ENGINEERING GRAPHICS I (GET 215)

Surface Development

BY

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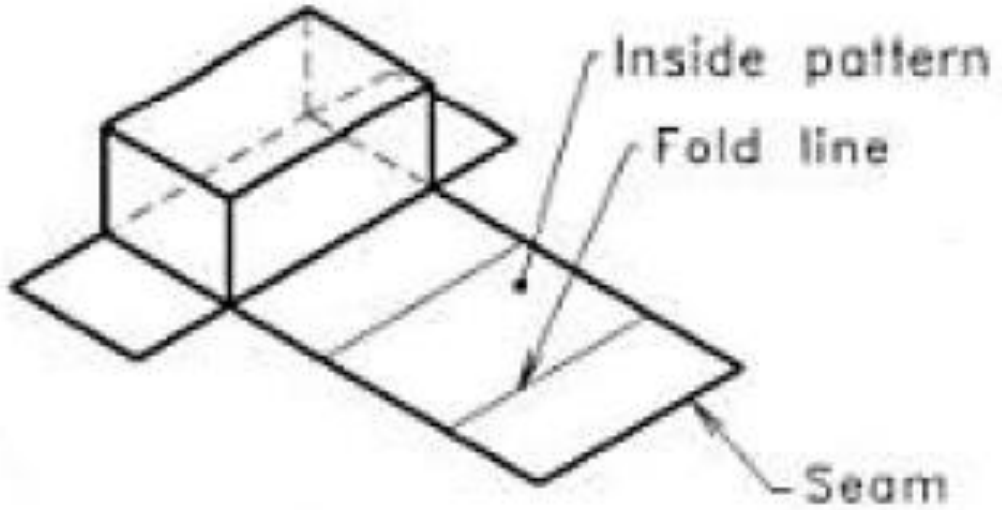
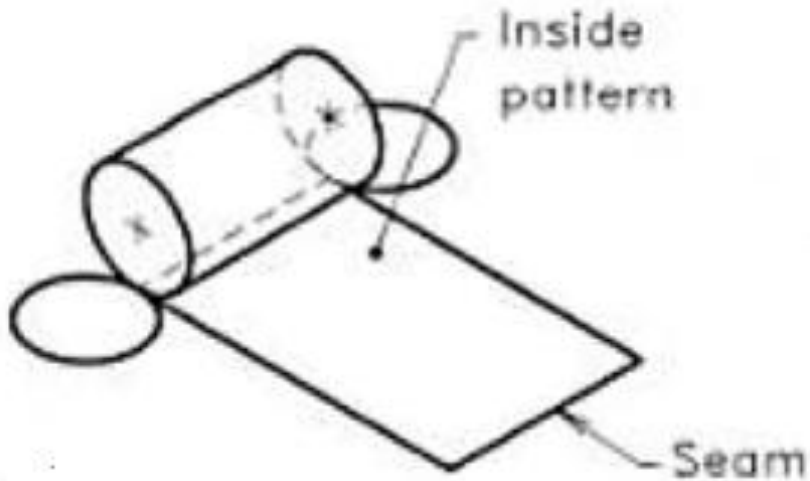
Surface Development

