

STAPLE



# basic education

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**ENGINEERING GRAPHICS AND DESIGN P2**  
**NOVEMBER 2016**

**MARKS: 100**  
**TIME: 3 hours**

This question paper consists of 6 pages.

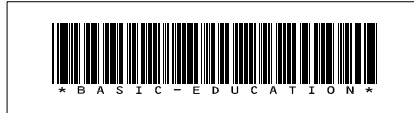
## INSTRUCTIONS AND INFORMATION

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, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
8. Proper planning 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	$\frac{1}{2}$	SIGN	MODERATED	$\frac{1}{2}$	SIGN	RE-MARKING	$\frac{1}{2}$	SIGN		
1											
2											
3											
4											
<b>TOTAL</b>											
	2	0	0		2	0	0		2	0	0

FINAL CONVERTED MARK	CHECKED BY
100	

<b>COMPLETE THE FOLLOWING:</b>
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER







**QUESTION 2: LOCI**

**NOTE:** Answer QUESTIONS 2.1 and 2.2.

**2.1 MECHANISM**

**Given:**

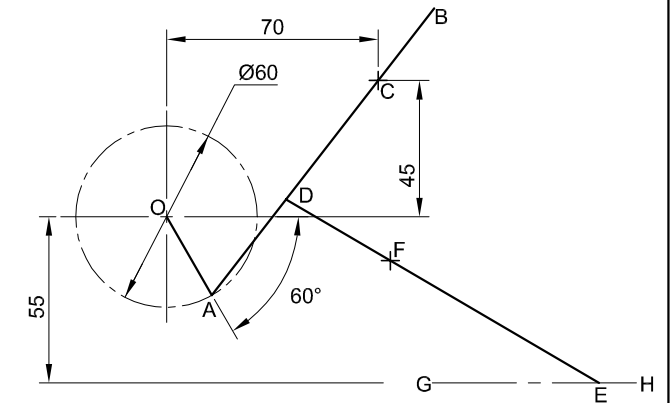
- A schematic drawing of a mechanism consisting of crank OA, connecting rod AB, swivel guide C, sliding rod DE, pin F and horizontal groove GH
- The position of centre point O on the drawing sheet

**Specifications:**

- The positions of O, C and groove GH are fixed
- Connecting rod AB is pin joined to crank OA at A
- Sliding rod DE is pin-joined to connecting rod AB at D
- Pin F is fixed to sliding rod DE
- AB = 120 mm
- DE = 120 mm
- AD = 40 mm
- DF = 40 mm

**Motion:**

As crank OA rotates in a clockwise direction, connecting rod AB freely slides through swivel guide C. Point E of sliding rod DE reciprocates along groove GH during the rotation.



**Instructions:**

- Draw, to scale 1:1, the given schematic drawing of the mechanism.
- Trace the locus generated by point F for ONE complete rotation of crank OA.

Show ALL necessary construction.

ASSESSMENT CRITERIA 2.1				
1	GIVEN	5		
2	CONSTRUCTION	7		
3	POINTS + CURVE	8		
<b>SUBTOTAL</b>		<b>20</b>		

[20]

O+

**2.2 AUGER (HELIX)**

**Given:**

- The incomplete front view and the left view of an auger with PQ indicating the starting position
- The position of centre point R on the drawing sheet

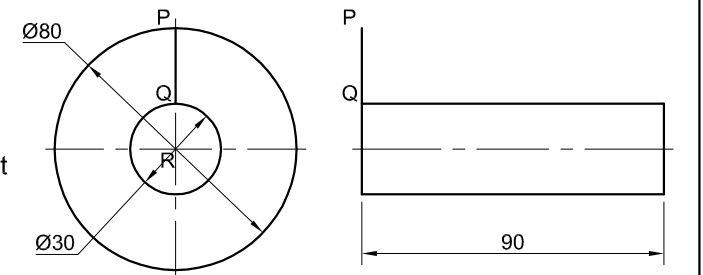
**Specifications:**

- Pitch : 60 mm
- Turns : ONE AND A HALF
- Direction : Right-handed

**Instructions:**

Draw, to scale 1 : 1, the given left view and the complete front view of the auger.

- Show ALL necessary construction.
- No hidden detail is required.



