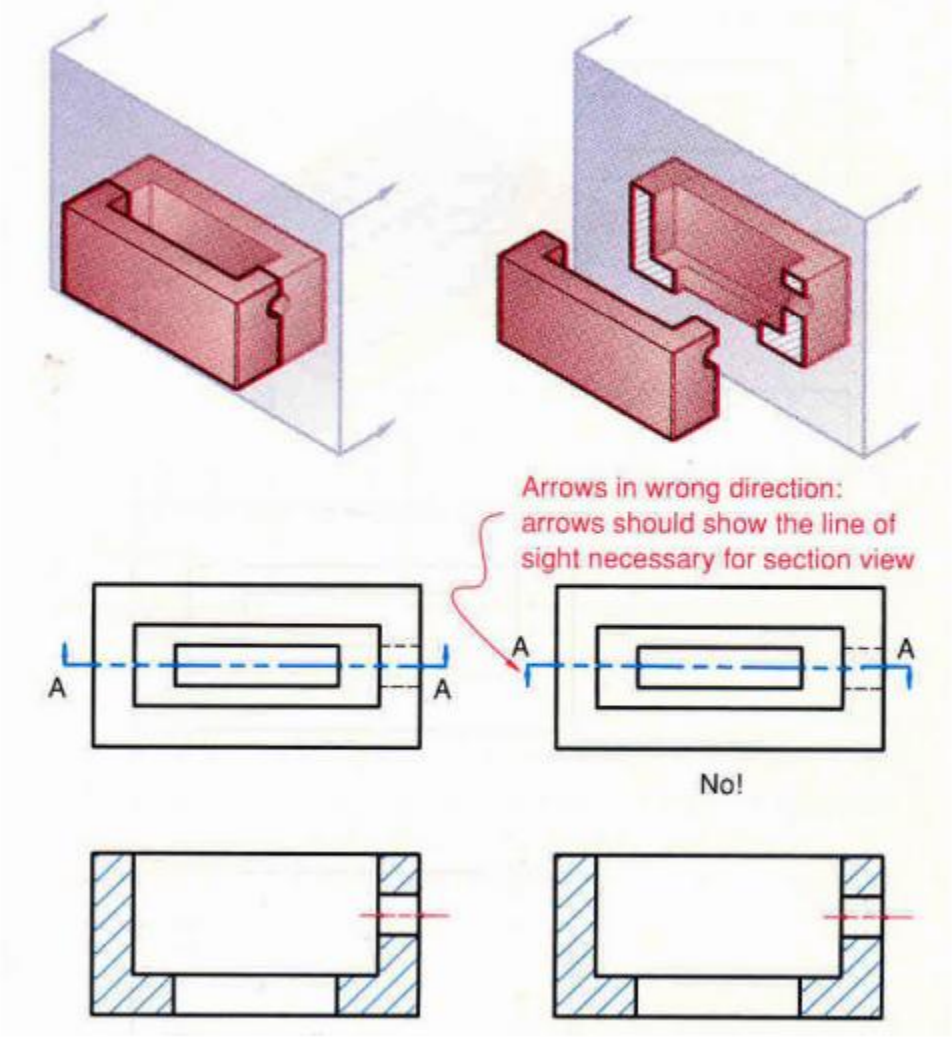
Sections of Solids

- Sectional drawings are multi-view technical drawings that contain special views of a part or parts, views that reveal interior features.
- Used to improve clarity and reveal interior features of parts.
- A primary reason for creating a section view is the elimination of hidden lines, so that a drawing can be more easily understood or visualized.

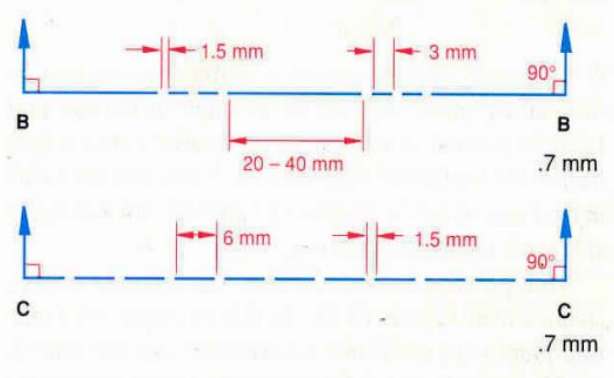
CUTTING PLANE LINES – which show where the cutting plane passes through the object, represent the edge view of the cutting plane and are drawn in the view(s) adjacent to the section view.



