The incomplete front view and the left view of an auger with PQ indicating the starting position
- The position of centre point R on the drawing sheet

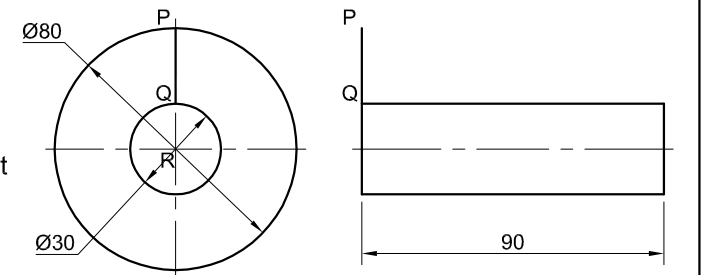
Specifications:

- Pitch : 60 mm
- Turns : ONE AND A HALF
- Direction : Right-handed

Instructions:

Draw, to scale 1 : 1, the given left view and the complete front view of the auger.

- Show ALL necessary construction.
- No hidden detail is required.



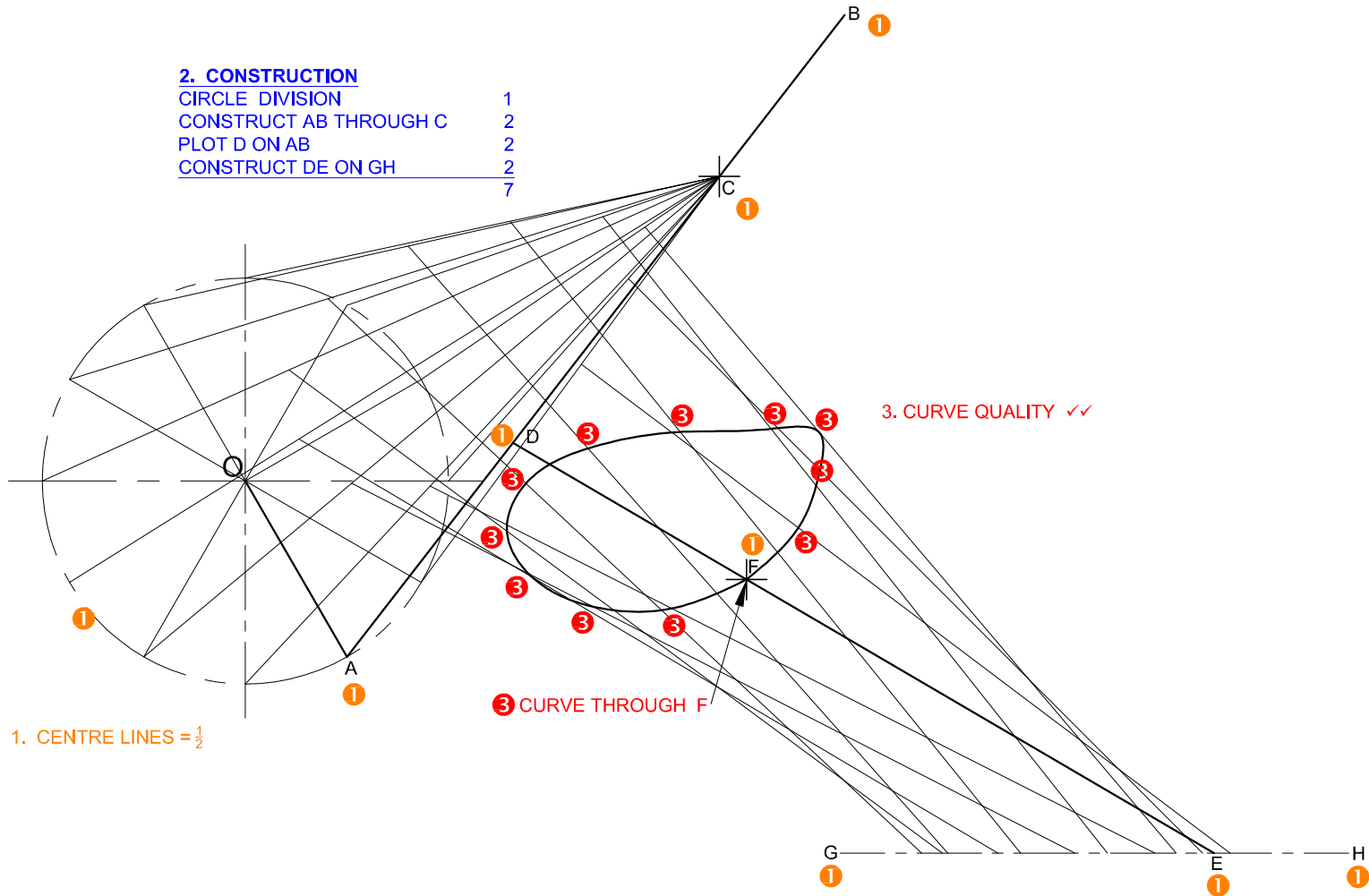
ASSESSMENT CRITERIA 2.2				
1	GIVEN + CENTRE LINES	4		
2	CONSTRUCTION	6		
3	OUTSIDE HELIX + CURVE QUALITY	8		
4	INSIDE HELIX + SHAFT	4		
SUBTOTAL 2.2		22		
SUBTOTAL 2.1		20		
TOTAL		42		

[22]

R+

EXAMINATION NUMBER				
EXAMINATION NUMBER				
				3





2. CONSTRUCTION

- CIRCLE DIVISION 1
- CONSTRUCT AB THROUGH C 2
- PLOT D ON AB 2
- CONSTRUCT DE ON GH 2

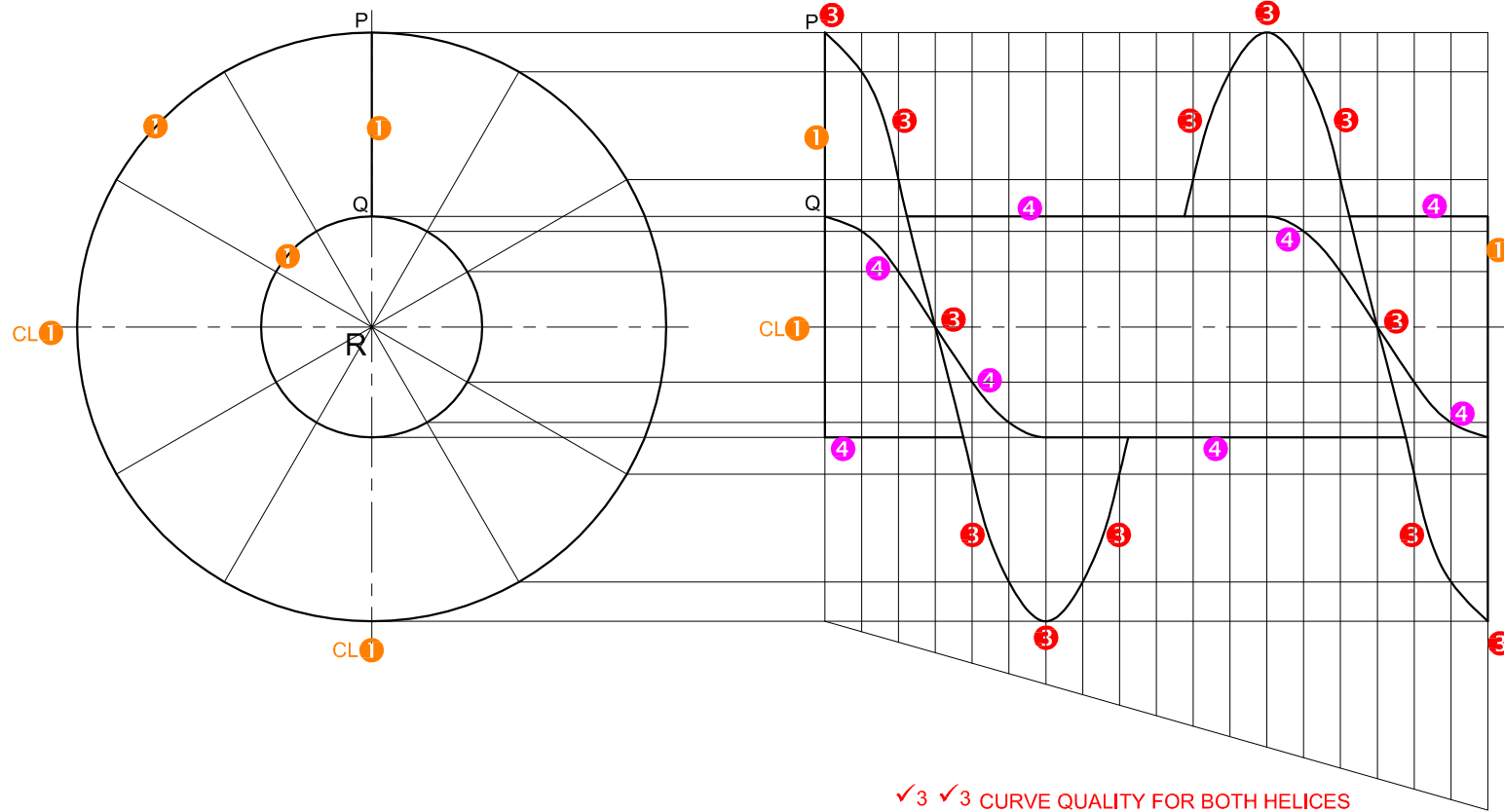
1. CENTRE LINES = $\frac{1}{2}$

3. CURVE QUALITY ✓✓

3. CURVE THROUGH F

PAPER 2 QUESTION 2.1
 GRADE 12
 November 2016
 MEMORANDUM

ASSESSMENT CRITERIA 2.1		
1	GIVEN	5
2	CONSTRUCTION	7
3	POINTS + CURVE	8
SUBTOTAL		20



✓3 ✓3 CURVE QUALITY FOR BOTH HELICES

2. CONSTRUCTION

- CIRCLE DIVISION 1
- PITCH + LINE DIVISION 2
- VERTICAL DIVISION 1
- HORIZONTAL PROJECTION 1
- DIRECTION 1
- 6

ASSESSMENT CRITERIA 2.2		
1	GIVEN + CENTRE LINES	4
2	CONSTRUCTION	6
3	OUTER HELIX + CURVE QUALITY	8
4	INNER HELIX + SHAFT	4
SUBTOTAL		22

PAPER 2 QUESTION 2.2
 GRADE 12
 November 2016
 MEMORANDUM



QUESTION 2: LOCI (CAM)

Given:

The detail of a wedge-shaped follower and the camshaft

Specifications:

- The follower reciprocates on the horizontal centre line of the camshaft
- The minimum distance from the follower to the centre of the camshaft = 14 mm
- Rotation = clockwise

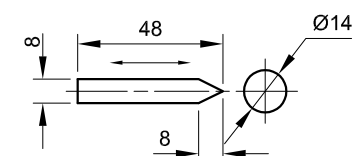
Motion:

The cam imparts the following motion to the follower:

- It moves left with uniform acceleration and retardation for 40 mm over the first 180°
- It moves further left with uniform motion for 15 mm over the next 90°
- It moves right with simple harmonic motion back to the original position for the rest of the rotation.

Instructions:

- Draw, to scale 1 : 1, the given camshaft and the wedge-shaped follower at the minimum distance.
- Draw, to a rotational scale of 30° = 8 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 from the displacement graph.
- Show the direction of rotation on the cam profile.
- Show ALL construction. [40]

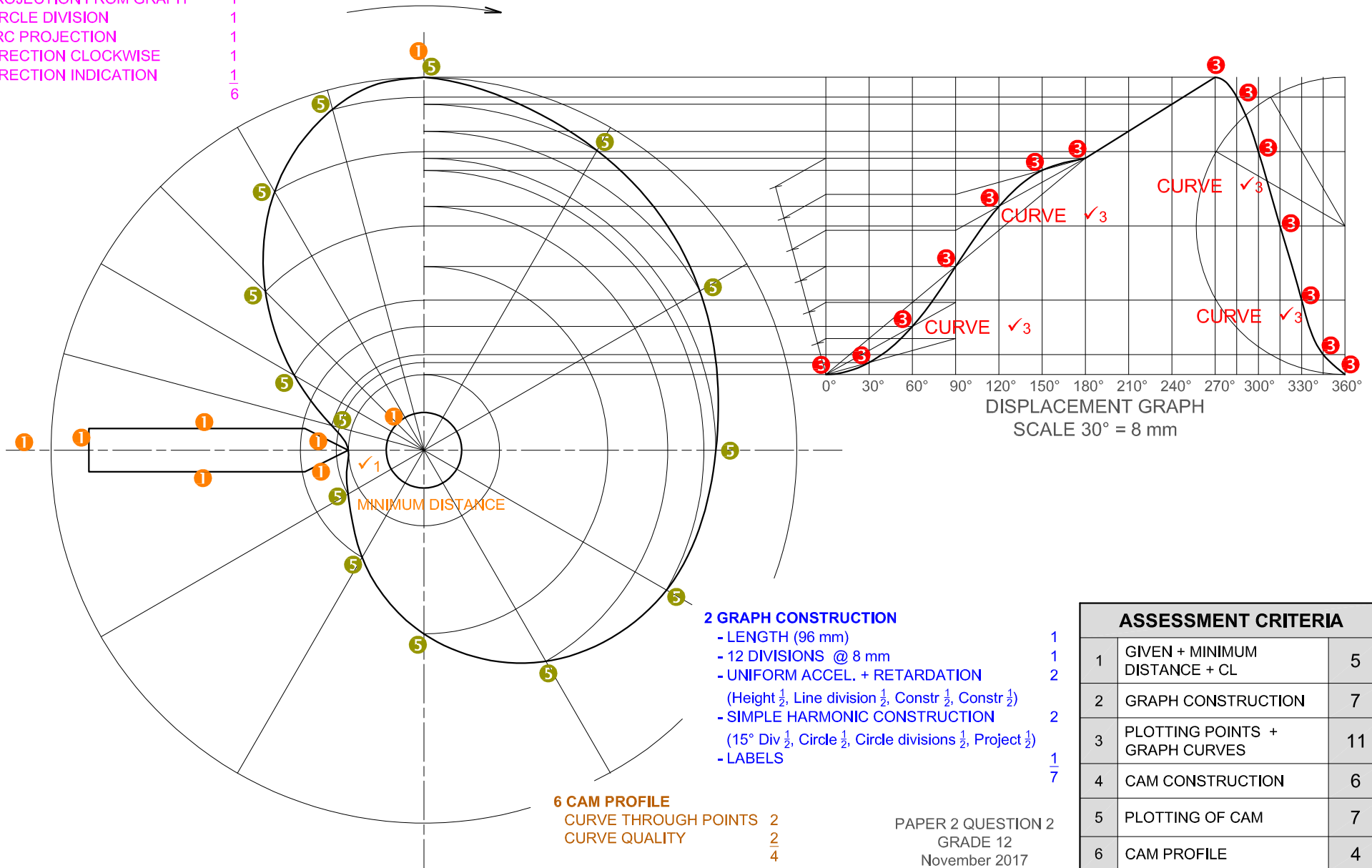


ASSESSMENT CRITERIA			
1	GIVEN + MINIMUM DISTANCE + CL	5	
2	GRAPH CONSTRUCTION	7	
3	PLOTTING POINTS + GRAPH CURVES	11	
4	CAM CONSTRUCTION	6	
5	PLOTTING OF CAM	7	
6	CAM PROFILE	4	
PENALTIES (-)			
TOTAL		40	
EXAMINATION NUMBER			
			3



4 CAM CONSTRUCTION

- ALIGN WITH GRAPH 1
- PROJECTION FROM GRAPH 1
- CIRCLE DIVISION 1
- ARC PROJECTION 1
- DIRECTION CLOCKWISE 1
- DIRECTION INDICATION 1/6



2 GRAPH CONSTRUCTION

- LENGTH (96 mm) 1
- 12 DIVISIONS @ 8 mm 1
- UNIFORM ACCEL. + RETARDATION 2
- (Height 1/2, Line division 1/2, Constr 1/2, Constr 1/2) 2
- SIMPLE HARMONIC CONSTRUCTION 2
- (15° Div 1/2, Circle 1/2, Circle divisions 1/2, Project 1/2) 1
- LABELS 7

6 CAM PROFILE

- CURVE THROUGH POINTS 2
- CURVE QUALITY 2
- 4

PAPER 2 QUESTION 2
 GRADE 12
 November 2017
 MARKING GUIDELINES

ASSESSMENT CRITERIA		
1	GIVEN + MINIMUM DISTANCE + CL	5
2	GRAPH CONSTRUCTION	7
3	PLOTTING POINTS + GRAPH CURVES	11
4	CAM CONSTRUCTION	6
5	PLOTTING OF CAM	7
6	CAM PROFILE	4
TOTAL		40



QUESTION 2: LOCI

NOTE: Answer QUESTIONS 2.1 and 2.2.

2.1 CAM

Motion:

A cam rotates at constant velocity imparting the following motion to a follower:

- It rises with uniform motion for 21 mm over the first 60°.
- There is a dwell period for the next 75°.
- It rises with uniform motion for a further 43 mm over the next 45°.
- It descends with simple harmonic motion back to the original position over the rest of the rotation.

Instructions:

- Draw, to a rotational (horizontal) scale of 360° = 114 mm and a displacement scale of 1 : 1, the complete displacement graph for the required motion.
- Label the displacement graph and include the scale.

Show ALL construction.

[11]

ASSESSMENT CRITERIA 2.1			
1	CONSTRUCTION	4	
2	POINTS + CURVE	6	
3	LABELS	1	
PENALTIES (-)			
SUBTOTAL		11	

2.2 MECHANISM

Given:

- A schematic drawing of a mechanism consisting of crank OA, sliding rod AB, rod CD, horizontal groove FG and swivel guide E
- The position of centre point O on the drawing sheet

Specifications:

- The positions of centre point O, swivel guide E and groove FG are fixed
- Sliding rod AB is pin-jointed to crank OA at A
- Rod CD is pin-jointed to sliding rod AB at C
- CD = 90 mm

Motion:

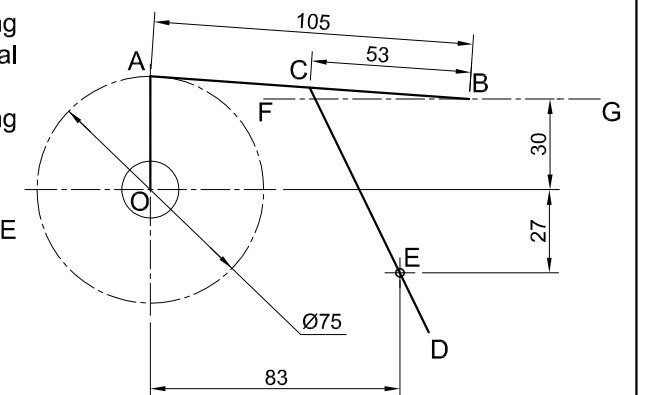
As crank OA rotates in a clockwise direction, point B, of sliding rod AB, reciprocates along groove FG, and rod CD slides through swivel guide E.

Instructions:

- Draw, to scale 1 : 1, the given schematic drawing of the mechanism.
- Trace the loci generated by point C and by point D for ONE complete rotation of crank OA.

Show ALL construction.

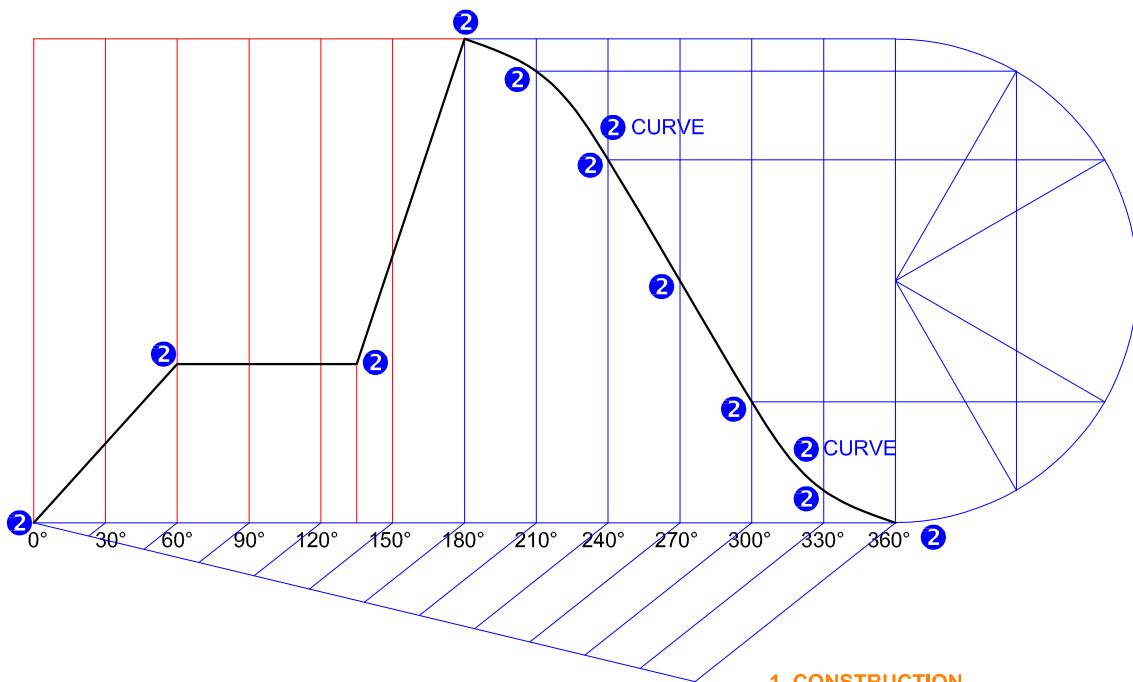
[25]



ASSESSMENT CRITERIA 2.2			
1	GIVEN	6	
2	CONSTRUCTION	5	
3	POINTS + CURVE	14	
PENALTIES (-)			
2.2 SUBTOTAL		25	
2.1 SUBTOTAL		11	
TOTAL		36	