ASSESSMENT CRITERIA 2.2				
1	GIVEN + CENTRE LINES	4		
2	CONSTRUCTION	6		
3	OUTSIDE HELIX + CURVE QUALITY	8		
4	INSIDE HELIX + SHAFT	4		
<b>SUBTOTAL 2.2</b>		<b>22</b>		
<b>SUBTOTAL 2.1</b>		<b>20</b>		
<b>TOTAL</b>		<b>42</b>		

[22]

R+





**QUESTION 3: ISOMETRIC DRAWING**

**Given:**

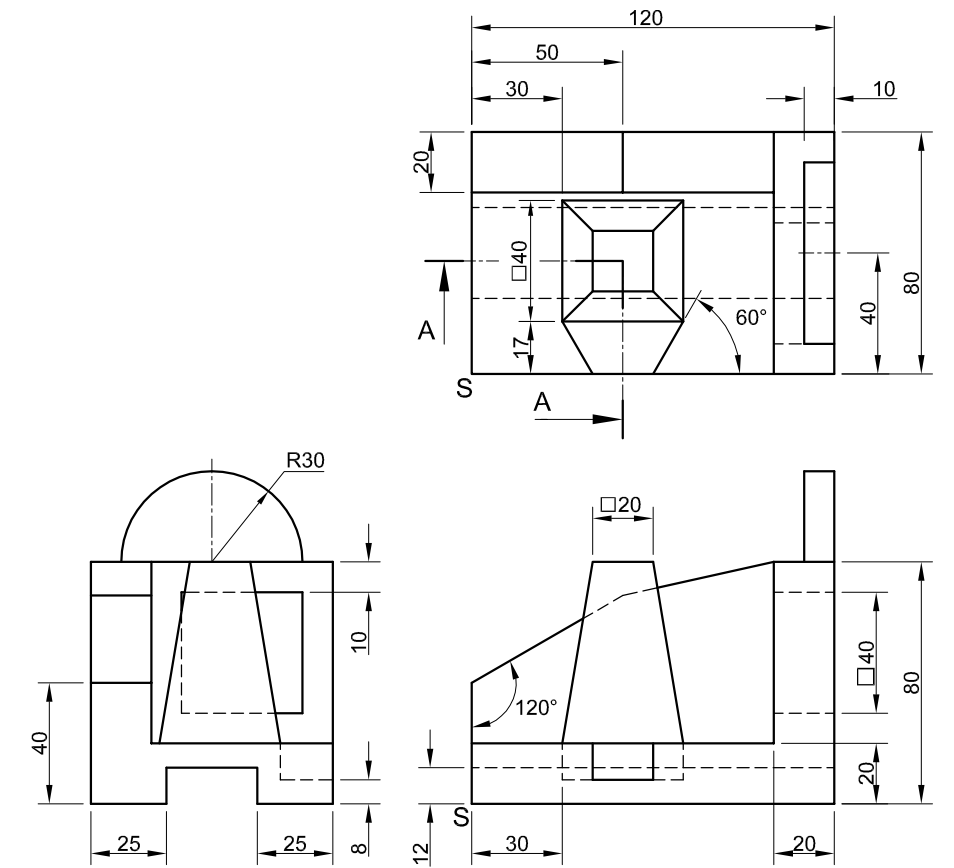
- The front view, top view and left view of a jig
- The position of point S on the drawing sheet

**Instructions:**

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

- Make S the lowest point of the drawing.
- Show ALL necessary construction.
- NO hidden detail is required.

**[40]**



S ↙

ASSESSMENT CRITERIA			
1	AUX. VIEW + PLACING	2 ½	
2	ISOMETRIC + NON-ISOMETRIC LINES	23	
3	SECTIONED SURFACES	9	
4	ISOMETRIC CIRCLES + CIRCLE CONSTR'	5 ½	
<b>TOTAL</b>		<b>40</b>	
EXAMINATION NUMBER			
EXAMINATION NUMBER			
EXAMINATION NUMBER			4







FOR OFFICIAL USE ONLY		
INCORRECT SCALE		
INCORRECT HATCHING		
PARTS NOT ASSEMBLED		
<b>TOTAL</b>		

ASSESSMENT CRITERIA					
TOP VIEW					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	BODY	5 1/2			
2	ADJUSTING SCREW	6			
3	PLATE	1			
4	SLIDE BLOCK	2 1/2			
5	SPACER	1/2			
6	TOOL HOLDER	1			
7	M16 BOLT	2 1/2			
<b>SUBTOTAL</b>		<b>19</b>			
SECTIONAL FRONT VIEW					
1	BODY	13			
2	ADJUSTING SCREW	10			
3	PLATE	3			
4	SLIDE GUIDE	3 1/2			
5	SLIDE BLOCK	4 1/2			
6	SPACER	3			
7	TOOL HOLDER	10			
8	M16 BOLT	8			
<b>SUBTOTAL</b>		<b>55</b>			
GENERAL					
1	CENTRE LINES	3			
2	CUTTING PLANE	4			
3	ASSEMBLY	7			
<b>SUBTOTAL</b>		<b>14</b>			
<b>TOTAL</b>		<b>88</b>			
PENALTIES (-)					
<b>GRAND TOTAL</b>					
EXAMINATION NUMBER					
EXAMINATION NUMBER					
<b>6</b>					

