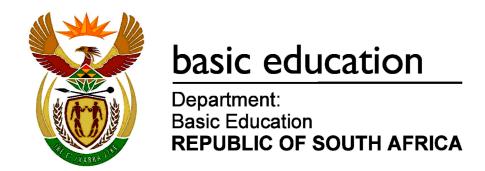


Confidential



SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

ENGINEERING GRAPHICS AND DESIGN P2 MAY/JUNE 2024

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

	В	arcode label	

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 prepared using pencil and 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. 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	MARK	S OBT	AINED	1/2	SIGN	МС	DERAT	ED	1/2	SIGN	RE	-MARKI	NG	1/2	SIGN
1															
2															
3															
4															
TOTAL															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK	CHECKED BY
100	

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

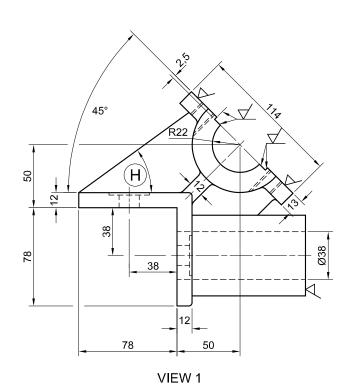
DO NOT FOLD THE QUESTION PAPER IN HALF.

Copyright reserved

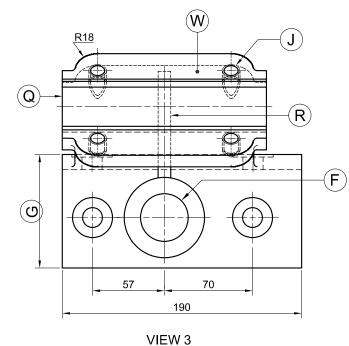
Please turn ove

Engineering Graphics and Design/P2 SC/NSC Confidential DBE May/June 2024

4 x Ø16 HOLE CBORE Ø32 x 2 DEEP (0)4 x M14 x 1,5 R18 (S)(B) (T) (U)**AUXILIARY VIEW**



VIEW 2



		DRAWING	AUTOCAD 2023	ALL DIMENSIONS ARE IN I	1 MILLING	
HANGER STREET PROGRAMME: CAPE TOWN			QUANTITY: 1500	c		
FIL	E NAME: JJVWBJ-6	DRAWING No. 013	SCALE 1:3	DRAWN BY: VERNON	DATE: 2023-05-19	
	MECHANICAL DRAUGHTERS 63 HUBBLE ROAD www.mecdraw.co.za			CHECKED BY: BARRY	DATE: 2023-05-27	2
CAPE TOWN 021 291 0910 7700			APPROVED: SIPHO	DATE: 2023-05-31		
TITLE: CORNER BRACKET				ALL UNSPECIFIED RADII ARE 2,5 mm.	TOLERANCE: +0,02 -0,17	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \

QUESTION 1: ANALYTICAL (MECHANICAL)

Given:

The front view, top view, right view and an auxiliary view of a corner bracket, a title block and a table of questions. The drawing is not presented to the indicated scale.

Instructions:

Complete the table below by neatly answering the questions, which refer to the accompanying drawings, title block and mechanical content.

	QUESTIONS	ANSWERS	3	
1	Who approved the drawing?		1	
2	What is the web address of the draughting firm?		1	
3	What is the file name of the drawing?		1	
4	How many corner brackets must be manufactured?		1	
5	What drawing method has been used to prepare the drawing?		1	
6	How deep is the counter bore of the 4 x Ø16 holes?		1	
7	If a scale of 1 : 1 was used, how would the dimension at A read?		1	
8	Which VIEW is the front view of the drawing?		1	
9	How many threaded holes are on the bracket?		1	
10	Name the feature at B.		1	
11	Determine the complete dimensions at : C : D :	E: F: G:	5	
12	Measure the angle at H.		1	
13	Determine the complete dimension at J.		2	
14	With reference to the tolerance, determine the maximum and minimum dimensions for K.		2	
15	How many surfaces on the corner bracket must be machined?		1	
10	Match the surfaces labelled Q and R on VIEW 3 with the	Q:		
16	corresponding labelled surfaces on VIEW 2.	R:	2	
17	Which view shows the true shape of the surface at W?		1	
18	What is indicated by C on the machining symbol at 1 in the title block?		1	
19	What does the machining symbol at 2 in the title panel indicate?		1	
20	In the space below (ANSWER 20), complete, in neat freehand, the SANS 1011 conventions of the interrupted views shown.	ne side view of each of the three	4	
		TOTAL	30	

ANSWER 20								
A	В	c						



Given:

The detail of a camshaft and a wedge-shaped follower at the minimum distance from the camshaft centre.

