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EASTERN CAPE EDUCATION DEPARTMENT
OOS-KAAP ONDERWYSDEPARTEMENT

NATIONAL SENIOR CERTIFICATE

GRADE 11

ENGINEERING GRAPHICS AND DESIGN P2

NOVEMBER 2011

MARKS: 100

TIME: 2 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

1. The paper consists of FOUR questions.
2. Answer ALL the questions.
3. All drawings must be drawn to scale 1:1, unless otherwise stated.
4. The questions must be answered on the answer sheets provided.
5. All the answer 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 assumed in good proportion.

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

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
NAME
NAME
EXAMINATION CENTRE
EXAMINATION CENTRE

STAPLE

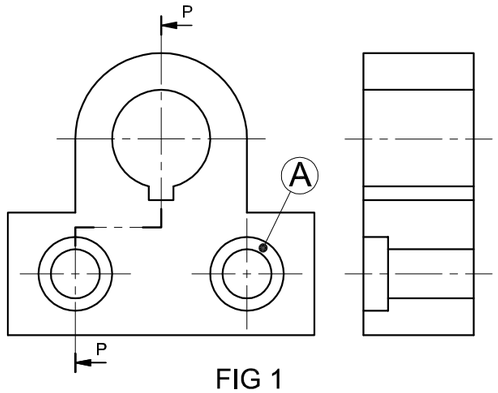


FIG 1

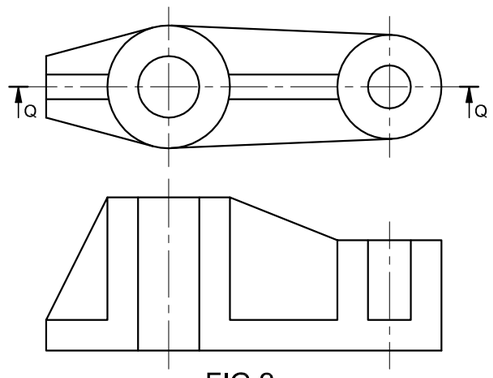


FIG 2

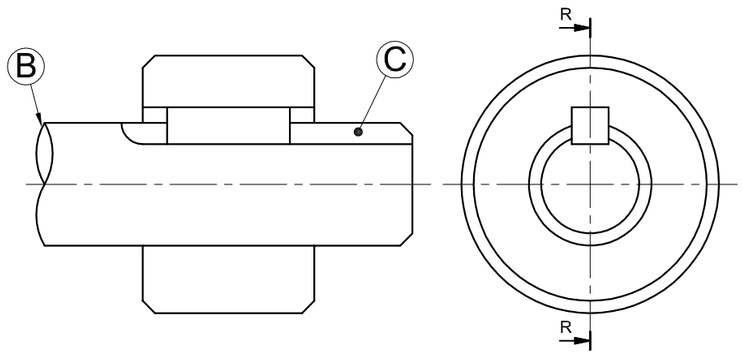


FIG 3

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
Three different drawings, a title block and a table of questions.

Instructions:
Complete the table below by neatly answering the questions, which all refer to the accompanying drawings and title block. **[13]**