In the figure the cutting plane line is drawn in the top view, which is adjacent to the sectioned front view.

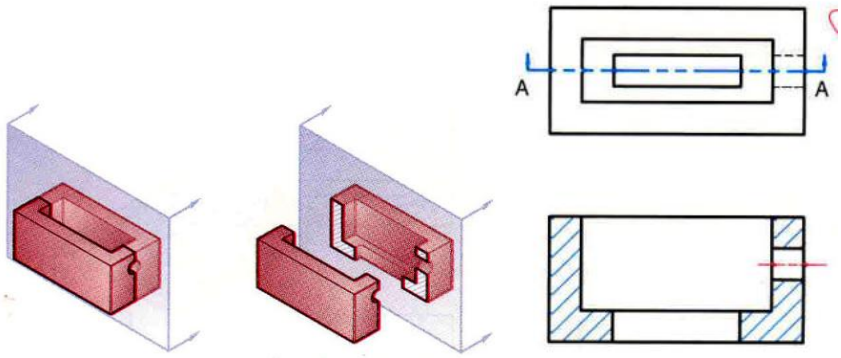
Cutting plane lines are ***thick*** **(0.7 mm) dashed lines**, that extend past the edge of the object **6 mm** and have line segments at each end drawn at **90 degrees and terminated with arrows.**

The arrows represent the direction of the line of sight for the section view and they point away from the sectioned view.

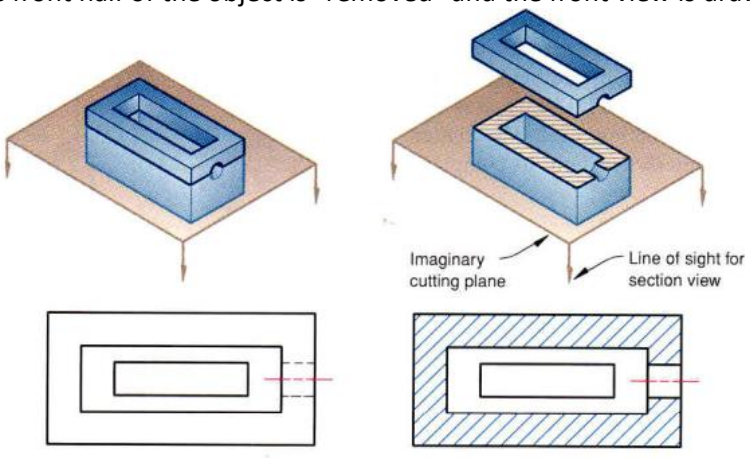


Types of Cutting Planes and Their Representation

- Frontal or Vertical Cutting/ Section Plane
- Horizontal Cutting/ Section Planes
- Profile Cutting / Section Planes
- Auxiliary Section Plane
  - – Auxiliary Inclined Plane (AIP)
  - – Auxiliary Inclined Plane (AVP)
- Oblique Section Plane

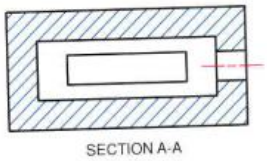


In this figure, the cutting plane appears as an edge in the top view and is normal in the front view; therefore, it is a frontal cutting plane or Vertical Section Plane.
The front half of the object is "removed" and the front view is drawn in section.



If the cutting plane appears as an edge in the front view and is normal in the top view, it is a horizontal cutting/section plane.