DBE May/June 2024

• The position of centre point P on the drawing sheet

Specifications:

- The wedge-shaped follower reciprocates along a 60° line that passes through the centre of the camshaft.
- The **minimum** distance from the follower to the centre of the camshaft = 20 mm
- Rotation = anti-clockwise

Motion:

The cam imparts the following motion to the wedgeshaped follower:

- It rises 40 mm over the first 60° with uniform motion.
- There is a dwell period for the next 30°.
- It rises to its maximum displacement of 80 mm over the next 90° with uniform motion.
- It descends 40 mm over the next 90° with simple harmonic motion.
- It returns to its original position with uniform acceleration and retardation over the remainder of the rotation.

Instructions:

- Using centre point P on the drawing sheet, draw, to scale 1: 1, the camshaft and wedge-shaped follower in the given position.
- Draw to a rotational scale of 30° = 8 mm and a displacement scale of 1:1, the complete displacement graph for the required motion.
- Using the given position of the follower as 0°, project and draw the cam profile from the displacement graph.
- Indicate the direction of rotation on the cam profile with an arrow.
- Indicate the rotational scale of the graph.
- Show ALL construction and projection.

60° Ø16

WEDGE-SHAPED FOLLOWER AND CAMSHAFT DETAIL

ASSESSMENT CRITERIA							
1	GIVEN + MINIMUM DISTANCE + CL	5					
2	GRAPH CONSTRUCTION	7					
3	PLOTTING GRAPH + GRAPH CURVES	9					
4	CAM CONSTRUCTION	5					
5	PLOTTING + CAM PROFILE	11					
PENA	ALTIES (-)						
	TOTAL	37					
EXAMINATION NUMBER							
	EXAMINATION NU	MBER				3	

[37]



QUESTION 3: ISOMETRIC DRAWING

Given:

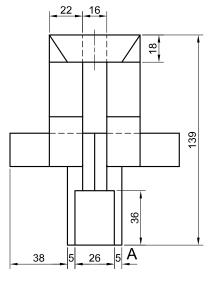
- The front view, top view and right view of a casting
- The position of point A on the drawing sheet

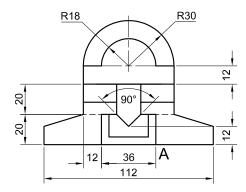
Instructions:

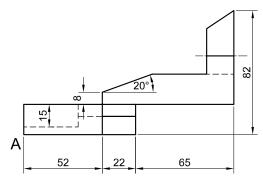
Using scale 1: 1, convert the orthographic views of the casting into an isometric drawing.

- Use A as the starting and lowest point of the drawing.
- Show ALL construction.
- NO hidden detail is required.

[40]



