basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P2

EXEMPLAR 2014

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

INSTRUCTIONS AND INFORMATION

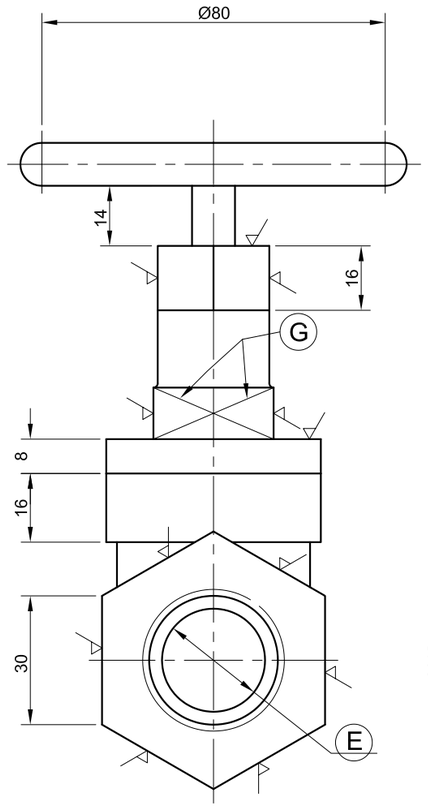
1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in third-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be completed using instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL 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											
	2	0	0			2	0	0			

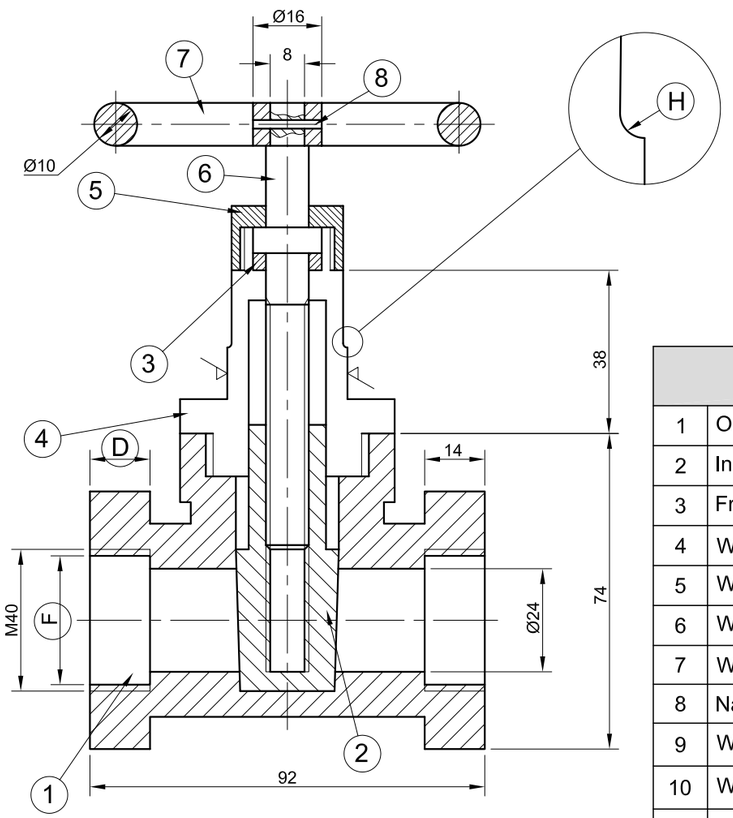
FINAL CONVERTED MARK	CHECKED BY
100	

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

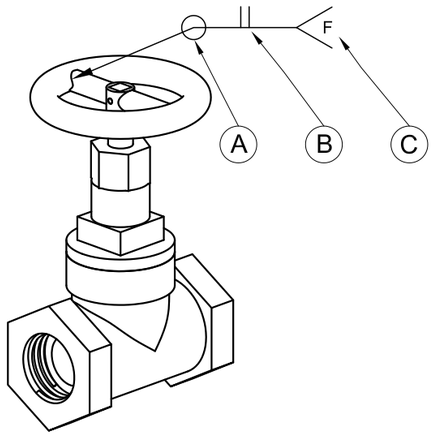
STAPLE



VIEW 2



VIEW 1



PARTS LIST

	PART	QUANTITY	MATERIAL
1.	TAP BODY	1	BRASS
2.	WEDGE	1	BRASS
3.	SEAL	1	RUBBER
4.	SHAFT GUIDE	1	BRASS
5.	GUIDE NUT	1	BRASS
6.	SHAFT	1	STAINLESS STEEL
7.	HAND WHEEL	1	STEEL
8.	PIN	1	STEEL