Section Line Practices

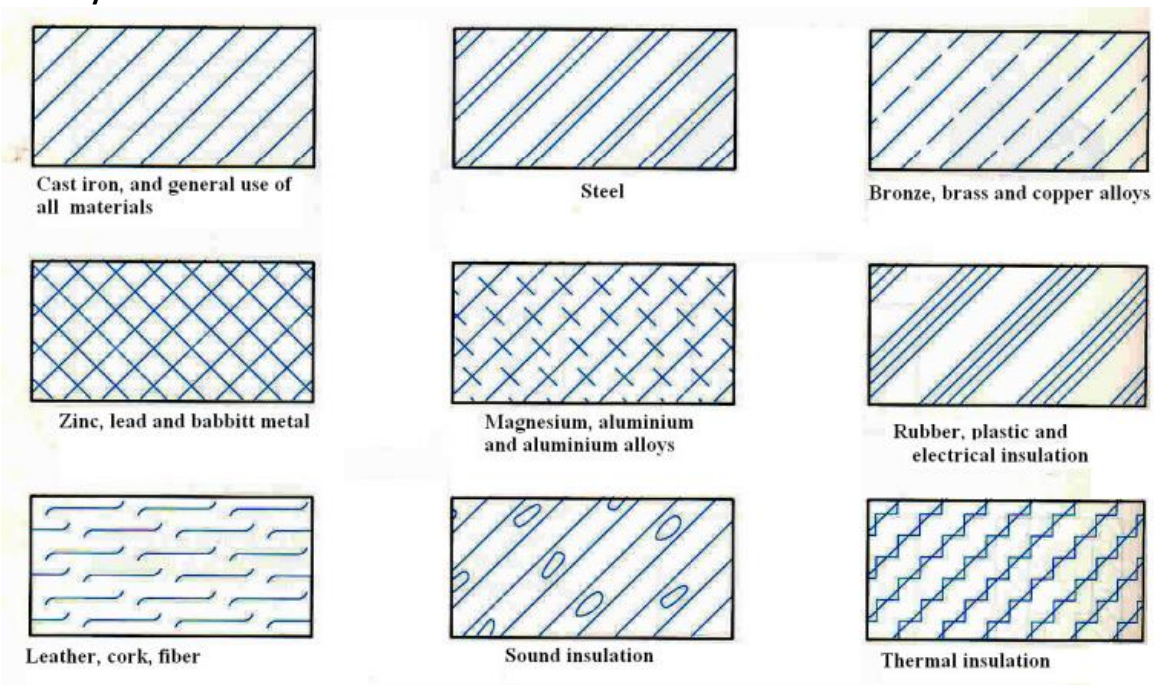


Section lines or cross-hatch lines are added to a section view to indicate the surfaces that are cut by the imaginary cutting plane.

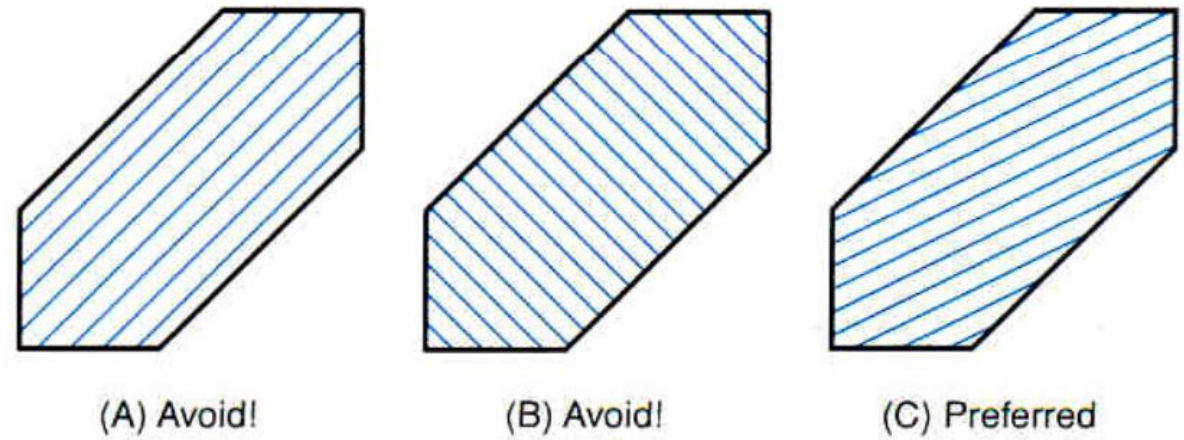
Different section line symbols can be used to represent various types of materials.