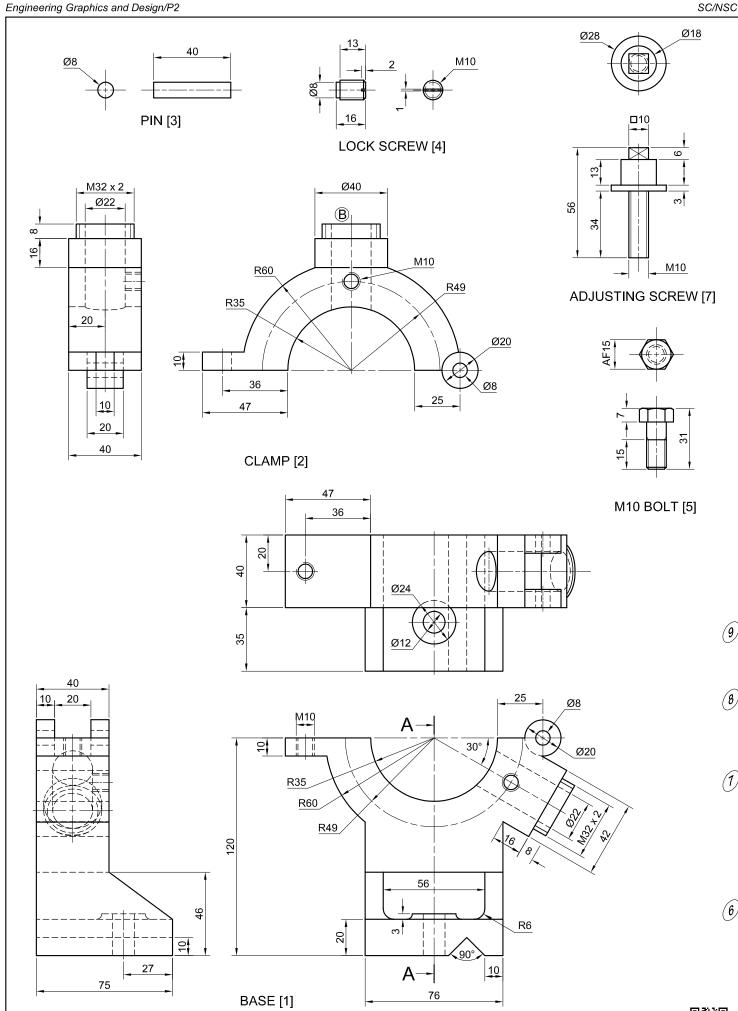


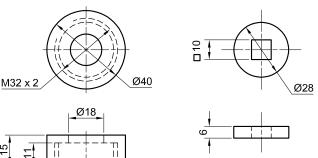


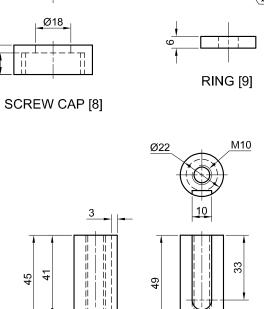
 $\stackrel{\checkmark}{\mathsf{A}}$

ASSESSMENT CRITERIA								
1	PLACING + AUX. VIEW	2						
2	FRONT PORTION	$12\frac{1}{2}$						
3	UPPER PORTION	18 ½						
4	ARCS + CONSTR. + CL	7						
PENA	LTIES (-)							
	TOTAL							
EXAMINATION NUMBER								
EXAMINATION NUMBER 2024 4								









GUIDE [6]

QUESTION 4: MECHANICAL ASSEMBLY

Given:

- Orthographic views of each part of the fixed lathe steady assembly
- The exploded isometric drawing of the parts of a fixed lathe steady assembly, showing the position of each part relative to all the others

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 fixed lathe steady assembly:
 - 4.1 The front view as seen from the direction of the arrow on the exploded isometric drawing.
 - 4.2 **A sectional left view** on cutting plane A-A. The cutting plane is shown on the front view of the base (part 1).

NOTE:

- Planning is essential.
- The convention of symmetry may NOT be applied.
- The drawing must comply with the SANS 10111 guidelines.
- Draw the guide (part 6), adjusting screw (part 7), screw cap (part 8) and the ring (part 9) only in the top hole marked B.
- Draw only the top lock screw (part 4) in position, as shown in the exploded isometric drawing.
- Show THREE faces of the M10 bolt (part 5) in the front
- nidden detail is required.
- cutting plane A-A.

[93]

		view. NO hi
9		• Add c
	5	
(8)		(3)
1		
		3)
6		
FRONT VIE	W EXPLODED ISOMETRIC DRAWING	1

PARTS LIST								
	PARTS QUANTITY MATERIAL							
1	BASE	1	CAST IRON					
2	CLAMP	1	CAST IRON					
3	PIN	1	STEEL					
4	LOCK SCREW	1	STEEL					
5	M10 BOLT	1	STEEL					
6	GUIDE	1	BRASS					
7	ADJUSTING SCREW	1	STEEL					
8	SCREW CAP	1	BRASS					
9	RING	1	ALUMINIUM					
7 XANDER STREET								

GUIDANCE ENGINEERING CC

7 XANDER STREET DE JAGER www.guidance.co.za **2** 012 345 6789

FIXED STEADY ASSEMBLY

ALL DIMENSIONS ARE IN MILLIMETRES.



INCORRECT ORTHOGRAPHIC PROJECTION

INCORRECT OVERALL SCALE

INCORRECT HATCHING

PARTS NOT ASSEMBLED

FOR OFFICIAL USE ONLY

TOTAL PENALTIES (-)

ASSESSMENT CRITERIA								
	FRONT VIEW							
		POSSIBLE	OBTAINED	SIGN	MODERATED			
1	BASE	15						
2	CLAMP + PIN	5						
3	SCREW CAP + RING	3						
4	GUIDE	1						
5	LOCK SCREW	$2\frac{1}{2}$						
6	M10 BOLT	6						
7	ADJUSTING SCREW	1						
SL	IBTOTAL	33 ½						
	SEC	TIONAL	LEFT VI	EW				
1	BASE	12						
2	CLAMP	7						
3	GUIDE	8 1 2						
4	ADJUSTING SCREW	6 ½						
5	RING	3						
6	LOCK SCREW	4 ½						
7	SCREW CAP	3						
SL	IBTOTAL	44 ½						
		GENE	RAL					
1	CENTRE LINES	4						
2	ASSEMBLY	8						
3	CUTTING PLANE A-A	3						
SUBTOTAL 15								
	TOTAL	93						
PENA	ALTIES (-)							
GRAND TOTAL								

EXAMINATION NUMBER

EXAMINATION NUMBER

6