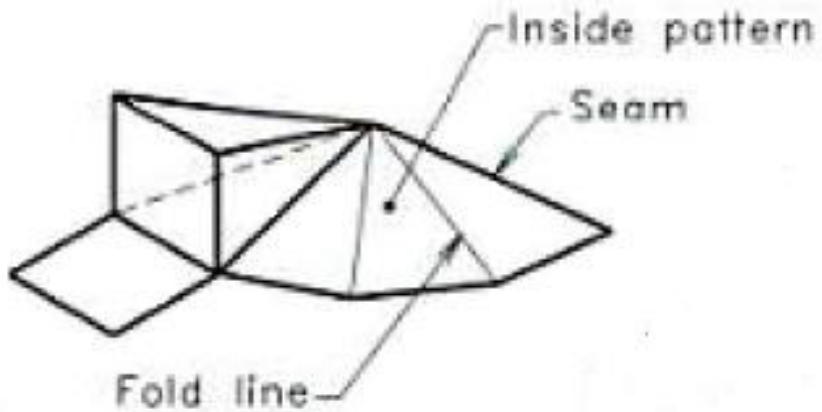
Definition of surface development

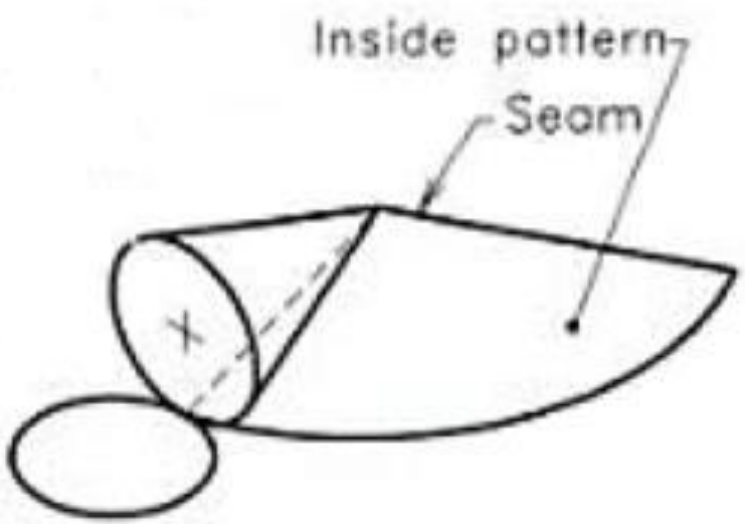
The process of unfolding the three-dimensional ‘solid’ is called development.
Alternatively, the development of a solid is the shape of a plane sheet (metal) that can be converted into the shape of the concerned solid by folding properly.
The shapes of most engineering components are whole, or parts of, prisms, pyramids, cylinders or cones.