The angle at which lines are drawn is usually 45 degrees to the horizontal, but this can be changed for adjacent parts shown in the same section. Also the spacing between section lines is uniform on a section view.

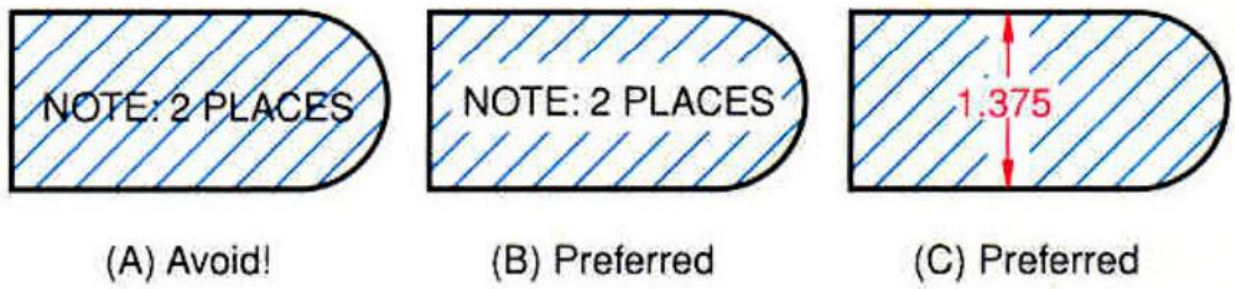
Material Symbols



If the visible outline to be sectioned is drawn at a 45- degree angle, the section lines are drawn at a different angle, such as 30 degrees.



Avoid placing dimensions or notes within the section lined areas. If the dimension or note must be placed within the sectioned area, omit the section lines in the area of the note.



Types of Section Views

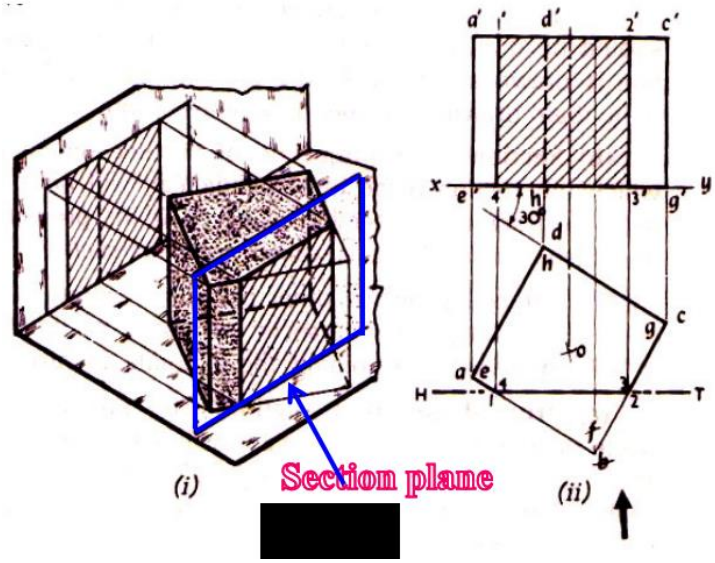
- Full sections
- Half sections
- Offset sections
- Broken-out sections
- Revolved sections
- Removed sections

Section of solids

- **Section plane parallel to VP (cube)**
- **Section plane parallel to HP (prism, pyramid)**
- **Section plane inclined to VP (Pyramid, cylinder)**
- **Section plane for which its true shape is given**
- **Sectional views for a complex object**

Section plane parallel to VP

Ex-



1-Draw the projection of the solid without section plane. (i.e. top view and front view according to the given conditions).

