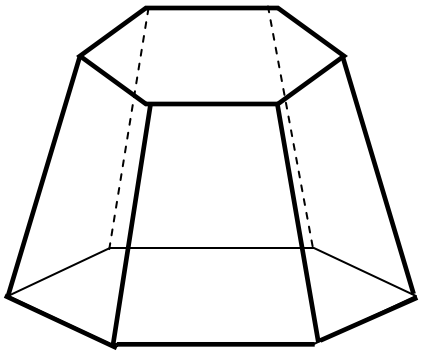
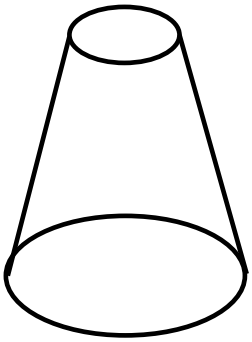
S.RAMANATHAN ASST PROF MVSREC
9989717732 rama_bhp@yahoo.com

Concept of Frustums

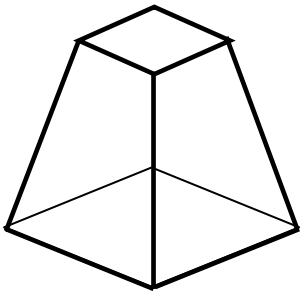
- → Frustums are the left over portions of pyramids or cones when they are cut by a plane parallel to the base.
- → Frustums are drawn only for pyramids and cones.
- → The shape of frustum at top and bottom parts will be same & the face at the top will be smaller than the bottom face.
- → There are three data needed to draw any frustum. They are the dimensions at the bottom, top & height of the frustum. (b, t, h).
- → While drawing isometric views of frustums, the orthographic view can be provided if it is asked for in the question. For square pyramids and cones, their frustums can be drawn directly without orthographic views. But for hexagonal pyramid, since the isometric views require box around the hexagon, the orthographic views should be drawn compulsorily.
- → The top views of frustums are usually concentric squares, circles and hexagons for their respective pyramids & the front views are usually in the form of a trapezium.



Frustum of Hexagonal pyramid



Cone Frustum



Square pyramid Frustum

For our syllabus an idea of the above three frustums are sufficient and hence are discussed in the following problems.

Frustum of Square Pyramids

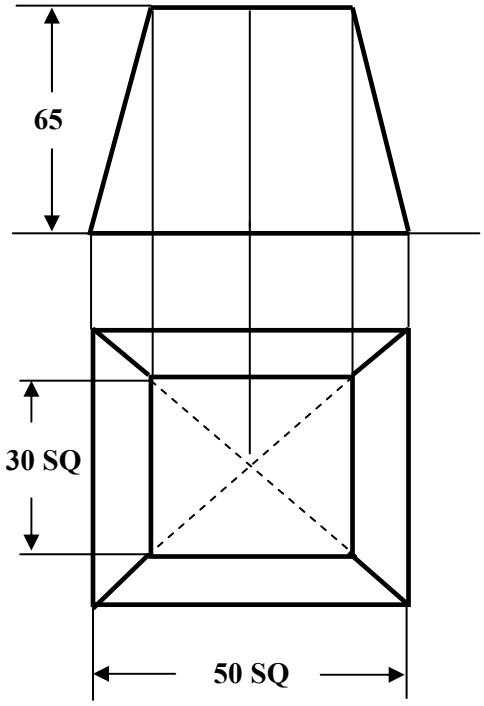
1) A frustum of a square pyramid has its base 50 mm sides, top 30 mm sides and height of frustum is 65 mm. Draw its orthographic projections & its isometric projections

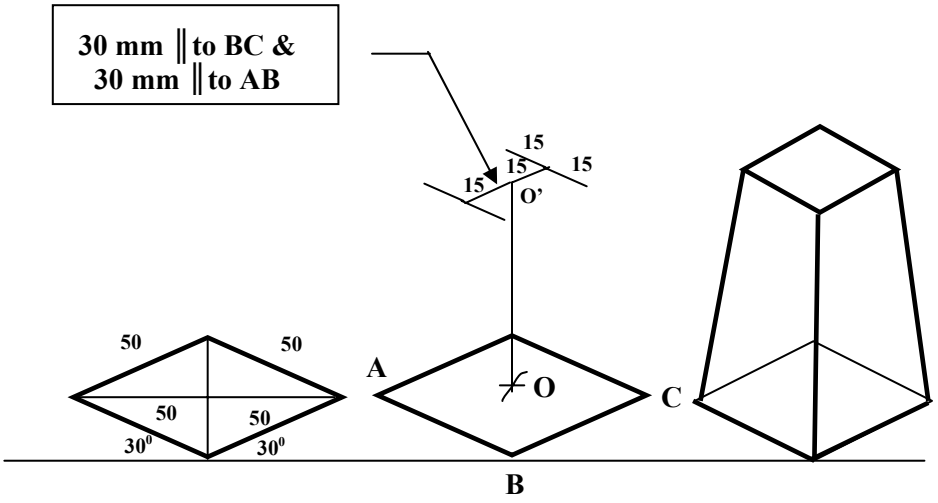
Ans) Given data: Base (b) = 50 mm; Top (t) = 30 mm; Height of frustum (h) = 65 mm.

