basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2012

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be completed using instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL the questions must be answered on the QUESTION PAPER as instructed.
7. ALL the pages must be re-stapled in numerical sequence, irrespective of whether the question was attempted.
8. Time management is essential in order to complete all the questions.
9. Print your examination number in the block provided on every page.
10. Any details or dimensions not given must be assumed in good proportion.

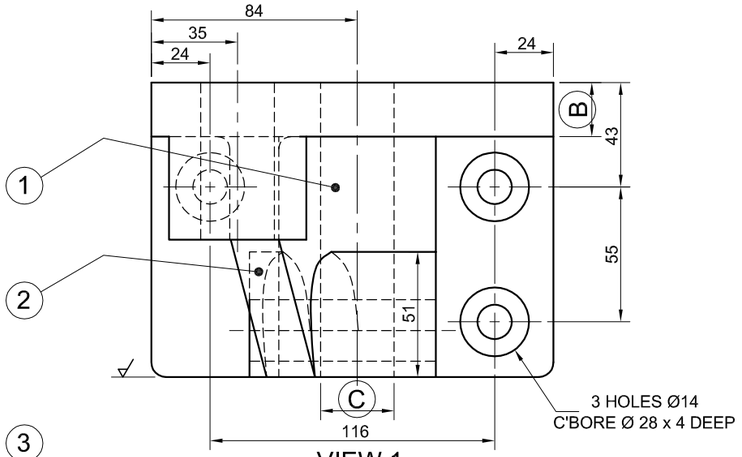
FOR OFFICIAL USE ONLY

QUESTION	MARKS OBTAINED	½	SIGN	MODERATED	½	SIGN	
1							
2							
3							
4							
TOTAL							
	200			200			

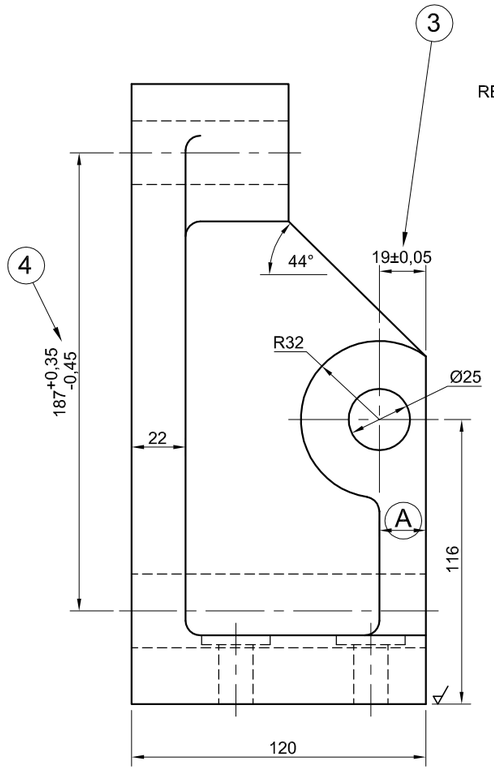
FINAL CONVERTED MARK	CHECKED BY
_____ 100	

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

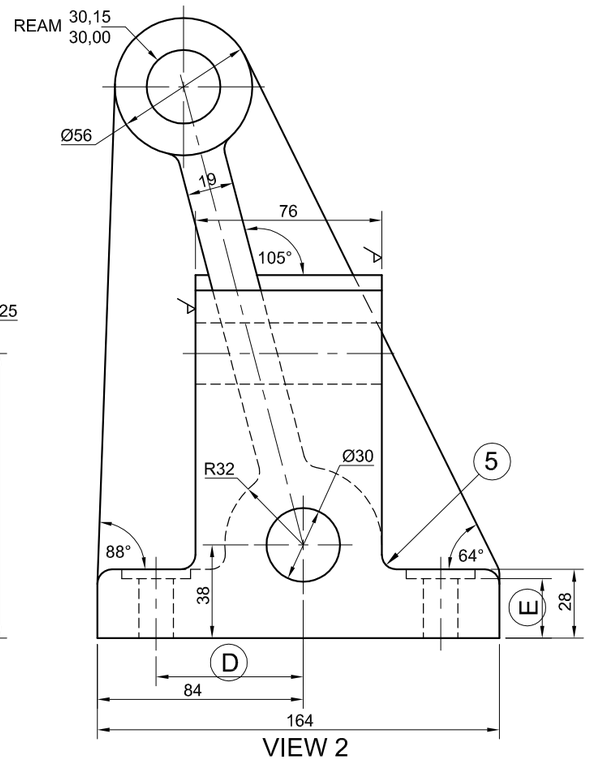
STAPLE



VIEW 1



VIEW 3



VIEW 2

ALL DIMENSIONS ARE IN MILLIMETRES.

