

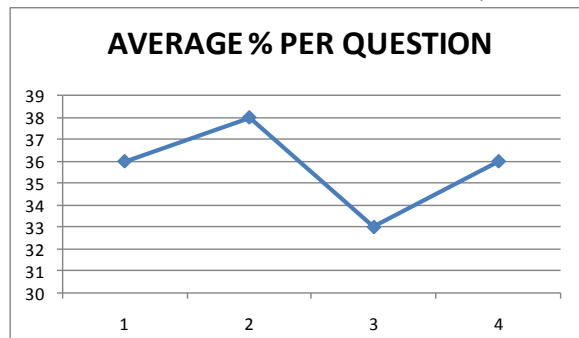


## CHIEF MARKER'S REPORT

<b>SUBJECT:</b>	<b>ENGINEERING GRAPHICS AND DESIGN – GRDS P2</b>
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### 1. ANALYSIS OF QUESTION BY QUESTION PERFORMANCE

#### PROVINCIAL AVERAGE % PER QUESTION



#### QUESTION 1

<b>Skills:</b>	Analysing data on a drawing; Interpreting data
<b>Knowledge:</b>	Drawing principles as contained in SANS code of Practice as related to complex Mechanical drawings. Single and multi-view drawing principles: 1st and 3rd angle orthographic projection complex assemblies detail drawings Principles of sectioning: multi-view drawings Single and multi-view drawing principles: limits & fits, tolerances, measurement and surface textures.
<b>The question relates to:</b>	LO 1: ASS 3 LO3: ASS 1, 3,5 LO4: ASS 1, 2, 4, 7
<b>Performance:</b>	All the candidates attempted the question. The question is well answered. Educators should spend time on questions of this type; enough exercise will result in an improvement of marks.
<b>Shortcomings of candidates</b>	Knowledge of the components and features of components. Text and numbers must be printed in capital letters. Free hand sketches must adhere to SANS and be neat. Arrows for 3rd angle OP and the labelling. The simple reading of the question and data tables was not well done

## QUESTION 2

Skills:	Analysing written information; Interpreting information, drawing skills
Knowledge:	Drawing principles as contained in SANS code of practice as related to complex Mechanical drawings. Single and multi-view drawing principles: 1st and 3rd angle orthographic projection detail drawings Loci of points on the components of mechanisms.
The question relates to:	LO3: ASS 1, 6 LO 4: ASS 1, 5, 7
Performance:	A large number of candidates did not attempt this question. This section of work (locii) covers Cams; Helixes and Mechanisms. All the sections must be covered during the year. Cams and Helixes basics are covered in Grd. 11. The only totally new section is Mechanisms. The candidates must do enough exercises in each section to ensure that the skills and techniques are mastered.
Shortcomings of candidates	Method of drawing cams with knife or wedge followers. Interpreting the scale and height of the graph. Drawing the follower detail. Rotation direction of the cam. Plotting the follower positions. Centre lines are not drawn in.

## QUESTION 3

Skills:	Analysing drawn information; Interpreting information, drawing skills
Knowledge:	Drawing principles as contained in SANS code of practice as related to complex Mechanical drawings. Single and multi-view drawing principles: 1st and 3rd angle orthographic projection detail drawings Pictorial drawings principles: isometric Principles of sectioning: pictorial drawings
The question relates to:	LO3: ASS 1, 4,5 LO 4: ASS 1, 3, 4,7
Performance:	Most candidates attempted this question. It is disturbing to note how many candidates cannot draw the basics of this question. The candidates do not know how to read ortho views in order to place the isometric view relative to a specified point.
Shortcomings of candidates	Auxiliary views are not used to draw the hexagon. Drawing of isometric circles. Centre lines are not indicated. Placement of the Isometric in relation to the given point B. Hatching of webs in cross section.

## QUESTION 4

Skills:	Analysing drawn information; Interpreting information, drawing skills
Knowledge:	Drawing principles as contained in SANS code of practice as related to complex Mechanical drawings. Single and multi-view drawing principles: 1st and 3rd angle orthographic projection detail drawings complex assemblies Pictorial drawings principles: isometric Principles of sectioning: multi-view drawing drawings
The question relates to:	LO3: ASS 1, 2, 3, 5 LO 4: ASS 1, 4, 7
Performance:	Most candidates answered this question. Sectioning rules according to SANS are not followed. Candidates do not read the question. Parts of the ASSEMBLY are not assembled. Centelines are not indicated. Line quality and neatness must not be forgotten.
Shortcomings of candidates	Centre lines are not indicated. Cutting planes / Section lines are not indicated and labeled. Hatching or not of features. Time wasted by drawing of unnecessary views. Ratios of nuts and screw thread detail. Correct assembly of parts. Candidates copy the unassembled parts from the data sheet, and do not assemble the parts.