Logic:

- → In the Orthographic views (top view and front view), we get concentric squares & trapezium respectively.
- → In the isometric view, we have to draw both the squares at 30^0-30^0 & height from centre to centre at 90^0.

The orthographic view is shown in single step and the isometric projection is shown in stages.





Base 50 @ 30^0-30^0 **Top 65 from O.** ***Final frustum***

Steps: 1) Draw the base of 50 mm at 30^0-30^0.
2) From centre O, mark **O'** 65 mm @ 90^0
3) Draw lines of 15 -15 mm ‖ to BC from centre O' on each side & lines of 15-15 mm ‖ to AB to get the sides of square. Join them and get the top square of 30 mm sides.
4) Join the visible corners of top & bottom to get the square frustum.

Frustum of Cones

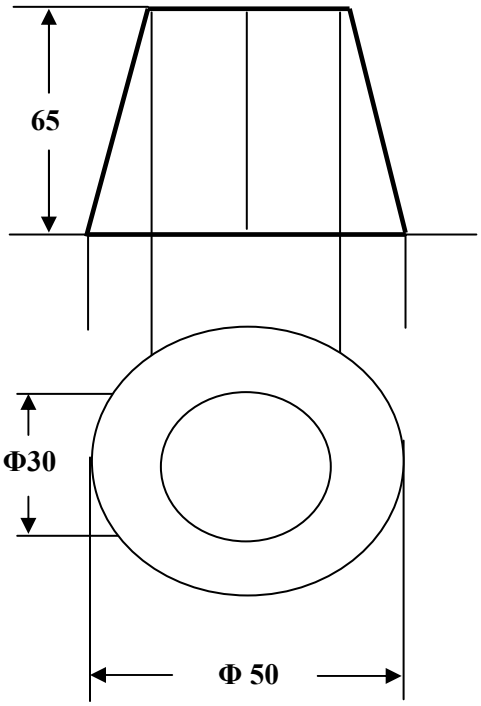
2) A frustum of a cone has its base 50 mm diameter, top 30 mm diameter & height 65 mm. Draw its orthographic projections & its isometric projections

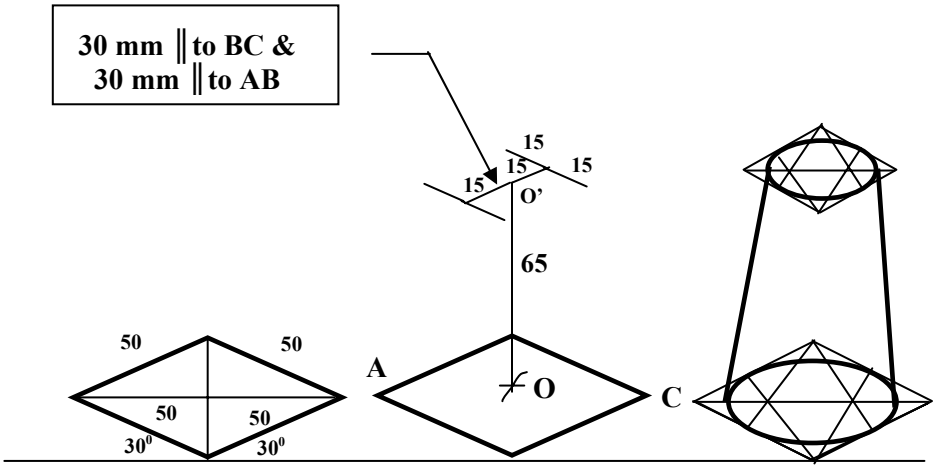
Ans) Given data: Base (b) = 50 mm; Top (t) = 30 mm; Height of frustum (h) = 65 mm.

