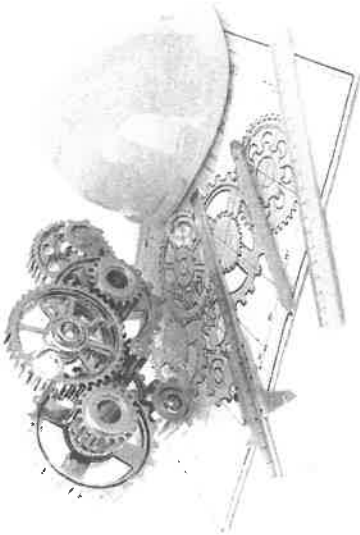




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2020

PAPER 2

MARKS: 200
TIME: 3 HOURS

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of **6 pages**, including the cover page and **4 questions**.
2. **All** questions must be answered.
3. Unless specified otherwise, all questions are in **third-angle orthographic projection**.
4. Unless specified otherwise, all questions are to be completed to a scale of **1:1**.
5. **All** answer sheets must be re-stapled in numerical order and handed in, even unanswered questions.
6. **All construction work** must be shown, even if a **stencil** was used.
7. Print your **examination number** neatly on each page.
8. Use only the **answer sheets** provided.
9. Your drawings should be **well presented** and **reflect neatness and accuracy**. Marks will be **deducted** for untidy and inaccurate work.
10. All dimensions or detail not given must be **assumed in good proportion**.
11. **Stencils** and **calculators** may be used.
12. **All** drawings must adhere to the **SANS 10111-1**.
13. In order to save time, **detailed assembly parts** must be **drawn to convention**.

FOR OFFICIAL USE ONLY					
QUESTION	SECTION	MARK	MODERATED	MAXIMUM	CODE
1	MECHANICAL ANALYTICAL			20	
2	LOCI CAM			40	
3	ISOMETRIC DRAWING			40	
4	MECHANICAL ASSEMBLY			100	
	TOTAL			200	

EXAMINATION NUMBER

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QUESTION 2

LOC
CAM

The following are given in the adjacent drawing:

- the incomplete **graph of displacement** in position of a **wedge-ended** follower.
- the vertical and horizontal centre lines of the camshaft.
- the shaft and follower detail at the starting position.

The cam imparts the following motion to the follower:

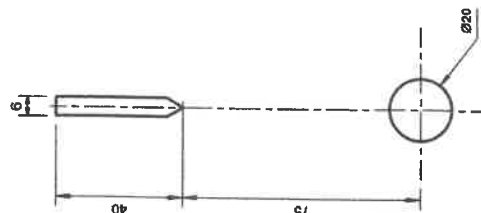
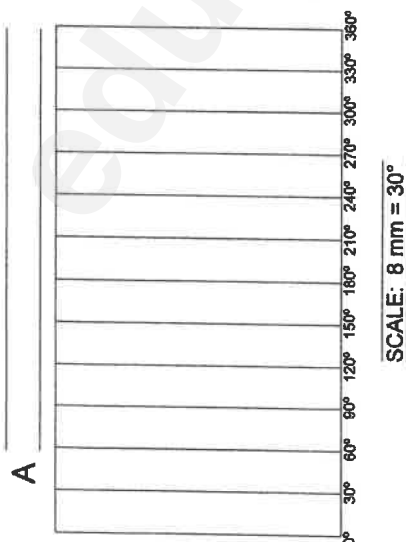
- 0° – 60° the follower **drops** 20 mm with **uniform motion**.
- 60° – 105° the follower is at **rest**.
- 105° – 195° the follower **drops** 34 mm with **simple harmonic motion**.
- 195° – 240° the follower is at **rest**.
- 240° – 360° the follower returns to its original position with **uniform acceleration and retardation**.

The cam profile has the following specifications:

- The direction of rotation is **anti-clockwise**.

Now do the following:

- 2.1 Draw the complete graph of displacement.
- 2.2 Draw and hatch the camshaft.
- 2.3 Draw the wedge-ended follower to the given measurements.
- 2.4 Draw the direction of rotation.
- 2.5 Draw and label all the divisions on the cam profile.
- 2.6 Draw the cam profile from the displacement graph.
- 2.7 Print, in capitals, the required **label** for the graph of displacement at A.
- 2.8 Show all constructions.



