education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P2

FEBRUARY/MARCH 2010

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

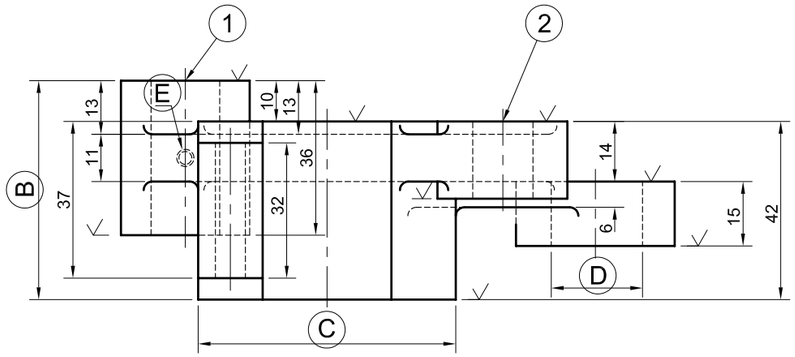
1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless stated otherwise.
4. ALL drawings must be drawn to scale 1:1, unless stated otherwise.
5. ALL the questions must be answered on the QUESTION PAPER as instructed.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

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

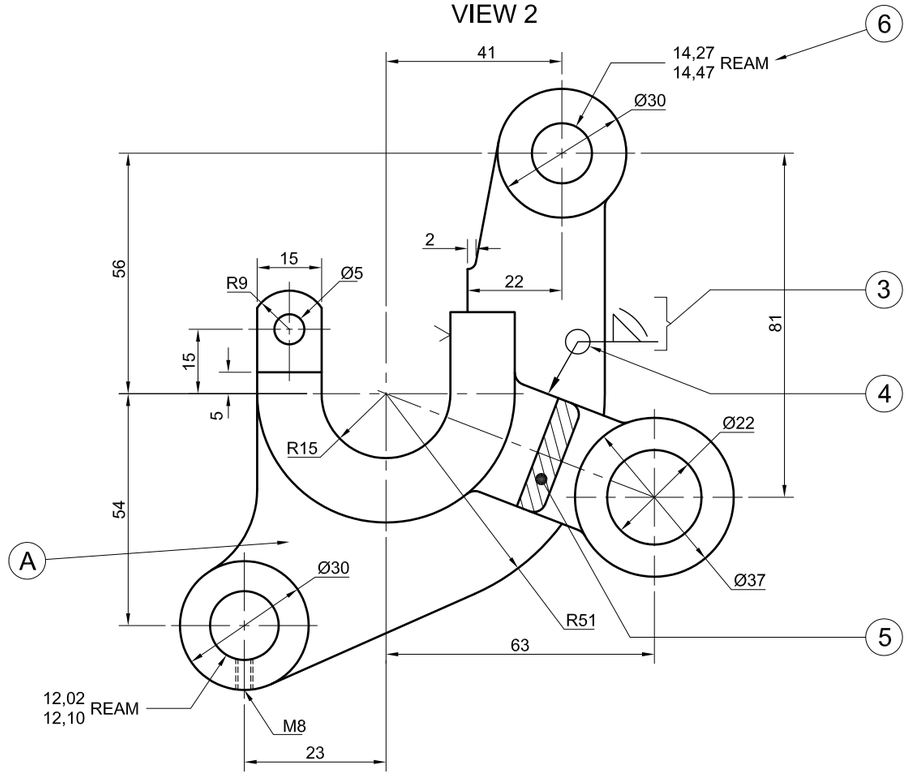
FINAL CONVERTED MARK	CHECKED BY
____ 100	

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

STAPLE



VIEW 2



VIEW 1

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
Two views of an adaptor plate with a title block and a table of questions.

Instructions:
Complete the table below by neatly printing the answers to the questions, which all refer to the accompanying drawings and the title block. **[30]**

	QUESTIONS	ANSWERS	
1	What is the title of the drawing?		1
2	On what date was the drawing checked?		1
3	Who approved the drawing?		1
4	What is the drawing number?		1
5	If a scale of 1:5 were used, what would a dimension of 10 mm read?		1
6	How many surfaces on the component require machining?		1
7	What process must be applied to achieve the required finish?		1
8	As what type of mechanical drawing can the views of the adaptor plate be classified?		1
9	What would VIEW 2 be called?		1
10	What is the thickness of the rib marked A?		1
11	Determine the dimensions at: B C D E		4
12	What is the linear distance between holes 1 and 2?		1
13	What type of symbol is shown at 3?		1
14	What does the circle on the symbol at 4 mean?		1
15	What type of section is shown at 5?		1
16	What is the permissible tolerance on the dimensions of the component?		1
17	Determine the tolerance for the dimension at 6.		2
18	In the box below, draw, in neat freehand, the symbol for the projection system used.		4
19	In the box below, draw, in neat freehand, the *SABS 0111* convention for the given internal screw thread.		5
	TOTAL		**30**

DATE	CHANGED BY	REVISION DESCRIPTION	No.
12-06-09	MUSA	CHANGE MACHINING SPEC'	B
07-06-09	MUSA	DECREASE RIB THICKNESS	A

DRAWING No. Q1/DOE/10 | MATERIAL: CAST ALUMINIUM
FILE NAME: FM-P2-2010 | HEAT TREATMENT: NONE

ALL DIMENSIONS ARE IN MILLIMETRES.