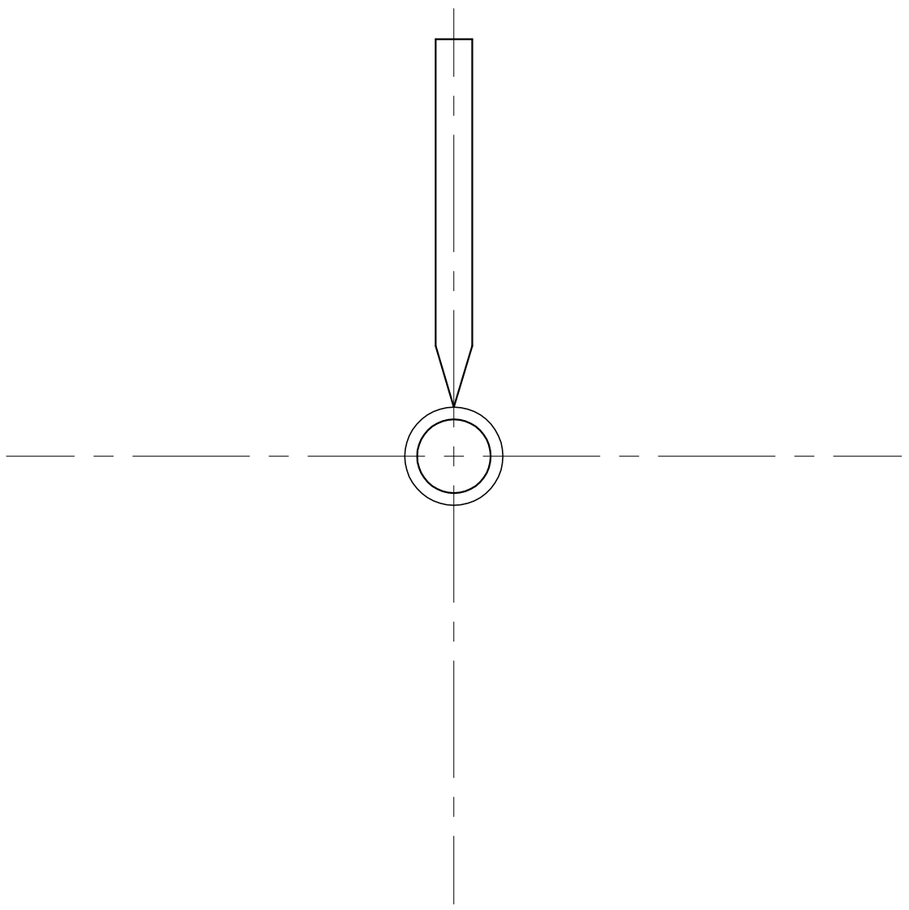
QUESTIONS		ANSWERS		
1	Insert the cross-hatching, in neat **freehand**, on the sectional side view for cutting plane P-P on figure 1.		2	
2	Insert the cross-hatching, in neat **freehand**, on the sectional front view for cutting plane Q-Q on figure 2.		2	
3	Insert the cross-hatching, in neat **freehand**, on the part-sectional side view for cutting plane R-R on figure 3.		2	
4	What is feature A called?		1	
5	What is feature B called?		1	
6	What is feature C called?		1	
7	In the box below (ANSWER 7), draw, in neat **freehand**, the symbol for the projection system used.		4	
	TOTAL		**13**	

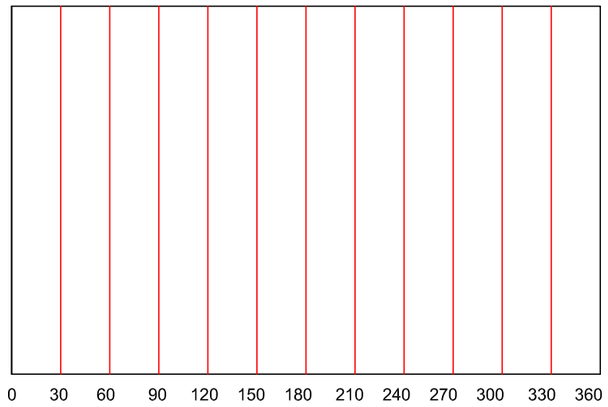
ANSWER 7

	05/07/2011	PETER	SIZE OF HOLE FOR BOLT	A
ALL DIMENSIONS ARE IN MILLIMETRES.	DATE	CHANGED BY	REVISION DESCRIPTION	№
UNLESS OTHERWISE SPECIFIED, TOLERANCES ON DIMENSIONS ARE ± 0,25.	DRAWN BY: NKOZI	DRAWING SET NO. 2 OF 3	MATERIAL: VARIOUS	
	DATE: 26/06/2011	FILE NAME: NB-S1-2011	HEAT TREATMENT: NONE	
	CHECKED BY: BAZI	McSTEEL MANUFACTURING	CURRY ROAD EAST LONDON 5260 www.microsteel.co.za	
ALL UNSPECIFIED RADII ARE R3.	DATE: 29/06/2011			
	APPROVED BY: CHRIS			
DRAWING PROGRAM: AUTOCAD 2011	DATE: 10/07/2011	SECTIONAL VIEWS		
	SCALE: 1 : 2			

EXAMINATION NUMBER	
EXAMINATION NUMBER	2

STAPLE





DISPLACEMENT GRAPH

QUESTION 2: LOCI (CAMS)

Given:

- The incomplete displacement graph.
- The shaft and follower detail of an industrial cam with follower shown at its lowest position.

The specifications for the movement are as follows:

- The cam shaft rotates anti-clockwise at uniform velocity
- Over the first 60° the follower rises 30 mm
- There is a dwell period for the next 30°
- Over the next 60° the follower rises a further 30 mm
- There is a dwell period for the next 30°
- Over the next 60° the follower falls 20 mm
- Over the next 30° the follower falls a further 20 mm
- There is a dwell period for the next 30°
- Over the final 60° the follower returns to its original position

Instructions:

2.1 Complete, to scale 1:1, the displacement graph for the given motion.

2.2 Project and draw the cam profile that would generate the given motion. The arrow indicating the direction of rotation must be shown.