ASSESSMENT CRITERIA	
• Graph & Label	15
• Plot Points	16
• Locus & Construction	4
• Shaft and Hatching	2
• Direction & Divisions	2
• Follower	1

GRPH	15
PTS	16
LOC	4
SHFT	2
DIR	2
FOL	1

40 MARKS

EXAMINATION NUMBER

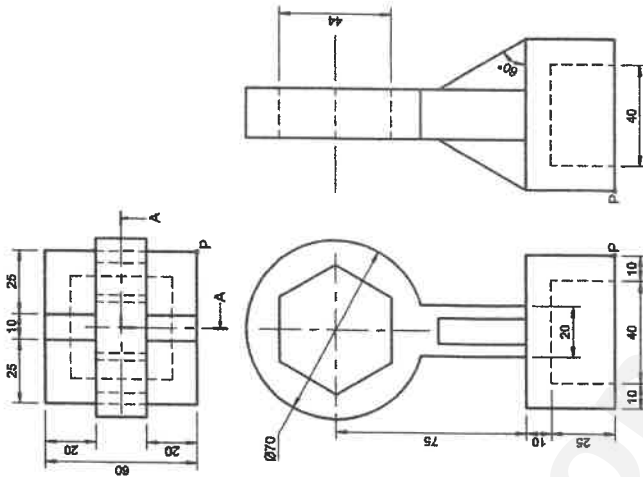
ANSWER SHEET 2

CONSTRUCTION AREA

QUESTION 3
ISOMETRIC
DRAWING

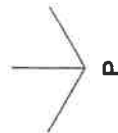
The figure below shows the front view, top view and right view of a heavy-duty **CASTING**. The **CASTING** is cut by **cutting-plane A-A**.

- 3.1 Draw a neat **half-sectioned isometric drawing** of the **CASTING** on **cutting-plane A-A**.
- 3.2 Draw the auxiliary views of the hexagon and angle in the construction area.
- 3.3 Do not draw any centre lines.
- 3.4 Make point **P** the starting point of your drawing.



CON	2
ISOM	23
CIRC	8
HAT	7

ASSESSMENT CRITERIA	
• Constructions	2
• Isometric Points	46/2
• Isometric Circles	8
• Hatching / Non-Hatching	7

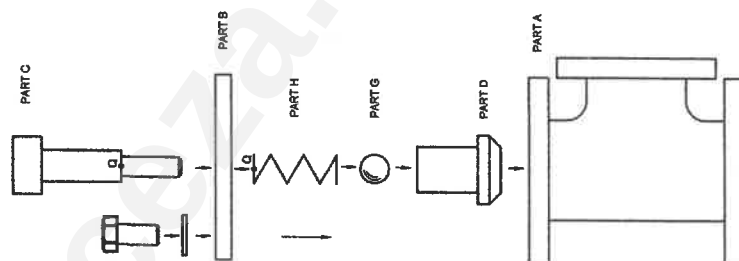
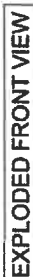


40 MARKS

EXAMINATION NUMBER

ANSWER SHEET 3

QUESTION 4
MECHANICAL
ASSEMBLY



PARTS LIST			
NO	PART	QUANTITY	MATERIAL
A	VALVE BODY	1	CARBON STEEL
B	VALVE COVER	1	CARBON STEEL
C	TENSION ADJUSTER	1	HIGH-TENSILE STEEL
D	VALVE	1	CARBON STEEL
E	M14 BOLT	4	HIGH-TENSILE STEEL
F	WASHER	4	MILD STEEL
G	SPHERE	1	STAINLESS STEEL
H	COMPRESSION SPRING	1	STAINLESS STEEL

100 MARKS

EXAMINATION NUMBER

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MECHANICAL
ASSEMBLY

ASSESSMENT CRITERIA	
FRONT VIEW	
A BODY	26/2 13
B COVER	6/2 3
C ADJUSTER	10/2 5
D VALVE	12/2 6
E M14 BOLT	9
F WASHER	2
G SPHERE	1
H SPRING	5
THREAD	6/2 3
TOTAL	47

RIGHT VIEW	
A BODY	16/2 8
B COVER	4/2 2
D VALVE	4
E M14 BOLT	3
F WASHER	1
HIDDEN DETAIL	8
PCD CENTRE LINE	1
TOTAL	27

ADDITIONAL	
CORRECT ASS.	3
HATCHING	14/2 7
NON-HATCHING	2
CENTRE LINES	4
DIMENSIONS	3
CUTTING PLANE	6/2 3
TITLE/SCALE/LABEL	4
TOTAL	26

TOTAL	
TOTAL	100

TITLE:	
SCALE:	

EXAMINATION NUMBERANSWER SHEET 4