STAPLE

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

NATIONAL SENIOR CERTIFICATE

GRADE 11

IGRDSE2

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2019

EXAMINATION

MARKS: 200

TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

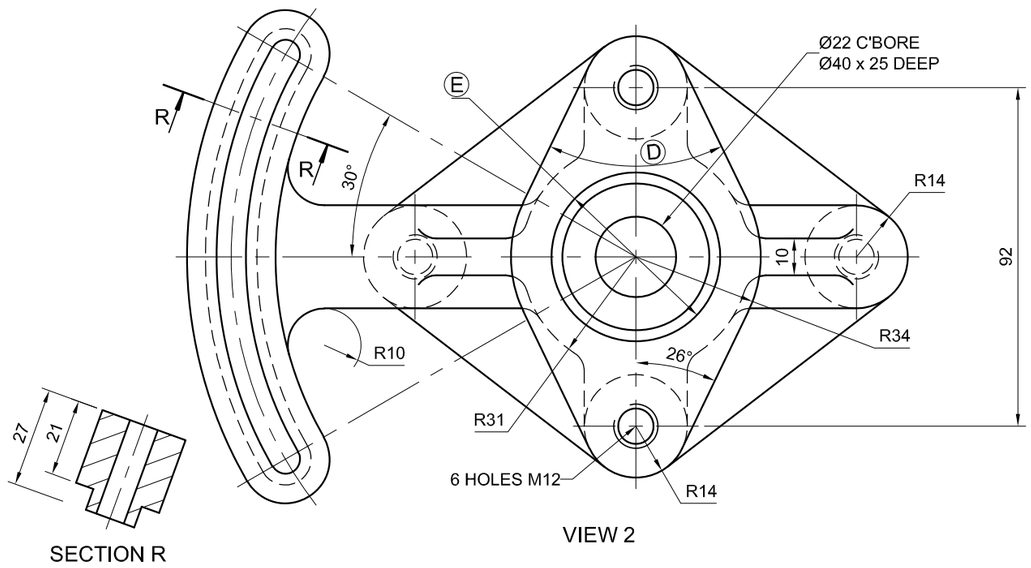
1. The question paper consists of FOUR questions.
2. Answer ALL the questions.
3. All drawings must be drawn to scale 1:1, unless otherwise stated.
4. All questions must be answered on the answer sheets provided.
5. All the answers sheets must be re-stapled in numerical sequence and handed in irrespective of whether the question was attempted or not.
6. Careful time management is essential in order to complete all the questions.
7. Print your name in the block provided on every answer sheet.
8. All answers must be drawn accurately and neatly.
9. Any details or dimensions not given must be estimated in good proportion.

FOR OFFICIAL USE ONLY								
					MODERATED MARK			
1								
2								
3								
4								
TOTAL								
	2	0	0					

FINAL CONVERTED MARK	CHECKED BY
100	

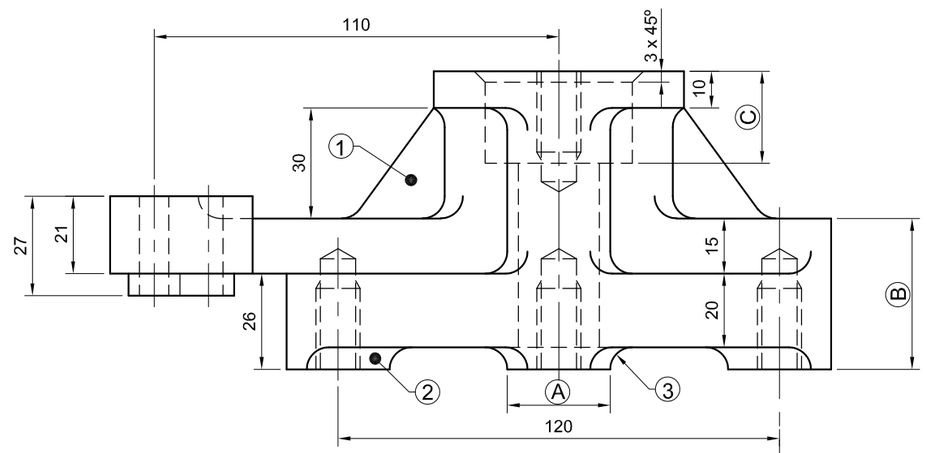
COMPLETE THE FOLLOWING:
SURNAME & INITIAL
SURNAME & INITIAL
SCHOOL
SCHOOL

STAPLE

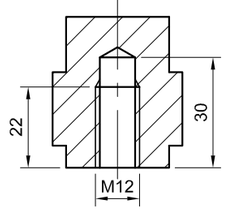


SECTION R

VIEW 2



VIEW 1



SECTION T

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
A detailed drawing of a seal bracket, 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. **[28]**