### 7. ANY ADVICE THAT YOU COULD GIVE TO EDUCATORS TO HELP LEARNERS TO REACH THE EXPECTED LEVELS.

**Question 1:** Use old examination questions as exercises. Many of the answers are simply read from the details in the drawing and title blocks.

1.8 refers to SANS par 8

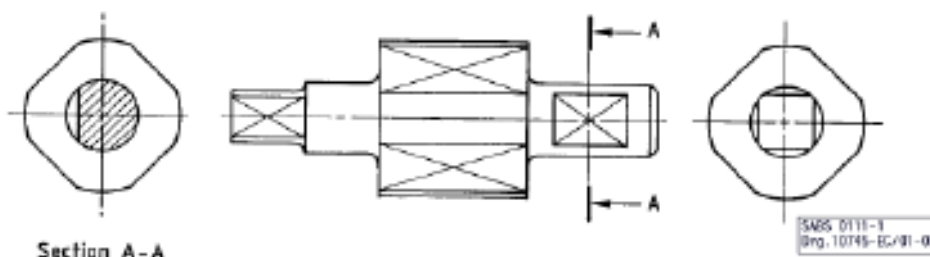


Figure 29 — Square on a shaft and flat face on a cylinder

1.9 Fillet = any arc which connects two surfaces. This can be as a result of the casting or machining processes.

1.11 Chamfer = angle to take away sharp edge for safety or ease of assembly.

## 1.14 Half section

### 7.3.1 Half section

Components that are symmetrical about a centre line may be drawn with one half in outside view and one half in section. When the sectioned half of the view contains an area of hatching that touches the centre line, the centre line should be changed to a continuous thin line (see figure 22). Hidden features should not be shown unless they are necessary for clarity.

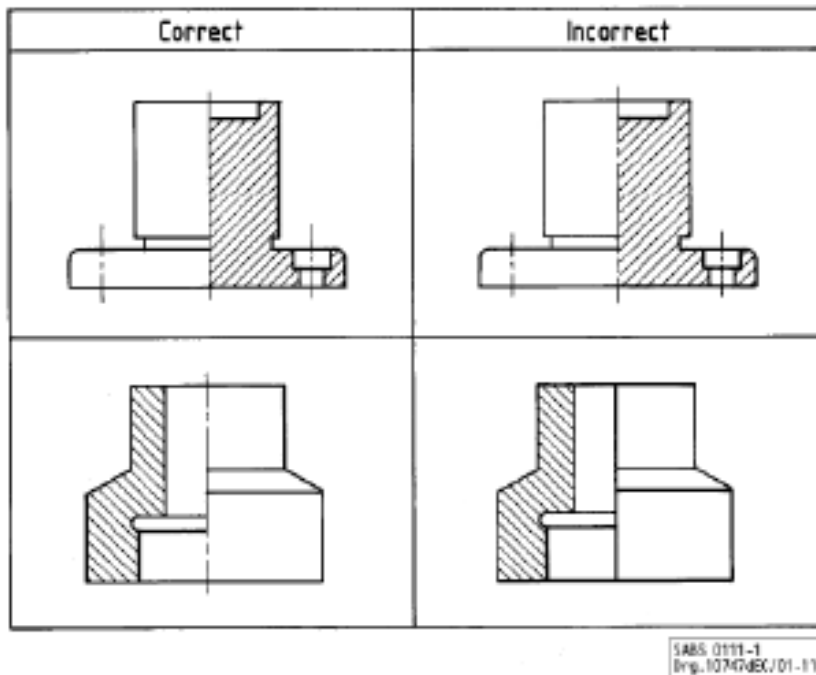
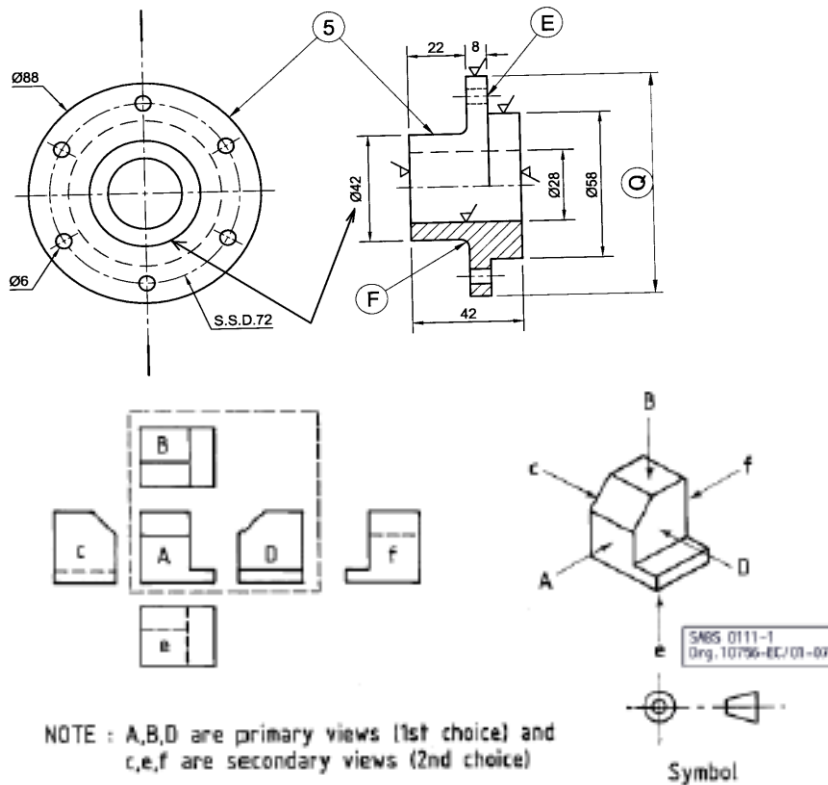


