



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P2
EXEMPLAR 2008

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

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INSTRUCTIONS AND INFORMATION

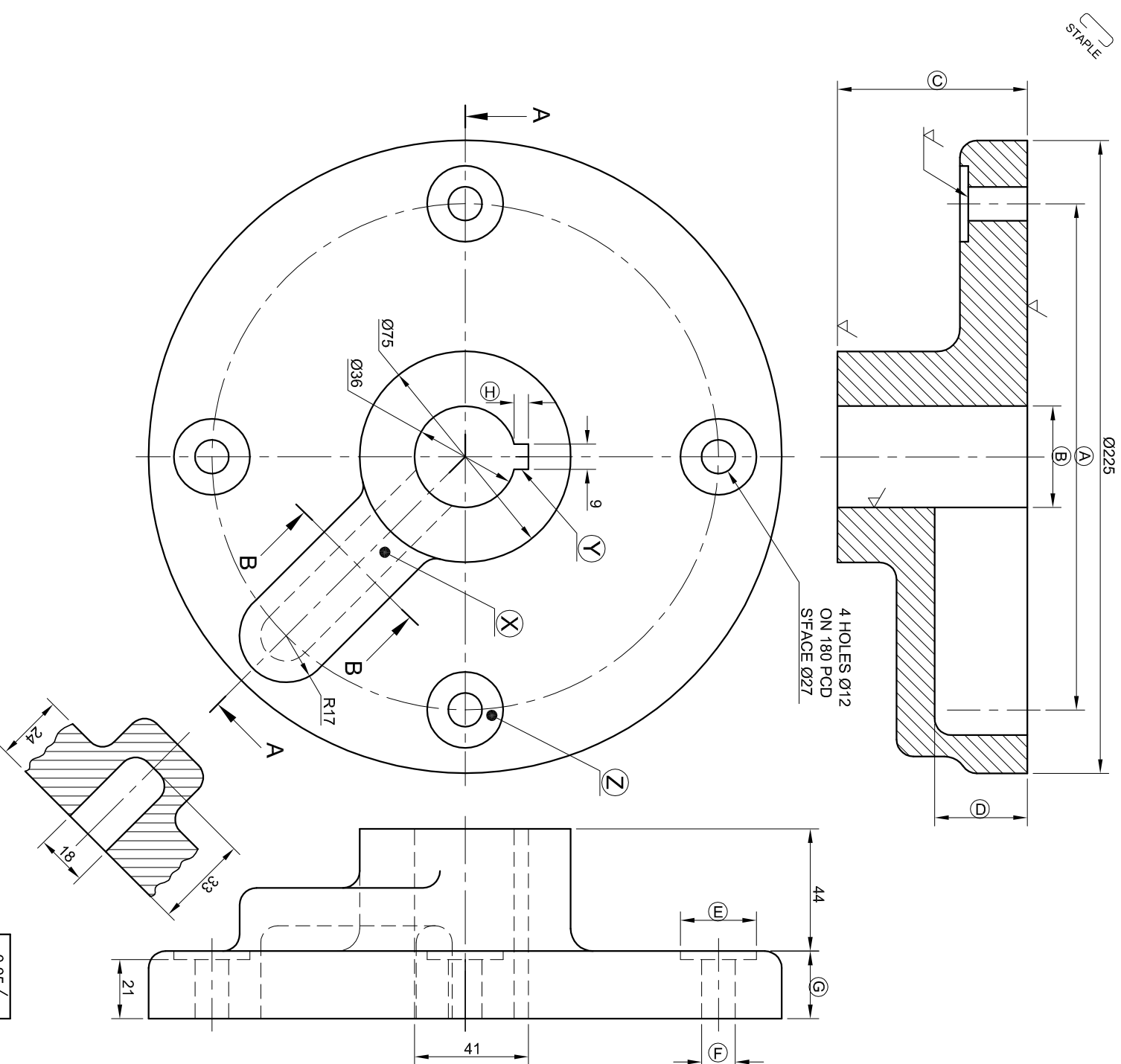
1. The question paper consists of FOUR questions.
2. Answer ALL the questions.
3. All drawings are in third-angle orthographic projection unless otherwise stated.
4. All drawings must be drawn to scale 1:1, unless otherwise stated.
5. The questions must be answered on the answer sheets provided.
6. All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

Please turn over



QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
A table of questions and a site plan of a proposed new addition to an existing dwelling.