	QUESTIONS	ANSWERS			
1	On what date was the drawing approved?		1		
2	Who was the draughsman?		1		
3	What is the name of the engineering firm?		1		
4	Which indicated scale has been used?		1		
5	How many seal brackets must be produced?		1		
6	On what date was the size of the tapped holes revised?		1		
7	What is the file name?		1		
8	What is VIEW 1 called?		1		
9	What is the depth of the thread on a standard M12 nut?		2		
10	How many threaded holes are there on the seal bracket?		1		
11	What type of section is Section R and T?		2		
12	Name the feature at 1.		1		
13	Name the feature at 2.		1		
14	Name the feature at 3.		1		
15	Determine the total height of the seal bracket.		2		
16	Determine the complete dimensions: A- B- C- D-		4		
17	Determine the complete dimension at E.		2		
18	In the box below, draw, in neat freehand, the symbol for the projection system used.		4		
	TOTAL		**28**		

ANSWER 18

SYMBOL

SURNAME & INITIAL

SURNAME & INITIAL 2

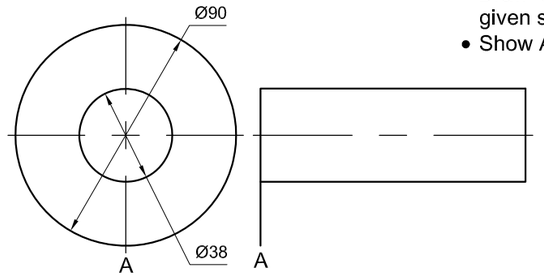
ALL UNDIMENSIONED RADII ARE R 6.			
ALL DIMENSIONS ARE IN MILLIMETRES.	SCALE: 1 : 5		
PROGRAMME: AUTOCAD 2019	MATERIAL: CAST IRON		
FILE NAME: bracket13.dwg	QUANTITY: 9 500 UNITS		
DRAWING No. JM-08	TREATMENT: NONE		
DESIGNED FOR KM FOUNDRIES	MILLING 0,15	2. ENLARGE TAPPED HOLES	2019/03/21
		1. INSERT SUPPORTS	2019/03/19
JIG MAKER ENGINEERING WORKS	10 PETER STREET EAST LONDON 5201 431 123 9876	**REVISIONS**	**DATE**
		DRAWN: DERICK	2019/03/05
		CHECKED: TINI	2019/04/16
TITLE SEAL BRACKET		APPROVED: THEO	2019/04/25

STAPLE

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

2.1 AUGER
Given:
The incomplete front view and incomplete left view of an auger.
Specifications:
- The outer diameter of the auger is Ø90 mm
- Pitch = 72 mm
- Direction: left-hand
- Starting point: left bottom as indicated by A

Instructions:
Using scale 1:1:
- Copy and complete the given left view.
- Draw ONE AND A HALF turns of the auger around the given shaft.
- Show ALL necessary construction. **[25]**



ASSESSMENT CRITERIA				
1	LEFT VIEW + CONSTRUCTION	12		
2	AUGER + SHAFT	13		
	SUBTOTAL	**25**		

2.2 CAMS

The specifications for the movement are as follows:
- The cam rotates at uniform velocity
- Over the first 60° the follower rises for 24 mm
- There is a dwell period for the next 30°
- Over the next 30° the follower rises a further 27 mm
- Over the next 60° the follower rises a further 34 mm
- There is a dwell period for the next 45°
- Over the next 60° the follower decends 50% of the displacement
- There is a dwell period for the next 15°
- Over the final 60° the follower returns to its original position

Instructions:
- Draw, to scale 1 : 1, a displacement graph with a rotational scale of 360° equal to 100 mm and a follower displacement scale of 1 : 1 for the given motion.
- Label the graph
- Show ALL necessary construction. **[14]**

ASSESSMENT CRITERIA				
1	CONSTRUCTION	3		
2	GRAPH + LABEL	11		
	SUBTOTAL 2.2	**14**		
	SUBTOTAL 2.1	**25**		
	TOTAL	**39**		
SURNAME & INITIAL				
SURNAME & INITIAL				3