- Show ALL necessary construction. **[23]**

ASSESSMENT CRITERIA				
1 GRAPH	9			
2 ARROW	1			
3 CONSTRUCTION	3			
4 CAM POINTS	6			
5 CURVE + QUALITY	4			
TOTAL	**23**			

EXAMINATION NUMBER	
EXAMINATION NUMBER	3

STAPLE

QUESTION 3: ISOMETRIC DRAWING

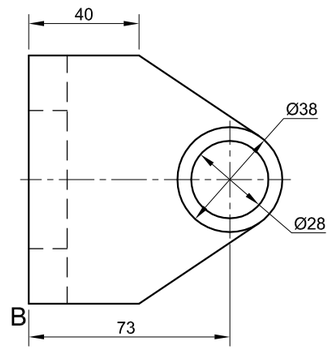
Given:

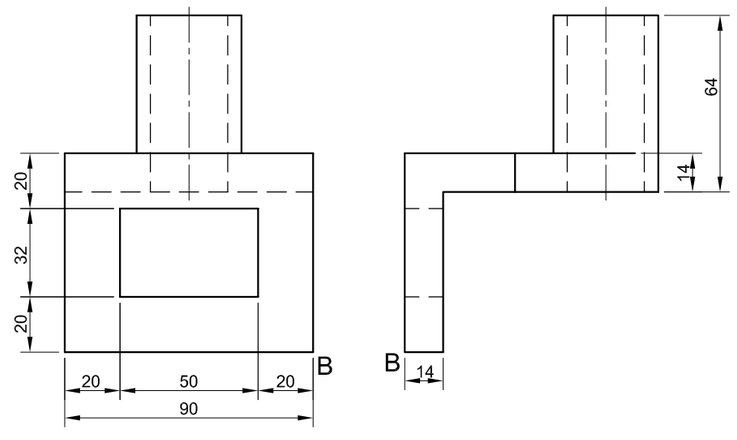
- The front view, top view and left view of a shaft support.
- The position of point B on the drawing sheet.

Instructions:

Convert the orthographic views of the shaft support into a scale 1 : 1 isometric drawing.

- Make corner B the lowest point of the drawing.
- Show ALL necessary circle and other construction.
- NO hidden detail is required. **[21]**



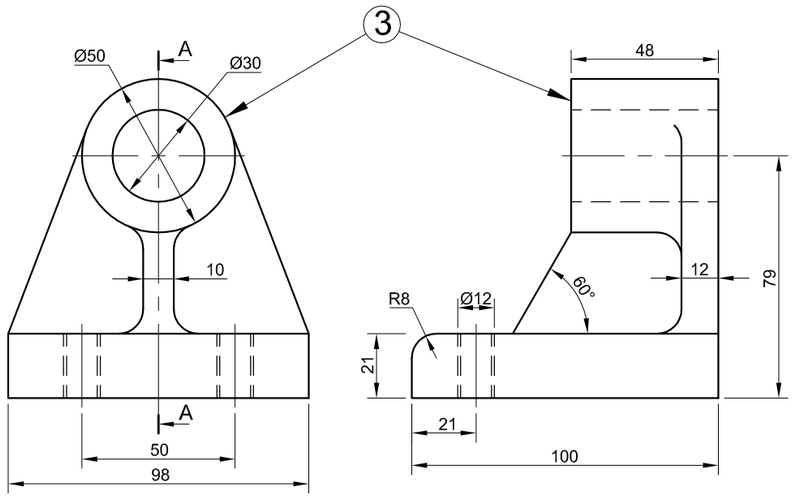


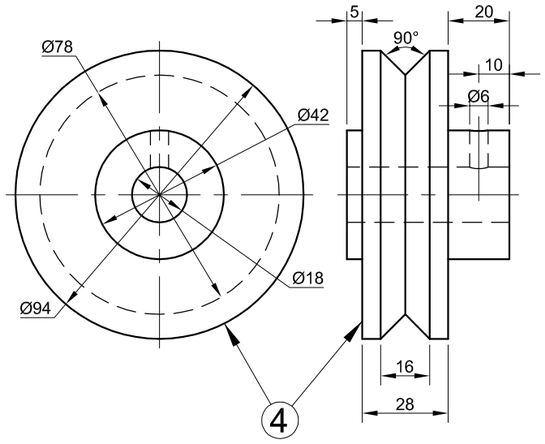
B

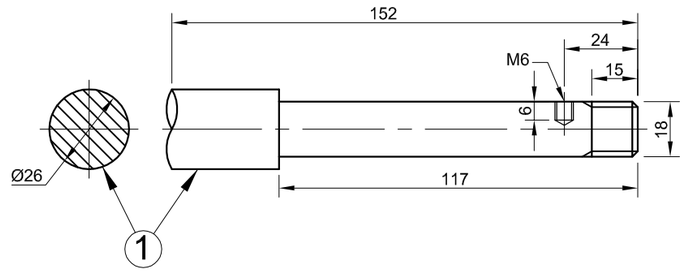
ASSESSMENT CRITERIA				
1. PLACING	1			
2. ISOMETRIC LINES	$9\frac{1}{2}$			
3. NON-ISOMETRIC LINES	$1\frac{1}{2}$			
4. ISOMETRIC CIRCLES	6			
5. CIRCLE CONSTRUCTION	2			
6. CENTRE LINES	1			
TOTAL	**21**			