Instructions:
Complete the table below by neatly printing the answers to the questions, which all refer to the accompanying drawing.

[25]

QUESTIONS		ANSWERS	
1	On what date was the drawing first completed?		1/2
2	Who redrew the drawing?		1/2
3	What is the name of the manufacturing company?		1/2
4	What is the drawing number?		1/2
5	What dimension unit is used?		1/2
6	What tolerances are allowed on the dimensions?		1
7	What heat treatment is required?		1
8	How many surfaces must be machined?		1
9	What is the width of the slot marked X?		1
10	What is feature Y called?		1
11	What is feature Z called?		1
12	What is the maximum 'M' sized bolt that could be used to hold the crank disc in place?		1
13	If the drawing was drawn full size, what would dimension $\varnothing 36$ read?		1/2
14	Determine the dimensions at: A B C D		4
15	Determine the dimensions at: E F G H		4
16	What type of section is created by cutting plane B-B?		1
17	What do the letters PCD stand for?		1
18	What does the symbol $\nabla^{0.05}$ mean?		1
19	Label the TWO sectioned views.		2
20	In the box below neatly draw, in freehand, the symbol for the projection system used.		2
TOTAL 25			

UNLESS OTHERWISE SPECIFIED TOLERANCES ON DIMENSIONS ARE: 2 DECIMAL PLACES: $\pm 0,05$ 3 DECIMAL PLACES: $\pm 0,005$

ALL UNSPECIFIED RADII ARE R3

DRAWING PROGRAMME: AUTOCAD 2007

ALL DIMENSIONS IN MILLIMETRES

DRAWN: NUTNANGWA
DATE: 11/04/07
CHECKED: STEVEN

DATE: 15/04/07
APPROVED DAN

DATE: 16/04/07
SCALE: 1:2

ISSUE

REVISION

DATE

BY

CHECKED

0.05

TSMIBI CORPORATION

TSHEDZA STREET
THOHONYANDOU
0960
www.tsimbi.co.za

CRANK DISC

MATERIAL: SAE 1040
HEAT TREATMENT: NORMALISE

DRAWING No. TC/DOE/0811
FILE NAME: CD-334

A REDRAWN: 20/04/07 S-BU NUTNANGWA

ORTHOGRAPHIC PROJECTION
SYMBOL

EXAMINATION NUMBER	
EXAMINATION NUMBER	2



QUESTION 2: LOCI (HELIX)

A manufacturing company has its packaging division located on the first floor of its factory. An open chute was installed to move the packed boxes from the first floor to the ground floor.

Given:

- The incomplete front view of the chute showing the start and the end points
- The top view of the chute
- The profile of the chute

Instructions:

Draw, to scale 1:10, the complete front view and the top view of the chute according to the following specifications:

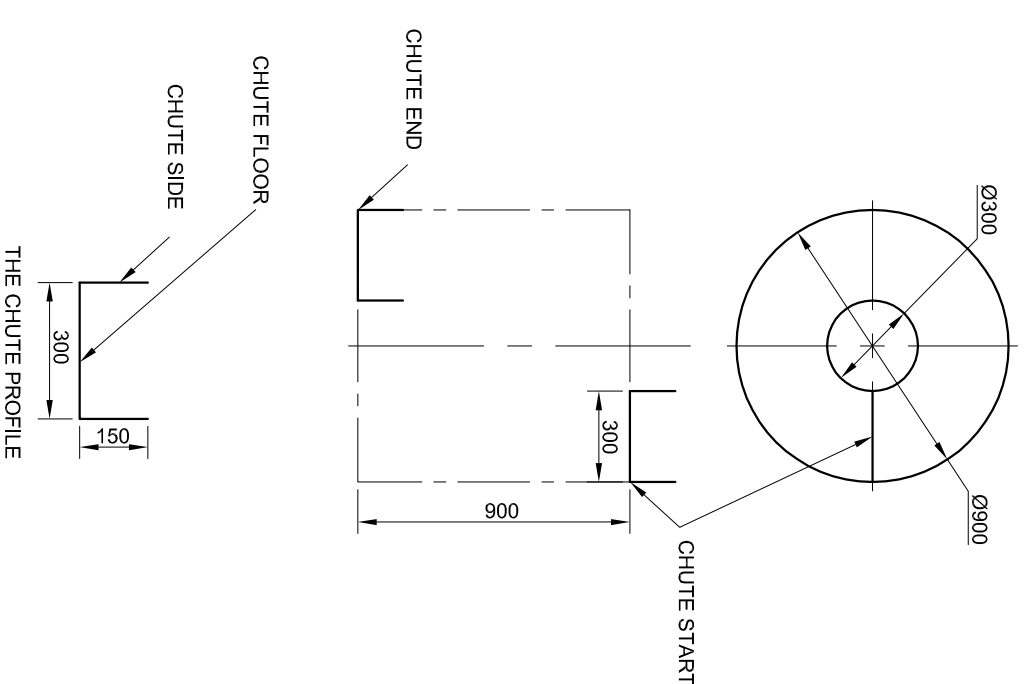
- Right-hand helical chute
- The chute floor drops 900 mm over 1½ turns
- The sides of the chute are 150 mm high
- The chute floor is 300 mm wide