STAPLE

QUESTION 3: ISOMETRIC DRAWING

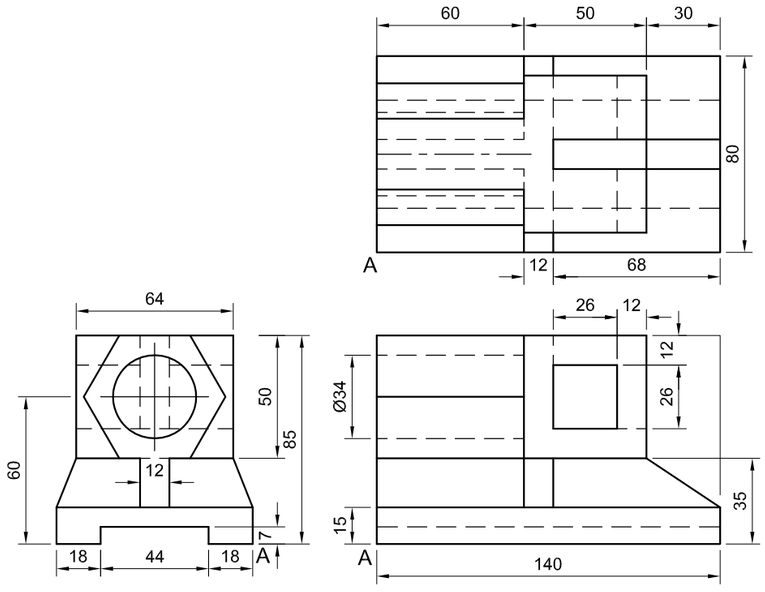
Given:

- The front view, top view and left view of a wall plate.
- The position of point A on the drawing sheet.

Instructions:

Convert the orthographic views of the wall plate into an isometric drawing.

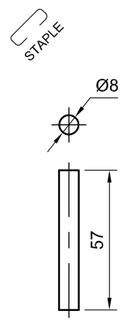
- Make corner A the lowest point of the drawing.
- Show ALL necessary circle and other constructions.
- NO hidden detail is required. **[38]**



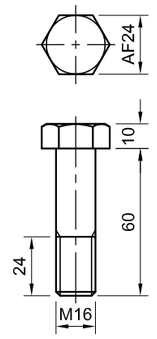
A

ASSESSMENT CRITERIA				
1	CONSTR' + PLACEMENT	3		
2	ISOMETRIC LINES	17		
3	RIB	$4\frac{1}{2}$		
4	HEXAGON	$6\frac{1}{2}$		
5	CIRCLE	7		
	TOTAL	**38**		