EXAMINATION NUMBER	
EXAMINATION NUMBER	3





DISPLACEMENT GRAPH ③
SCALE: 114 mm = 360° ROTATION ③

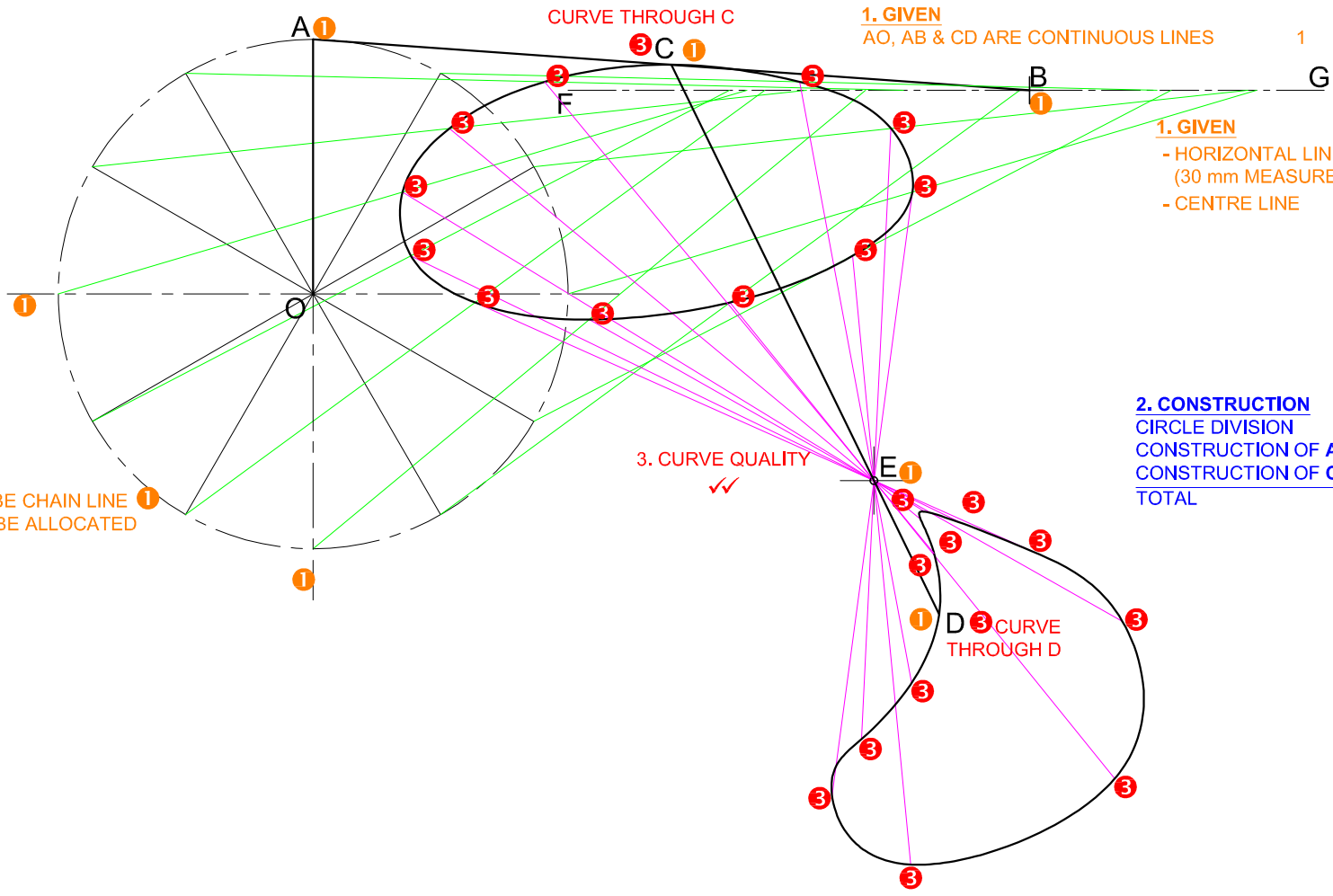
1 CONSTRUCTION

- LENGTH (114) 1
- LINE DIVISION CONSTRUCTION 1
- 114 INTO 12 EQUAL PARTS 2
- SIMPLE HARMONIC MOTION 1
- * SEMI CIRCLE 2
- * CIRCLE DIVISION 2
- * HORIZONTAL PROJECTION 2

TOTAL 4

ASSESSMENT CRITERIA 2.1		
1	CONSTRUCTION	4
2	POINTS + CURVE	6
3	LABELS	1
PENALTIES (-)		
SUBTOTAL		11

PAPER 2 QUESTION 2.1
GRADE 12
NOVEMBER 2018
MARKING GUIDELINE



1. GIVEN
CIRCLE MUST BE CHAIN LINE
FOR MARK TO BE ALLOCATED

CURVE THROUGH C

1. GIVEN
AO, AB & CD ARE CONTINUOUS LINES

1. GIVEN
- HORIZONTAL LINE FG
(30 mm MEASUREMENT)
- CENTRE LINE

3. CURVE QUALITY
✓✓

2. CONSTRUCTION
CIRCLE DIVISION 1
CONSTRUCTION OF AB 2
CONSTRUCTION OF CD THROUGH E 2
TOTAL 5

CURVE THROUGH D

ASSESSMENT CRITERIA 2.2		
1	GIVEN	6
2	CONSTRUCTION	5
3	POINTS + CURVE	14
TOTAL		25

PAPER 2 QUESTION 2.2
GRADE 12
NOVEMBER 2018
MARKING GUIDELINE

Handwritten signatures and initials

STAPLE

S

QUESTION 2: LOCI (CAM)

Given:

- The detail of a wedge-shaped follower and the camshaft
- The position of centre point S on the drawing sheet

Specifications:

- The follower reciprocates on the vertical centre line of the camshaft
- The minimum distance from the follower to the centre of the camshaft = 17 mm
- Rotation = anti-clockwise

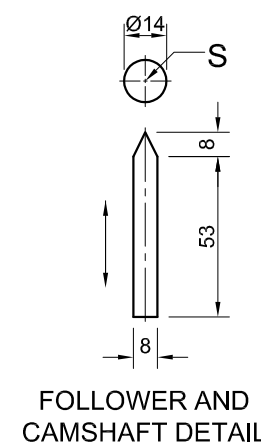
Motion:

The cam imparts the following motion to the follower:

- It descends 56 mm with uniform acceleration and retardation over the first 180°
- It rises 20 mm with uniform motion over the next 45°
- There is a dwell period for the next 45°
- It returns to its original position with simple harmonic motion over the rest of the rotation

Instructions:

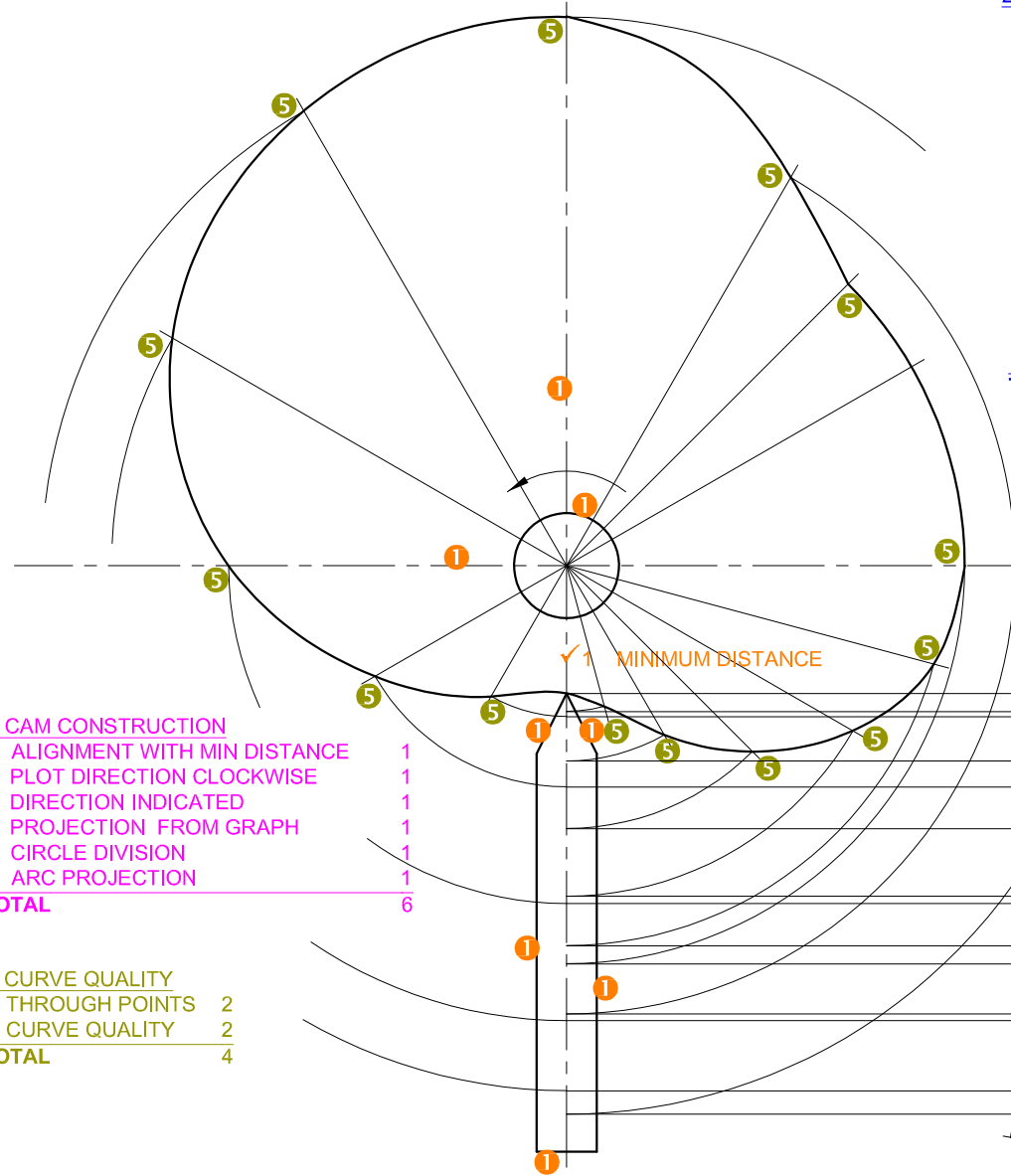
- Draw, to scale 1 : 1, the given camshaft and the wedge-shaped follower at the minimum distance.
- Draw to a rotational scale of 30° = 8 mm and a displacement scale of 1 : 1, the complete displacement graph for the required motion.
- Label the displacement graph and include the scale.
- Project and draw the cam profile from the displacement graph.
- Show the direction of rotation on the cam profile.
- Show ALL construction and projection. **[38]**



FOLLOWER AND CAMSHAFT DETAIL

ASSESSMENT CRITERIA				
1	GIVEN + MINIMUM DISTANCE + CENTRE LINES	5		
2	GRAPH CONSTRUCTION	7		
3	DISPLACEMENT GRAPH	9		
4	CAM CONSTRUCTION	6		
5	CAM + CURVE QUALITY	11		
PENALTY (-)				
TOTAL		38		
EXAMINATION NUMBER				
EXAMINATION NUMBER				3



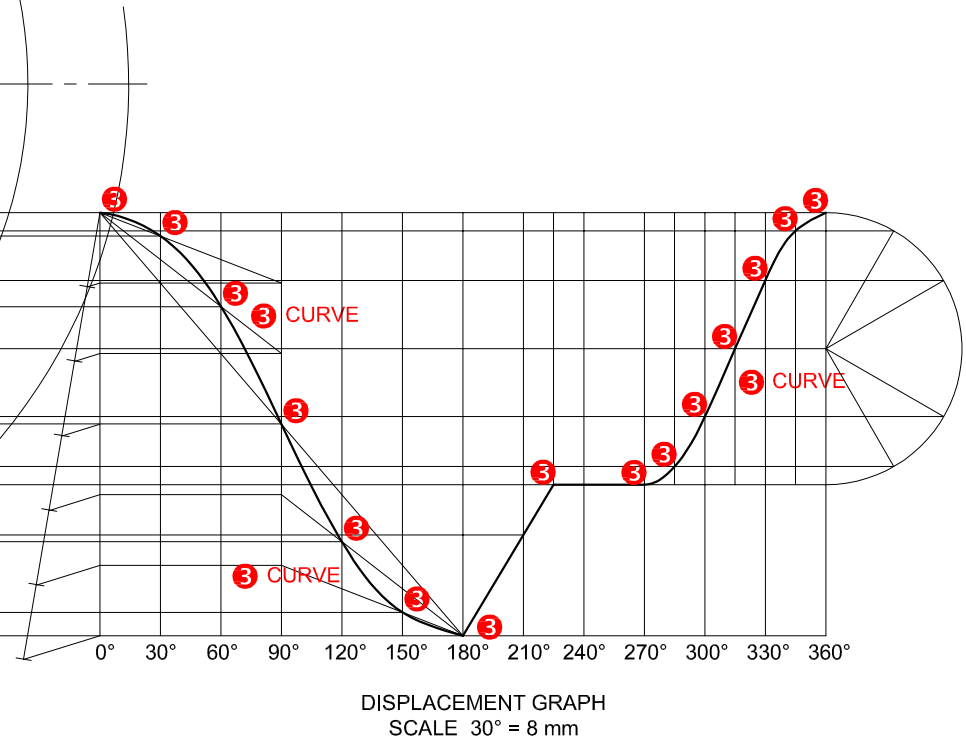


- 2. GRAPH CONSTRUCTION**
- BASE LENGTH 96 mm 1
 - 12 DIVISIONS @ 8 mm 1
 - **UNIFORM ACCELERATION + RETARDATION**
 - * HEIGHT 56 mm 1
 - * LINE DIVISION 2
 - * FIRST 1/2 CONSTRUCTION 2
 - * SECOND 1/2 CONSTRUCTION 2
 - **SIMPLE HARMONIC MOTION**
 - * SEMI CIRCLE 1
 - * CIRCLE DIVISION 2
 - * 15° SUBDIVISIONS 2
 - * PROJECTION 2
 - LABELS 1
 - TOTAL 7**

ASSESSMENT CRITERIA		
1	GIVEN + MINIMUM DISTANCE + CENTRE LINES	5
2	GRAPH CONSTRUCTION	7
3	DISPLACEMENT GRAPH	9
4	CAM CONSTRUCTION	6
5	CAM + CURVE QUALITY	11
TOTAL		38

- 4. CAM CONSTRUCTION**
- ALIGNMENT WITH MIN DISTANCE 1
 - PLOT DIRECTION CLOCKWISE 1
 - DIRECTION INDICATED 1
 - PROJECTION FROM GRAPH 1
 - CIRCLE DIVISION 1
 - ARC PROJECTION 1
 - TOTAL 6**

- 5. CURVE QUALITY**
- THROUGH POINTS 2
 - CURVE QUALITY 2
 - TOTAL 4**



PAPER 2 QUESTION 2
GRADE 12
NSC 2019
MARKING GUIDELINES

GRADE 12 NSC

PAST QUESTIONS ON

ISOMETRIC DRAWING PAPER 2

WITH

MARKING GUIDELINES

EC LEARNERS



QUESTION 3: ISOMETRIC DRAWING

Given:

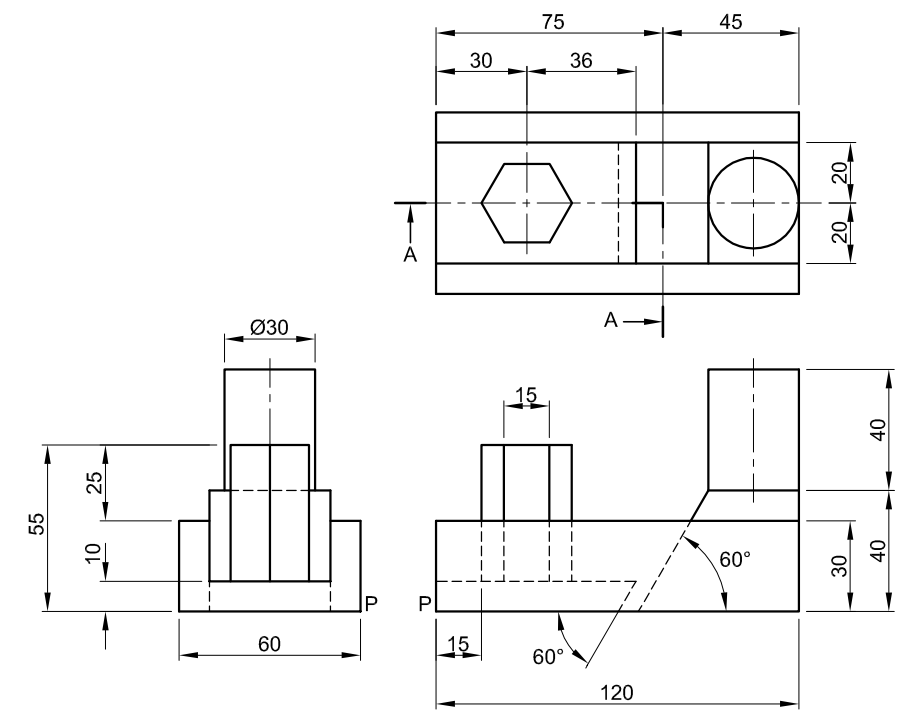
- The front view, top view and left view of a woodworking plane
- The position of point P on the drawing sheet

Instructions:

Using scale 1 : 1, convert the orthographic views of the woodworking plane into a sectional isometric drawing on cutting plane A-A.

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

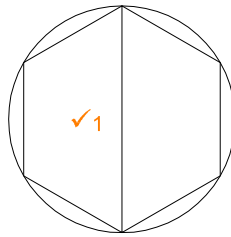
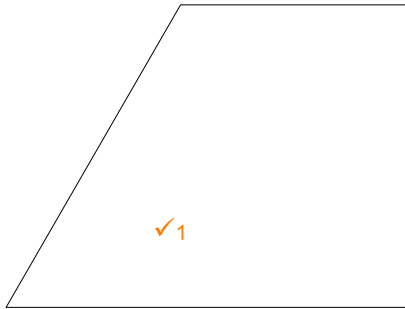
[34]



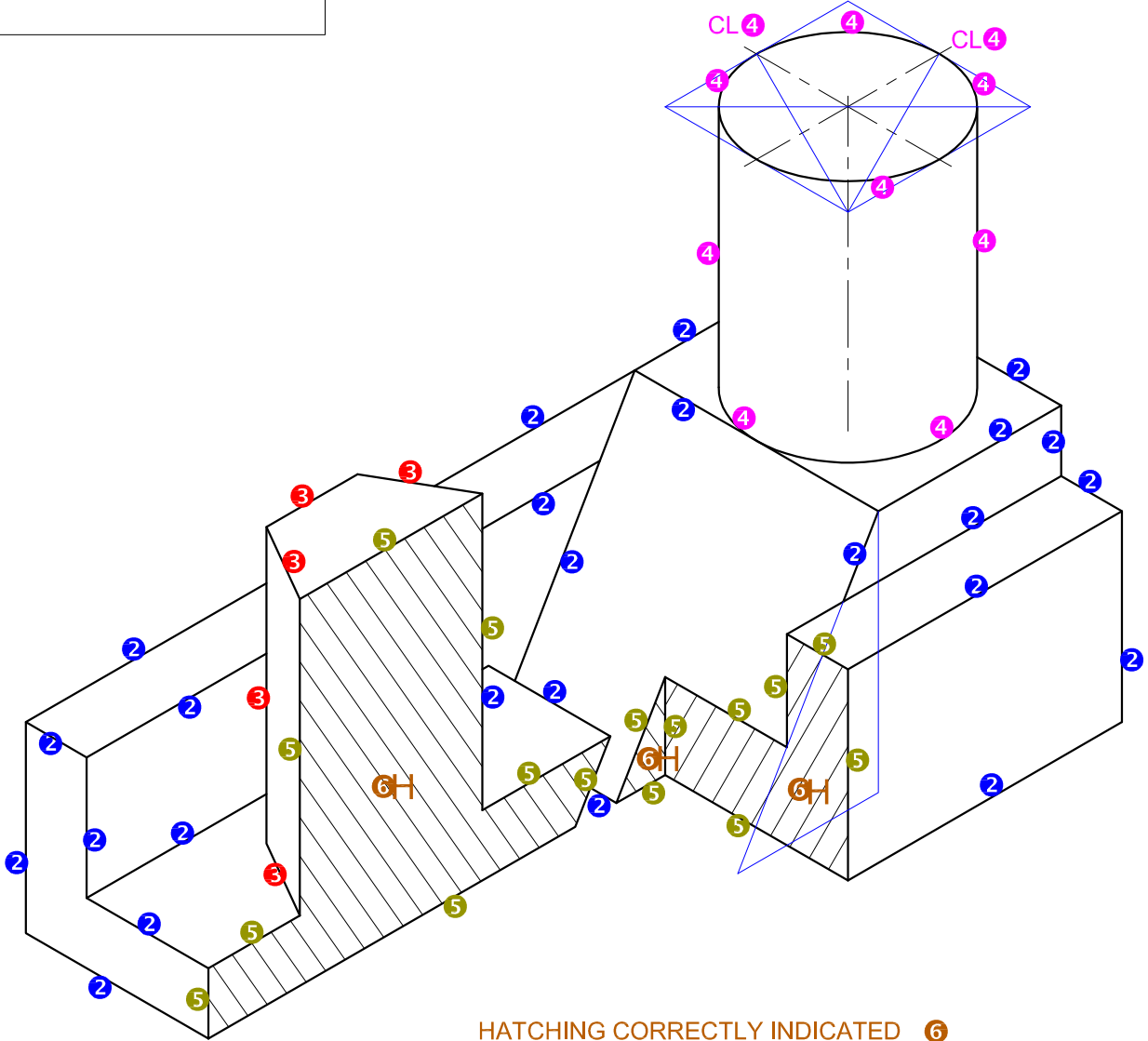
P

ASSESSMENT CRITERIA			
1	AUXILLIARY VIEW + PLACING	3	
2	ISOMETRIC + NON-ISOMETRIC	12 1/2	
3	HEXAGON	2 1/2	
4	CIRCLES + CONSTRUCTION + CL	6	
5	SECTION	8	
6	HATCHING	2	
PENALTIES (-)			
TOTAL		34	
EXAMINATION NUMBER			
EXAMINATION NUMBER			4





CIRCLE CONSTRUCTIONS ✓4



HATCHING CORRECTLY INDICATED 6



P CORRECT PLACEMENT ON POINT P ✓1

ASSESSMENT CRITERIA		
1	AUXILIARY VIEW + PLACING	3
2	ISOMETRIC + NON-ISOMETRIC	12 ½
3	HEXAGON	2 ½
4	CIRCLES + CONSTRUCTION + CL	6
5	SECTION	8
6	HATCHING	2
PENALTIES (-)		
TOTAL		34

PAPER 2 QUESTION 3
 GRADE 12
 November 2015
 MEMORANDUM



QUESTION 3: ISOMETRIC DRAWING

Given:

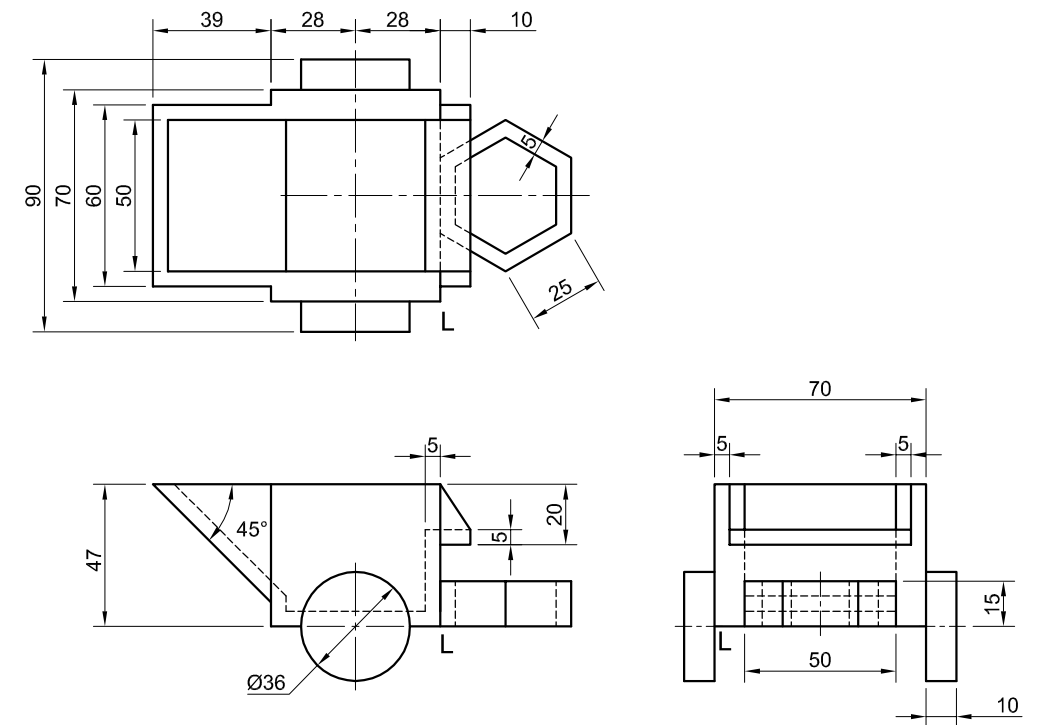
- The front view, top view and right view of a toy planter
- The position of corner L on the drawing sheet

Instructions:

Using scale 1 : 1, convert the orthographic views of the toy planter into an isometric drawing.