Note:

NO hidden detail is required.

Study the given diagrams carefully before you start drawing.

[45]



ASSESSMENT CRITERIA	
CONSTRUCTION	= 6
TOP VIEW	= 2
DIRECTION	= 4
CENTRE LINES	= 2
HELIX	= 31
TOTAL	= 45

EXAMINATION NUMBER	
EXAMINATION NUMBER	3



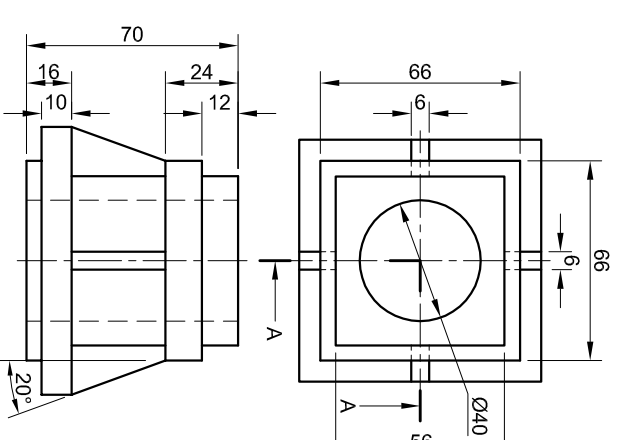
QUESTION 3: ISOMETRIC DRAWING

Given:
The front view and top view of a rod guide that is cut by cutting plane A-A.

Instructions:

- Convert the orthographic views of the rod guide into a sectional isometric drawing.
- Position the answer so that the sectioned surfaces are visible.
- Show ALL necessary construction.
- NO hidden detail is required.

[40]



ASSESSMENT CRITERIA	
AUXILIARY VIEW	= 2
ISOMETRIC SURFACES	= 8
NON-ISOMETRIC LINES	= 2
SECTION	= 12
ISOMETRIC CIRCLES	= 4
CIRCLE CONSTRUCTION	= 4
HATCHING	= 6
CENTRE LINES	= 2
TOTAL	= 40