Surface Development Cont'd







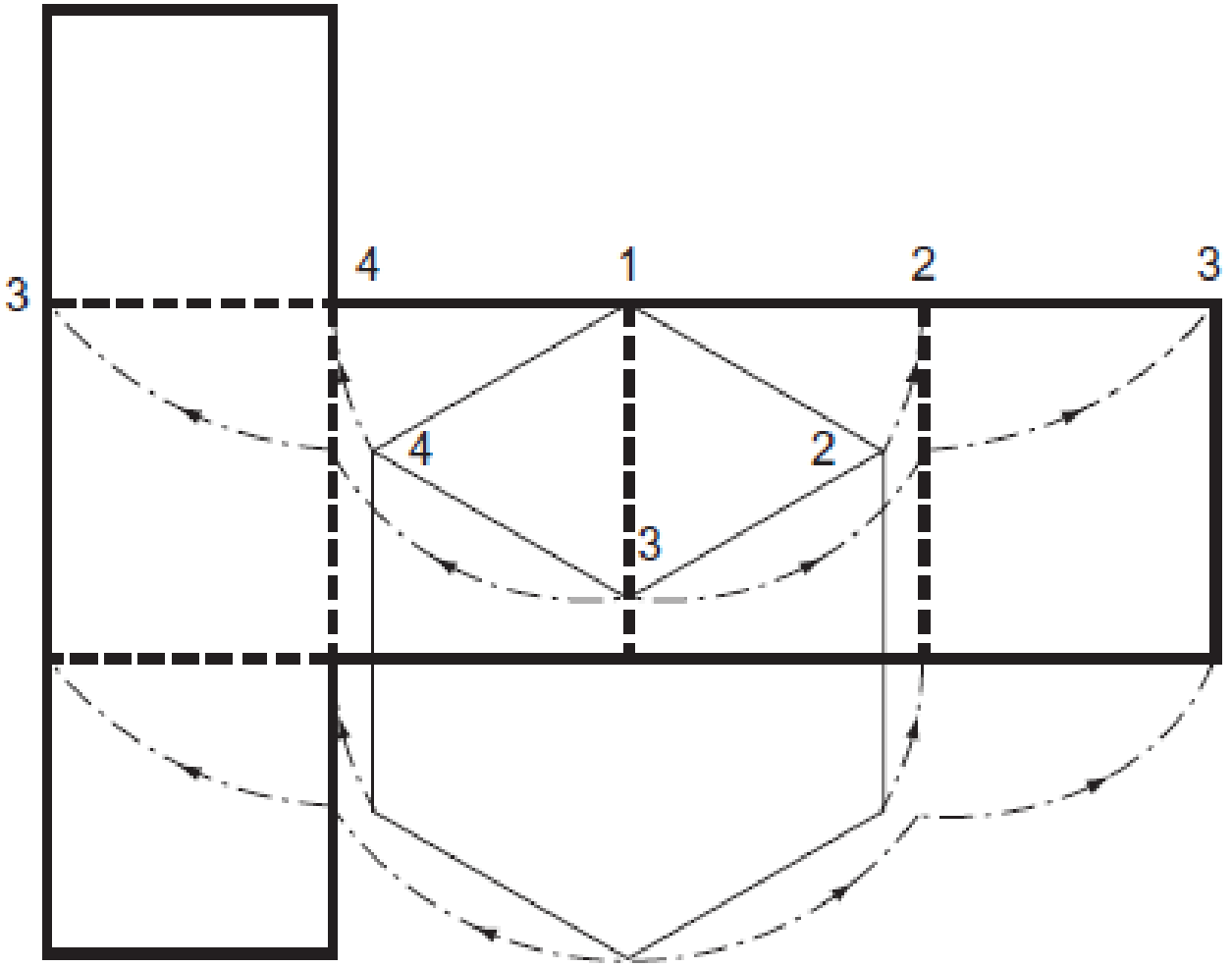


Surface Development Cont'd

Draw the development of a rectangular prism

Steps to follow are:

1. Draw the prism which is unfolded and its development obtained.
2. Note that where there are corners in the undeveloped solid, these are shown as dotted lines in the development.
3. A trace of the solid prism is shown with construction line while the thin chain line shows the direction of unfolding the prism. Note that, thick and dashed line are required