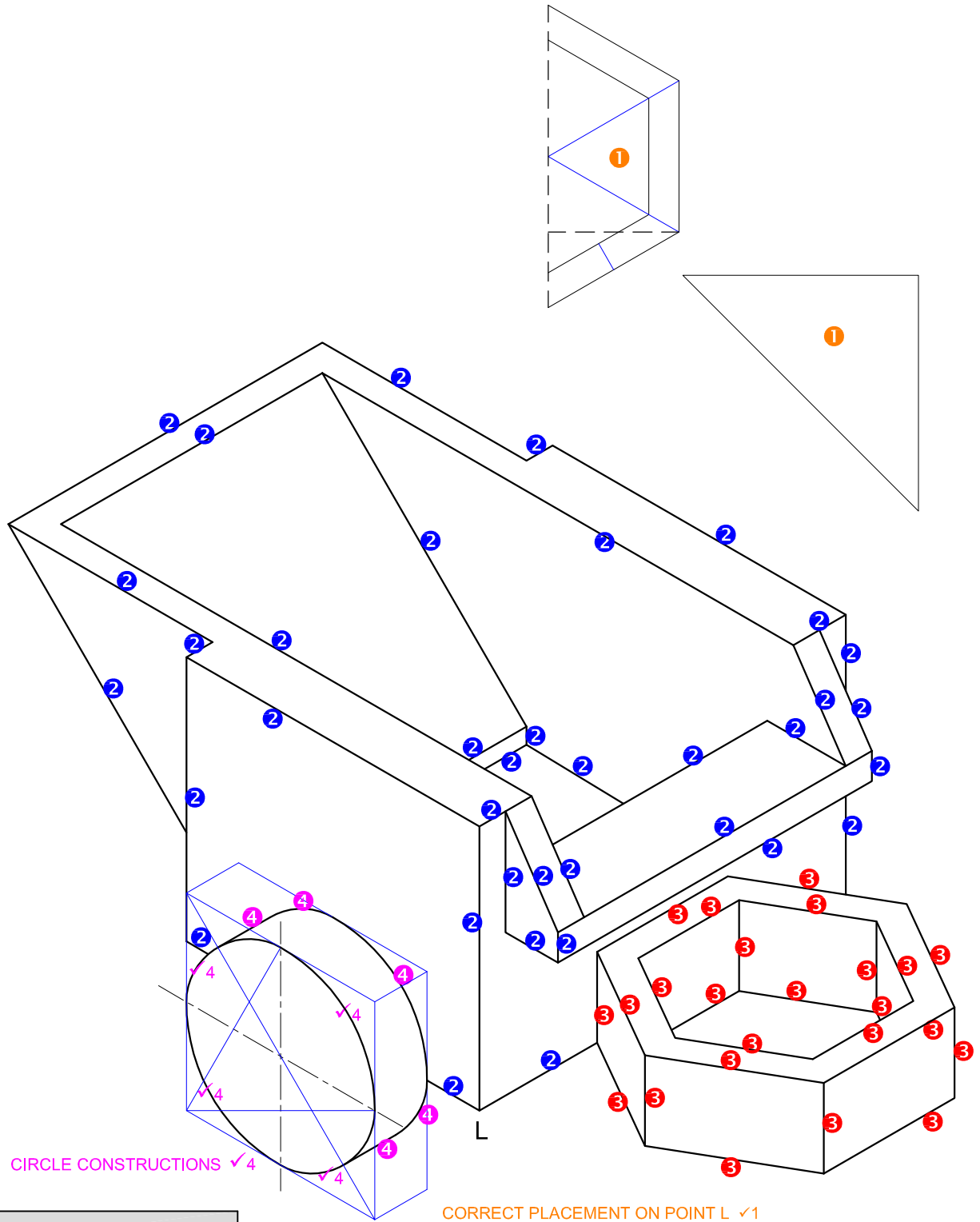
- Use corner L as the starting point of the drawing.
- Show ALL necessary construction.
- NO hidden detail is required.

[40]



ASSESSMENT CRITERIA				
1	AUXILIARY VIEWS + PLACING	2		
2	ISOMETRIC + NON-ISOMETRIC LINES	18 1/2		
3	HEXAGON	12		
4	CIRCLES + CONSTRUCTION + CENTRE LINES	7 1/2		
PENALTIES (-)				
TOTAL		40		
EXAMINATION NUMBER				
EXAMINATION NUMBER				
EXAMINATION NUMBER				4





CIRCLE CONSTRUCTIONS ✓4

CORRECT PLACEMENT ON POINT L ✓1

ASSESSMENT CRITERIA		
1	AUXILIARY VIEWS + PLACING	2
2	ISOMETRIC + NON-ISOMETRIC LINES	18 ½
3	HEXAGON	12
4	CIRCLES + CONSTRUCTION + CENTRE LINES	7 ½
PENALTIES (-)		
TOTAL		40

PAPER 2 QUESTION 3
 GRADE 12
 DBE/Feb.-Mar. 2016
 MEMORANDUM



QUESTION 3: ISOMETRIC DRAWING

Given:

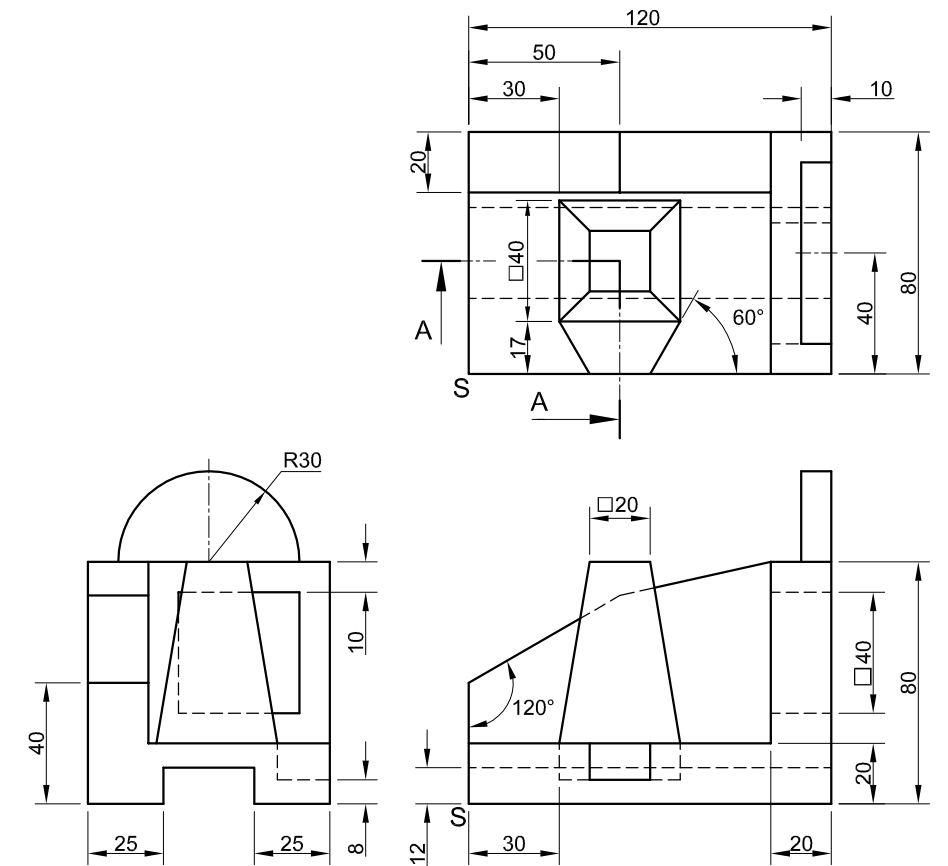
- The front view, top view and left view of a jig
- The position of point S on the drawing sheet

Instructions:

Using scale 1 : 1, convert the orthographic views of the jig into a sectional isometric drawing on cutting plane A-A.

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

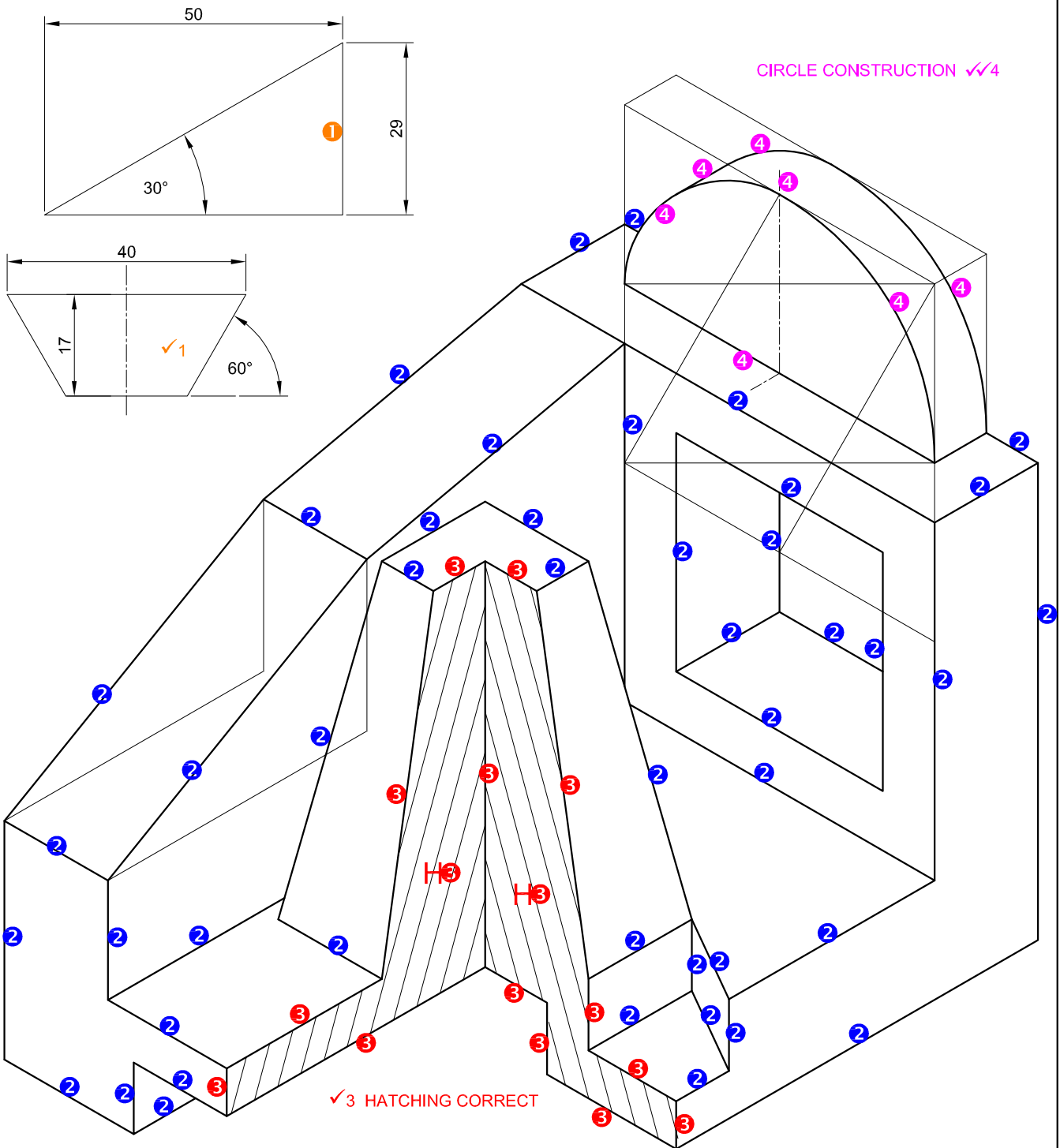
[40]



S ↙

ASSESSMENT CRITERIA			
1	AUX. VIEW + PLACING	2 ½	
2	ISOMETRIC + NON-ISOMETRIC LINES	23	
3	SECTIONED SURFACES	9	
4	ISOMETRIC CIRCLES + CIRCLE CONSTR'	5 ½	
TOTAL		40	
EXAMINATION NUMBER			
EXAMINATION NUMBER			
EXAMINATION NUMBER			4





CIRCLE CONSTRUCTION ✓✓4

✓3 HATCHING CORRECT

✓1 PLACING ON S

ASSESSMENT CRITERIA		
1	AUX. VIEW + PLACING	2 ½
2	ISOMETRIC + NON-ISOMETRIC LINES	23
3	SECTIONED SURFACES	9
4	ISOMETRIC CIRCLES + CIRCLE CONSTR'	5 ½
TOTAL		40

PAPER 2 QUESTION 3
 GRADE 12
 November 2016
 MEMORANDUM



QUESTION 3: ISOMETRIC DRAWING

Given:

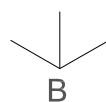
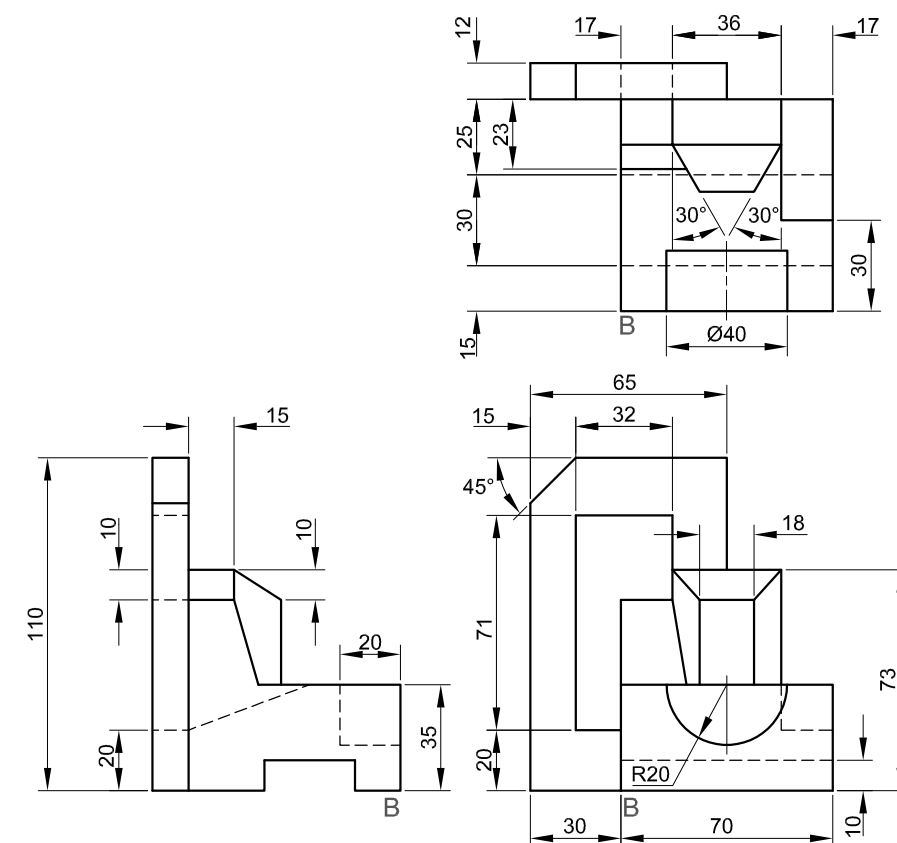
- The front view, top view and left view of a guide
- The position of point B on the drawing sheet

Instructions:

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

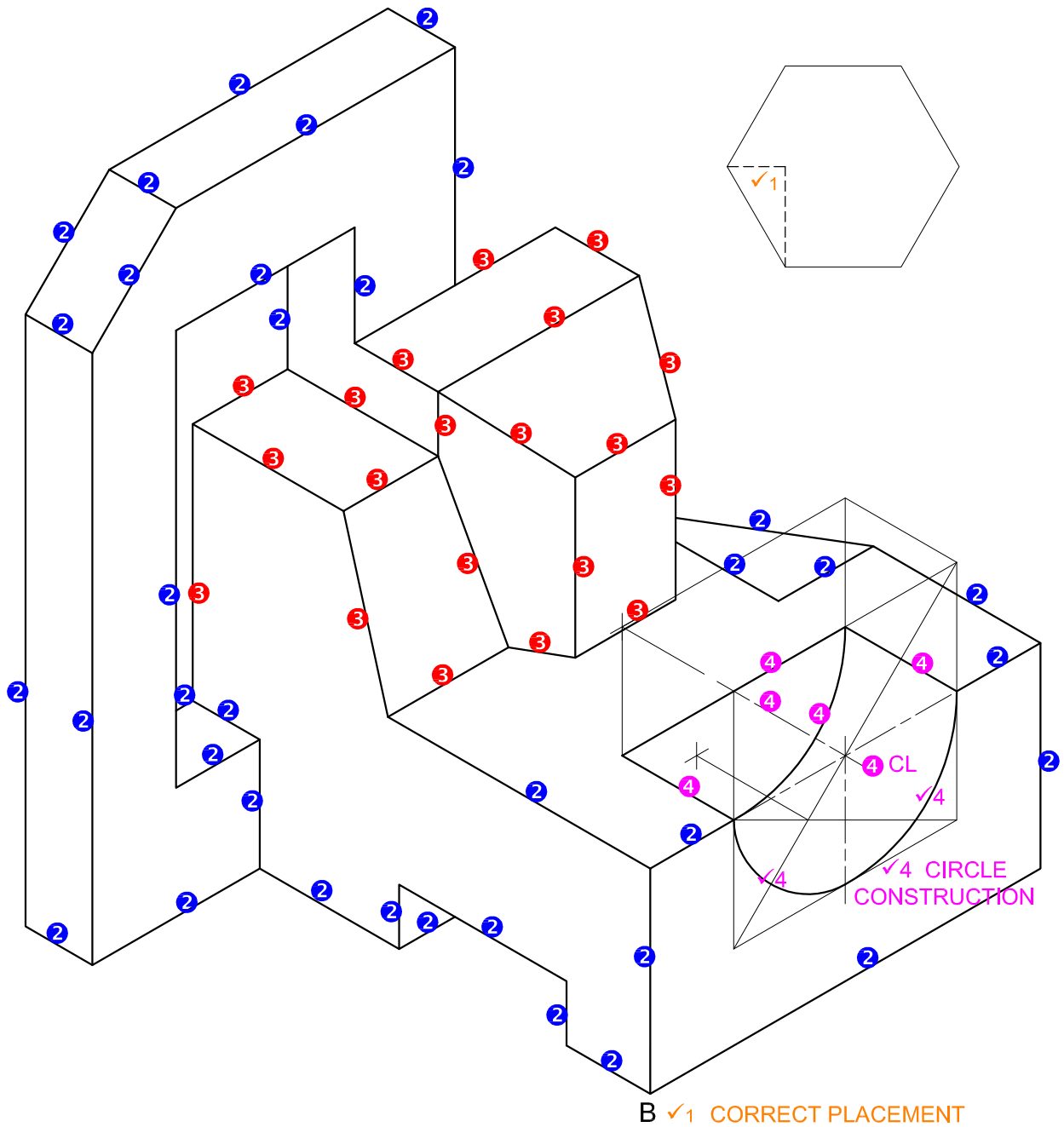
- Make B the lowest point of the drawing.
- Show ALL construction.
- NO hidden detail is required.

[36]



ASSESSMENT CRITERIA			
1	PLACEMENT + AUX. VIEW	2	
2	FRONT + REAR	18	
3	MIDDLE SECTION	10	
4	CIRCLE + CIRCLE CONSTRUCTION + CL	6	
PENALTIES (-)			
TOTAL		36	
EXAMINATION NUMBER			
EXAMINATION NUMBER			4





PAPER 2 QUESTION 3
 GRADE 12
 November 2017
 MARKING GUIDELINES

ASSESSMENT CRITERIA		
1	PLACEMENT + AUX. VIEW	2
2	FRONT + REAR	18
3	MIDDLE SECTION	10
4	CIRCLE + CIRCLE CONSTRUCTION + CL	6
TOTAL		36



QUESTION 3: ISOMETRIC DRAWING

Given:

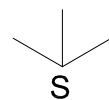
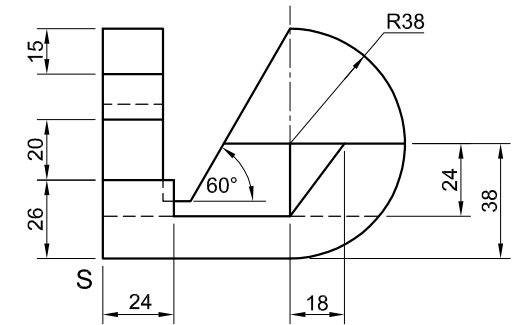
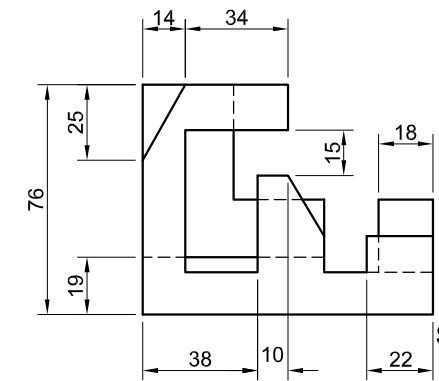
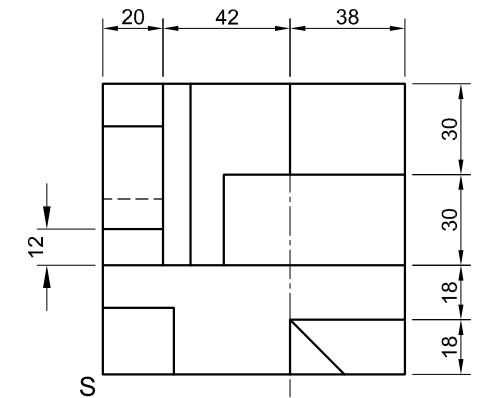
- The front view, top view and left view of a bracket
- The position of point S on the drawing sheet

Instructions:

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

- Make S the lowest point of the drawing.
- Show ALL construction.
- NO hidden detail is required.