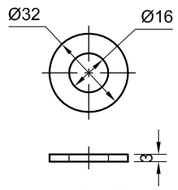
SURNAME & INITIAL	
SURNAME & INITIAL	4



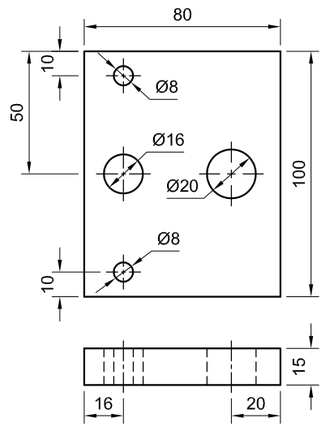
PIN



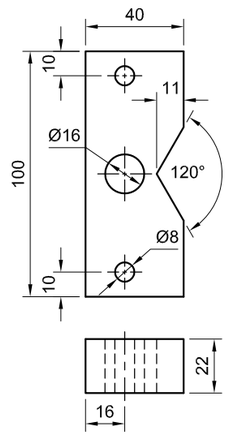
M16 BOLT



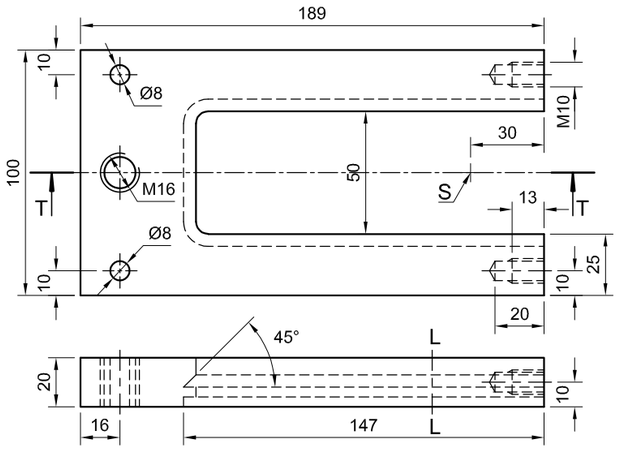
WASHER



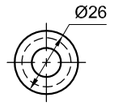
TOP PLATE

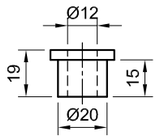


GUIDE BLOCK

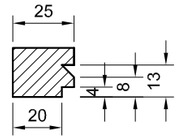


BASE

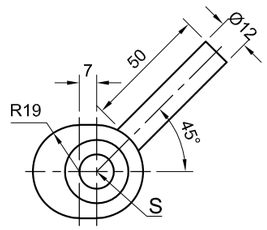


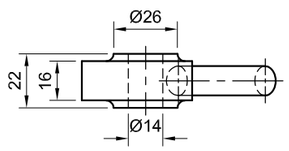


GUIDE BUSH

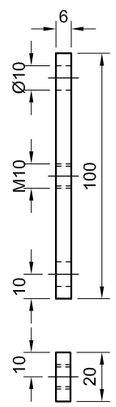


SECTION L-L

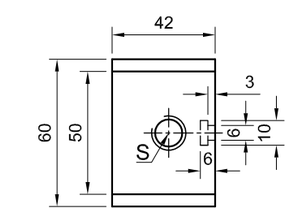


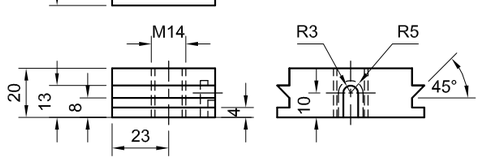


CAM LEVER



COVER PLATE





SLIDE BLOCK

EXPLODED ISOMETRIC DRAWING

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a drill jig assembly, showing the position of each part relative to all the others.
- Orthographic views of each of the parts of the drill jig assembly.
- Starting point S on page 6.

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 drill jig assembly:
  - **4.1 The sectional front view** of the drill jig assembly, on cutting plane T-T as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, that runs vertically through the centre of the assembly, is shown on the top view of the base (part 7).
  - **4.2 A top view** without any hidden detail.
- ALL drawings must comply with the guidelines contained in the *SANS 10111.*

NOTE:

- Use point S as reference to position the parts.
- Planning of the layout of the views is important.
- Show, in the sectional front view, THREE faces of the M16 bolt and ALL constructions.
- NO hidden detail is required.

Add the following features to the drawing:

- The cutting plane T-T. **[95]**

PARTS LIST

PARTS	QUANTITY	MATERIAL
1. PIN	2	MILD STEEL
2. M16 BOLT	1	MILD STEEL
3. WASHER	1	MILD STEEL
4. GUIDE BUSH	1	MILD STEEL
5. TOP PLATE	1	CAST IRON
6. GUIDE BLOCK	1	CAST IRON
7. BASE	1	CAST IRON
8. CAM LEVER	1	CAST IRON
9. SLIDE BLOCK	1	CAST IRON
10. COVER PLATE	1	MILD STEEL

TITLE

DRILL JIG

JIG MAKERS
ENGINEERING WORKS

10 PETER STREET
EAST LONDON
5201
☎ 431 123 9876

ALL DIMENSIONS ARE IN MILLIMETRES.

ALL UNSPECIFIED RADII ARE R3.

Please turn over

STAPLE

S

ASSESSMENT CRITERIA				
TOP VIEW				
1	PIN	4		
2	M16 BOLT + WASHER	$5\frac{1}{2}$		
3	GUIDE BUSH	$2\frac{1}{2}$		
4	TOP PLATE	1		
5	BASE	2		
6	CAM LEVER	$9\frac{1}{2}$		
7	SLIDE BLOCK	$2\frac{1}{2}$		
8	COVER PLATE	2		
9	CUTTING PLANE T-T	3		
	SUBTOTAL	**32**		
ASSESSMENT CRITERIA				
SECTIONAL FRONT VIEW				
1	M16 BOLT + WASHER	$13\frac{1}{2}$		
2	GUIDE BUSH	$4\frac{1}{2}$		
3	TOP PLATE	5		
4	GUIDE BLOCK	2		
5	BASE	$6\frac{1}{2}$		
6	CAM LEVER	$10\frac{1}{2}$		
7	SLIDE BLOCK	8		
8	COVER PLATE	5		
9	ASSEMBLY (9 parts)	8		
	SUBTOTAL	**63**		
	TOTAL	**95**		
SURNAME & INITIAL				
SURNAME & INITIAL				6