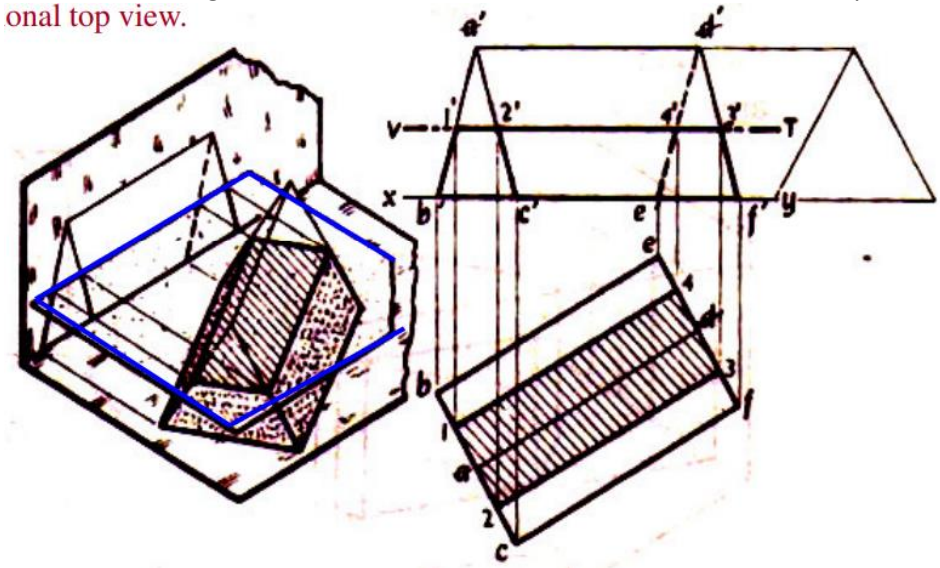
2-Then introduce the section plane in the top view. As it is parallel to the VP, is seen as a line in top view.

3-Carry it to the front view.

Section plane parallel to HP

Ex.1- A triangular prism, side of base 30 mm and axis 50 mm long is lying on the HP on one of its rectangular faces with its axis inclined at 30° to the VP. It is cut by a horizontal section plane at a distance of 12 mm above the ground. Draw its front view, side view and sectional top view.

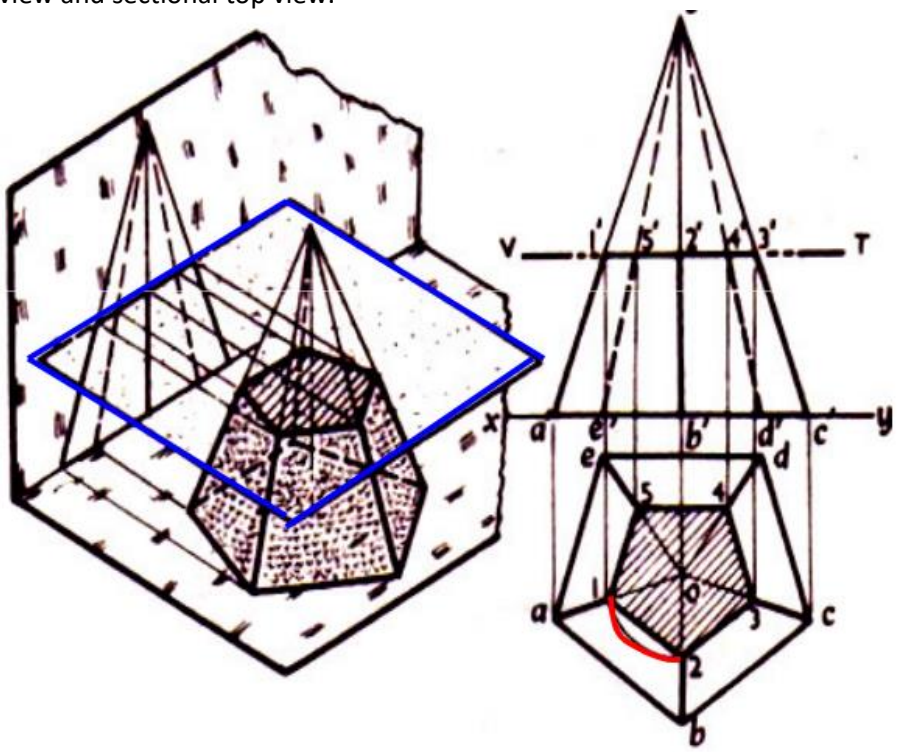
onal top view.



Draw the projections of the un-cut prism. As the section plane is parallel to HP, it will be seen as a straight line parallel to XY in the front view. Project the section to the top view.