EXAMINATION NUMBER

EXAMINATION NUMBER

4

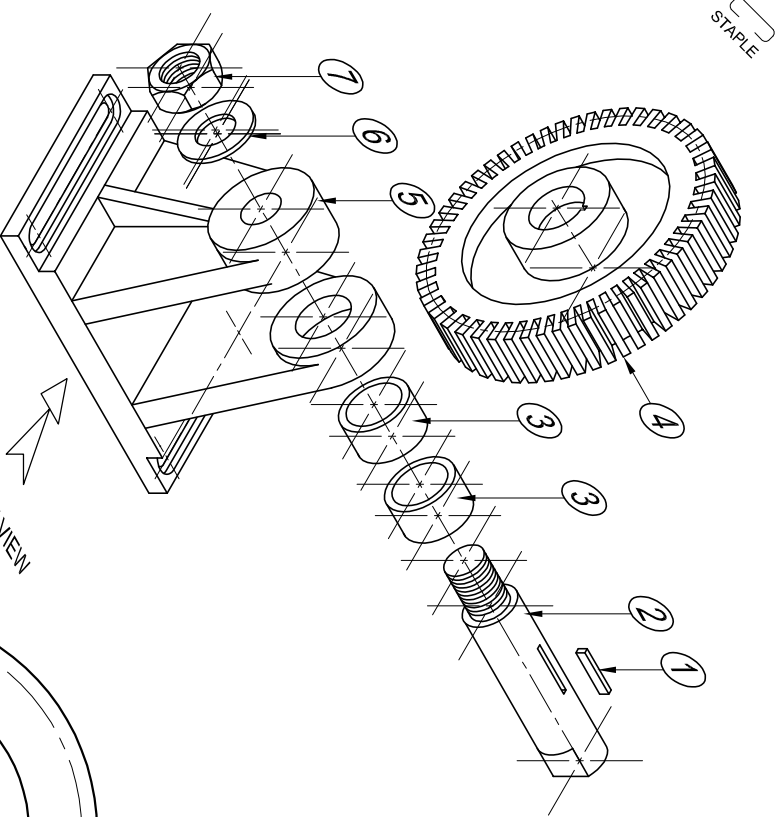


ANSWER SHEET 4

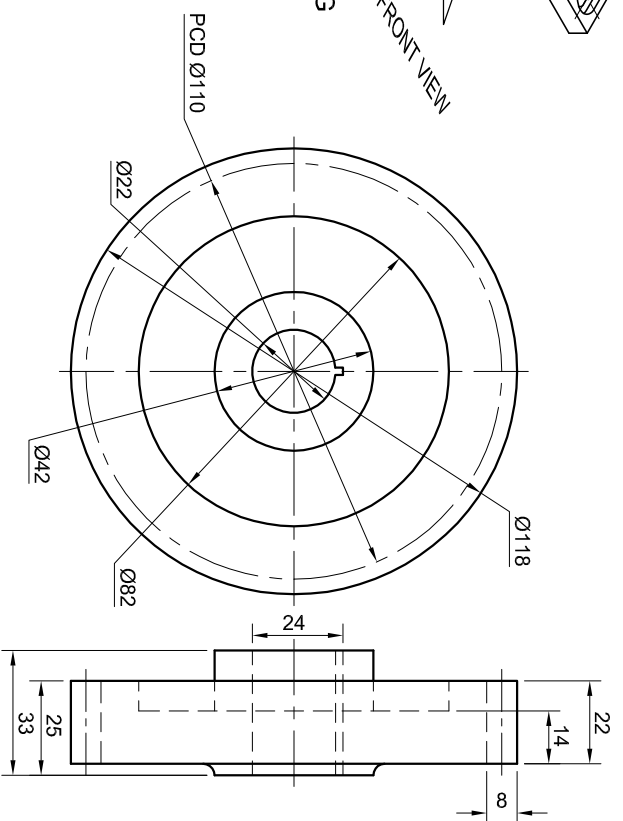
ASSESSMENT CRITERIA						
	FACET		SECTIONING		TOTAL	
	POSSIBLE	OBTAINED	POSSIBLE	OBTAINED	POSSIBLE	OBTAINED
1 KEY	2		1		3	
2 SHAFT	10		2½		12½	
3 BUSH	4		2		6	
4 SPUR GEAR	11		4½		15½	
5 HOUSING BRACKET	15½		6		21½	
6 WASHER	1		½		1½	
7 M16-NUT	4½		½		5	
CENTRE LINES					5	
ASSEMBLY					7	
LEFT VIEW					9	
CUTTING PLANE					1	
LABEL VIEW					1	
AUXILIARY VIEW					2	
TOTAL					90	



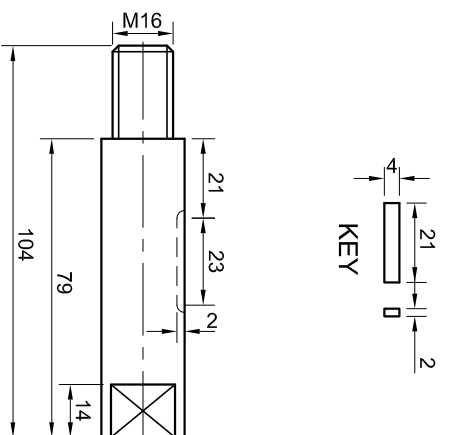
EXAMINATION NUMBER	
EXAMINATION NUMBER	5