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
A detailed drawing showing THREE views of an ejector base, 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 all refer to the accompanying detailed drawing and the title block. **[30]**

	QUESTIONS	ANSWERS		
1	Who approved the drawing?		½	
2	What SI unit are the dimensions presented in?		½	
3	When was the drawing checked?		½	
4	Who was responsible for the revision?		½	
5	What drawing method was used to prepare the drawing?		½	
6	How many ejector bases must be manufactured?		½	
7	How many surfaces require machining?		1	
8	What is the roughness value of the machined surfaces?		1	
9	What method must be used to produce the machined surfaces?		1	
10	What is the angle to the horizontal of the surface at 1?		1	
11	What is the angle to the horizontal of the surface at 2?		1	
12	How many holes are there in the casting?		1	
13	What does the abbreviation *C'BORE* stand for?		1	
14	What would VIEW 2 be called?		1	
15	What is the radius of the fillet at 5?		1	
16	Determine the complete dimensions at: A B C D E		5	
17	What is the total height of the ejector base?		3	
18	What is the upper tolerance of the dimension at 3?		2	
19	What is the upper and lower tolerance of the dimension at 4?		4	
20	In the box below (ANSWER 20), draw, in neat freehand, the symbol for the projection system used.		4	
	TOTAL		**30**	

2012-08-03	S GOBA	REDUCE TOLERANCE VALUES	1
DATE	REVISED BY	REVISION DESCRIPTION	No.

MASTERCAST ENGINEERING
29 BURMAN ROAD
DEALPARTY
PORT ELIZABETH 6025
www.mtech.co.za
041 545 7820

TITLE
EJECTOR BASE

UNLESS OTHERWISE SPECIFIED, ALL TOLERANCES ON DIMENSIONS ARE ± 0,3.
ALL UNSPECIFIED RADII ARE 6 mm.

GRINDING 0,03

SCALE: 1 : 2

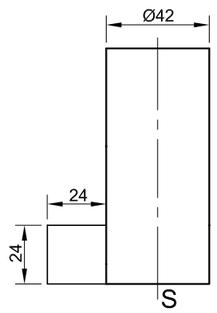
DRAWING PROGRAMME: AUTOCAD
MATERIAL: CAST IRON
FILE NAME: TLS30.dwg
HEAT TREATMENT: NORMALISE
DRAWING No. 12-729-KM3
DRAWN BY: K MOODLEY
DATE: 2012-07-15
CHECKED BY: L MBELE
DATE: 2012-07-18
APPROVED BY: J BURGER
DATE: 2012-07-19
QUANTITY: 382

ANSWER 20

EXAMINATION NUMBER

EXAMINATION NUMBER 2

STAPLE



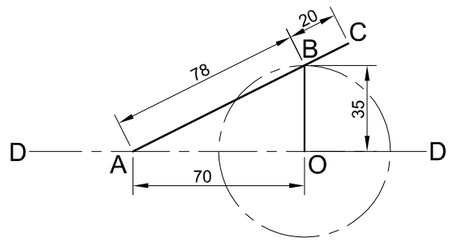
QUESTION 2: LOCI
NOTE: Answer QUESTIONS 2.1 AND 2.2.

2.1 Thread
Given:
- The profile of a single-start right-hand square thread in the starting position
- The complete core
- The position of S on the drawing sheet

Instructions:
- Draw, to scale 1 : 1, ONE AND A HALF turns of the single-start right-hand square thread.
- Show ALL necessary construction.
- NO hidden detail is required. **[24]**

S

ASSESSMENT CRITERIA					
1	CENTRE LINES + CONSTR'	6			
2	HELICES + SHAFT + DIRECTION	18			
	SUBTOTAL	**24**			



2.2 Mechanism
Given:
- A schematic diagram of a mechanism consisting of a crank OB, which is attached to a connecting rod AC at point B
- The position of centre point O on the drawing sheet

Motion:
As crank OB rotates in a clockwise direction, point A moves to and fro along axis D-D.