Figure 22 — Half section showing the correct and incorrect presentation

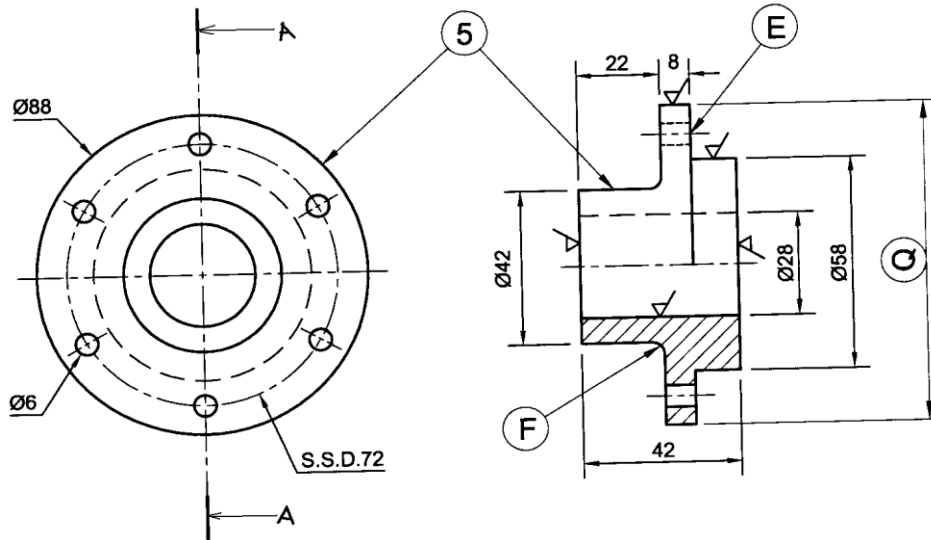
1.19 Third Angle Orthographic projection can be identified from the drawing below



NOTE : A,B,D are primary views (1st choice) and c,e,f are secondary views (2nd choice)

Figure 12 — Third angle projection

1.18 The arrows point in the direction that the observer is looking



1.20 Symbols for bearings - remember the centre line

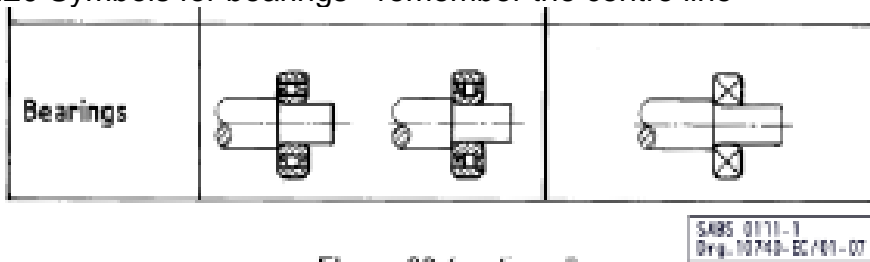
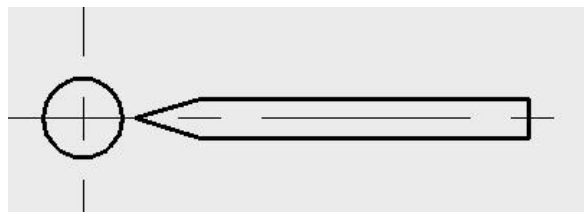