2013-09-26	AFROX	WELDING DETAIL	1
DATE	REVISED BY	REVISION DESCRIPTION	№

GRINDING 0,02

DRAWING PROGRAMME: AUTOCAD

DRAWING No. 01-225-BT | FILE NAME: ME31.dwg

APPROVED BY : J CLAASEN | DATE: 2013-09-20

CHECKED BY: L VAN ZYL | DATE: 2013-09-19

DRAWN BY: H SHADER | DATE: 2013-09-02

SCALE: 1 : 1

JPW DEVELOPMENTS

123 STRUBEN STR
Pretoria
www.jpwdevelopments.co.za
☏ 012 345 6789

TITLE

BRASS TAP

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:
A front and the left view of a brass tap assembly in third-angle orthographic projection, an isometric drawing of the brass tap, a parts list, 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. **[29]**

	QUESTIONS		ANSWERS			
1	On what date was the drawing prepared?			1		
2	In which city is the manufacturing company situated?			1		
3	From what material is the seal (part 3) made ?			1		
4	Who made the revision?			1		
5	What is the file name of the drawing?			1		
6	What scale is indicated for the drawing?			1		
7	What would VIEW 1 be called?			1		
8	Name the feature at H.			1		
9	What is indicated by feature G?			1		
10	What is the total height of the brass tap?			1		
11	How many parts make up the brass tap?			1		
12	Determine the complete dimensions at: D. E. F.			3		
13	With reference to the welding symbol, name the following elements.	A		1		
		B		1		
		C		1		
14	What is the purpose of the pin (part 8)?			1		
15	How many surfaces must be machined?			1		
16	Add, in neat freehand, suitable hatching to the shaft guide (part 4) on view 1.			3		
17	Insert the cutting plane on **VIEW 2** and label it S-S.			3		
18	In the box below (answer 18), neatly draw, in freehand, the symbol for the projection system used.			4		
		TOTAL		**29**		

ANSWER 18

EXAMINATION NUMBER

EXAMINATION NUMBER 2

STAPLE

S

QUESTION 2: LOCI

CAM

Given:

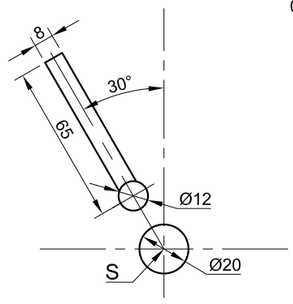
- The detail of a roller-ended follower and the cam shaft
- The incomplete displacement graph
- The position of point S on the answer sheet

Specifications:

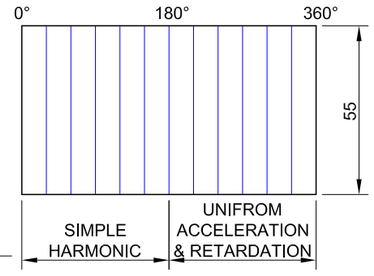
- The minimum distance from the cam profile to the centre of the camshaft = 19 mm
- The follower reciprocates along the 30° centre line which passes through the centre of the camshaft
- Rotation = clockwise

Instructions:

- Draw, to scale 1 : 1, the given follower and camshaft.
- Draw, to a horizontal scale of 8 mm equal to 30° and a displacement scale of 1 : 1, the complete displacement graph for the required motions. Label the graph.
- Project and draw the cam profile from the displacement graph.
- Show the direction of rotation on the cam profile.
- Show ALL necessary construction and projection. **[40]**