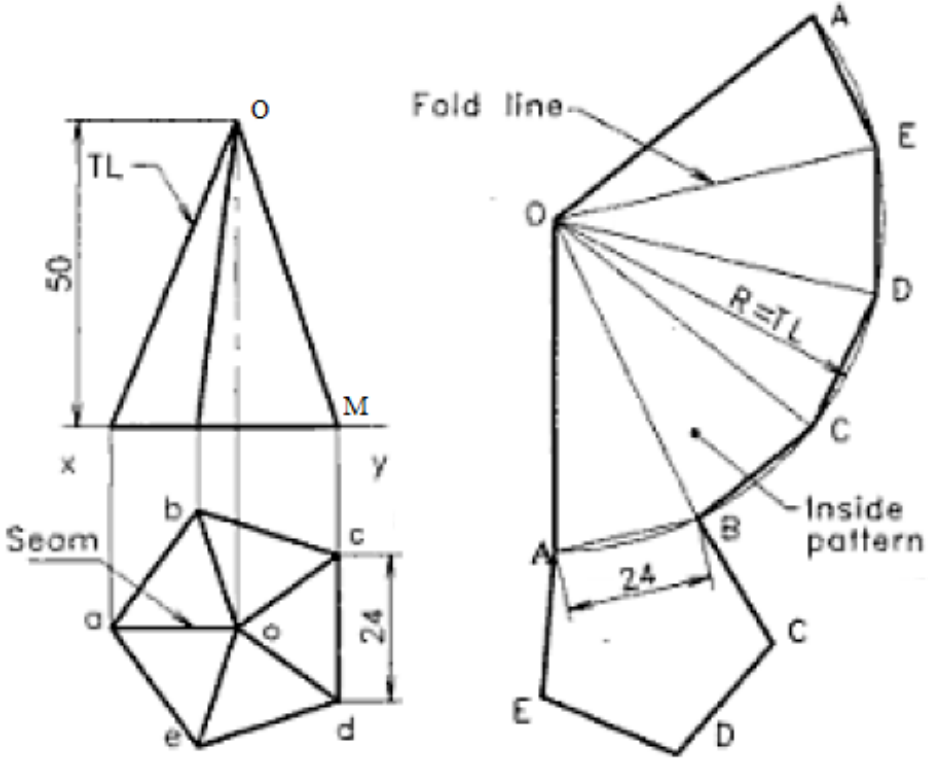
Surface Development Cont'd

Approximate method:

Draw the development of a regular closed pentagonal based prism.

Steps to follow are:

1. Draw the plan view of the regular pentagonal prism. Note that the base c-d is vertical.
2. Project lines from a, b and c upward to construct the front view as shown.
3. With radius OM draw an arc and use radius 24 mm to mark five divisions after leaving a space between the front view and the development.
4. Join the A, B, C, etc. with straight line
5. As closed prism, attached the base of the prism (plan) with any of the five division, i.e line A-B or B-C, etc.



