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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

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.



Confidential

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.
- 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.
- 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	MARKS OBTAINED		AINED	1/2	SIGN	МС	DERAT	ED	1/2	SIGN	RE	-MARKI	NG	1/2	SIGN
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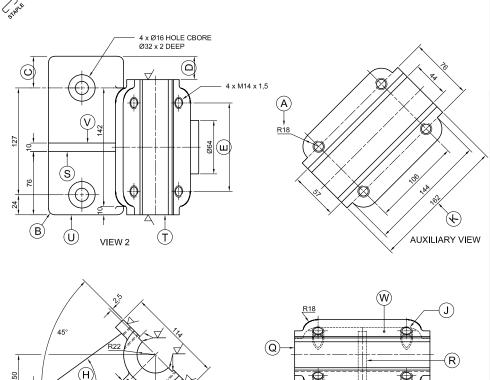
COMPLETE THE FOLLOWING:	
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DO NOT FOLD THE QUESTION PAPER IN HALF.

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Please turn over

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'	VIEW 3	

COMMISSIONED BY: BRACKETS FOR AFRICA	DRAWING	AUTOCAD 2023	ALL DIMENSIONS ARE IN I	1 MILLING	
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TITLE: CORI	NER BRACKET	·	ALL UNSPECIFIED RADII ARE 2,5 mm.	TOLERANCE: +0,02 -0,17	V

QUESTION 1: ANALYTICAL (MECHANICAL)

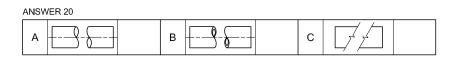
Given:

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. [30]

		QUESTIONS	ANSWER	S	
	1	Who approved the drawing?		1	
	2	What is the web address of the draughting firm?		1	
\setminus	3	What is the file name of the drawing?		1	
Ī	4	How many corner brackets must be manufactured?		1	
Ī	5	What drawing method has been used to prepare the drawing?		1	
Ī	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	
Ī	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	
	/	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	





EXAMINATION NUMBER

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VIEW 1

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TARILE

QUESTION 2: LOCI (CAM)

Given

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

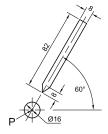
The cam imparts the following motion to the wedgeshaped follower:

- 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.

[37]



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 NU	MBER					

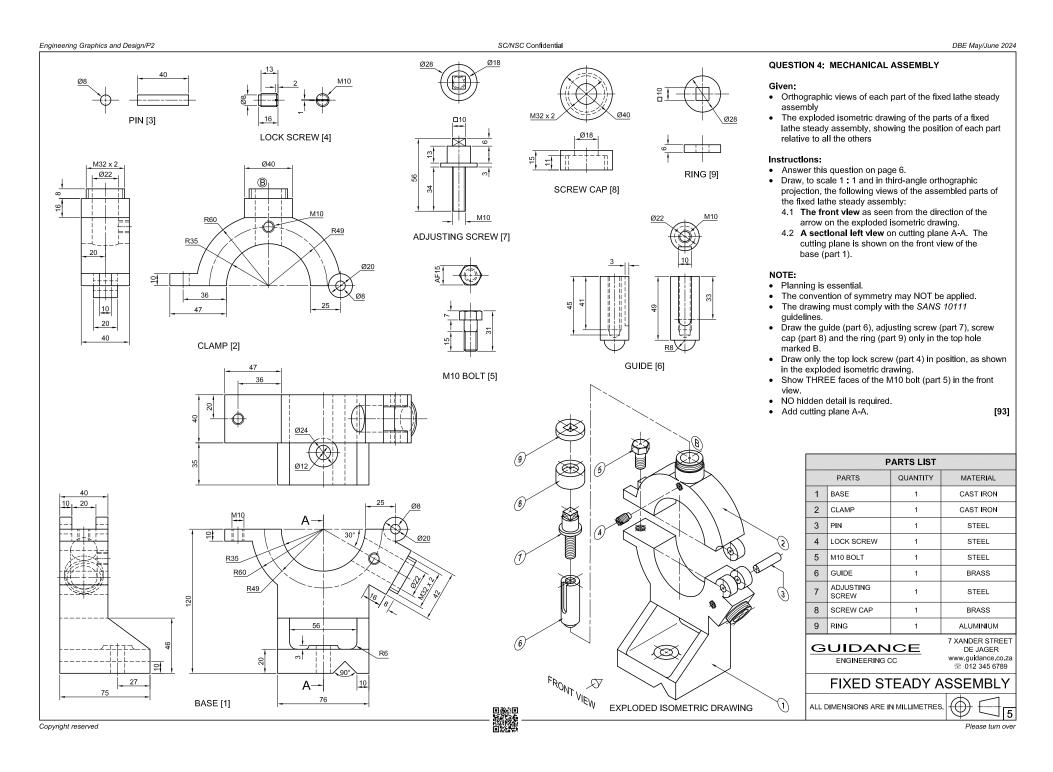
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Engineering Graphics and Design/P2 SC/NSC Confidential DBE May/June 2024 QUESTION 3: ISOMETRIC DRAWING Given: • The front view, top view and right view of a casting • The position of point A on the drawing sheet Instructions: Using scale 1:1, convert 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] 12 36 ASSESSMENT CRITERIA 1 PLACING + AUX. VIEW 2 FRONT PORTION 12 ½ 18 ½ 3 UPPER PORTION 4 ARCS + CONSTR. + CL PENALTIES (-) TOTAL 40 EXAMINATION NUMBER

EXAMINATION NUMBER



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