Instructions:
- Draw, to scale 1 : 1, the given schematic drawing of the mechanism.
- Trace the locus generated by point C for ONE complete revolution of the mechanism.
- Show ALL necessary construction. **[18]**

O

ASSESSMENT CRITERIA					
1	GIVEN	4			
2	CONSTRUCTION	6			
3	LOCUS + CURVE	8			
	SUBTOTAL	**18**			
	TOTAL	**42**			

EXAMINATION NUMBER

EXAMINATION NUMBER 3

STAPLE

QUESTION 3: ISOMETRIC DRAWING

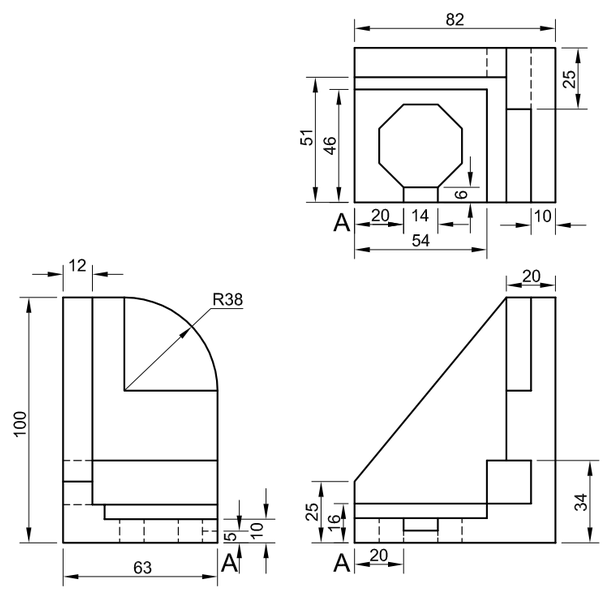
Given:

- The front view, top view and left view of a bracket with a regular octagonal hole
- The position of point A on the drawing sheet

Instructions:

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

- Make A the lowest point of the drawing.
- Show ALL necessary construction.
- NO stencils may be used.
- NO hidden detail is required. **[36]**