Logic:

- → In the Orthographic views (top view and front view), we get concentric circles & trapezium respectively.
- → In the isometric view, we have to draw both the squares at 30^0-30^0 & height from centre to centre at 90^0.

The orthographic view is shown in single step and the isometric projection is shown in stages.





Base 50 @ 30^0-30^0 **Top 65 from O.** ***Final frustum***

Steps: 1) Draw the base of 50 mm at 30^0-30^0.

2) From centre O, mark **O'** 65 mm @ 90^0

3) At the top part, draw lines of 15 -15 mm ‖ to BC from centre O' on each side & lines of 15-15 mm ‖ to AB to get the sides of square. Join them and get the top square of 30 mm sides.

4) Draw ellipses by 4-Centre-V & Join the centers of top & bottom to get the cone frustum.

Frustum of Hexagonal Pyramid

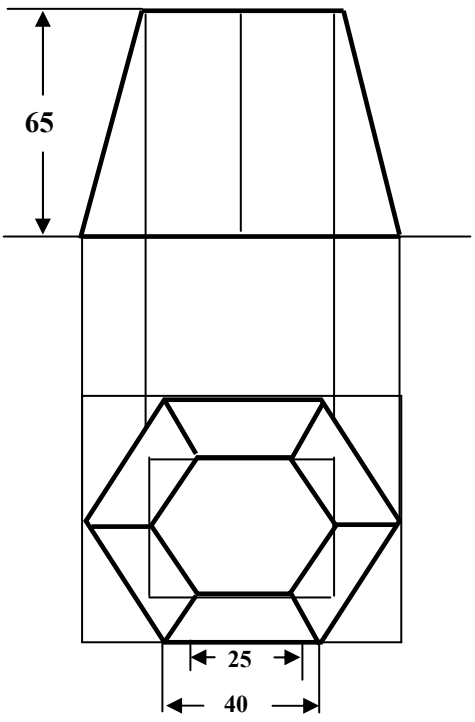
3) A frustum of a hexagonal pyramid has its base 40 mm sides, top 25 mm sides & height 65 mm. Draw its orthographic projections & its isometric projections

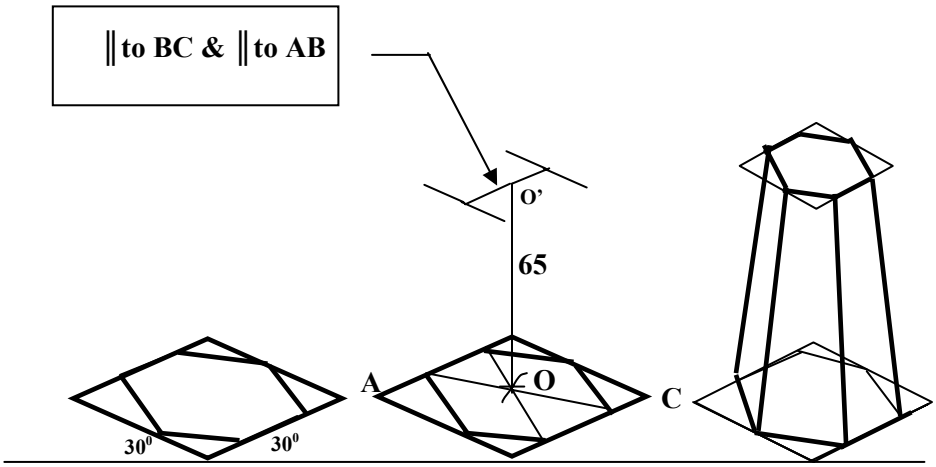
Ans) Given data: Base (b) = 40 mm; Top (t) = 25 mm; Height of frustum (h) = 65 mm.

Logic:

- → In the Orthographic views (top view and front view), we get concentric hexagons & trapezium respectively.
- → In the isometric view, we have to draw both the squares at 30^0-30^0 & height from centre to centre at 90^0.

The orthographic view is shown in single step and the isometric projection is shown in stages.





Base @ 30^0-30^0 **Top 65 from O.** ***Final frustum***

Steps: 1) Draw the hexagons in top view and box around them.
2) At 30^0- 30^0, draw the same box and mark hexagon in it.
3) From centre O, mark **O'** 65 mm @ 90^0 & draw the small box also parallel to AB & AC.
4) Draw hexagon inside the box at the top by measurements from corners of box
5) Join the visible corners at the top & bottom to get the frustum of hexagonal pyramid.