[38]



ASSESSMENT CRITERIA			
1	PLACEMENT + AUX. VIEW	2	
2	FRONT PORTION	22½	
3	BACK PORTION	5	
4	CIRCLE + CIRCLE CONSTRUCTION + CL	8½	
PENALTIES (-)			
TOTAL		38	
EXAMINATION NUMBER			
EXAMINATION NUMBER			4



✓✓✓4 CIRCLE CONSTRUCTION/ PROJECTION

✓4 FOR ALL CENTRE LINES

✓1 CORRECT PLACEMENT

ASSESSMENT CRITERIA		
1	PLACEMENT + AUX. VIEW	2
2	FRONT PORTION	22½
3	BACK PORTION	5
4	CIRCLE +CIRCLE CONSTRUCTION + CL	8½
TOTAL		38

PAPER 2 QUESTION 3
GRADE 12
NOVEMBER 2018
MARKING GUIDELINE



QUESTION 3: ISOMETRIC DRAWING

Given:

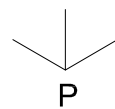
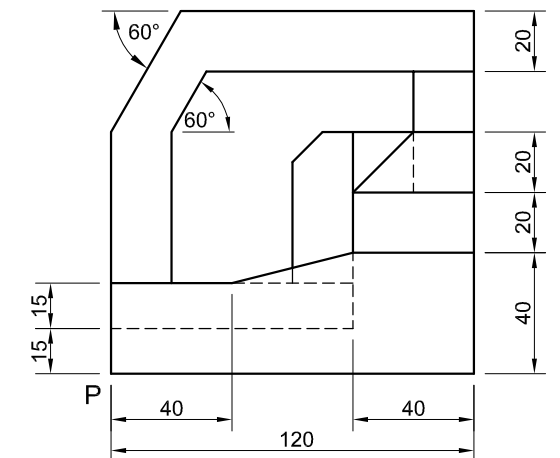
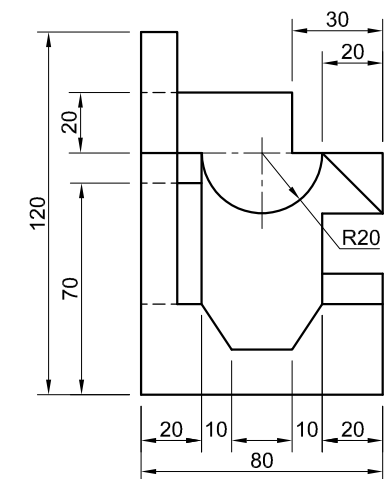
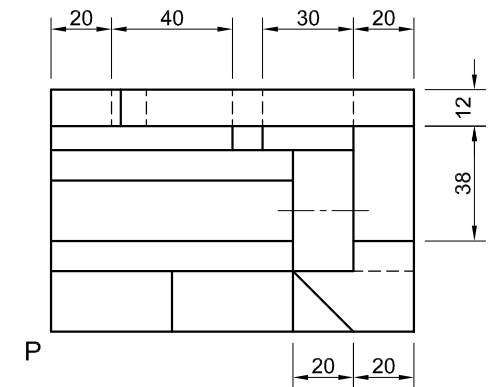
- The front view, top view and left view of a tool jig
- The position of point P on the drawing sheet

Instructions:

Using scale 1 : 1, convert the orthographic views of the tool jig into an isometric drawing.

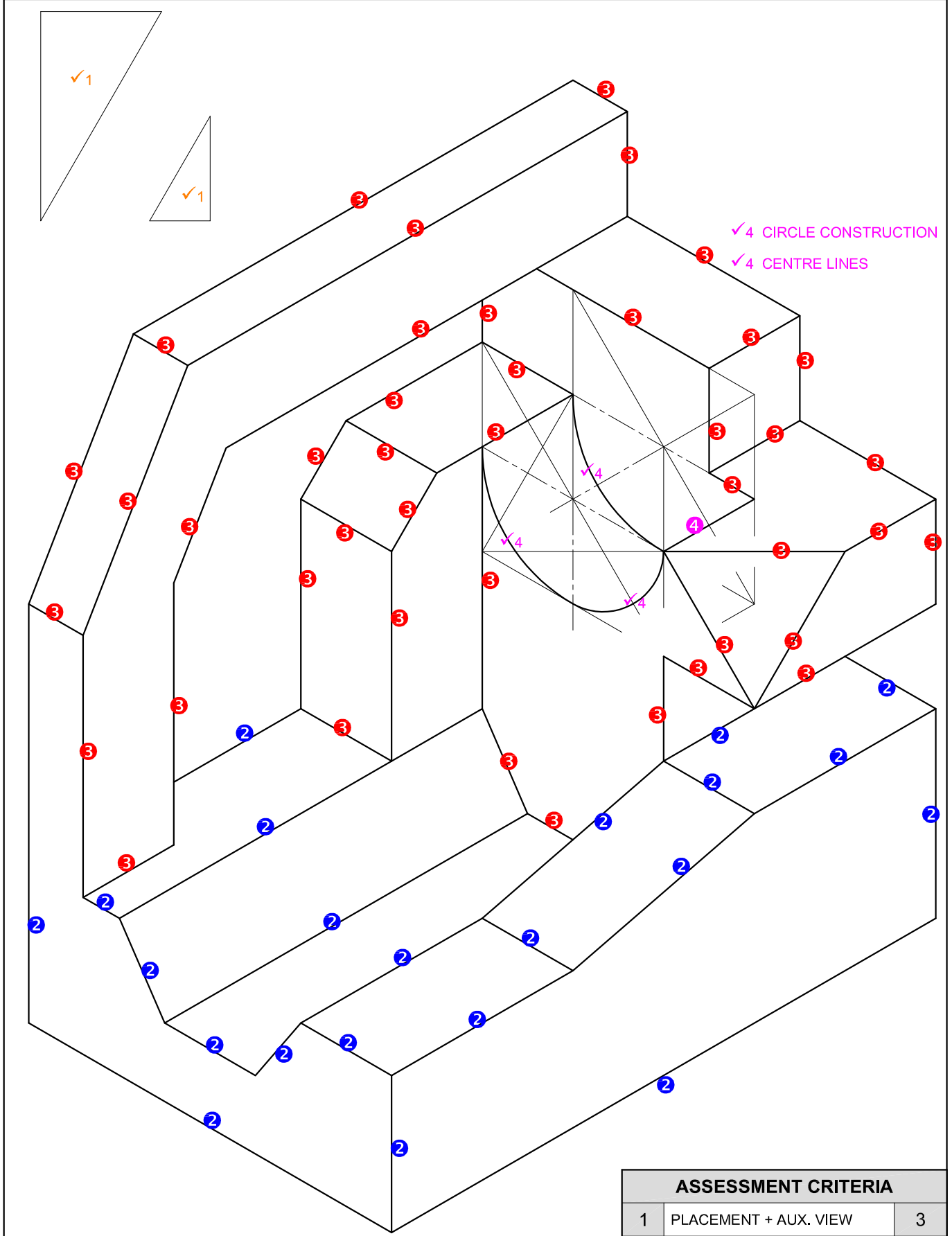
- Make P the lowest point of the drawing.
- Show ALL construction.
- NO hidden detail is required.

[41]



ASSESSMENT CRITERIA			
1	PLACEMENT + AUX. VIEW	3	
2	FRONT PORTION	11	
3	BACK PORTION	21 1/2	
4	CIRCLE + CIRCLE CONSTRUCTION + CL	5 1/2	
PENALTIES (-)			
TOTAL		41	
EXAMINATION NUMBER			
EXAMINATION NUMBER			4





✓1 CORRECT PLACEMENT

PAPER 2 QUESTION 3
 GRADE 12
 NSC 2019
 MARKING GUIDELINES

ASSESSMENT CRITERIA		
1	PLACEMENT + AUX. VIEW	3
2	FRONT PORTION	11
3	BACK PORTION	21 ¹ / ₂
4	CIRCLE + CIRCLE CONSTRUCTION + CL	5 ¹ / ₂
TOTAL		41

GRADE 12 NSC

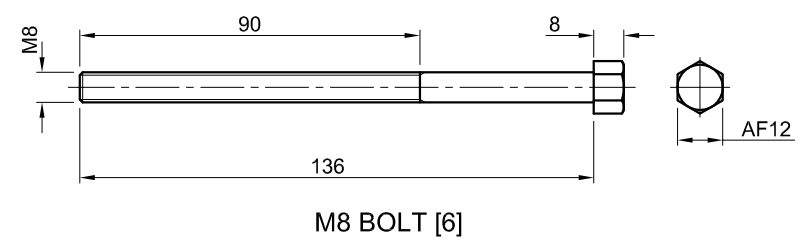
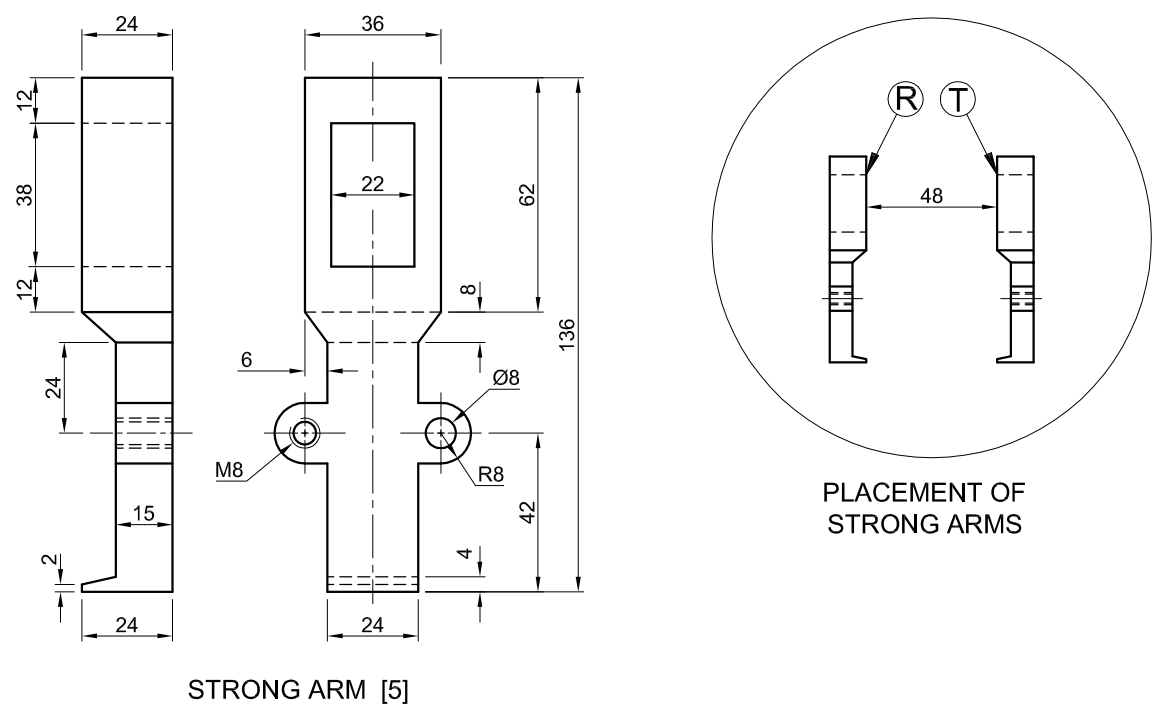
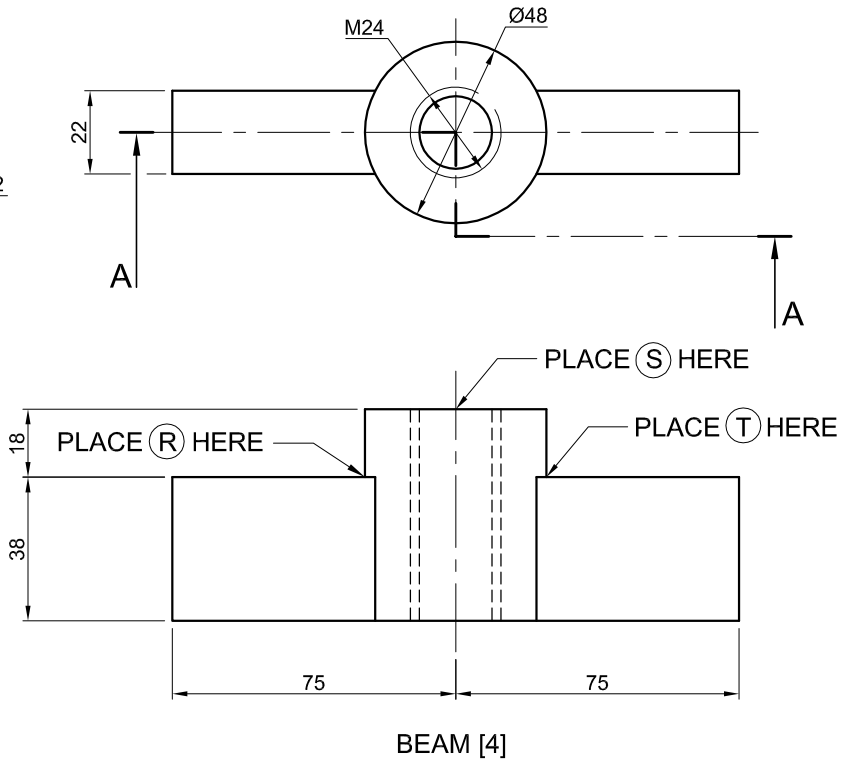
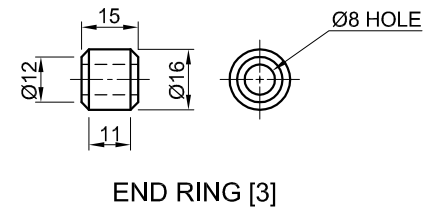
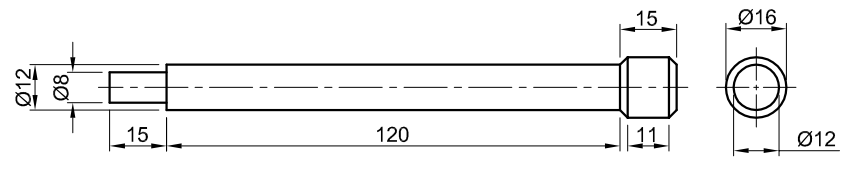
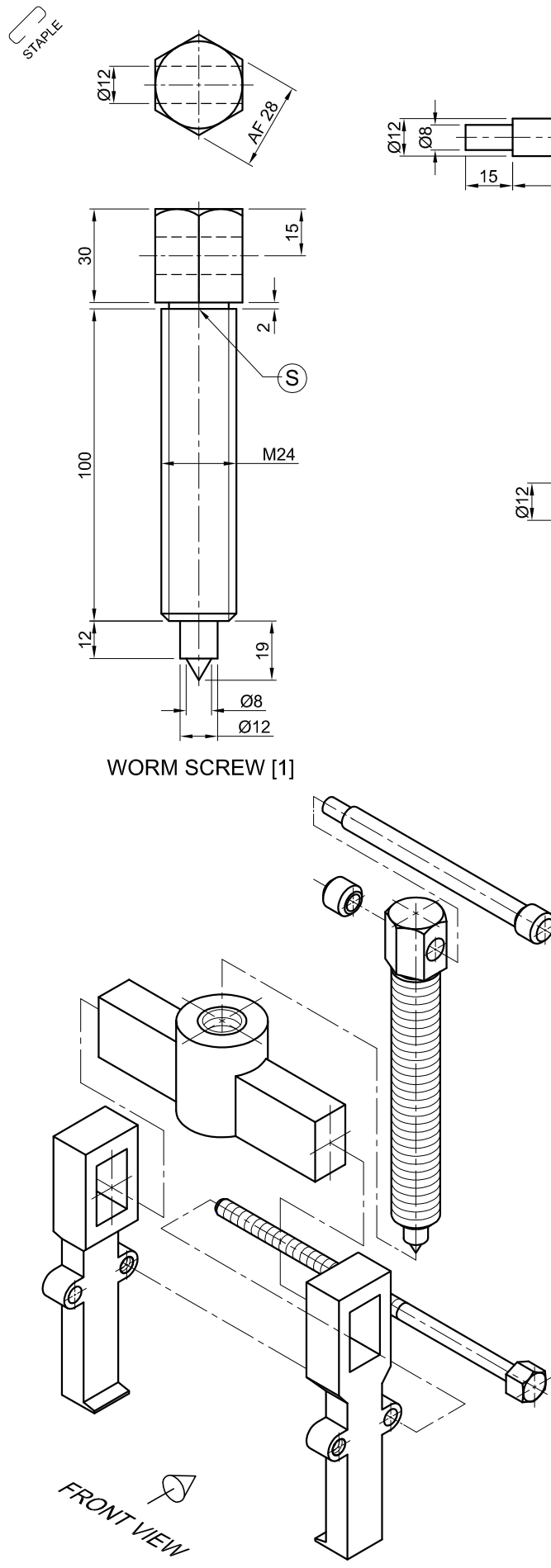
PAST QUESTIONS ON

MECHANICAL ASSEMBLY DRAWINGS PAPER 2

WITH

MARKING GUIDELINES

EC LEARNERS



QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a bearing puller assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the bearing puller 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 bearing puller assembly:
 - 4.1 A half sectional front view** according to cutting plane A-A. Show the left side in section, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane is shown on the top view of the beam (part 4).
 - 4.2 The top view.**
- ALL drawings must comply with the guidelines as contained in the SANS 10111.

NOTE:

- The two strong arms (part 5) must be placed against the cylindrical part of the beam (part 4) so that points R and T will be at the indicated positions.
- The worm screw (part 1) must be completely screwed into the beam (part 4) so that point S will be at the indicated position.
- The lever (part 2) must be placed in the centre of the worm screw (part 1).
- Draw only the rear M8 bolt, as indicated by the exploded isometric drawing.
- Show THREE faces of the head of the M8 bolt in the front view.
- Add the cutting plane A-A to the drawing
- NO hidden detail is required.

[96]

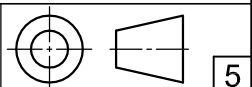
PARTS LIST			
	PARTS	QUANTITY	MATERIAL
1	WORM SCREW	1	HARDENED STEEL
2	LEVER	1	HARDENED STEEL
3	END RING	1	MILD STEEL
4	BEAM	1	HARDENED STEEL
5	STRONG ARM	2	HARDENED STEEL
6	M8 BOLT	2	MILD STEEL

WR
SN KING CC

8 VON WHEILIG STREET
ALIES PARK 1791
www.sn_king.co.za
069 313 1574

BEARING PULLER

ALL DIMENSIONS ARE IN MILLIMETRES.



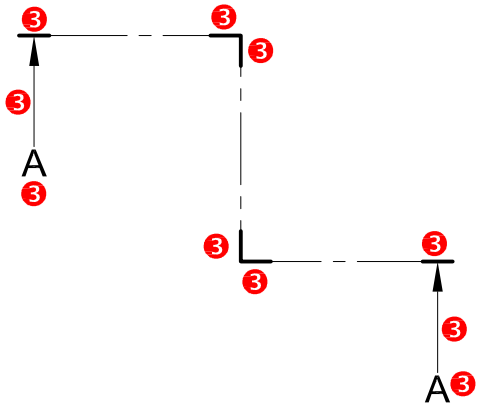


FOR OFFICIAL USE ONLY		
NOT IN THIRD ANGLE		
INCORRECT OVERALL SCALE		
INCORRECT HATCHING		
PARTS NOT ASSEMBLED		
PARTS DRAWN FREEHAND		
TOTAL PENALTIES (-)		

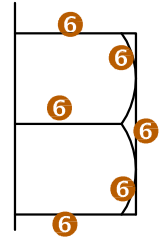
ASSESSMENT CRITERIA					
TOP VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	WORM SCREW	3½			
2	LEVER	4			
3	END RING	3			
4	BEAM	4½			
5	STRONG ARM	10			
6	M8 BOLT	7			
SUBTOTAL		32			
SECTIONAL FRONT VIEW					
1	WORM SCREW	15			
2	LEVER	7			
3	END RING	3			
4	BEAM	5½			
5	STRONG ARM	10½			
6	M8 BOLT	9			
SUBTOTAL		50			
GENERAL					
1	CENTRE LINES	3			
2	ASSEMBLY	6			
3	CUTTING PLANE	5			
SUBTOTAL		14			
TOTAL		96			
TOTAL PENALTIES(-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					6



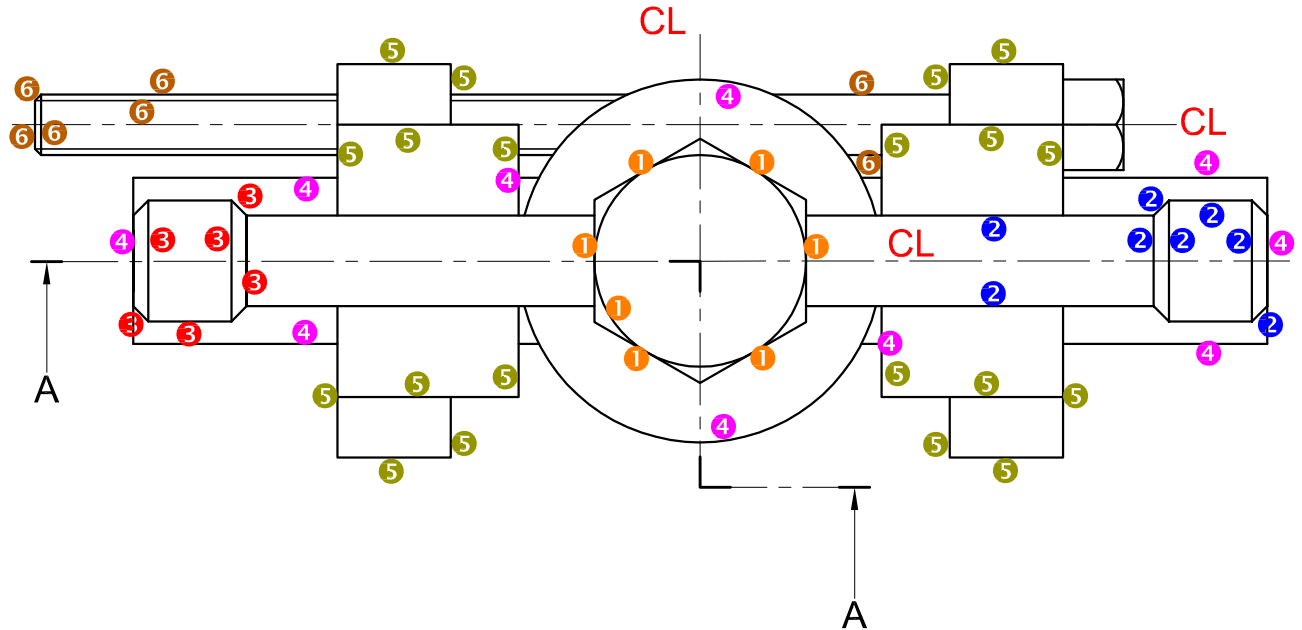
ASSESSMENT CRITERIA		
TOP VIEW		
1	WORM SCREW	3½
2	LEVER	4
3	END RING	3
4	BEAM	5
5	STRONG ARM	10
6	M8 BOLT	6½
SUBTOTAL		32