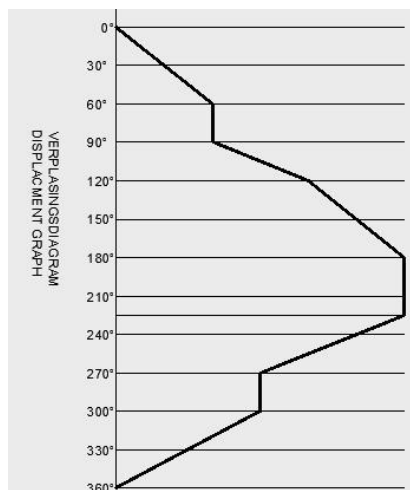
Figure 30 (continued)

Question 2: Three types of locii can be tested i.e. Helixes; Mechanisms and Cams. The question requires careful reading of the instructions. The candidates must read the question a couple of times and highlight the important details.

For the particular question the first step is to draw the given in the question that is the follower and the camshaft. This was 15% of the marks for the question. The given must be copied per dimensions in the same position.



The next step is to draw the displacement graph. The important details are the height of the graph (this gives the maximum displacement if the follower) and the distance between intervals (8 mm). Here you determine the height of the follower at each interval. Remember that there are three types of motion generated for cams. Constant velocity; Uniform acceleration and deceleration; Simple harmonic motion each requiring a different construction technique. In the particular case the requisite is constant velocity. The result is that the graph intervals are connected by straight lines. Label the graph and the intervals.

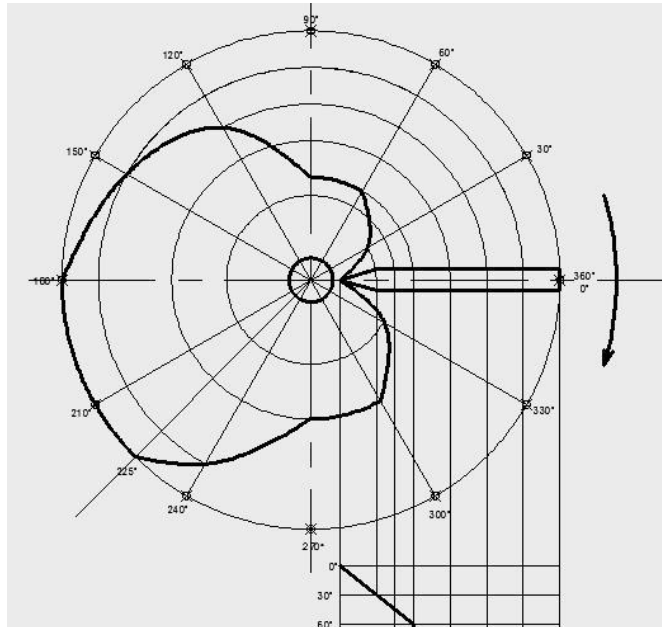


The maximum circle can be drawn and it can be divided by 12 i.e.  $30^\circ$  and  $60^\circ$ . Draw the center lines.

The direction arrow and the labels for the intervals can be added. The labels increase opposite to the direction of the arrow.

The heights of the intervals can now be transferred to generate points for the construction of the profile.

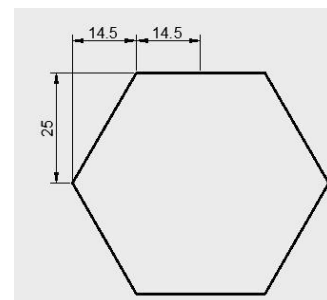
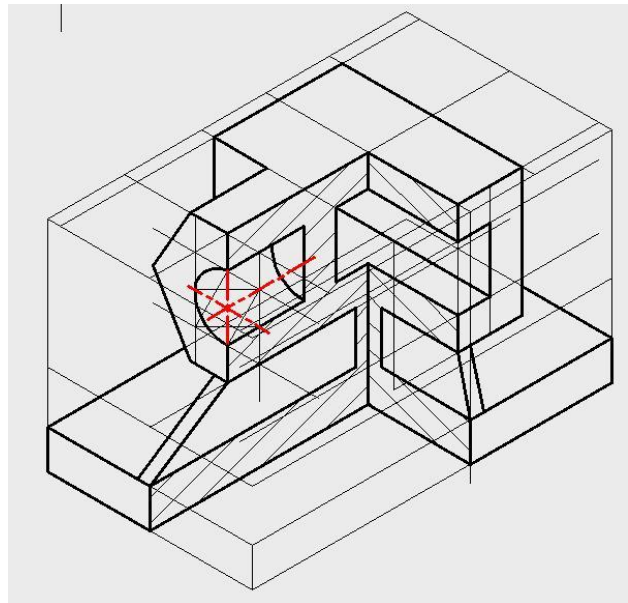
Remember to work in an orderly manner, start from  $30^\circ$  on to  $360^\circ$ . When joining the points of loci the curves must be drawn using french curves or flexi curves - NOT FREE HAND.