FOLLOWER DETAIL



ASSESSMENT CRITERIA						
1	PLACEMENT, GRAPH DIVISIONS + CONSTRUCTION FOR MOVEMENT + LABEL	7 ½				
2	PLOTTING POINTS & CURVE	10 ½				
3	FOLLOWER + MIN. DIST' C'LINES+ CAMSHAFT+ DIRECTION	9				
4	CONSTRUCTION	3				
5	PLOTTING	6				
6	PROFIEL	4				
TOTAL		**40**				
EXAMINATION NUMBER						
EXAMINATION NUMBER						3

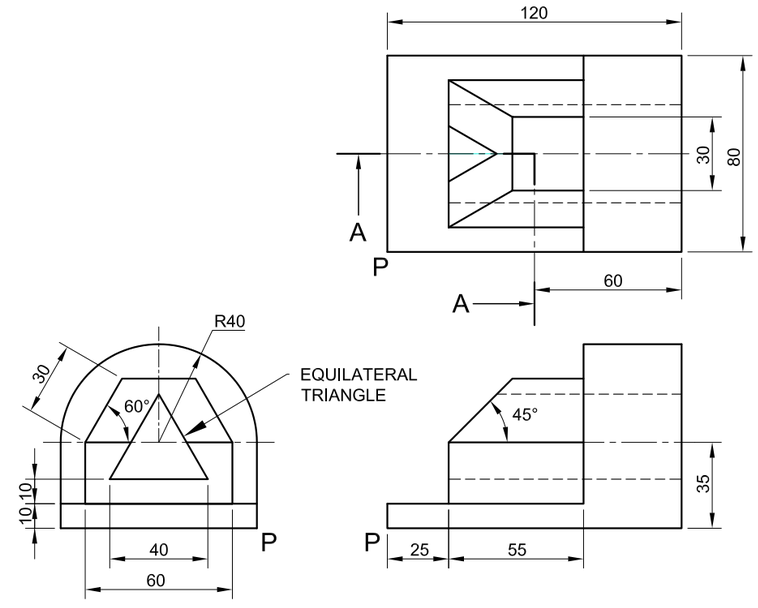
STAPLE

QUESTION 3: ISOMETRIC DRAWING

Given:
- The front view, top view and left view of a support
- The position of point P on the drawing sheet

Instructions:
Using scale 1 : 1, convert the orthographic views of the support into a sectional isometric drawing on cutting plane A-A.

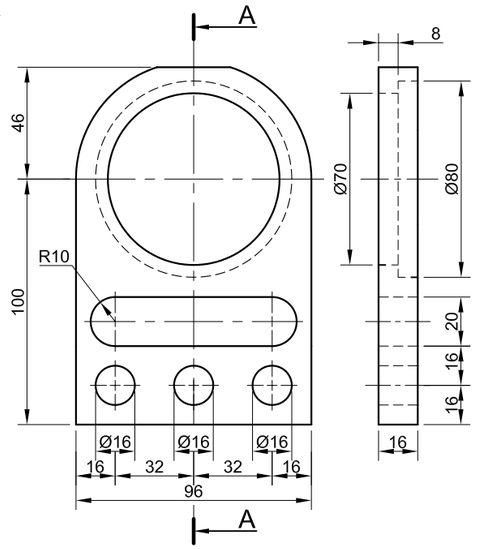
- Make P the lowest point of the drawing.
- Show ALL necessary construction.
- NO hidden detail is required. **[36]**



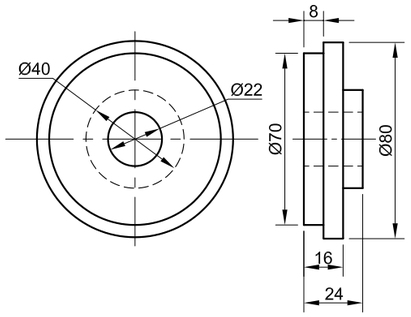
P

ASSESSMENT CRITERIA						
1.	AUX. VIEW + PLACING	4				
2.	ISOMETRIC + NON-ISOMETRIC LINES	13				
3.	ISOMETRIC CIRCLES	4				
4.	CIRCLE CONSTRUCTION	2				
5.	SECTIONED SURFACES	9				
6.	HATCHING	4				
TOTAL		**36**				
EXAMINATION NUMBER						
EXAMINATION NUMBER						4