DETAIL OF MARK ALLOCATION FOR SECTION A-A

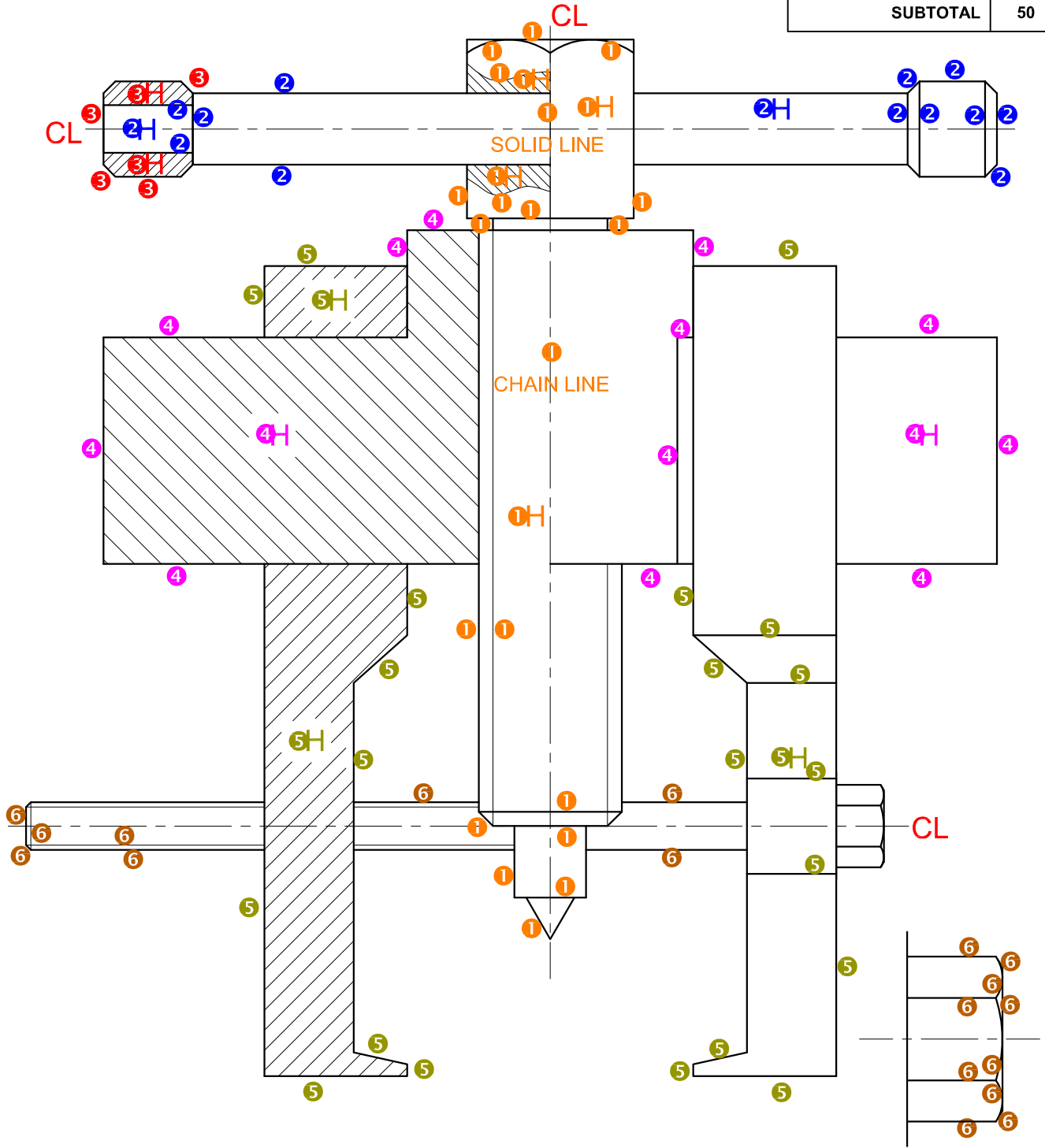


DETAIL OF MARK ALLOCATION FOR BOLT HEAD



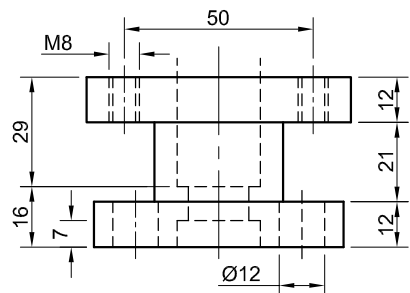
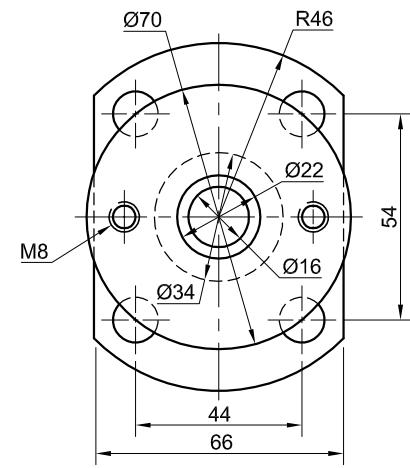
1 MARK FOR EVERY COMPONENT CORRECTLY ASSEMBLED (7 PARTS - 1) = 6

ASSESSMENT CRITERIA		
SECTIONAL FRONT VIEW		
1	WORM SCREW	12
2	LEVER	7
3	END RING	3
4	BEAM	7
5	STRONG ARM	12
6	M8 BOLT	9
SUBTOTAL		50

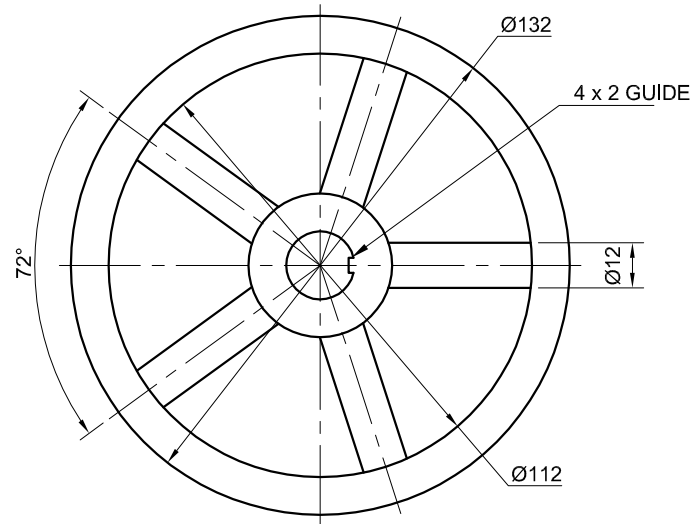


PAPER 2 QUESTION 4
 GRADE 12
 November 2015
 MEMORANDUM

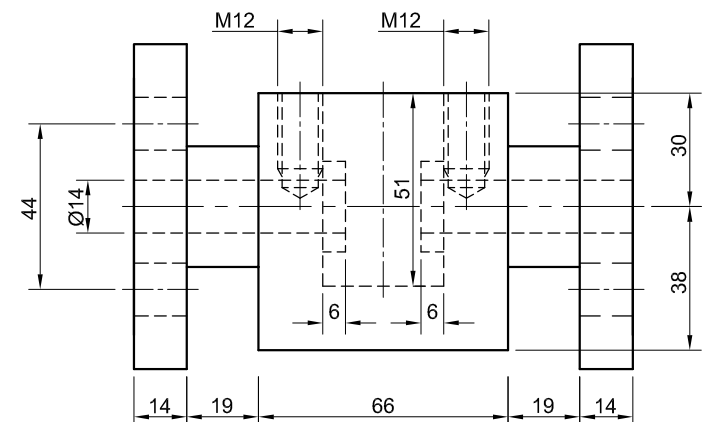
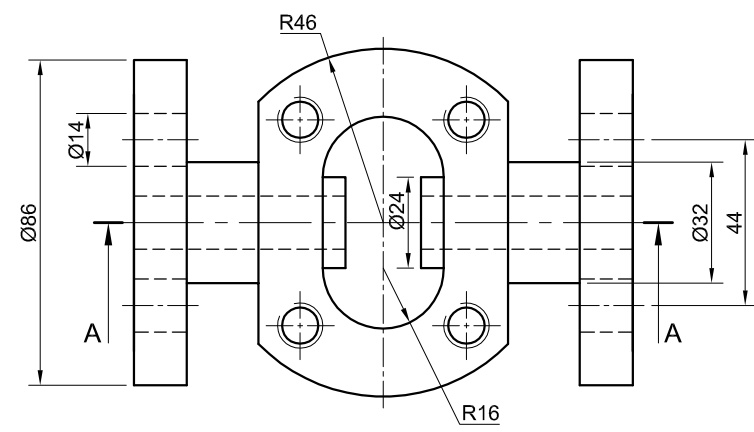
DETAIL OF MARK ALLOCATION FOR BOLT HEAD



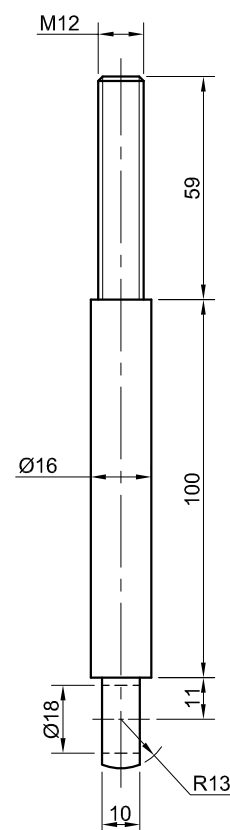
FILLER PIECE [2]



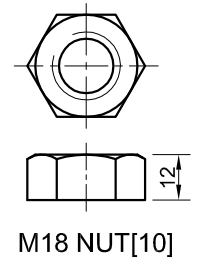
HAND WHEEL [4]



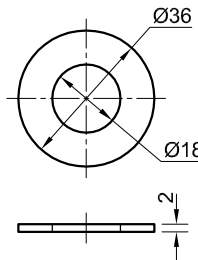
VALVE BASE [1]



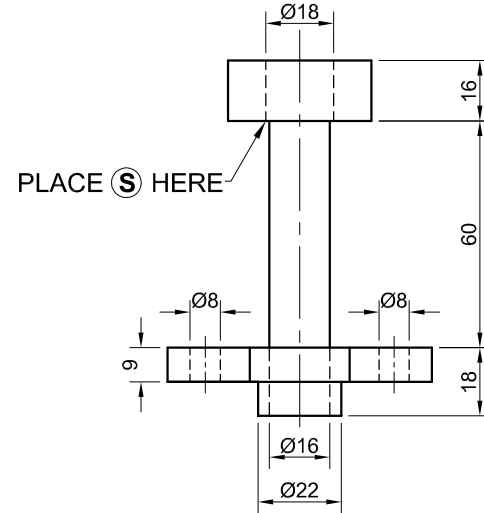
CONNECTING ROD [7]



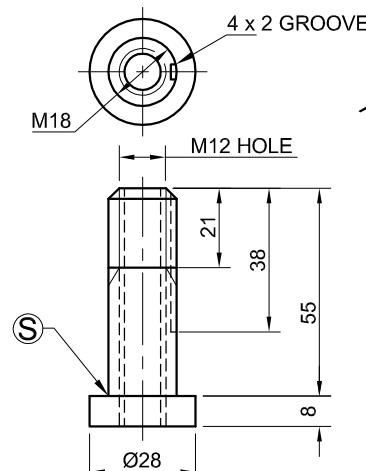
M18 NUT [10]



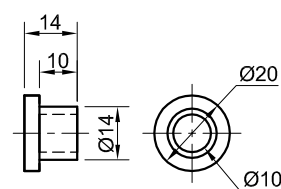
WASHER [9]



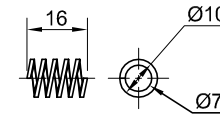
SPLIT PIECE [3]



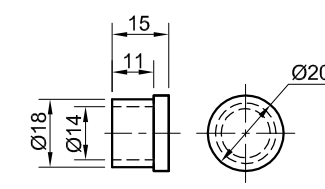
SPACING BOLT [8]



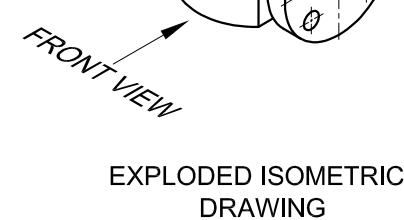
INNER VALVE CAP [5]



SPRING [6]



OUTER VALVE CAP [5]



EXPLODED ISOMETRIC DRAWING

QUESTION 4: MECHANICAL ASSEMBLY

Given:

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

Instructions:

- Answer this question on page 6.
- Draw, to scale 1 : 1 and in third-angle orthographic projection, 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, which passes vertically through the centre of the assembly, is shown on the top view of the valve base (part 1).
- ALL drawings must comply with the guidelines as contained in the SANS 10111.

NOTE:

- Planning is essential.
- The M12 bolts (part 12) which connect the filler piece (part 2) to the valve base (part 1) are not shown and not required to be drawn.
- The M8 bolts (part 11) which connect the filler piece (part 2) to the split piece (part 3) are not shown and not required to be drawn.
- The spacing bolt (part 8) must be placed through the split piece (part 3) so that point **S** will be at the indicated position.
- Show THREE faces of the M18 nut.
- NO hidden detail is required.

[98]

PARTS LIST

PARTS	QUANTITY	MATERIAL
1 VALVE BASE	1	CAST IRON
2 FILLER PIECE	1	CAST IRON
3 SPLIT PIECE	1	CAST IRON
4 HAND WHEEL	1	MILD STEEL
5 VALVE CAPS	2	STAINLESS STEEL
6 SPRING	1	SPRING STEEL
7 CONNECTING ROD	1	STAINLESS STEEL
8 SPACING BOLT	1	TOOL STEEL
9 WASHER	1	MILD STEEL
10 M18 NUT	1	MILD STEEL
11 M8 BOLT	2	MILD STEEL
12 M12 BOLT	4	MILD STEEL

WEST COAST
MANUFACTURING

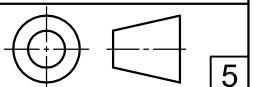
17 MAIN ROAD
VELDDRIFT
7365
www.wce.co.za

TITLE

STEAM VALVE ASSEMBLY

ALL DIMENSIONS ARE IN MILLIMETRES.

ALL UNSPECIFIED RADII ARE R3.



5

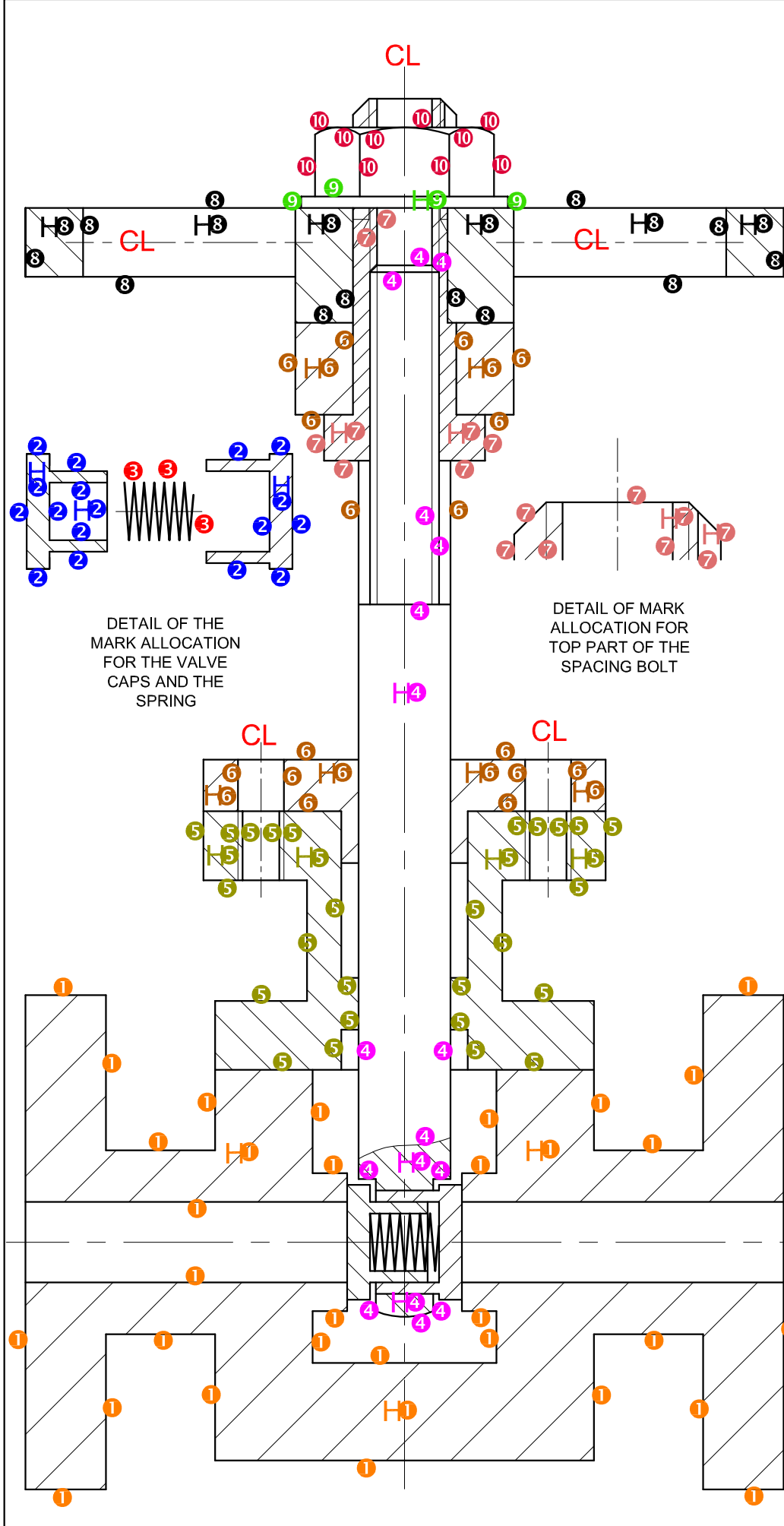




FOR OFFICIAL USE ONLY		
INCORRECT SCALE		
INCORRECT HATCHING		
PARTS NOT ASSEMBLED		
TOTAL PENALTIES (-)		

ASSESSMENT CRITERIA					
SECTIONAL FRONT VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	VALVE BASE	16 ¹ / ₂			
2	VALVE CAPS	8 ¹ / ₂			
3	SPRING	1 ¹ / ₂			
4	CONNECTING ROD	8 ¹ / ₂			
5	FILLER PIECE	15			
6	SPLIT PIECE	11			
7	SPACING BOLT	8			
8	HAND WHEEL	9			
9	WASHER	2			
10	M18 NUT	5			
SUBTOTAL		85			
GENERAL					
1	CENTRE LINES	3			
2	ASSEMBLY	10			
SUBTOTAL		13			
TOTAL		98			
TOTAL PENALTIES(-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
6					





DETAIL OF THE MARK ALLOCATION FOR THE VALVE CAPS AND THE SPRING

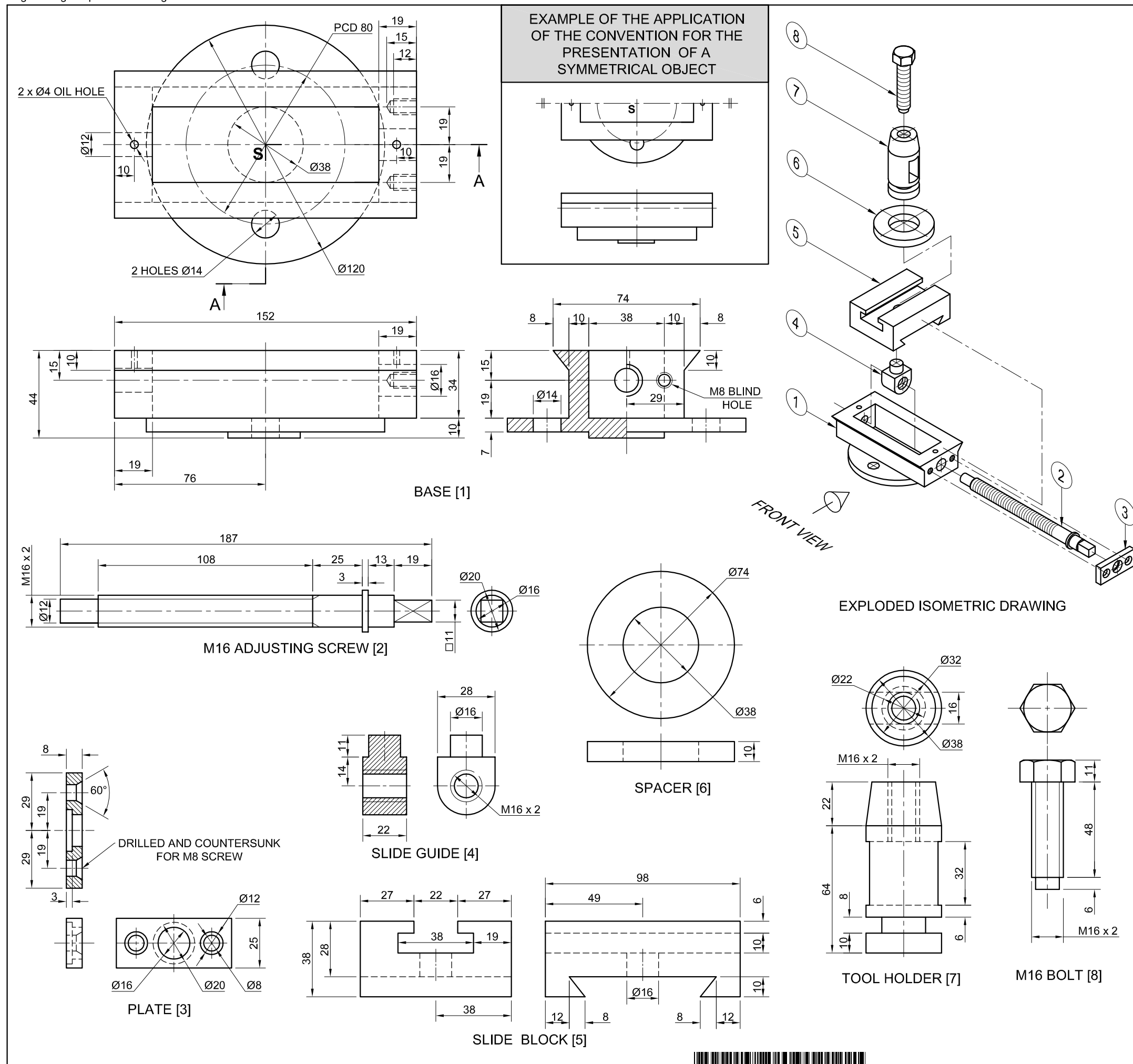
DETAIL OF MARK ALLOCATION FOR TOP PART OF THE SPACING BOLT

ASSESSMENT CRITERIA

SECTIONAL FRONT VIEW

		POSSIBLE
1	VALVE BASE	16 ¹ / ₂
2	VALVE CAPS	8 ¹ / ₂
3	SPRING	1 ¹ / ₂
4	CONNECTING ROD	8 ¹ / ₂
5	FILLER PIECE	15
6	SPLIT PIECE	11
7	SPACING BOLT	8
8	HAND WHEEL	9
9	WASHER	2
10	M18 NUT	5
SUBTOTAL		85
GENERAL		
1	CENTRE LINES	3
2	ASSEMBLY	10
SUBTOTAL		13
TOTAL		98

PAPER 2 QUESTION 4
GRADE 12
DBE/Feb.-Mar. 2016
MEMORANDUM



QUESTION 4: MECHANICAL ASSEMBLY

Given:

- Orthographic views of each of the parts of a tool holder assembly
- An example of the application of the convention for the drawing of a symmetrical object
- The exploded isometric drawing of the parts of the tool holder assembly, showing the position of each part relative to all the others
- The top view centre line and reference point **S** on page 6

Instructions:

- Answer this question on page 6.
- Using the given centre line and reference point **S**, draw, to scale 1 : 1 and in third-angle orthographic projection, the following views of the assembled parts of the tool holder assembly:
 - 4.1 A half sectional front view** on cutting plane A-A. Show the right side in section, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane is shown on the top view of the base (part 1).
 - 4.2 The top view.** Show **only the front half** of the top view by applying the convention for the presentation of a symmetrical object.

NOTE:

- Planning is essential.
- ALL drawings must comply with the guidelines as contained in the *SANS 10111*.
- Apply the convention of symmetry only to the top view.
- Show **THREE** faces of the M16 bolt (part 8) in the front view.
- In this drawing the M16 bolt (part 8) must be completely screwed into the tool holder (part 7).
- Add cutting plane A-A.
- **NO** hidden detail is required.

[88]

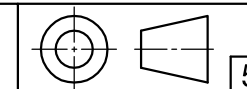
PARTS LIST			
	PARTS	QUANTITY	MATERIAL
1	BASE	1	CAST STEEL
2	M16 ADJUSTING SCREW	1	MILD STEEL
3	PLATE	1	MILD STEEL
4	SLIDE GUIDE	1	MILD STEEL
5	SLIDE BLOCK	1	CAST IRON
6	SPACER	1	MILD STEEL
7	TOOL HOLDER	1	MILD STEEL
8	M16 BOLT	1	MILD STEEL

BVJ
PROJECTS CC

13 BALLACK STREET
NEW GERMANY
www.bvjpro.co.za
031BMUNICH

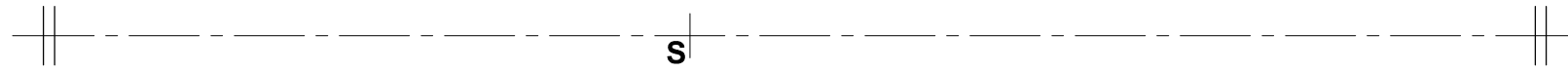
TOOL HOLDER

ALL DIMENSIONS ARE IN MILLIMETRES.



