HILLCREST HIGH SCHOOL

NOVEMBER EXAMINATION

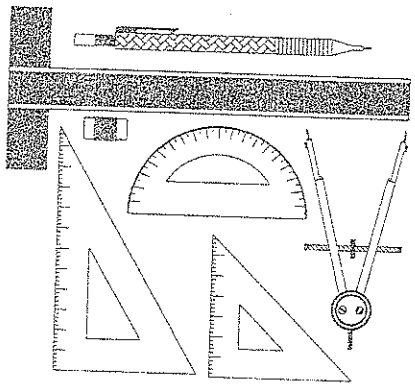
ENGINEERING, GRAPHICS & DESIGN

GRADE 11

2013

PAPER 2

MARKS: 180 **TIME**: 3 HOURS



INSTRUCTIONS TO CANDIDATES

1. This question paper consists of 5 pages including the cover page and 3 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, even questions that are not attempted/blank.
6. All construction work must be shown, even if a stencil was used.
7. Print your NAME neatly on each page.
8. Use only the drawing sheets provided.
9. Your drawings should reflect neatness and accuracy.
10. All dimensions or detail not given may be assumed in good proportion.

QUESTION	SECTION	MARK	MAXIMUM
1	LOCI: CAM PROFILE		40
2	ISOMETRIC PROJECTION		30
3	MECHANICAL ASSEMBLY		110
TOTAL			180
SYMBOL			100

NAME

NOVEMBER 2013
GRADE 11 P2

QUESTION 1
30 MARKS

LOCI:
CAM PROFILE

A disc cam rotates with uniform velocity in a clockwise direction, and transmits the following motion to a wedge - ended follower which reciprocates along the vertical centre line of the cam shaft. The position of the follower is shown below.
During the first 45° rotation the follower ***rises 15mm***.
During the next 45° rotation the follower is at ***rest***.
During the next 45° rotation the follower ***rises 15mm***.
During the next 45° rotation the follower ***falls 30mm***.
During the next 30° rotation the follower is at ***rest***.
During the next 45° rotation the follower ***falls 15mm***.
During the next 45° rotation the follower is at ***rest***.
During the final 60° rotation the follower returns to the ***original position***.

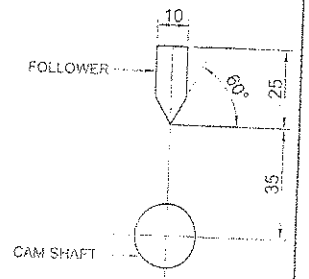
Cam Shaft Diameter = 20mm

Draw the following:
2a.1.1. the graph of displacement, using a scale 7mm = 30°.
2a.1.2. the profile of the cam that generates the above motion.

Calculate the following:
2a.2.1. The maximum displacement.
2a.2.2. The total travel.
2a.2.3. The displacement at 240°.
2a.2.4. The travel at 240°.

ASSESSMENT CRITERIA
You will be assessed on your ability to do the following:

• draw a graph of displacement	(8)
• label the graph of displacement	(3)
• accurately plot the minimum cam profile	(2)
• draw and hatch the cam shaft	(2)
• draw and label the divisions	(1)
• draw the follower to the given dimensions	(2)
• draw the direction	(1)
• project points from the graph to the divisions	(1)
• accurately plot the locus of the cam profile	(14)
• draw the centre lines	(2)
• answer the questions based on the graph	(4)



2a.2.1. The maximum displacement =
2a.2.2. The total travel =
2a.2.3. The displacement at 240° =
2a.2.4. The travel at 240° =

NAME

ANSWER SHEET 1

NOVEMBER 2013
GRADE 11 (P)

QUESTION 2

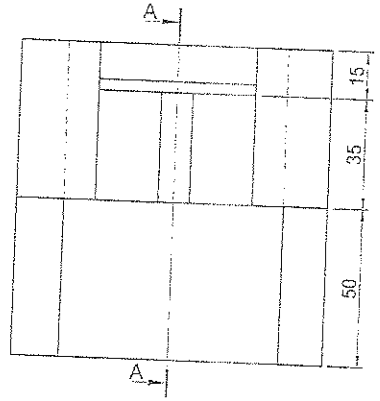
ISOMETRIC PROJECTION

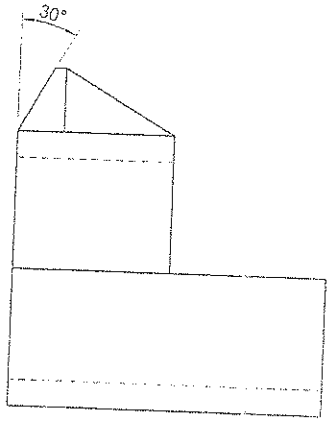
The figure shows the front view, top view and left view of a CASTING drawn in Third Angle Orthographic projection. The casting is cut by a cutting plane A-A.
Use your instruments to draw a **Sectional isometric** view of the casting, on the cutting plane A-A.
Do **NOT** show hidden details. Show all construction.
X-Hatch all the sectioned areas. Use scale 1:1.