**Question 3:** Isometric drawings. Pay attention to placing of isometric drawings. Use blocks to draw isometric drawings. The construction for drawing isometric circles and arcs should not be erased.

The direction of hatching in quarter sections must be opposing. Webs should not be hatched in isometric or orthographic drawings. When two webs intersect in a sectioned drawing the intersecting areas are hatched.

When drawing non isometric components, use an orthographic drawing to find the dimensions.

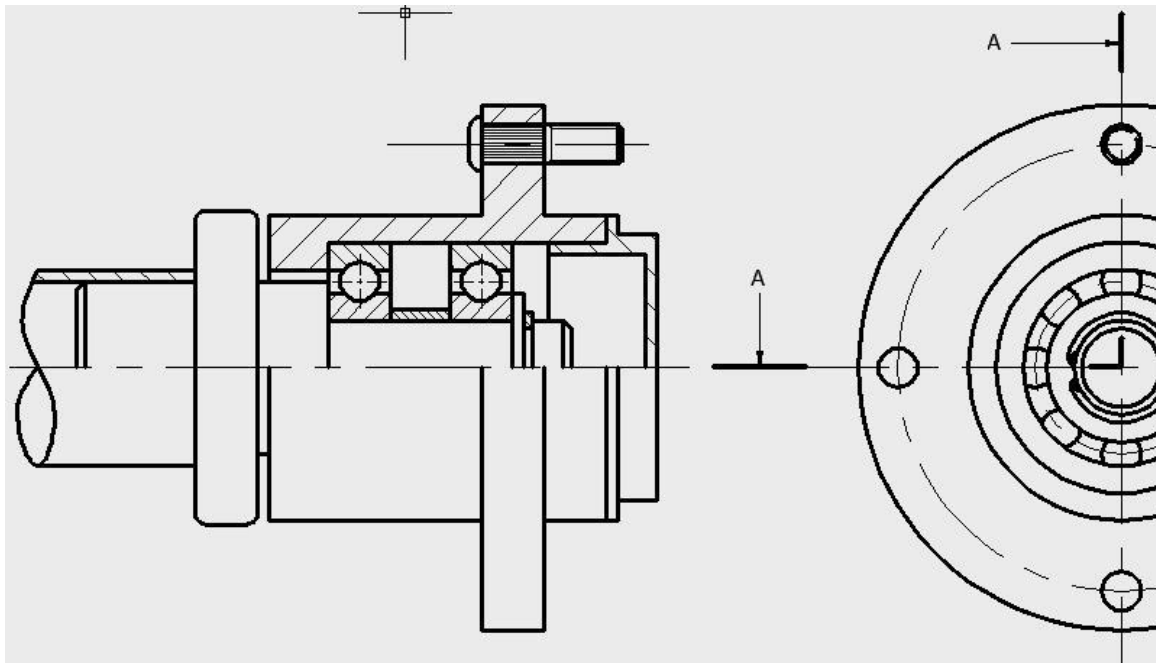


Question 4: Assembly drawings require many exercises to achieve the skill to interpret and draw. The schematic exploded view is there to guide the candidate to place parts in the correct order. The instructions of the drawings must be read carefully. Careful planning of the drawing i.e. the placement of the views is required. The drawing will fit in the provided space. Draw the centre lines of the views to see how they will be placed on the page.

Breaks in continuous or long elements of parts are shown with an S as shown in the given of the axle pipe.

Shafts and axles are not hatched in sections along the length wise axis. The stud must not be hatched; it is a fastener and a standard part. Although there is a convention for the bearing the question requires the drawing of detail. Hatching of adjoining parts requires that either direction or spacing is changed.

Centrelines must be added for all round parts. The cutting plane AA could be a vertical line. The drawing will be as per front view, because symmetrical parts need not be drawn twice.



## 8. ANY OTHER COMMENTS

Candidates must staple the questions in the correct order.

The question should be read carefully before answering the question.

READ the assessment criteria before answering the question.

Candidates must use sharp pencils and clean drawing equipment to draw.

SANS standards must be adhered to.

Construction lines should NOT be erased.

Candidates should plan the time they spend on each question. Roughly 1, 1 marks per minute.