5

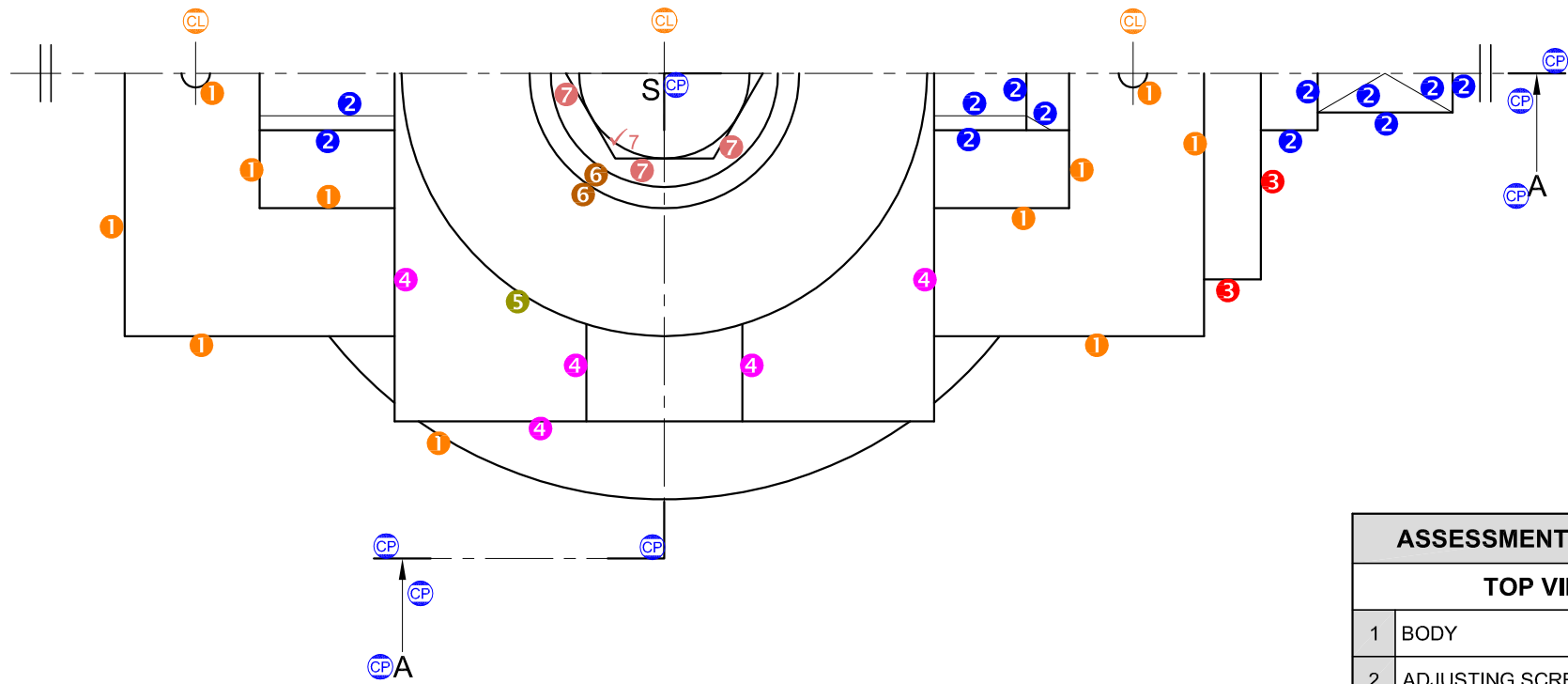




FOR OFFICIAL USE ONLY		
INCORRECT SCALE		
INCORRECT HATCHING		
PARTS NOT ASSEMBLED		
TOTAL		

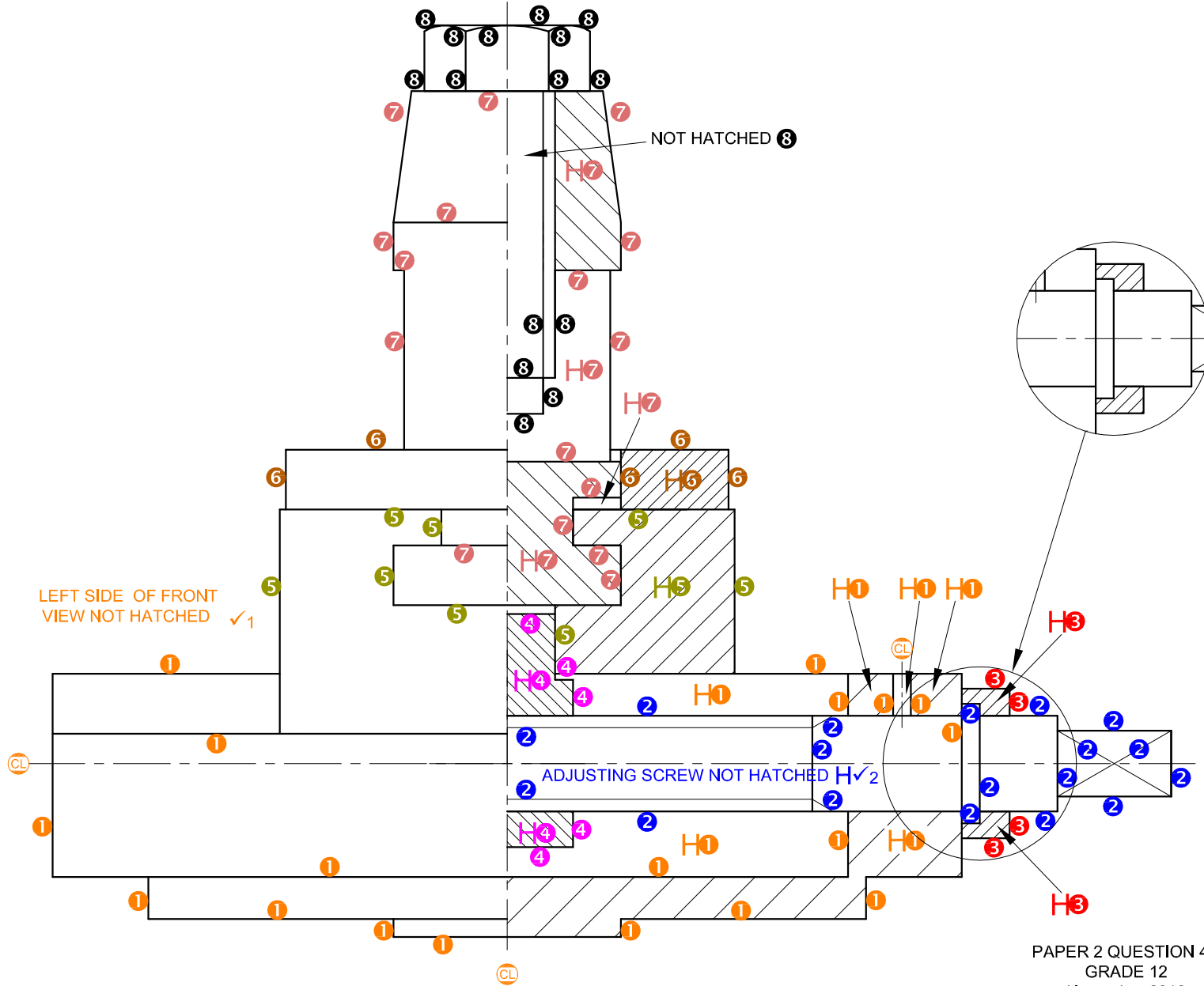
ASSESSMENT CRITERIA					
TOP VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	BODY	5 1/2			
2	ADJUSTING SCREW	6			
3	PLATE	1			
4	SLIDE BLOCK	2 1/2			
5	SPACER	1/2			
6	TOOL HOLDER	1			
7	M16 BOLT	2 1/2			
SUBTOTAL		19			
SECTIONAL FRONT VIEW					
1	BODY	13			
2	ADJUSTING SCREW	10			
3	PLATE	3			
4	SLIDE GUIDE	3 1/2			
5	SLIDE BLOCK	4 1/2			
6	SPACER	3			
7	TOOL HOLDER	10			
8	M16 BOLT	8			
SUBTOTAL		55			
GENERAL					
1	CENTRE LINES	3			
2	CUTTING PLANE	4			
3	ASSEMBLY	7			
SUBTOTAL		14			
TOTAL		88			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
6					





ASSESSMENT CRITERIA		
TOP VIEW		
1	BODY	5 $\frac{1}{2}$
2	ADJUSTING SCREW	6
3	PLATE	1
4	SLIDE BLOCK	2 $\frac{1}{2}$
5	SPACER	$\frac{1}{2}$
6	TOOL HOLDER	1
7	M16 BOLT	2 $\frac{1}{2}$
SUBTOTAL		19

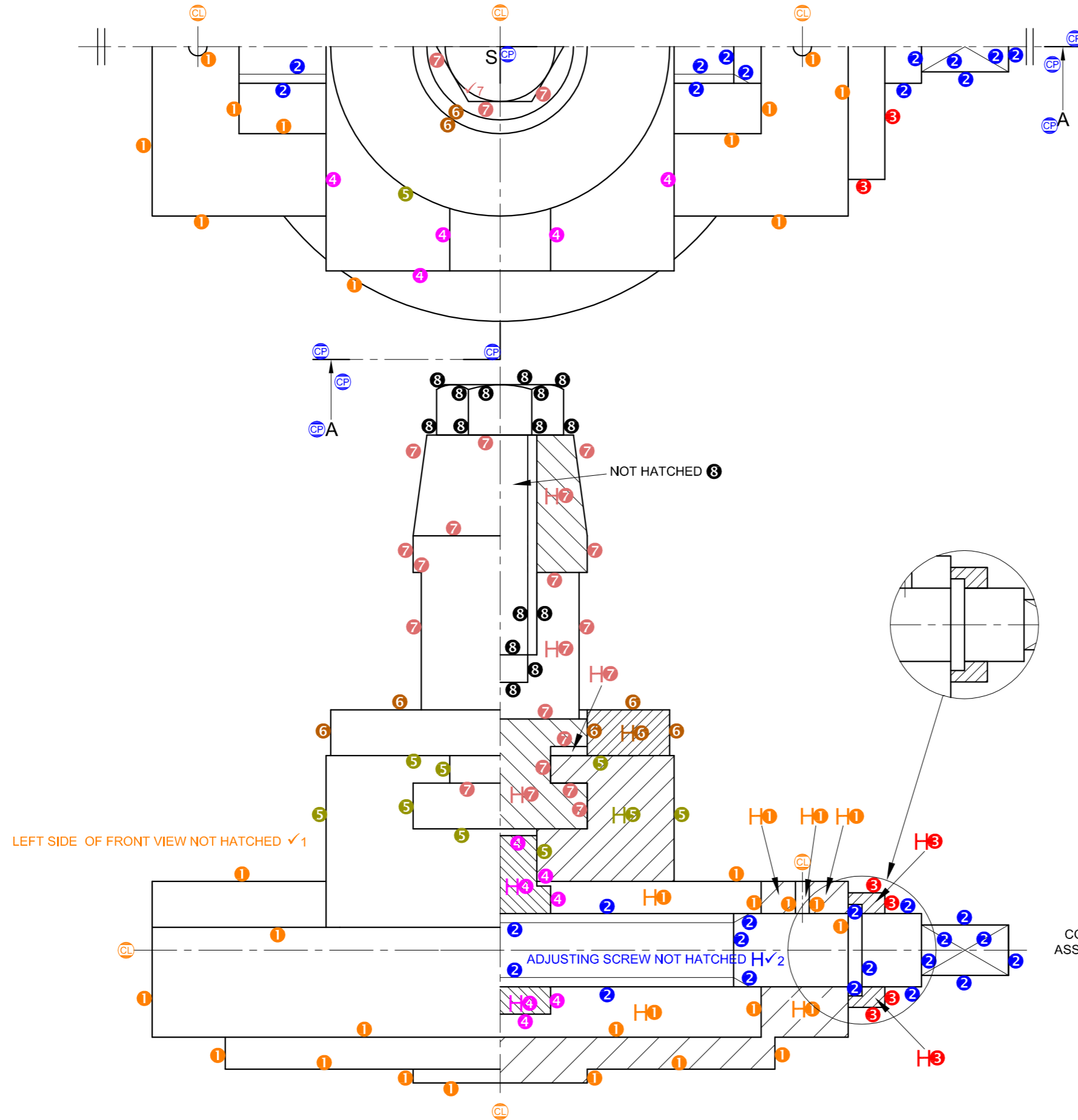
PAPER 2 QUESTION 4.2
 GRADE 12
 November 2016
 MEMORANDUM



1 MARK FOR EVERY COMPONENT CORRECTLY ASSEMBLED (8 PARTS - 1) = 7

ASSESSMENT CRITERIA		
SECTIONAL FRONT VIEW		
1	BODY	13
2	ADJUSTING SCREW	10
3	PLATE	3
4	SLIDE GUIDE	3 1/2
5	SLIDE BLOCK	4 1/2
6	SPACER	3
7	TOOL HOLDER	10
8	M16 BOLT	8
SUBTOTAL		55

PAPER 2 QUESTION 4.1
GRADE 12
November 2016
MEMORANDUM



1 MARK FOR EVERY COMPONENT CORRECTLY ASSEMBLED (8 PARTS - 1) = 7

PAPER 2 QUESTION 4
GRADE 12
November 2016
MEMORANDUM

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INCORRECT SCALE		
INCORRECT HATCHING		
PARTS NOT ASSEMBLED		
TOTAL		

ASSESSMENT CRITERIA

TOP VIEW

		POSSIBLE	OBTAINED	SIGN	MODERATED
1	BODY	5 1/2			
2	ADJUSTING SCREW	6			
3	PLATE	1			
4	SLIDE BLOCK	2 1/2			
5	SPACER	1/2			
6	TOOL HOLDER	1			
7	M16 BOLT	2 1/2			
SUBTOTAL		19			

SECTIONAL FRONT VIEW

1	BODY	13			
2	ADJUSTING SCREW	10			
3	PLATE	3			
4	SLIDE GUIDE	3 1/2			
5	SLIDE BLOCK	4 1/2			
6	SPACER	3			
7	TOOL HOLDER	10			
8	M16 BOLT	8			
SUBTOTAL		55			

GENERAL

1	CENTRE LINES	3			
2	CUTTING PLANE	4			
3	ASSEMBLY	7			
SUBTOTAL		14			
TOTAL		88			

PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					

QUESTION 4: MECHANICAL ASSEMBLY

Given:

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

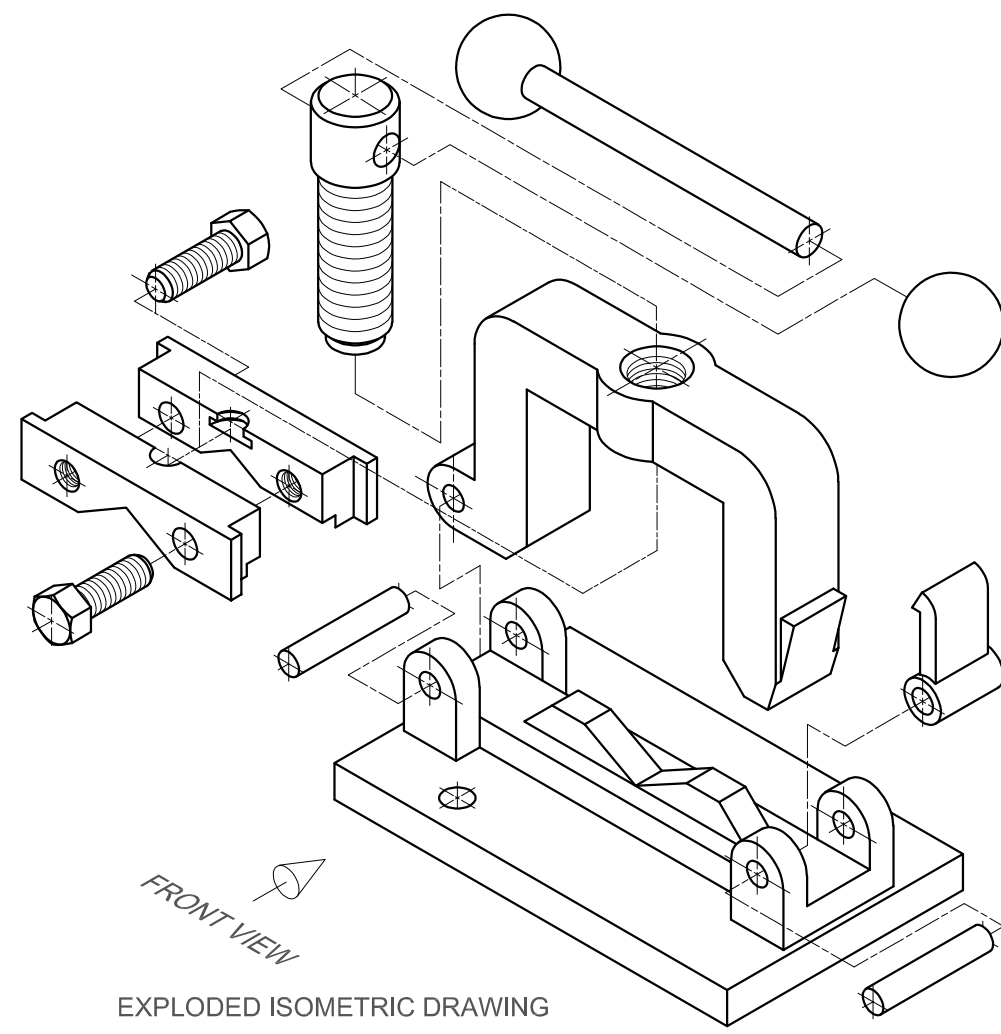
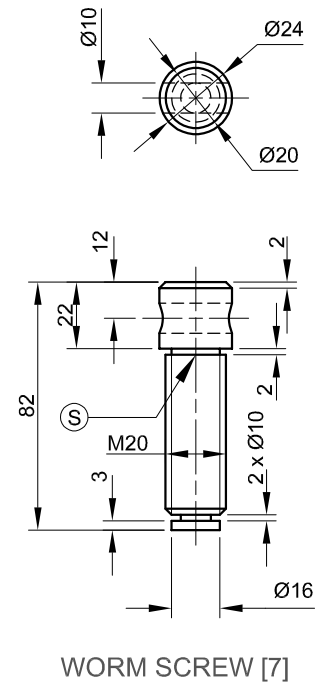
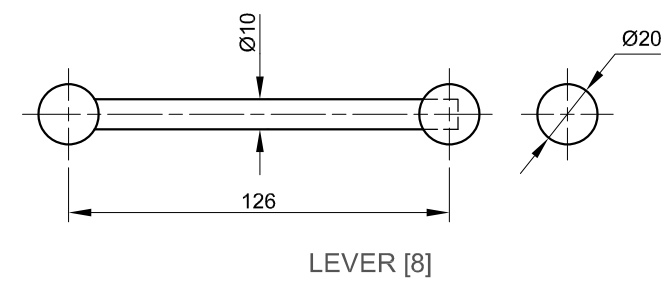
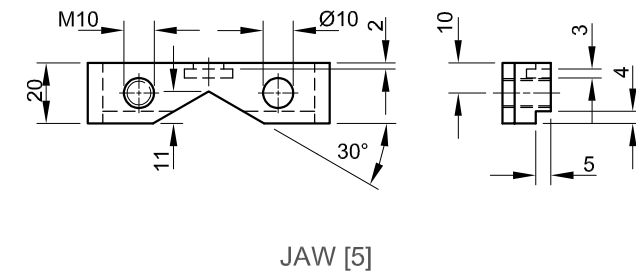
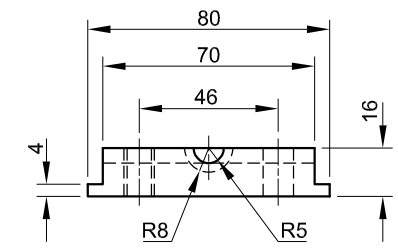
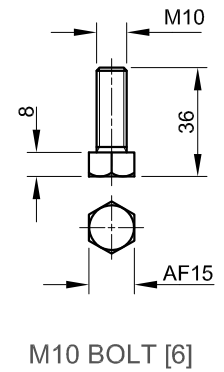
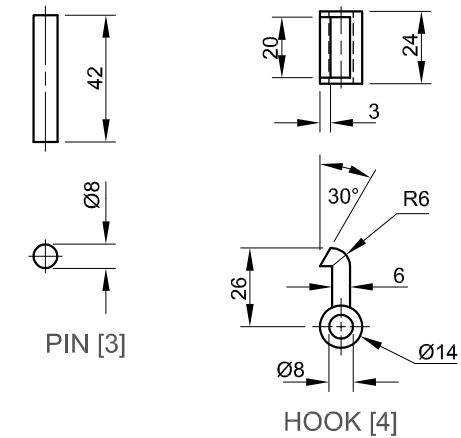
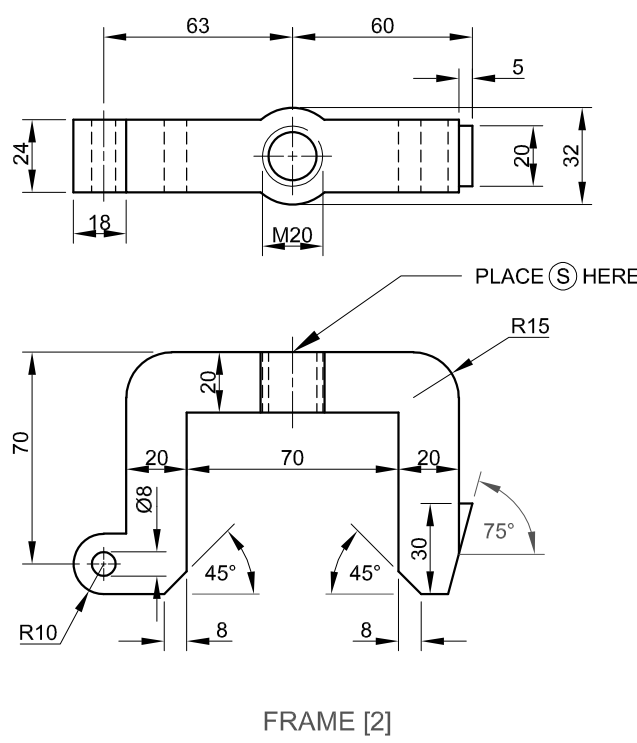
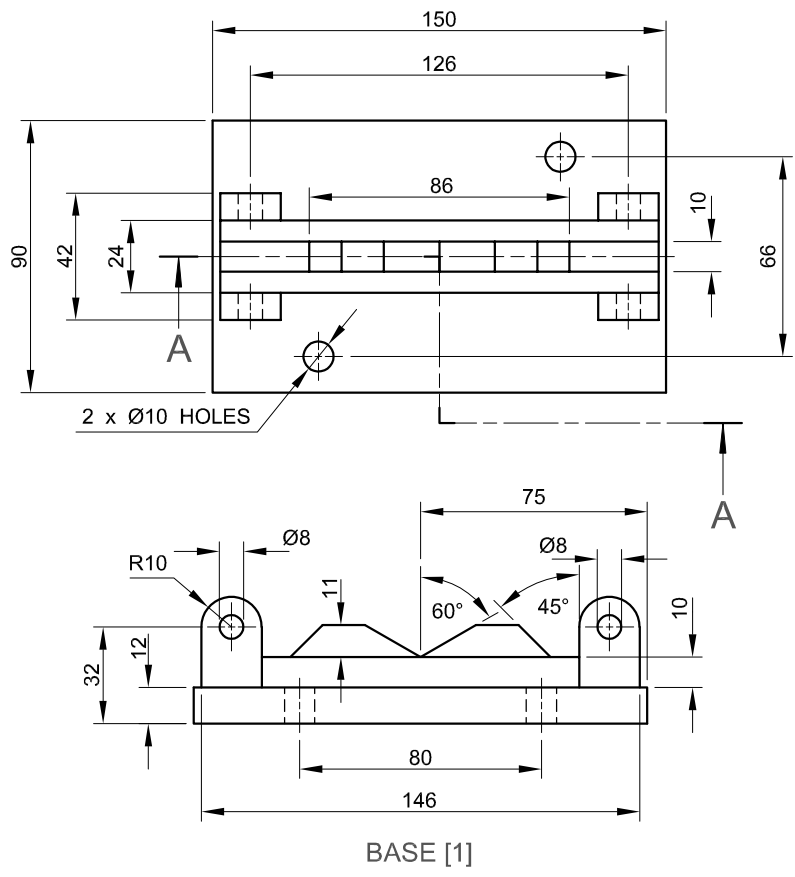
NOTE:

- Planning is essential.
- ALL drawings must comply with the guidelines as contained in the *SANS 10111*.
- The convention of symmetry may not be applied.
- The worm screw (part 7) must be completely screwed into the frame (part 2) so that point S will be at the indicated position.
- The lever (part 8) must be placed in the centre of the worm screw (part 7).
- In the top view, draw only the right-side M10 bolt. Show TWO faces of the bolt.
- Add cutting plane A-A.
- NO hidden detail is required.