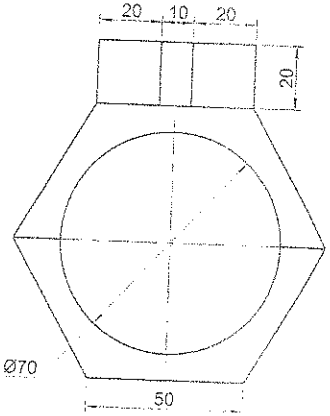
ASSESSMENT CRITERIA

You will be assessed on your ability to do the following:

• draw the isometric view in the correct position	17
• draw the isometric circle arcs using construction	4½
• draw the construction for the angles & hexagon	2
• draw all centre lines	4½
• X-Hatch all sectioned areas	2





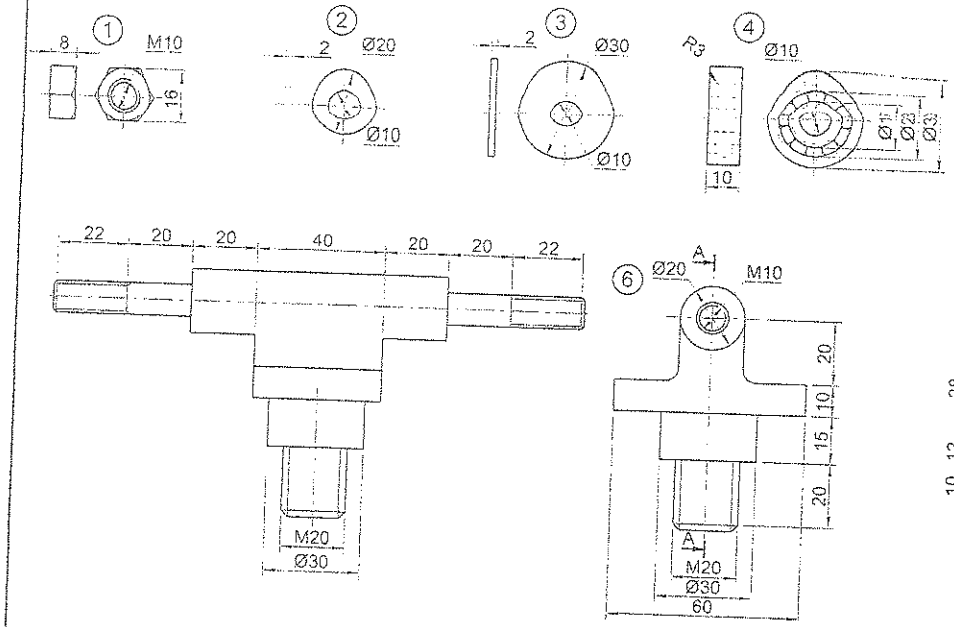


PTS	24
ARC	6
CCc	3
CLS	9
CON	4
RIB	4
HAT	4
POS	3
ANG	3
TOT	60

NAME

ANSWER SHEET 2

NOVEMBER 2013
GRADE 11 P2
90 MARKS
MECHANICAL ASSEMBLY



Answer this question on ANSWER SHEET 3

The figure shows the multi-views of components of a **SKATEBOARD TRUCK ASSEMBLY**, drawn in third angle orthographic projection.