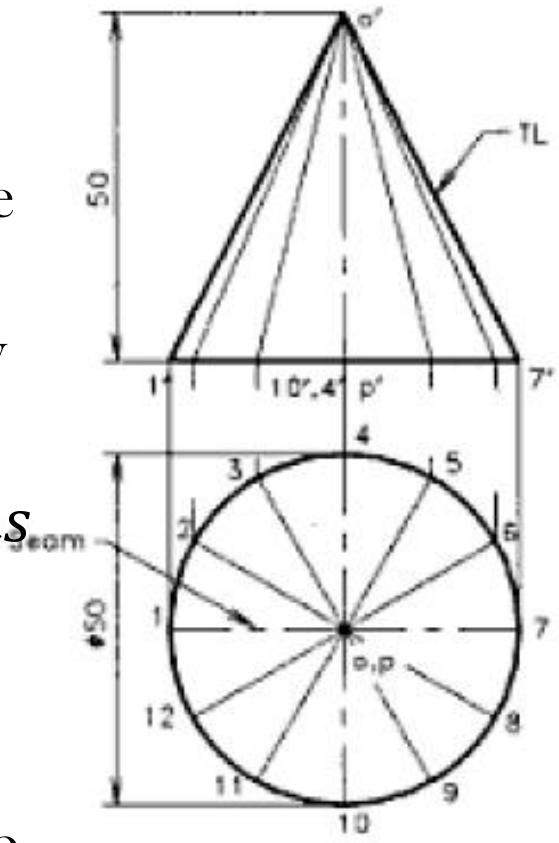
Surface Development Cont'd

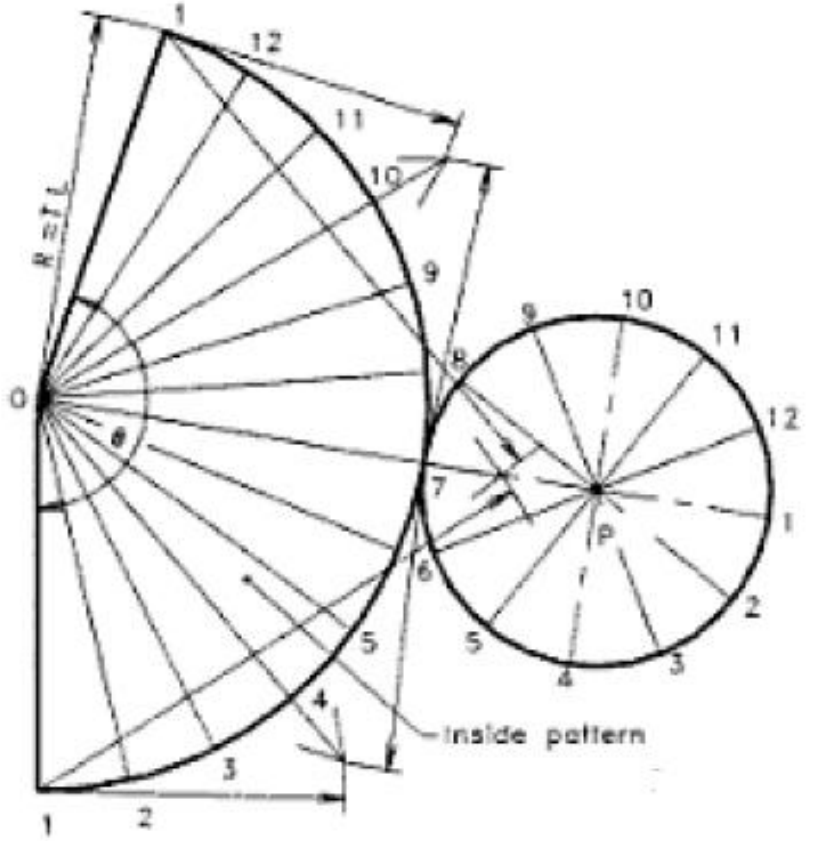
Accurate method:

Draw the development of a cone

Steps to follow are:

1. Draw the plan and front views of the cone
2. With radius of true length TL, draw the arc for development of sector angle $\theta = 360\frac{R}{TL}$ where R = $radius$