[96]

PARTS LIST			
PART	QUANTITY	MATERIAL	
1	BASE	1	CAST IRON
2	FRAME	1	MILD STEEL
3	PIN	2	MILD STEEL
4	HOOK	1	MILD STEEL
5	JAW	2	TOOL STEEL
6	M10 BOLT	2	TOOL STEEL
7	WORM SCREW	1	HARDENED STEEL
8	LEVER	1	HARDENED STEEL

WR PROJECTS 8 VON WHEILIG STREET ALIES PARK 1791 www.sn_king.co.za ☎ 069 313 1574	
TITLE	PIPE CLAMP



ALL DIMENSIONS ARE IN MILLIMETRES	DRAWN: WILLEM DATE: 10/11/2016
FILLETS ARE R3 AND ROUNDINGS ARE R5	DRAWING PROGRAM: CAD 2016

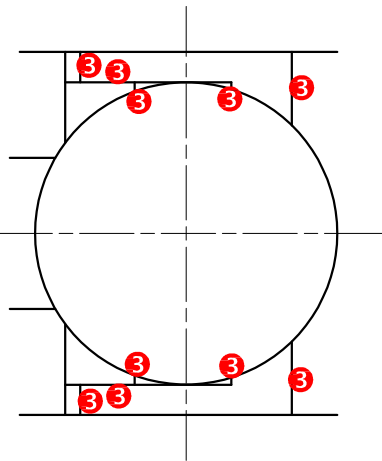
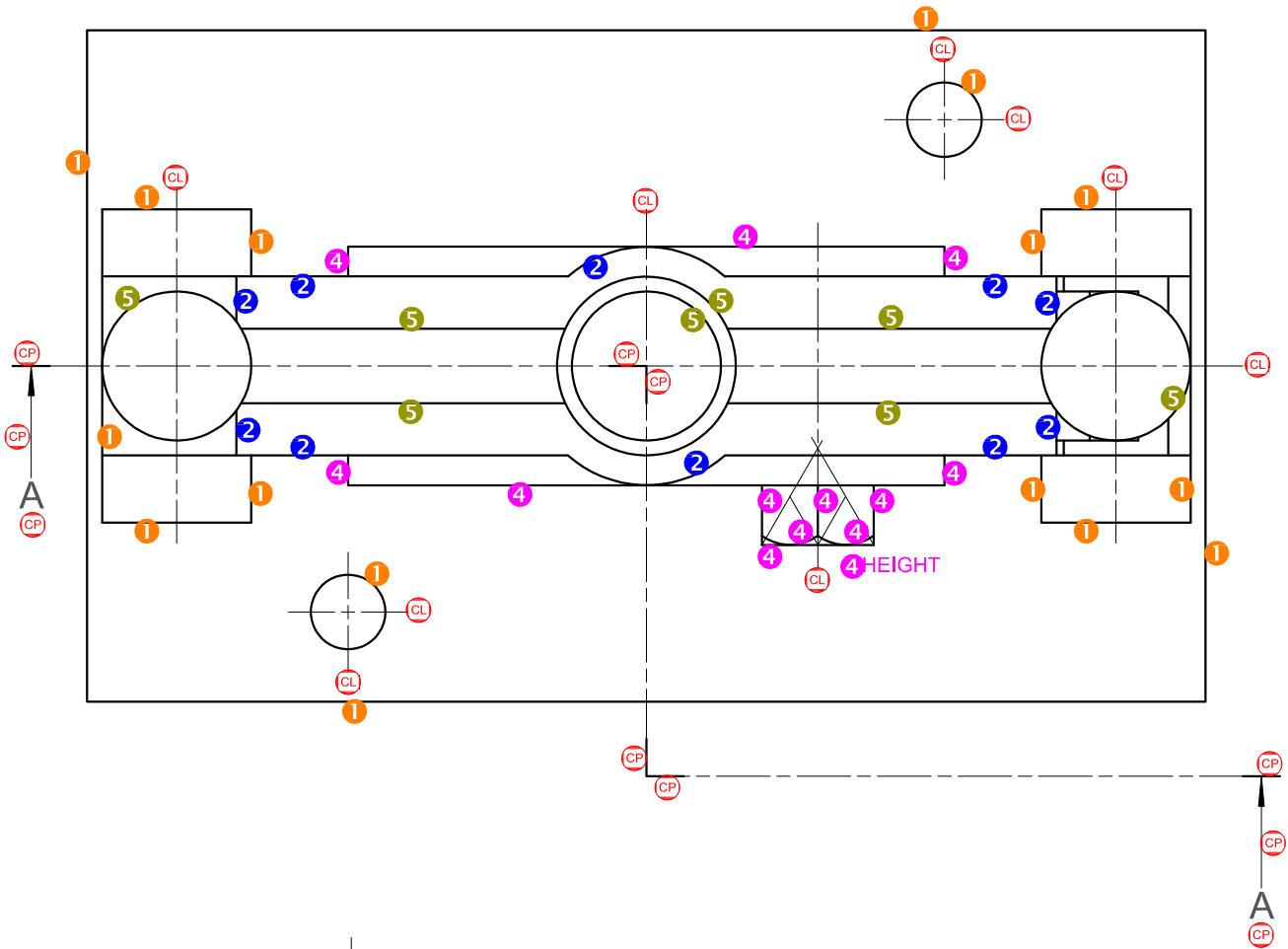




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INCORRECT ORTHOGRAPHIC PROJECTION	
INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL PENALTIES (-)	

ASSESSMENT CRITERIA					
TOP VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	BASE	8			
2	FRAME	5			
3	HOOK	5			
4	JAW + M10 BOLT	6½			
5	WORM SCREW + LEVER	4			
SUBTOTAL		28½			
SECTIONAL FRONT VIEW					
1	BASE	9½			
2	FRAME	8			
3	PINS + HOOK	3½			
4	JAW + M10 BOLT	9½			
5	WORM SCREW	9½			
6	LEVER	3			
SUBTOTAL		43			
GENERAL					
1	CENTRE LINES	10½			
2	ASSEMBLY	9			
3	CUTTING PLANE	5			
SUBTOTAL		24½			
TOTAL		96			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
6					

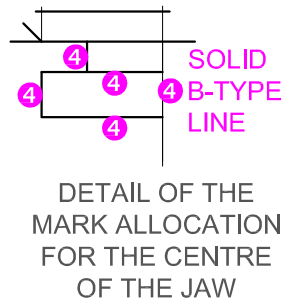
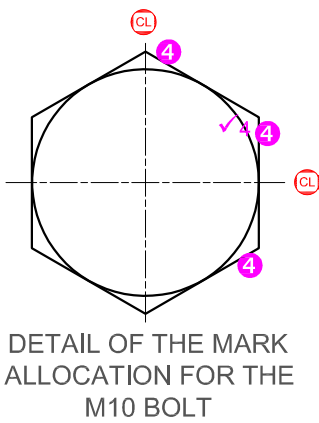
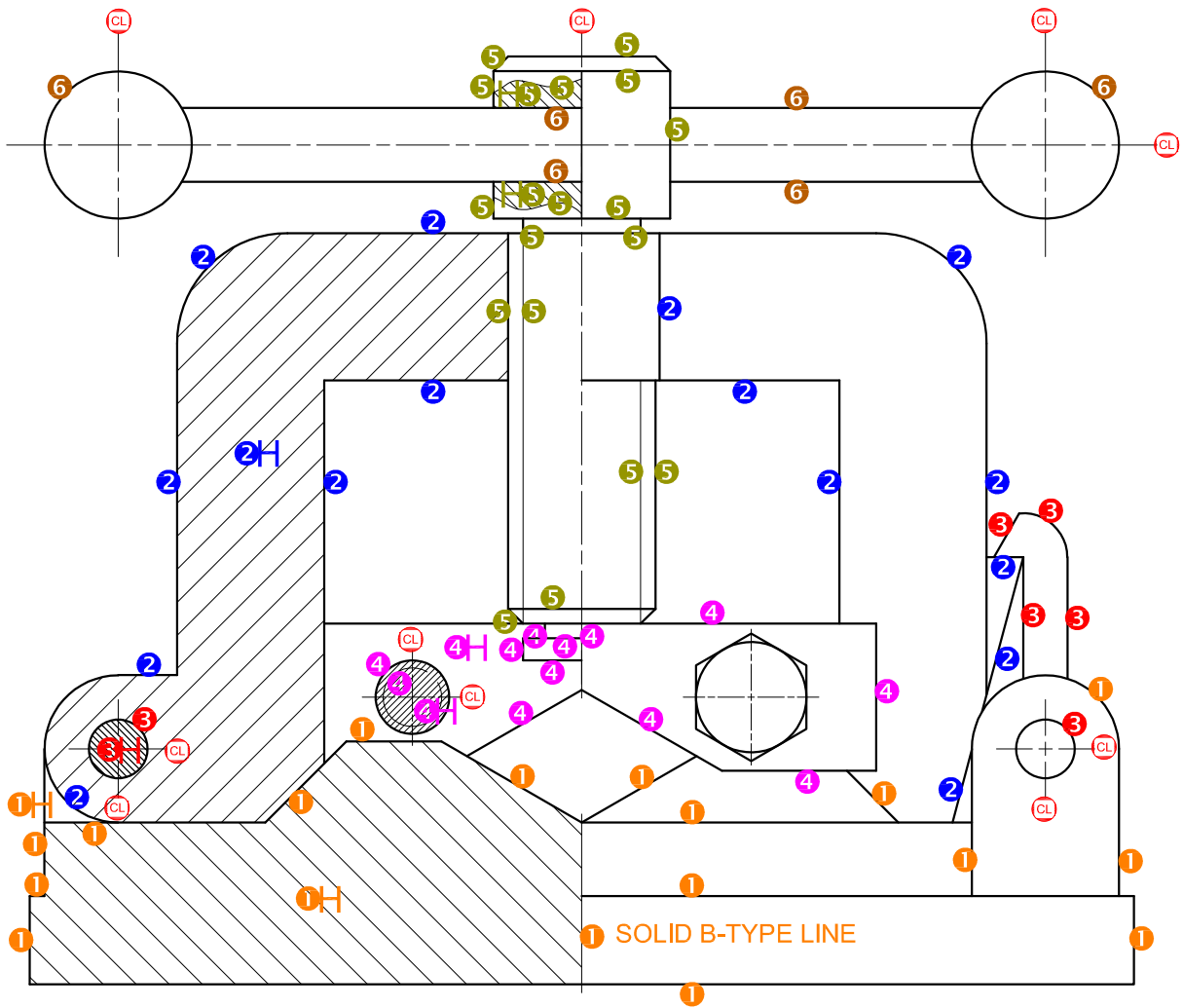




DETAIL OF THE MARK ALLOCATION FOR THE HOOK

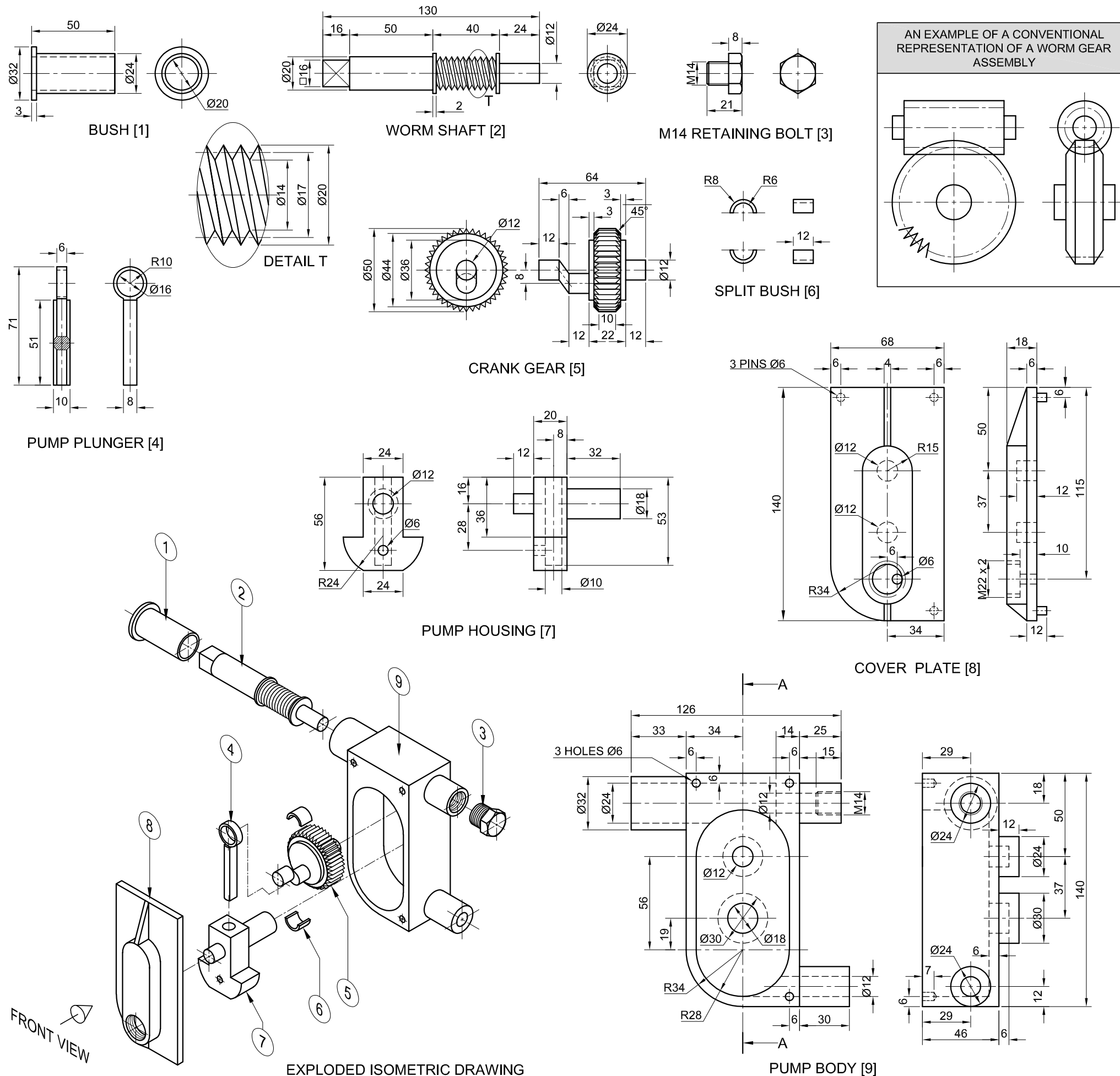
ASSESSMENT CRITERIA		
TOP VIEW		
1	BASE	8
2	FRAME	5
3	HOOK	5
4	JAW + M10 BOLT	6½
5	WORM SCREW + LEVER	4
SUBTOTAL		28½

PAPER 2 QUESTION 4 TV
 GRADE 12
 November 2017
 MARKING GUIDELINES



ASSESSMENT CRITERIA		
SECTIONAL FRONT VIEW		
1	BASE	9½
2	FRAME	8
3	PINS + HOOK	3½
4	JAW + M10 BOLT	9½
5	WORM SCREW	9½
6	LEVER	3
SUBTOTAL		43

PAPER 2 QUESTION 4 SFV
 GRADE 12
 November 2017
 MARKING GUIDELINES



QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of an oil pump assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the oil pump assembly
- An example of a conventional representation of a worm gear 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 oil pump assembly:
 - 4.1 **The front view** as seen from the direction of the arrow shown on the exploded isometric drawing.
 - 4.2 **A sectional right view** on cutting plane A-A. The cutting plane, which passes vertically through the oil pump assembly, is shown on the front view of the pump body (part 9).

NOTE:

- Planning is essential.
- The drawing must comply with the guidelines as contained in the SANS 10111.
- Show THREE faces of the M14 retaining bolt (part 3) in the front view.
- Draw a conventional representation of the worm gear assembly in the sectional right view.
- Add cutting plane A-A.
- NO hidden detail is required.

[96]

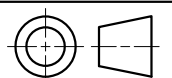
PARTS LIST			
	PARTS	QUANTITY	MATERIAL
1	BUSH	1	BRONZE
2	WORM SHAFT	1	EN 8
3	M14 RETAINING BOLT	1	BRASS
4	PUMP PLUNGER	1	BRASS
5	CRANK GEAR	1	EN 19
6	SPLIT BUSH	2	BRONZE
7	PUMP HOUSING	1	BRASS
8	COVER PLATE	1	MILD STEEL
9	PUMP BODY	1	STAINLESS STEEL

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OIL PUMP

ALL DIMENSIONS ARE IN MILLIMETRES.



5





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INCORRECT ORTHOGRAPHIC PROJECTION	
INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL PENALTIES (-)	

ASSESSMENT CRITERIA					
FRONT VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	COVER PLATE	8			
2	PUMP BODY + BUSH	5			
3	WORM SHAFT	2 ½			
4	M14 RETAINING BOLT	4 ½			
SUBTOTAL		20			
SECTIONAL RIGHT VIEW					
1	COVER PLATE	11 ½			
2	PUMP BODY	11 ½			
3	CRANK GEAR + SHAFT	17			
4	PUMP PLUNGER	7			
5	SPLIT BUSH	3			
6	PUMP HOUSING	10			
SUBTOTAL		60			
GENERAL					
1	CENTRE LINES	4			
2	SECTION A-A	3			
3	ASSEMBLY	9			
SUBTOTAL		16			
TOTAL		96			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER				6	



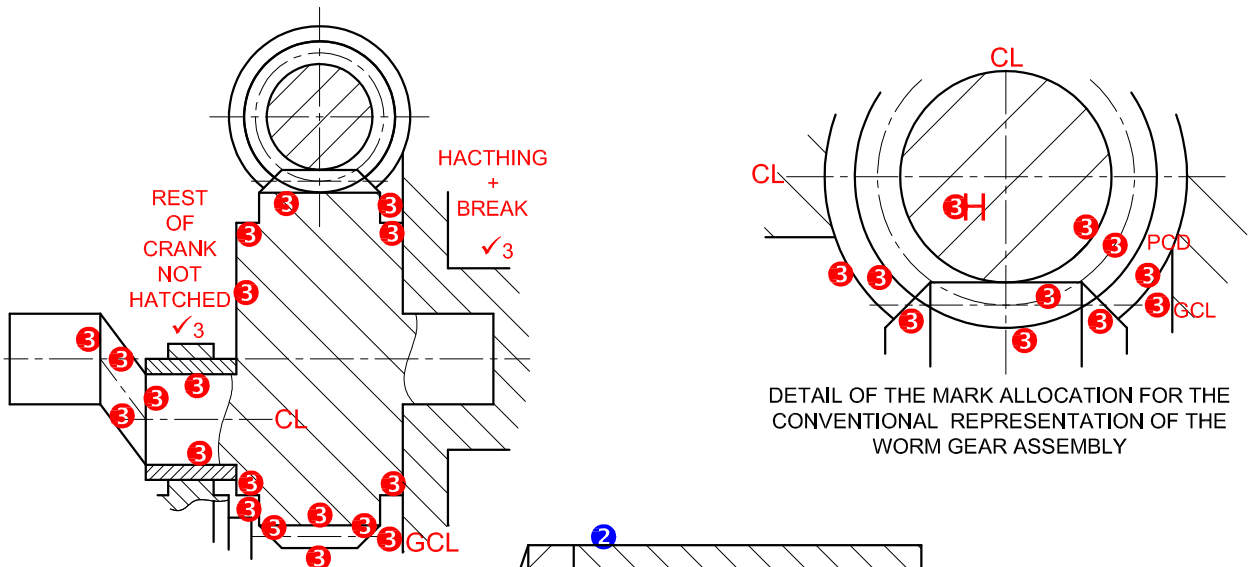
DETAIL OF THE MARK ALLOCATION FOR THE BOLT

4 HEIGHT

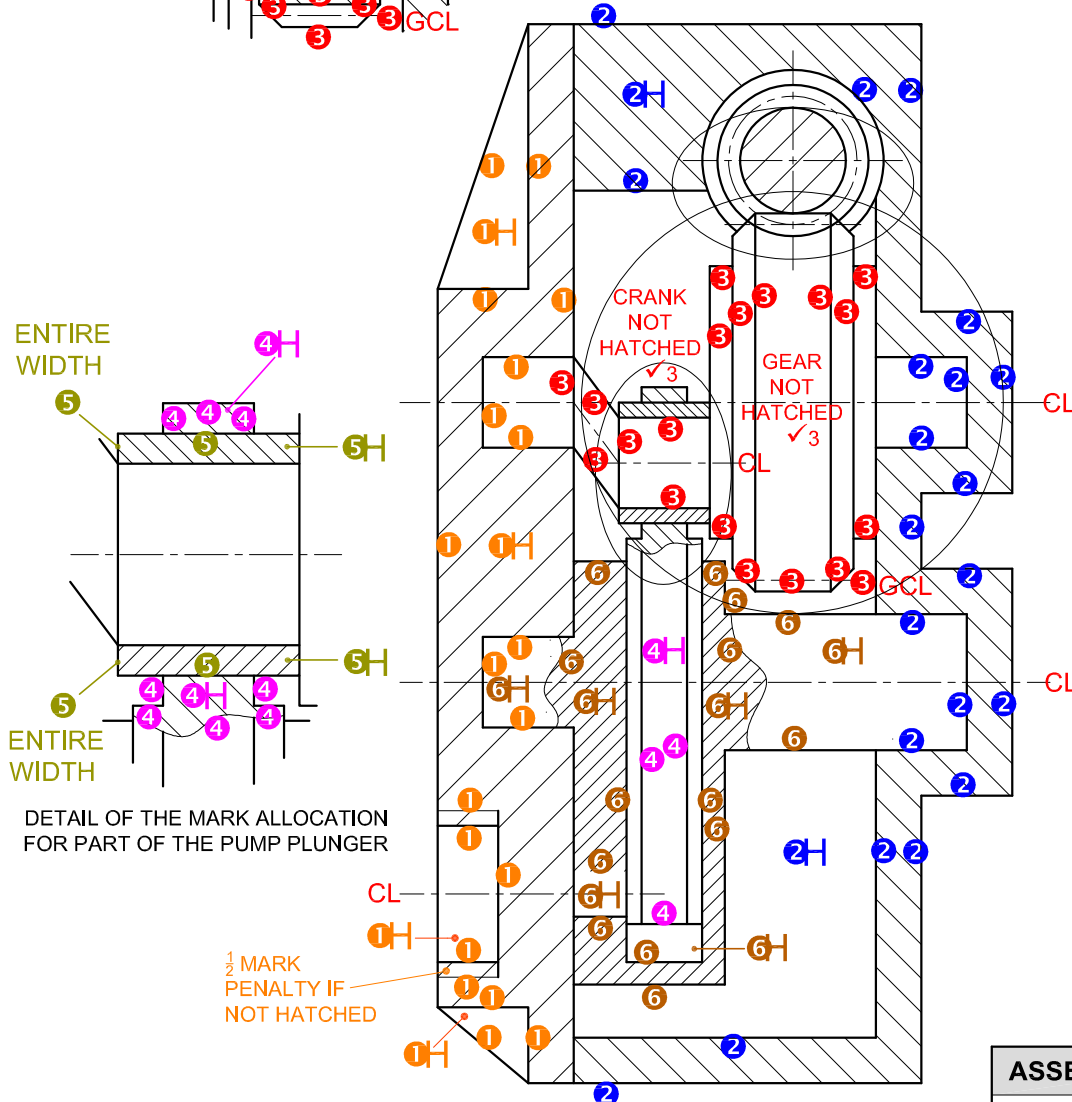
PAPER 2 QUESTION 4
GRADE 12
NOVEMBER 2018
MARKING GUIDELINE