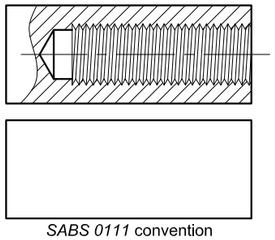
ALL SPECIFIED SURFACE FINISHES ARE: 0,05 GRINDING

THE TOLERANCE ON DIMENSIONS IS ± 0,3, UNLESS OTHERWISE SPECIFIED.

DRAWING PROGRAM: AUTOCAD 2009

DRAWN BY: AB MORKEL	20/05/09
CHECKED BY: Z KHUMALO	25/05/09
APPROVED BY: PP STEYN	07/06/09
SCALE: 1:2	

18
SYMBOL

19

SABS 0111 convention

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TITLE
ADAPTOR PLATE

EXAMINATION NUMBER

EXAMINATION NUMBER 2

STAPLE

G

QUESTION 2: LOCI (MECHANISMS)

Given:

- A mechanism consisting of a movable slider DF and a T-piece ABC
  FIGURE 1: An oblique drawing of the mechanism
  FIGURE 2: A schematic drawing of the mechanism
- Point G as the reference point on the drawing sheet

Motion:

Pin E, located on slider DF, slides freely in groove AB to its furthest position on the left, then to its furthest position on the right. Slider DF moves freely around a fixed pin G located on the T-piece ABC.

Instructions:

2.1 Draw, to scale 1:1, the given schematic drawing using point G as the reference point. Include ALL labels.
2.2 Trace the locus of point D for the complete movement of the slider.
2.3 Trace the locus of point F for the complete movement of the slider.

- Show ALL necessary construction. **[33]**

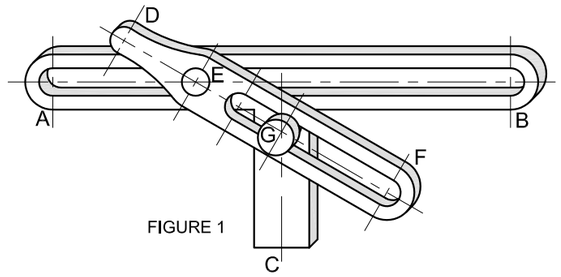


FIGURE 1

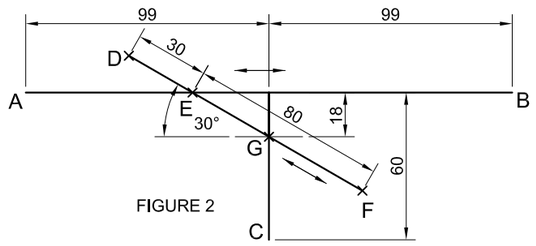


FIGURE 2

ASSESSMENT CRITERIA				
GIVEN + LABELS	6			
CONSTRUCTION	6			
LOCUS D + CURVE	11			
LOCUS F + CURVE	10			
TOTAL	**33**			

EXAMINATION NUMBER	
EXAMINATION NUMBER	3

STAPLE

QUESTION 3: ISOMETRIC DRAWING

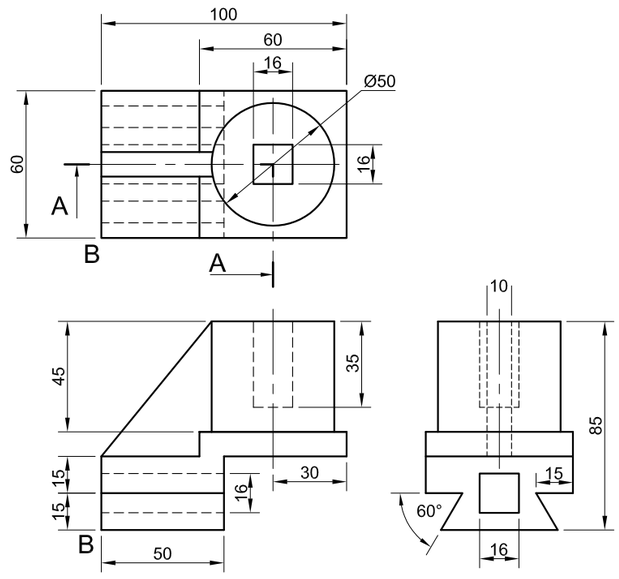
Given:

- The front view, top view and right view of a cross slide with a cutting plane A-A
- The position of point B on the drawing sheet

Instructions:

Convert the orthographic views of the cross slide into a sectional isometric drawing on cutting plane A-A.