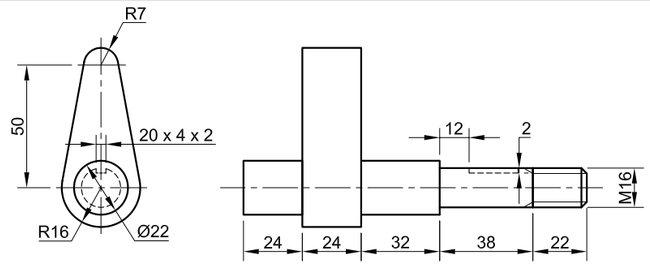
STAPLE



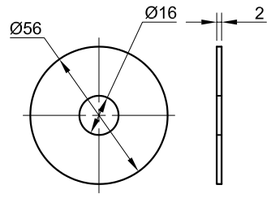
SIDE PLATE [2]



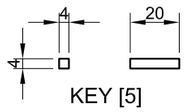
COLLAR [3]



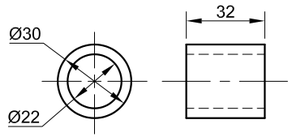
CAM SHAFT [4]



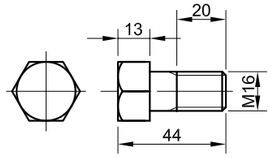
SPACER [8]



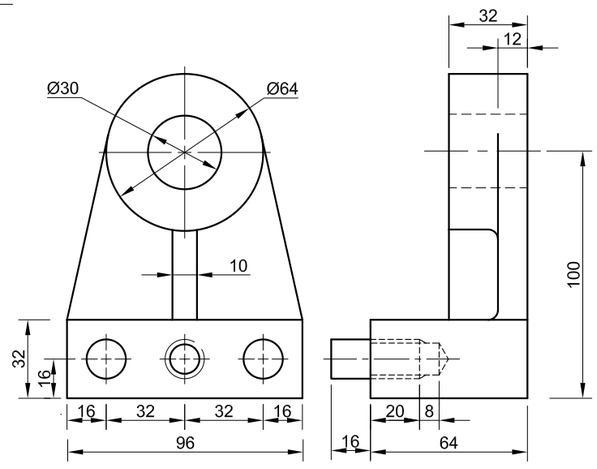
KEY [5]



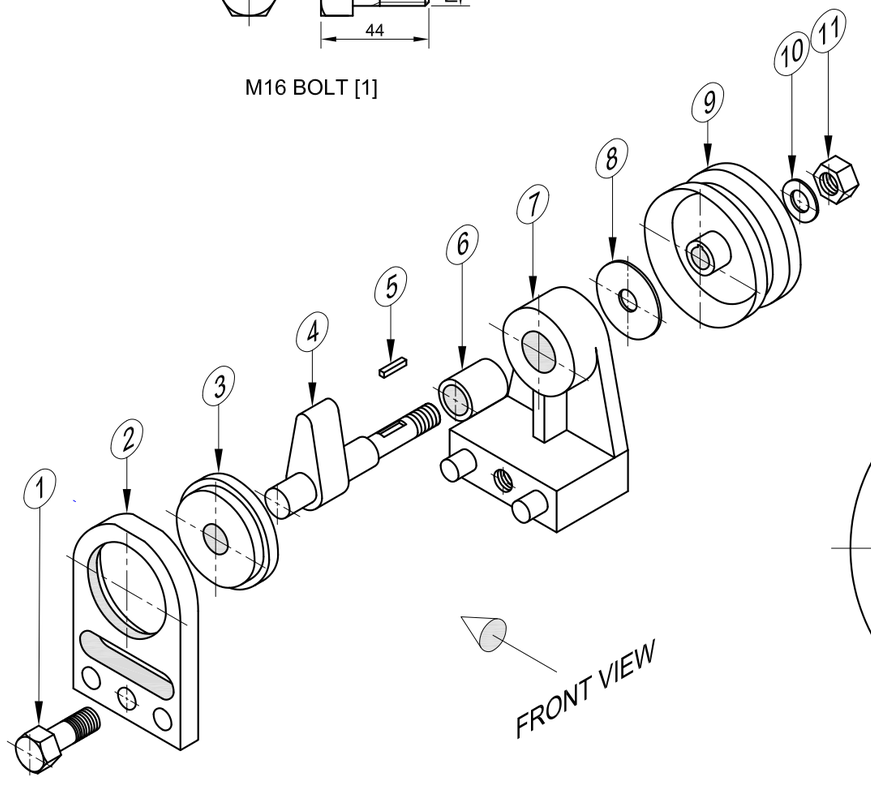
BUSH [6]