ASSESSMENT CRITERIA		
FRONT VIEW		
1	COVER PLATE	8
2	PUMP BODY + BUSH	5
3	WORM SHAFT	2 ½
4	M14 RETAINING BOLT	4 ½
SUBTOTAL		20

Handwritten signatures and initials: AB, [unclear], Lily



DETAIL OF THE MARK ALLOCATION FOR THE CONVENTIONAL REPRESENTATION OF THE WORM GEAR ASSEMBLY



ENTIRE WIDTH

ENTIRE WIDTH

DETAIL OF THE MARK ALLOCATION FOR PART OF THE PUMP PLUNGER

1/2 MARK PENALTY IF NOT HATCHED

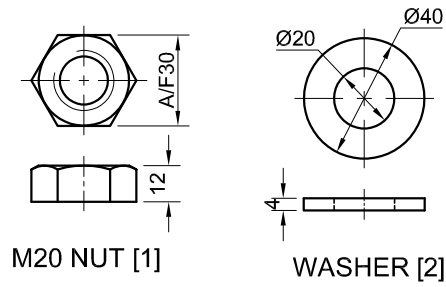
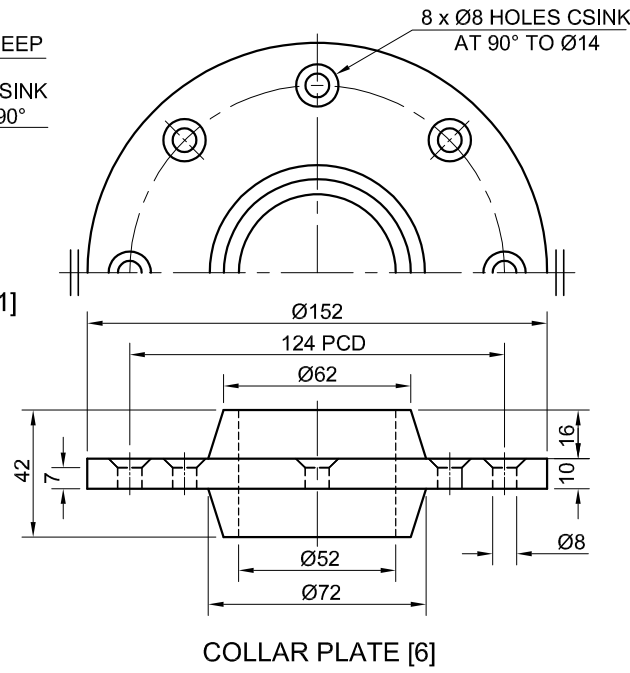
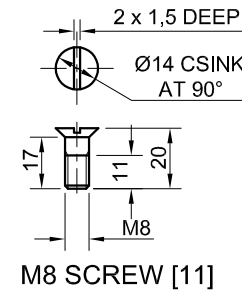
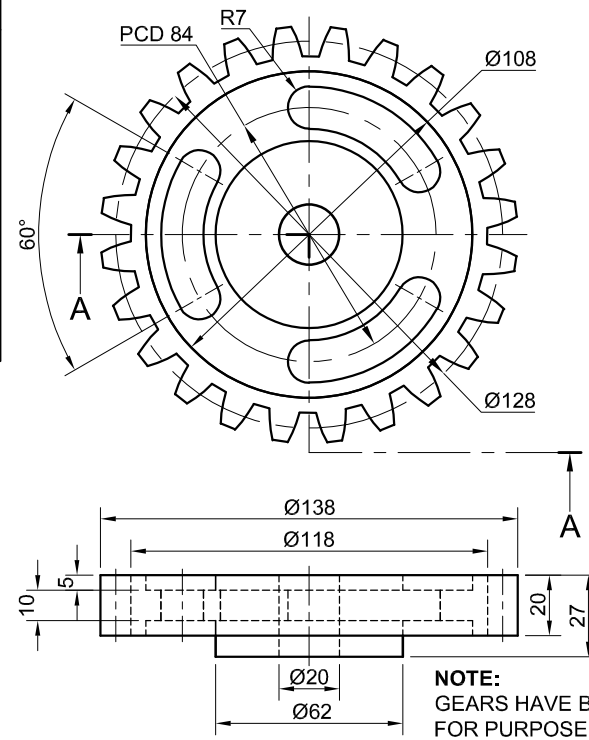
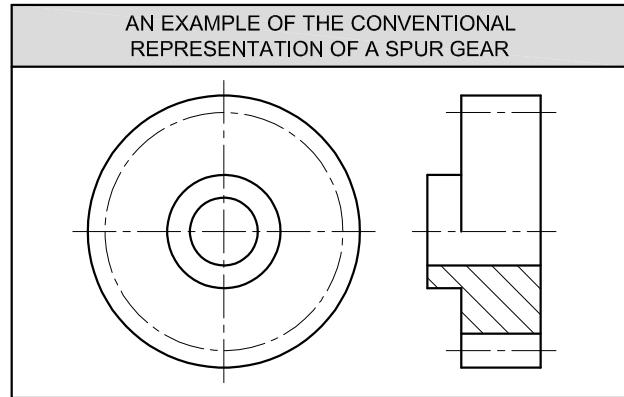
3. ASSEMBLY
1 MARK FOR EVERY COMPONENT CORRECTLY ASSEMBLED (10 PARTS -1) = 9

1. CENTRE LINE MARK ALLOCATION
SANS COMPLIANT (LINE TYPE) 2
14 CENTRE LINES 2
TOTAL 4

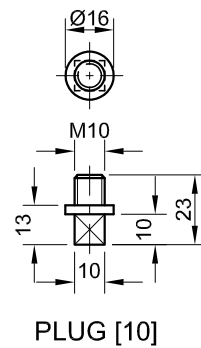
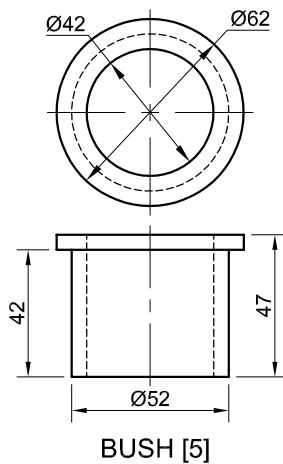
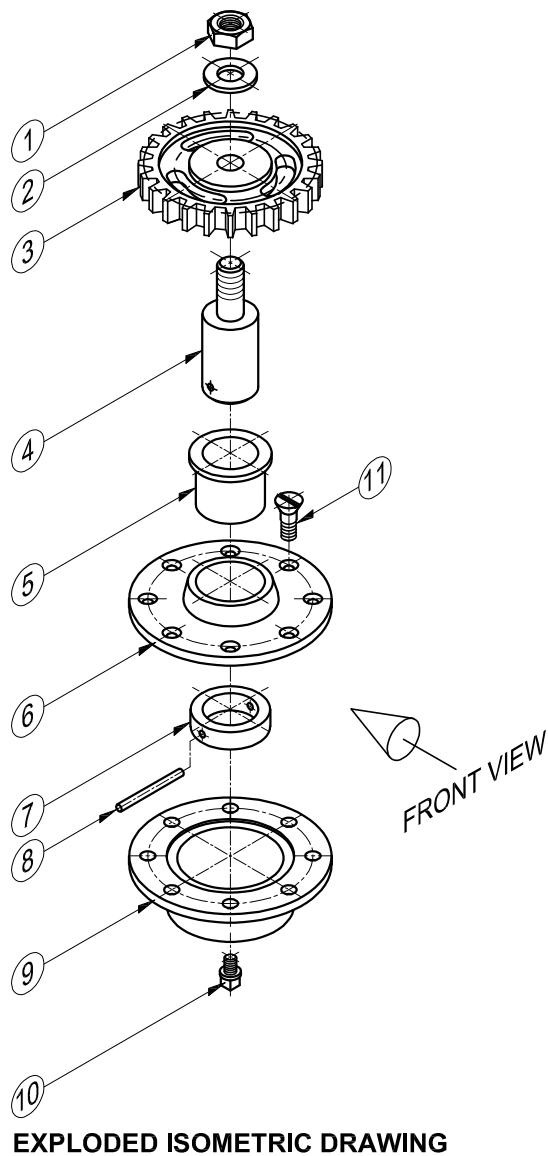
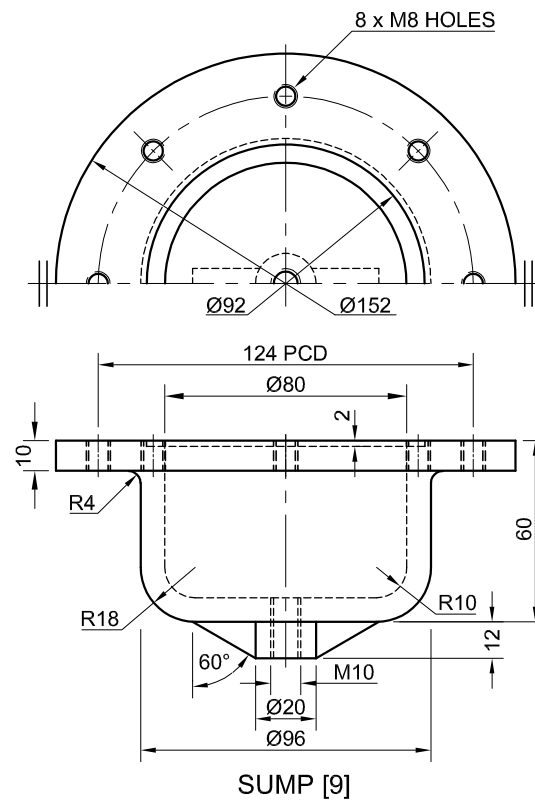
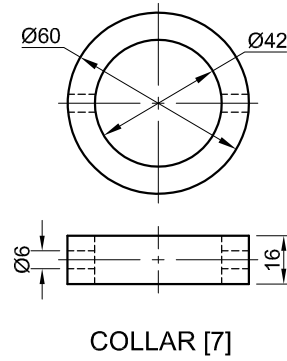
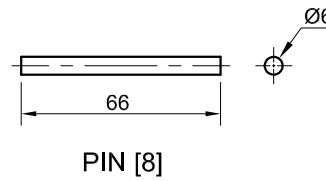
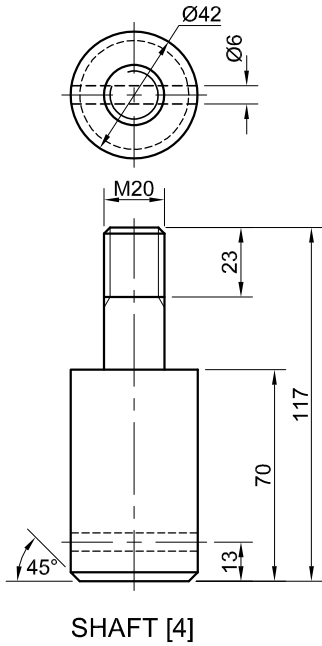
ASSESSMENT CRITERIA		
SECTIONAL RIGHT VIEW		
1	COVER PLATE	11 1/2
2	PUMP BODY	11 1/2
3	CRANK GEAR + SHAFT	17
4	PUMP PLUNGER	7
5	SPLIT BUSH	3
6	PUMP HOUSING	10
SUBTOTAL		60

PAPER 2 QUESTION 4
GRADE 12
NOVEMBER 2018
MARKING GUIDELINE

Handwritten signatures and initials.



SPUR GEAR [3]



QUESTION 4: ASSEMBLY DRAWING

Given:

- The exploded isometric drawing of the parts of a gear and sump assembly, showing the position of each part relative to all the others.
- Orthographic views of each of the parts of the gear and sump assembly
- An example of the conventional representation of a spur gear

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 gear and sump assembly:

4.1 The half-sectional front view on cutting plane A-A. Show the left half in section, as seen from the direction of the arrow on the exploded isometric drawing. The cutting plane is shown on the top view of the spur gear (part 3).

4.2 The top view. Show only the top half of the view by applying the convention for the presentation of a symmetrical object.

NOTE:

- Planning is essential.
- ALL drawings must comply with the guidelines as contained in the SANS 10111.
- Show THREE faces of the M20 nut (part 1).
- Draw the conventional representation of the spur gear (part 3) in both views.
- NO hidden detail is required. [93]

PARTS LIST			
PART	QUANTITY	MATERIAL	
1	M20 NUT	1	MILD STEEL
2	WASHER	1	MILD STEEL
3	SPUR GEAR	1	CAST IRON
4	SHAFT	1	CAST IRON
5	BUSH	1	MILD STEEL
6	COLLAR PLATE	1	MILD STEEL
7	COLLAR	1	MILD STEEL
8	PIN	1	MILD STEEL
9	SUMP	1	CAST IRON
10	PLUG	1	CAST IRON
11	M8 SCREW	8	MILD STEEL

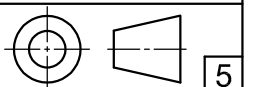
CASTFORM
ENGINEERING (PTY) LTD

98 BROAD STREET
MIDDELFontein
4070
www.foundry.co.za

GEAR AND SUMP ASSEMBLY

ALL DIMENSIONS ARE IN MILLIMETRES

ALL UNSPECIFIED RADII ARE 3 mm

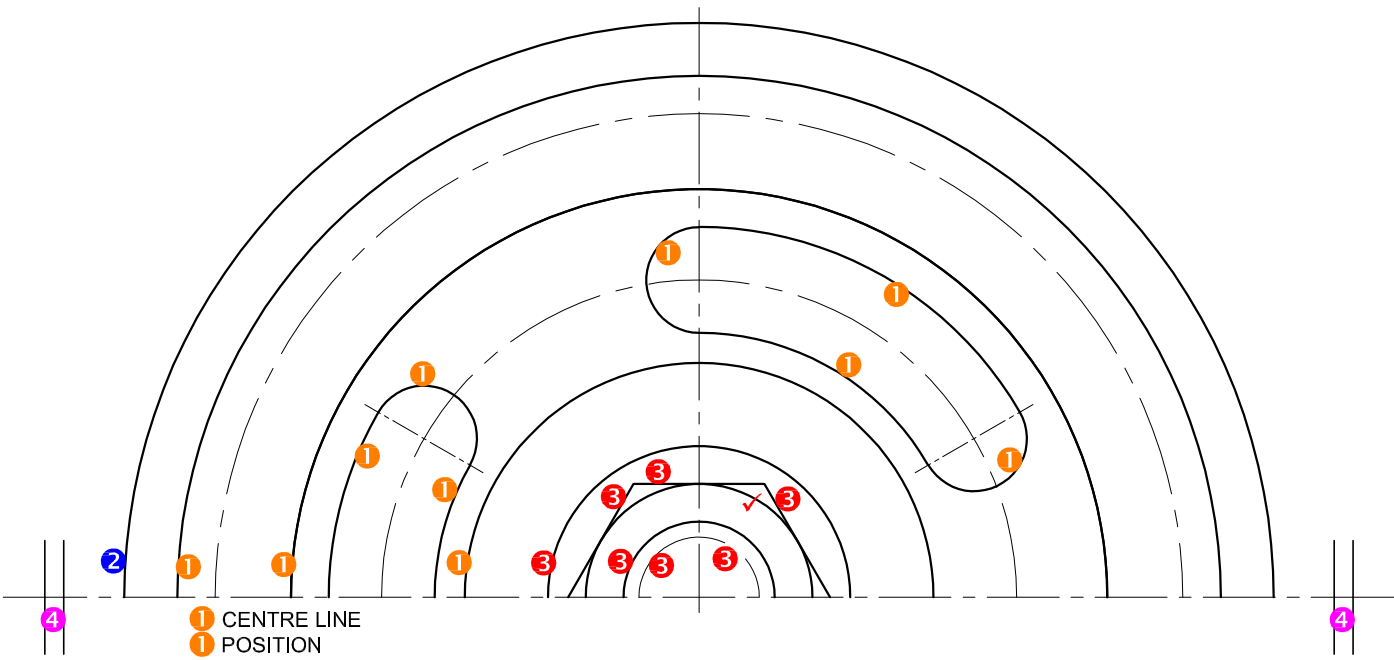




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INCORRECT OVERALL SCALE	
INCORRECT HATCHING	
PARTS NOT ASSEMBLED	
TOTAL PENALTIES (-)	

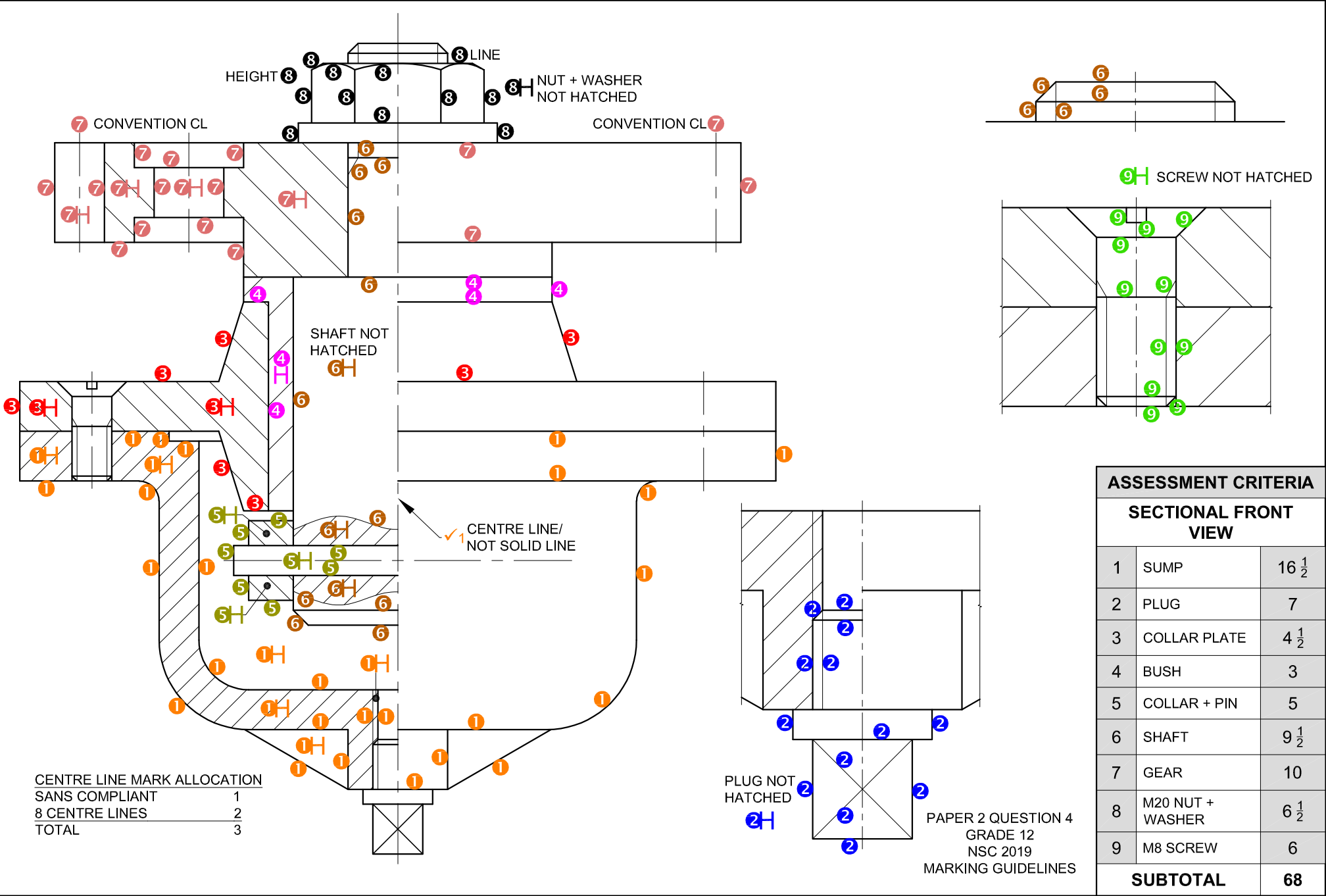
ASSESSMENT CRITERIA					
TOP VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	GEAR	6			
2	COLLAR PLATE	$\frac{1}{2}$			
3	M20 NUT + WASHER	$4\frac{1}{2}$			
4	SYMMETRY	1			
SUBTOTAL		12			
SECTIONAL FRONT VIEW					
1	SUMP	$16\frac{1}{2}$			
2	PLUG	7			
3	COLLAR PLATE	$4\frac{1}{2}$			
4	BUSH	3			
5	COLLAR + PIN	5			
6	SHAFT	$9\frac{1}{2}$			
7	GEAR	10			
8	M20 NUT + WASHER	$6\frac{1}{2}$			
9	M8 SCREW	6			
SUBTOTAL		68			
GENERAL					
1	CENTRE LINES	3			
2	ASSEMBLY	10			
SUBTOTAL		13			
TOTAL		93			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
6					





PAPER 2 QUESTION 4
GRADE 12
NSC 2019
MARKING GUIDELINES

ASSESSMENT CRITERIA		
TOP VIEW		
1	GEAR	6
2	COLLAR PLATE	$\frac{1}{2}$
3	M20 NUT + WASHER	$4\frac{1}{2}$
4	SYMMETRY	1
SUBTOTAL		12



CENTRE LINE MARK ALLOCATION

SANS COMPLIANT	1
8 CENTRE LINES	2
TOTAL	3

ASSESSMENT CRITERIA		
SECTIONAL FRONT VIEW		
1	SUMP	16 $\frac{1}{2}$
2	PLUG	7
3	COLLAR PLATE	4 $\frac{1}{2}$
4	BUSH	3
5	COLLAR + PIN	5
6	SHAFT	9 $\frac{1}{2}$
7	GEAR	10
8	M20 NUT + WASHER	6 $\frac{1}{2}$
9	M8 SCREW	6
SUBTOTAL		68