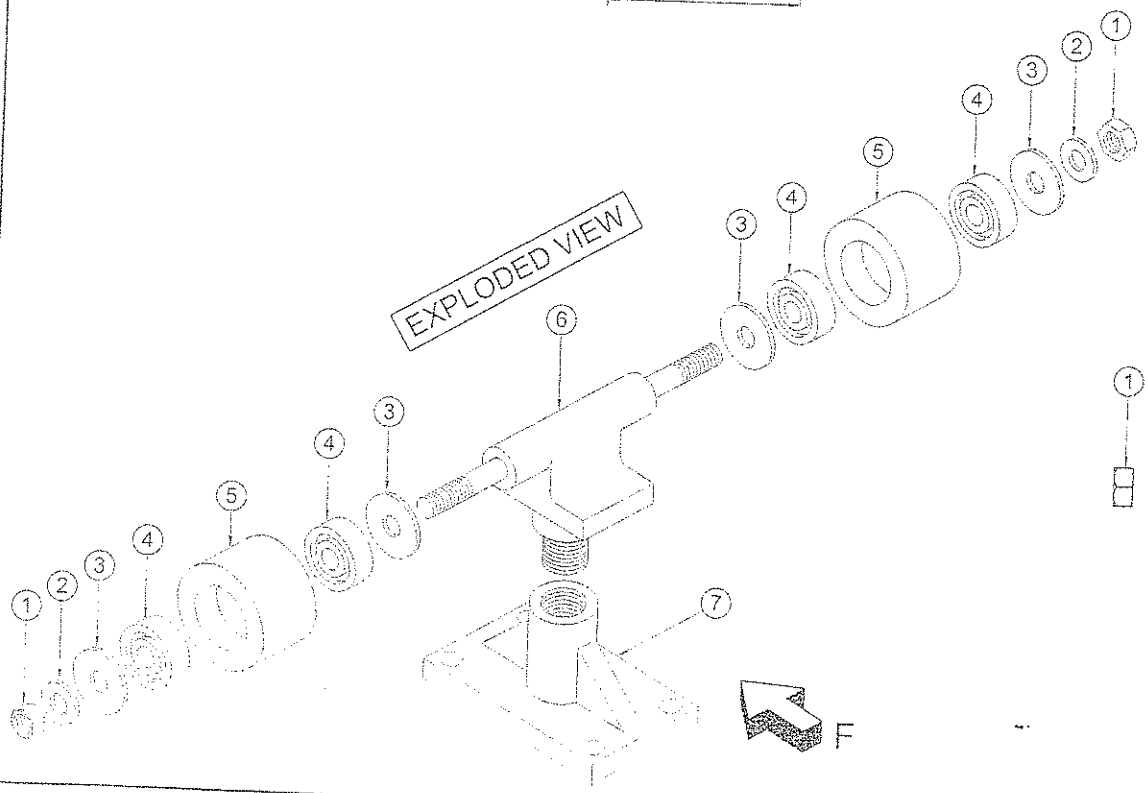
Draw to a scale 1:1 the following:

3.1 A **Sectional Front View**, on the cutting plane A-A, of the assembled components, as seen in the direction of F;

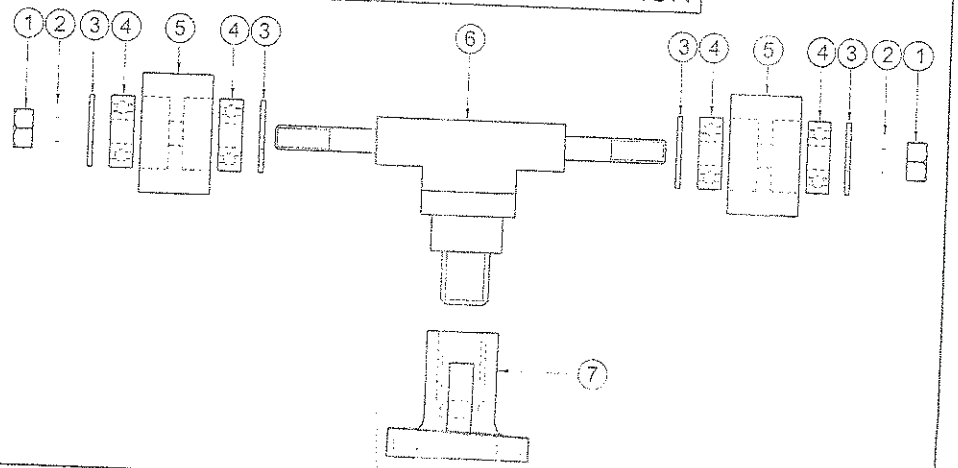
- Show the stud & nut construction.
- All fillets not given R4.
- Print the title, scale and heading in the space provided.
- Draw the projection symbol in the space provided.
- Show 2 faces for the M10 hexagonal nut.
- Draw the BEARING using the *Conventional Representation* as stipulated in the *SANS 0111-1*. Do not draw the *Detailed Representation* as shown.

COMPONENT LIST		
No	PART	Quantity
1	M10 HEXAGONAL NUT	2
2	WASHER	2
3	BEARING PLATE	4
4	BEARING	4
5	WHEEL	2
6	HANGER	1
7	BASE	1

EXPLODED VIEW



GRAPHICAL REPRESENTATION



NOVEMBER 2013
GRADE 11 P2

QUESTION 3

MECHANICAL ASSEMBLY

ASSESSMENT CRITERIA		
SECTIONAL FRONT VIEW		
Tit,Sca,Sym,Head	A	4
CENTRE LINES	B	2
SECTIONING	C	23
NO SECTIONING	D	10
M10 NUT	E	6
M10 NUT Consi	F	1
BEARINGS	G	8
BEARING Conve	H	2
FILLETS	J	2
HATCHING	K	23
THREAD	L	11
INT.THREAD.HAT	M	2
ASSEMBLY	N	6
TOTAL	110	

TITLE:

SCALE:

HEADING:

PROJECTION
SYMBOL

NAME

ANSWER SHEET 3