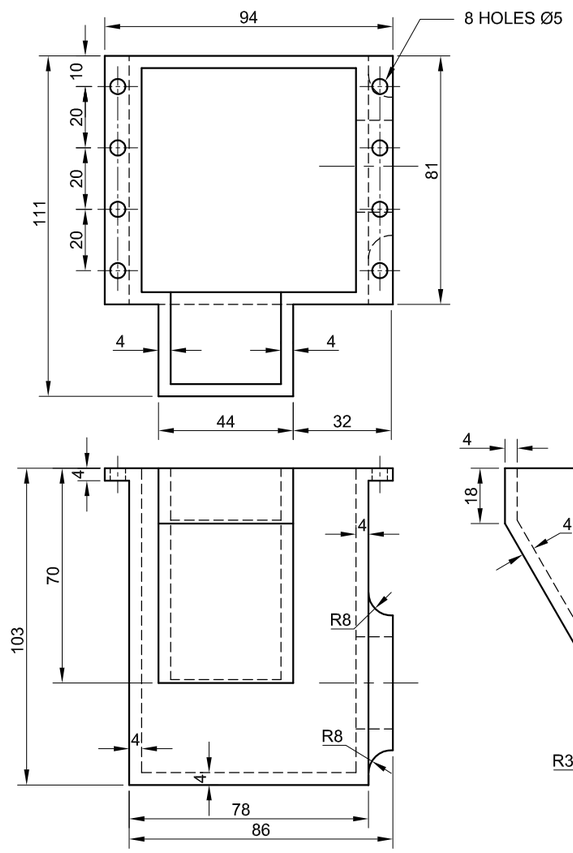


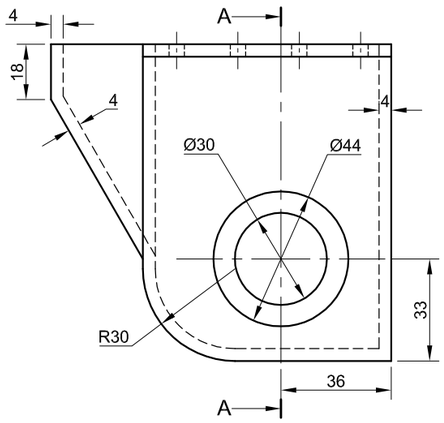
A

ASSESSMENT CRITERIA					
1	AUX' VIEWS + CIRCLE + CONSTR' + PLACE	5			
2	OCTAGONAL HOLE	10			
3	ISO' + NON-ISO' LINES	21			
TOTAL		**36**			

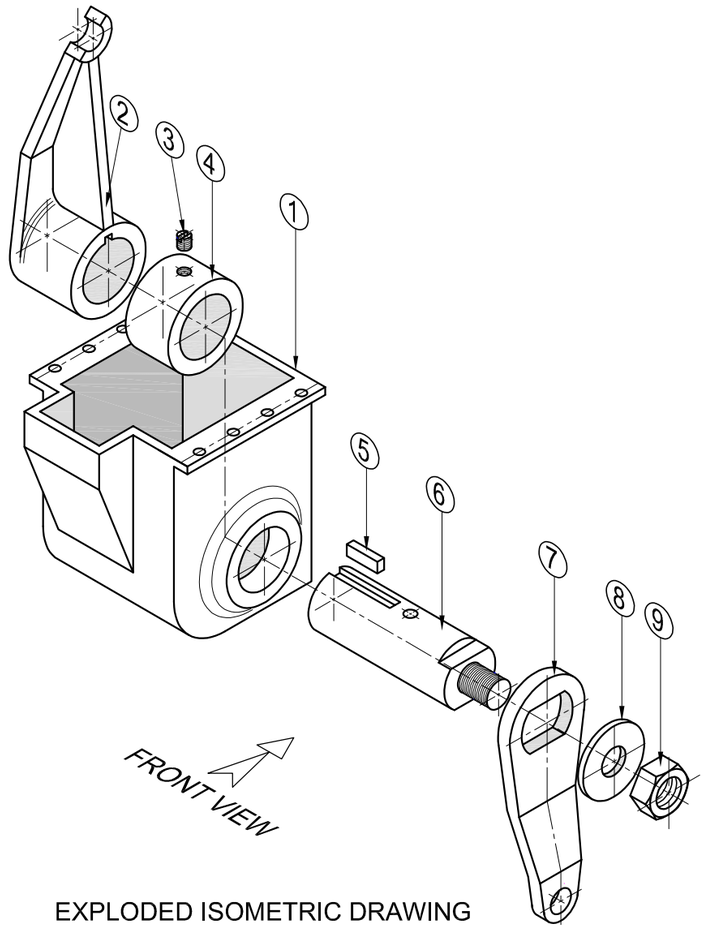
EXAMINATION NUMBER

EXAMINATION NUMBER

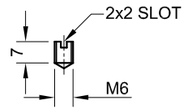




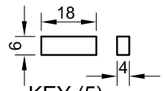
HOUSING (1)



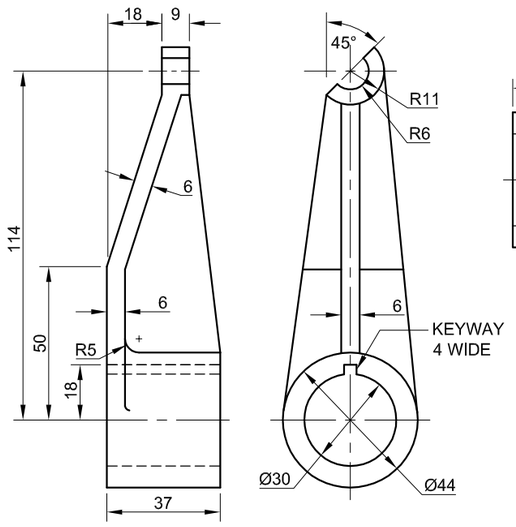
EXPLODED ISOMETRIC DRAWING



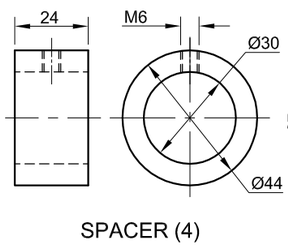
GRUB SCREW (3)