3. Divide the arc into two and further divide the half into two. Then the obtained division should be divided into 3 using the divider with the help of sector angle $\theta/12$. Note that the cone is close





Surface Development Cont'd

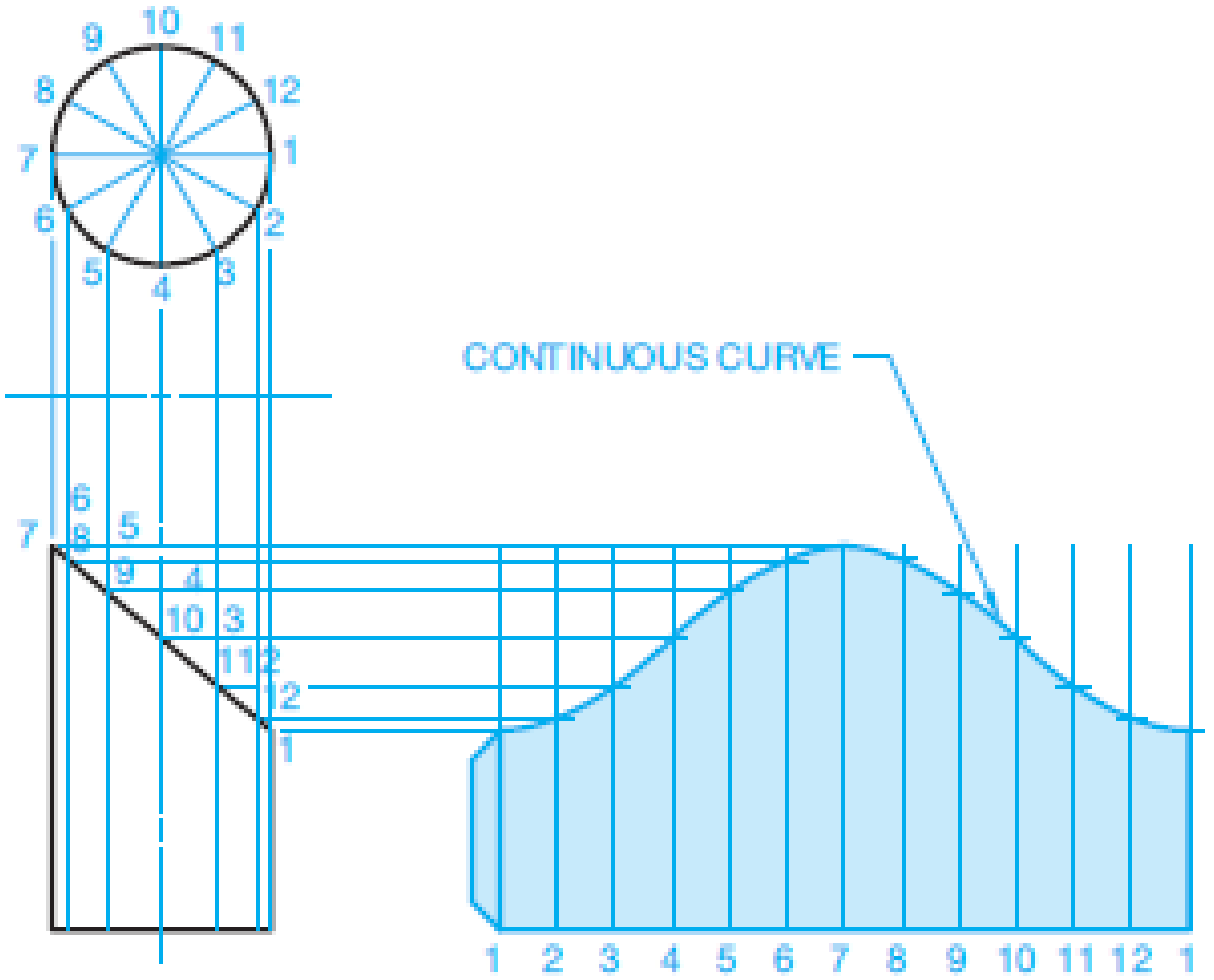
Approximate method:

Draw the development of a truncated cylinder opened at both ends

Steps to follow are:

1. Draw the plan view and divide it into 12 equal parts.
2. Project the truncated front view of the cone
3. Project lines from point 7, 8-6, 9-5, etc. downward to produce the front view.
4. Draw the truncated plane base on the instruction.
5. Project a line sideway from each of 7, 6-8, 9-5, etc. including the base line.
6. Give a convenient gap and divide the line from base into 12 by using the cordial radius.
7. Project from each division upward to intersect the horizontal lines.
8. Locate the points and join the points with a neat curve

Surface Development Cont'd



Surface Development Cont'd

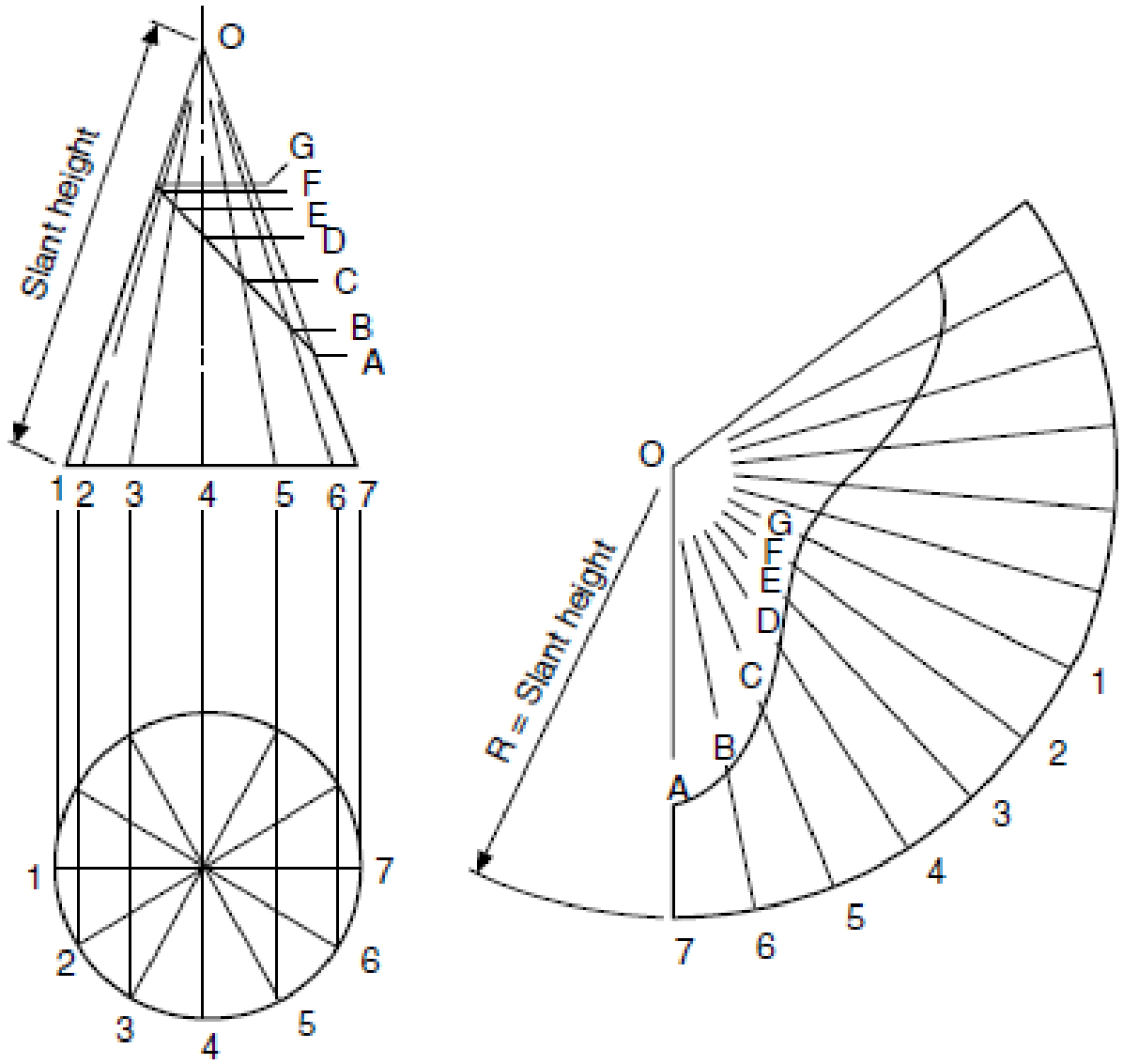
Approximate method:

Draw the development of a truncated cone open at both ends

Steps to follow are:

1. Draw the truncated front view of the cone
2. Project line 1-1 and 7-7 downward to draw the plan, circle and divide it into 12 equal parts
3. Project 2-2, 3-3, etc to the apex of the cone through the base.
4. Use horizontal line to mark the point of intersection of the cutting plane and the projection line 1, 2, 3, etc as G, F, E, etc.
5. Open your compass to radius O7 draw an arc from point 7 away from the front view.
6. Leave a gap and use the chordal distance to mark off the arc and mark A-7, B-6, C-5, etc.

Surface Development Cont'd



Assignment 6

1. Draw the required sheet metal needed to make a closed rectangular based container to hold 36 mm^3 of kerosene.
2. Draw the development of a regular closed pentagonal based prism. Take the prism base size as 38 mm and its vertical height is 82 mm.
3. Draw the development of a cone with 42 mm and 89 mm as base radius and vertical height, respectively.
4. Draw the development of a cylinder truncated at angle 30° from top right corner while the seam is located at the left side of the front view. Note that the cylinder is open at the top only.
5. Draw the development of a cone open at both ends but truncated at 30 mm from apex and angle 45° from the vertical to the left of the front view. Let the base diameter and vertical height be 62 mm and 98 mm, respectively.