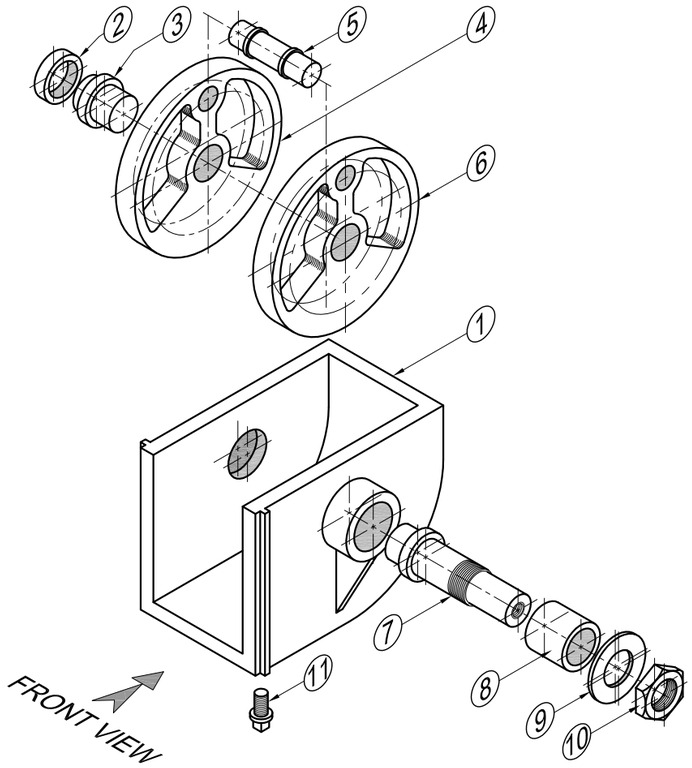
- Make corner B the lowest point of the drawing.
- Show ALL necessary circle construction.
- NO hidden detail is required. **[43]**



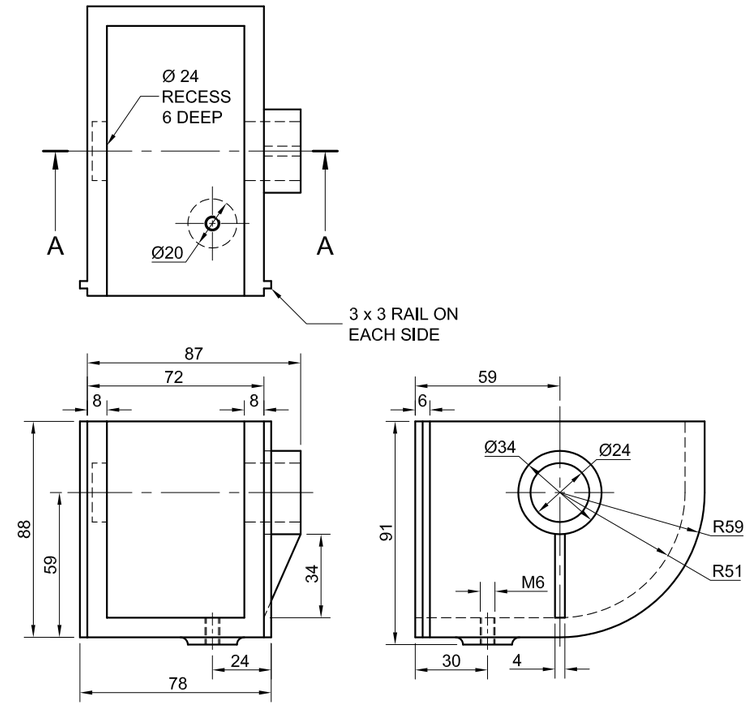
B

ASSESSMENT CRITERIA				
AUXILIARY VIEW + PLACING	3			
ISO' CIRCLES + CONSTR' + CENTRE LINES	9			
ISO' + NON-ISO' LINES	15½			
SECTIONED SURFACES	11½			
HATCHING/NO HATCHING	4			
TOTAL	**43**			

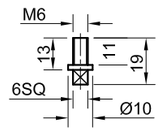
EXAMINATION NUMBER	
EXAMINATION NUMBER	4



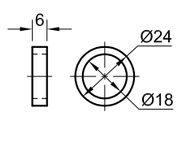
EXPLODED ISOMETRIC DRAWING



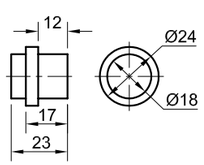
HOUSING [1]