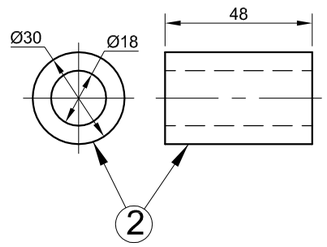
EXAMINATION NUMBER	
EXAMINATION NUMBER	4

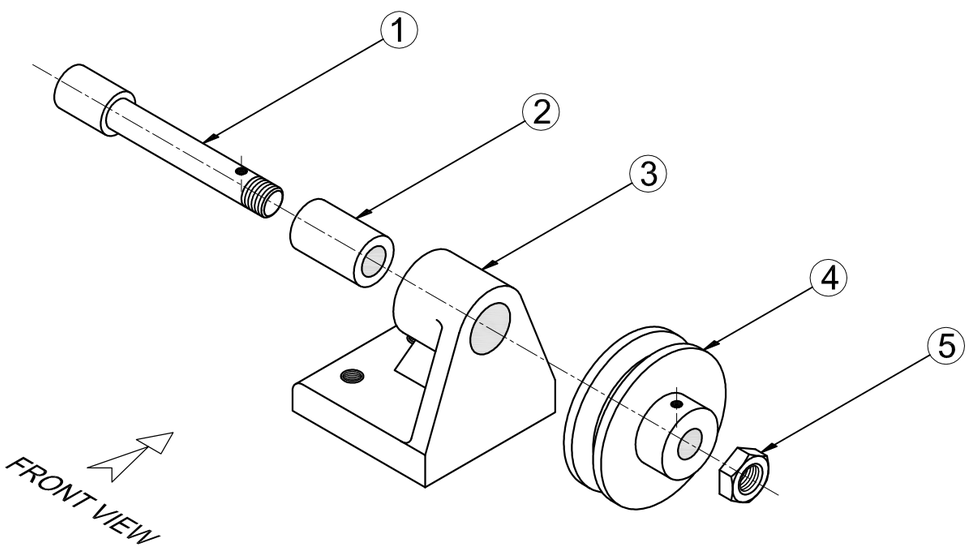
STAPLE



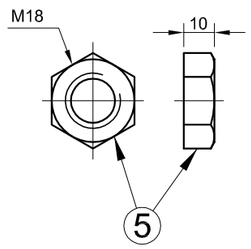








EXPLODED ISOMETRIC



QUESTION 4: MECHANICAL ASSEMBLY

Given:

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

Instructions:

- Answer this question on page 6.
- Draw, to scale 1 : 1 and in third-angle orthographic projection, the following view of the assembled parts of the bearing bracket 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 is shown on the left view of the base (part 3).
- ALL drawings must comply with the guidelines contained in the *SABS 0111.*

NOTE:

- No hidden detail is required. **[43]**

PARTS LIST		
PART	QUANTITY	MATERIAL
1. SHAFT	1	HARDENED STEEL
2. BUSH	1	BRONZE
3. BASE	1	CAST IRON
4. PULLEY	1	CAST IRON
5. M18 NUT	1	MILD STEEL

ALL DIMENSIONS ARE IN MILLIMETRES.	DRAWN BY: JOHAN	MICRO STEEL MANUFACTURING	SUTTON ROAD SYDENHAM 6001 www.microsteel.co.za
	DATE: 25/06/2011		
	CHECKED BY: BEYERS		
ALL UNSPECIFIED RADII ARE R8.	DATE: 05/07/2011	TITLE: BEARING BRACKET	
	APPROVED BY: JOSEPH		
DRAWING PROGRAM: CAD 2011	DATE: 15/07/2011	EASTERN CAPE DEPARTMENT BASIC EDUCATION GRADE 11 November 2011	
	SCALE 1 : 2		

Please turn over

STAPLE

ASSESSMENT CRITERIA				
SECTIONAL FRONT VIEW				
	POSSIBLE	OBTAINED	SIGN	MODERATE
1. SHAFT	$11\frac{1}{2}$			
2. BUSH	1			
3. BASE	$5\frac{1}{2}$			
4. PULLEY	11			
5. M18 NUT	5			
6. CENTRE LINES	1			
7. HATCHING	8			
TOTAL	**43**			

EXAMINATION NUMBER	
EXAMINATION NUMBER	6