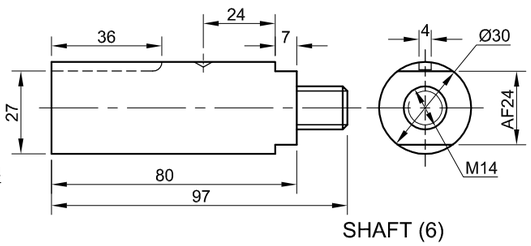
KEY (5)



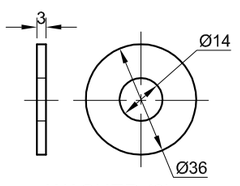
RELEASE ARM (2)



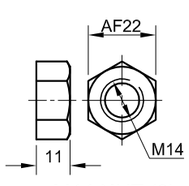
SPACER (4)



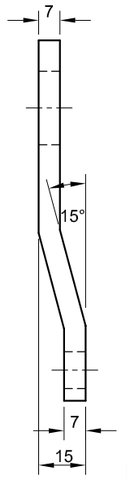
SHAFT (6)

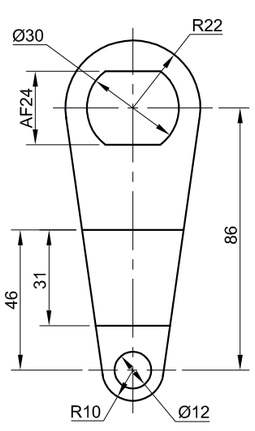


WASHER (8)



M14 NUT (9)





LEVER (7)

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a clutch release housing assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the clutch release housing 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 clutch release housing assembly:
  - **4.1 A sectional front view** on cutting plane A-A, as seen from the direction of the arrow shown on the exploded isometric drawing. The cutting plane, which passes vertically through the centre of the assembly, is shown on the right view of the housing (part 1).
  - **4.2 The right view**
- ALL drawing must comply with the guidelines contained in the *SABS 0111.*

NOTE:

- Show THREE faces of the nut in the front view and ALL necessary construction.
- NO hidden detail is required.

Add the following feature to the drawing:

- The cutting plane A-A **[92]**

PARTS LIST

PART	QUANTITY	MATERIAL
1. HOUSING	1	CAST IRON
2. RELEASE ARM	1	CAST IRON
3. GRUB SCREW	1	MILD STEEL
4. SPACER	1	MILD STEEL
5. KEY	1	MILD STEEL
6. SHAFT	1	MILD STEEL
7. LEVER	1	MILD STEEL
8. WASHER	1	MILD STEEL
9. M14 NUT	1	MILD STEEL

MASTERCAST ENGINEERING

29 BURMAN ROAD
DEALPARTY
PORT ELIZABETH 6025
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☏ 041 545 7820

CLUTCH RELEASE HOUSING

ALL DIMENSIONS ARE IN MILLIMETRES.

ALL UNSPECIFIED RADII ARE R2.

Please turn over

STAPLE

ASSESSMENT CRITERIA					
SECTIONAL FRONT VIEW					
1	HOUSING	9			
2	RELEASE ARM	9½			
3	GRUB SCREW	3			
4	SPACER	3			
5	KEY	2			
6	SHAFT	6½			
7	LEVER	7			
8	WASHER	2			
9	M14 NUT	5			
H	HATCHING	13			
SUBTOTAL		**60**			
RIGHT VIEW					
1	HOUSING	5			
2	RELEASE ARM	4			
3	LEVER	4			
4	WASHER + M14 NUT	4			
SUBTOTAL		**17**			
GENERAL					
1	CENTRE LINES	4			
2	CUTTING PLANE	3			
3	ASSEMBLY	8			
SUBTOTAL		**15**			
TOTAL		**92**			
EXAMINATION NUMBER					
EXAMINATION NUMBER					6