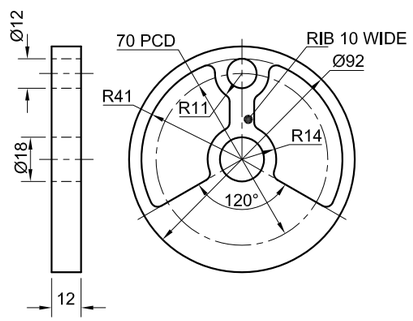
DRAIN PLUG [11]



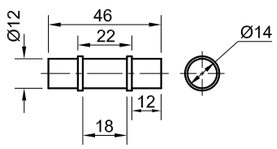
BUSH A [2]



SHORT SHAFT [3]

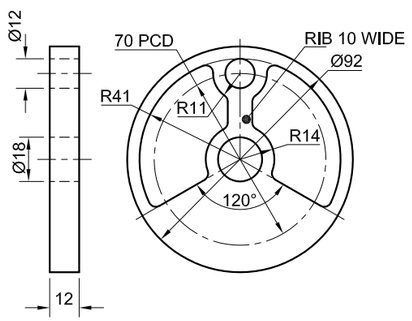


LEFT FLYWHEEL [4]

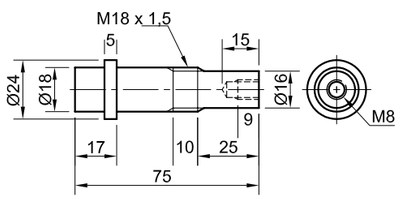


JOURNAL [5]

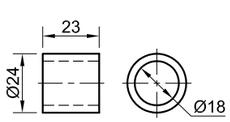
NOTE:
SHOW THE JOURNAL IN THE HIGHEST POSITION.



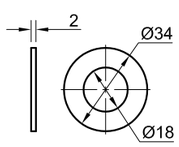
RIGHT FLYWHEEL [6]



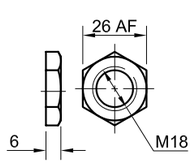
DRIVE SHAFT [7]



BUSH B [8]



WASHER [9]



SPECIAL NUT [10]

QUESTION 4: ASSEMBLY DRAWING

Given:

- The exploded isometric drawing of the parts of a crank assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the crank 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 crank assembly:
  - **4.1 The sectional front view** on cutting plane A-A, as seen from the direction of the arrow shown in the exploded isometric drawing. The vertical cutting plane passes through the centre line of the assembly, as shown on the top view of the housing.
  - **4.2 The right view.** NO hidden detail is required.
- ALL drawings must comply with the guidelines contained in the *SABS 0111.*

Add the following features to the drawing:

- The cutting plane A-A
- Label the sectional view: SECTION A-A.

NOTE:
Show THREE faces of the special nut and ALL necessary construction. **[94]**

PARTS LIST		
PART	QUANTITY	MATERIAL
1. HOUSING	1	CAST IRON
2. BUSH A	1	BRONZE
3. SHORT SHAFT	1	MILD STEEL
4. LEFT FLYWHEEL	1	CAST IRON
5. JOURNAL	1	MILD STEEL
6. RIGHT FLYWHEEL	1	CAST IRON
7. DRIVE SHAFT	1	MILD STEEL
8. BUSH B	1	BRONZE
9. WASHER	1	MILD STEEL
10. SPECIAL NUT	1	MILD STEEL
11. DRAIN PLUG	1	MILD STEEL

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CRANK ASSEMBLY

ALL DIMENSIONS ARE IN MILLIMETRES.

ALL UNSPECIFIED RADII ARE 3.

Please turn over

STAPLE

ASSESSMENT CRITERIA					
SECTIONAL FRONT VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATE
1	HOUSING	7			
2	BUSH A + SHORT SHAFT	5			
3	FLYWHEELS	6			
4	JOURNAL	4			
5	BUSH B + DRIVE SHAFT	$11\frac{1}{2}$			
6	WASHER + NUT	7			
7	HATCHING + NON-HATCHING	14			
8	LABELS + CENTRE LINES	2			
SUBTOTAL		$56\frac{1}{2}$			
RIGHT VIEW					
1	HOUSING	$6\frac{1}{2}$			
2	DRAIN PLUG	4			
3	FLYWHEEL	4			
4	DRIVE SHAFT	2			
5	NUT + WASHER	4			
6	CUTTING PLANE + CENTRE LINES	5			
7	3RD ANGLE RIGHT VIEW	2			
8	ASSEMBLY	10			
SUBTOTAL		$37\frac{1}{2}$			
TOTAL		**94**			
EXAMINATION NUMBER					
EXAMINATION NUMBER					6