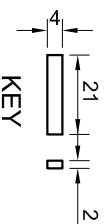
EXPLODED ISOMETRIC DRAWING



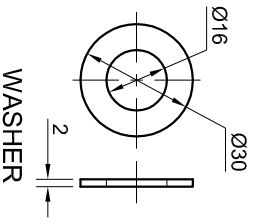
SPUR GEAR



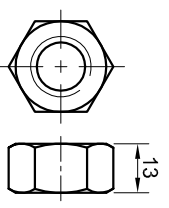
SHAFT



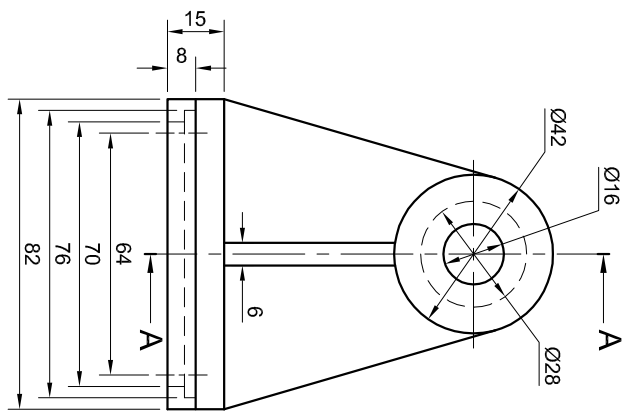
KEY



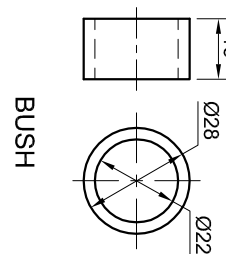
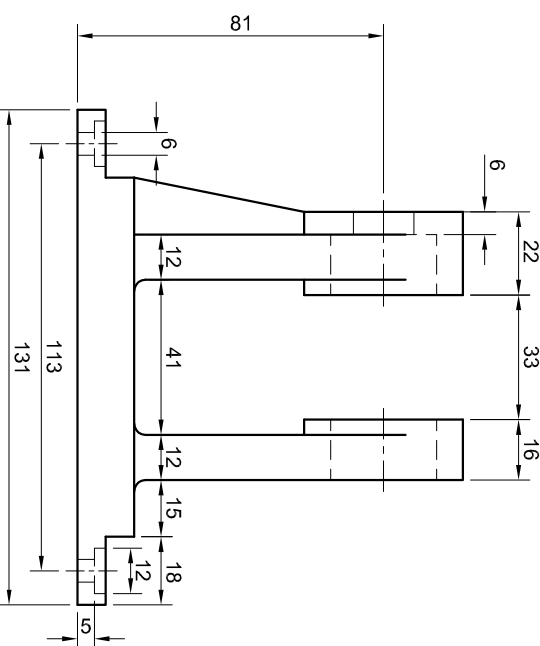
WASHER



M16 NUT



HOUSING BRACKET



BUSH

QUESTION 4: ASSEMBLY DRAWING

Given:
The exploded isometric drawing of the parts of a spur gear sub-assembly, showing the position of each part relative to all the others.

Orthographic views of each of the parts of the spur gear sub-assembly.

Instructions:
Answer this question on ANSWER SHEET 4 on page 5.
Draw, to scale 1:1, the following views of the assembled parts of the spur gear sub-assembly:

- The full sectional front view on A-A as seen from the arrow indicated in the exploded isometric drawing. The cutting plane passes through the vertical centre line of the assembly as shown on the housing bracket. Label the sectioned view.
- The left view. NO hidden detail is required. Show the cutting plane.

Note:

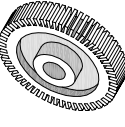
- Show THREE faces of the M16 nut and ALL necessary construction.
- Draw the conventional representation of the spur gear in accordance with the SABS 0111.
- ALL drawing must comply with the guidelines contained in the SABS 0111.

[90]

PARTS LIST

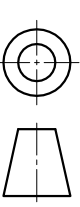
PART	QUANTITY	MATERIAL
1. KEY	1	MILD STEEL
2. SHAFT	1	MILD STEEL
3. BUSH	2	BRASS
4. SPUR GEAR	1	MILD STEEL
5. HOUSING BRACKET	1	CAST IRON
6. WASHER	1	SPRING STEEL
7. M16 NUT	1	MILD STEEL

ALL DIMENSIONS ARE IN MILLIMETRES	DRAWN: CAREN
ALL UNSPECIFIED RADII ARE R3	DATE: 26/05/07
DRAWING PROGRAM: AUTOCAD 2007	CHECKED: PHILLION
	DATE: 27/05/07
	APPROVED: SAREL
	DATE: 31/05/07
	SCALE: 1:2


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SPUR GEAR SUB-ASSEMBLY

NATIONAL SENIOR CERTIFICATE
GRADE 12 EXEMPLAR 2008



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