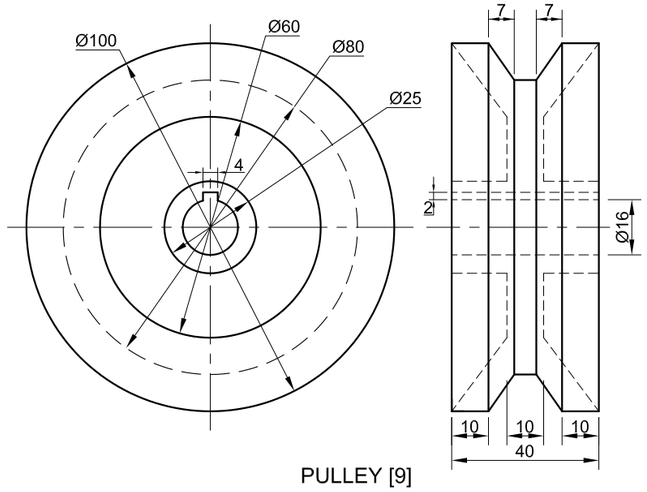
M16 BOLT [1]



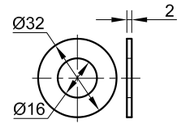
BRACKET [7]



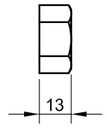
EXPLODED ISOMETRIC DRAWING



PULLEY [9]



WASHER [10]



M16 NUT [11]

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- The exploded isometric drawing of the parts of a cam-pulley assembly, showing the position of each part relative to all the others
- Orthographic views of each of the parts of the cam-pulley 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 cam-pulley 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 left view of the side plate (part 2).
  - 4.2 **The left view**
- ALL drawing must comply with the guidelines contained in the *SANS 10111.*

NOTE:

- Show THREE faces and ALL the necessary construction of the M16 nut in the front view.
- Show TWO faces and ALL the necessary construction of the M16 bolt head in the front view.
- Ilsert cutting plane A-A.
- NO hidden detail is required. **[95]**

PARTS LIST

	PART	QUANTITY	MATERIAL
1.	M16 BOLT	1	MILD STEEL
2.	SIDE PLATE	1	CAST IRON
3.	COLLAR	1	MILD STEEL
4.	CAM SHAFT	1	MILD STEEL
5.	KEY	1	BRASS
6.	BUSH	1	CAST IRON
7.	BRACKET	1	MILD STEEL
8.	SPACER	1	MILD STEEL
9.	PULLEY	1	CAST IRON
10.	WASHER	1	MILD STEEL
11.	M16 NUT	1	MILD STEEL

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CAM-PULLEY

ALL DIMENSIONS ARE IN MILLIMETRES.

ALL UNSPECIFIED RADII ARE R4

Please turn over

STAPLE

ASSESSMENT CRITERIA					
SECTIONAL FRONT VIEW					
1	BRACKET	7 ½			
2	SIDE PLATE	4			
3	CAM SHAFT	10			
4	BELT PULLEY	13 ½			
5	COLLAR	3 ½			
6	M16 NUT	5			
7	M16 BOLT	8			
8	BUSH	2			
9	SPACER	1			
10	KEY	1 ½			
11	WASHER	1			
H	HATCHING	13 ½			
SUBTOTAL		70 ½			
LEFT VIEW					
1	SIDE PLATE	5			
2	BRACKET	2			
3	COLLAR	½			
4	BOLT	1			
5	CAM SHAFT	2			
6	PULLEY	1			
SUBTOTAL		**11 ½**			
GENERAL					
1	CENTRE LINES	8			
2	ASSEMBLY	5			
SUBTOTAL		**13**			
PENALTIES (-)					
TOTAL		**95**			
EXAMINATION NUMBER					
EXAMINATION NUMBER					6