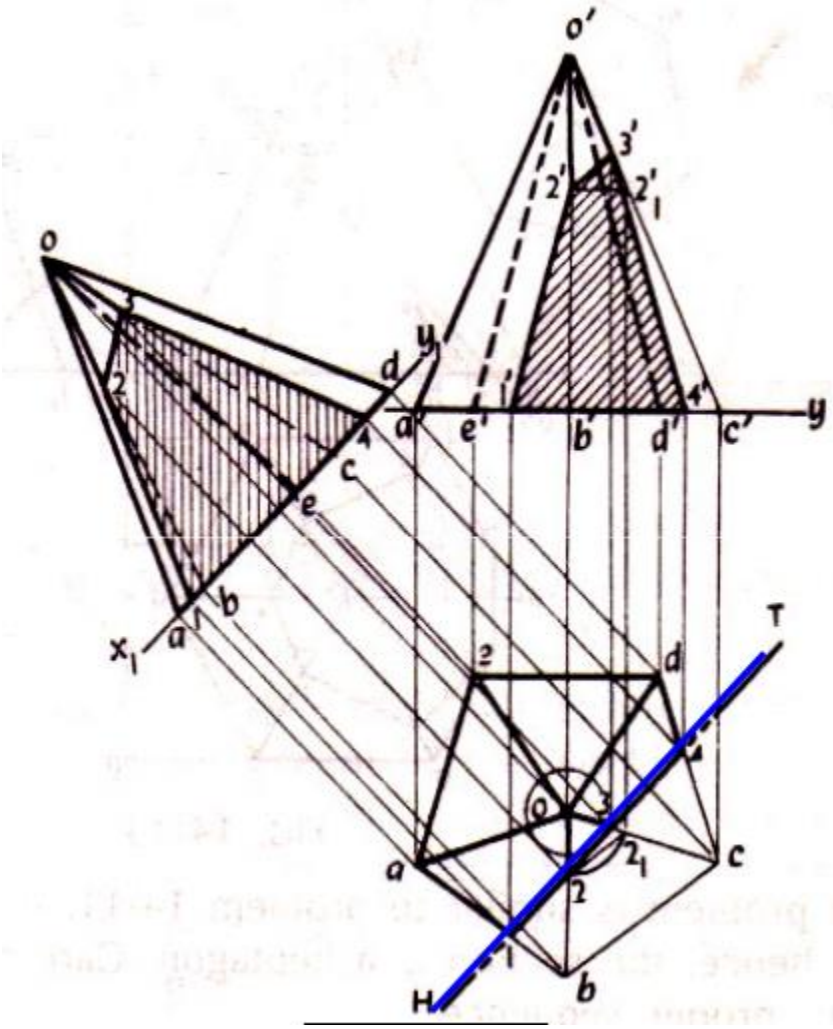
Ex.2-

A pentagonal pyramid, side of base 30 mm and axis 65 mm long, has its base horizontal and an edge of the base parallel to the VP. A horizontal section plane cuts it at a distance of 25 mm above the base. Draw its front view and sectional top view.



Section plane Inclined to VP

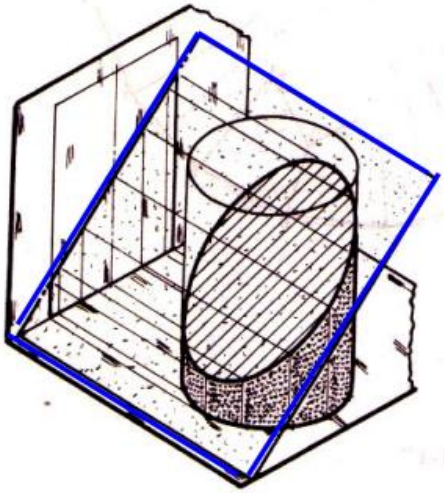
Ex. 1- A pentagonal pyramid has its base on the HP. Base of the pyramid is 30 mm in side, axis 50 mm long. The edge of the base nearer to VP is parallel to it. A vertical section plane, inclined at 45^0 to the VP, cuts the pyramid at a distance of 6 mm from the axis.

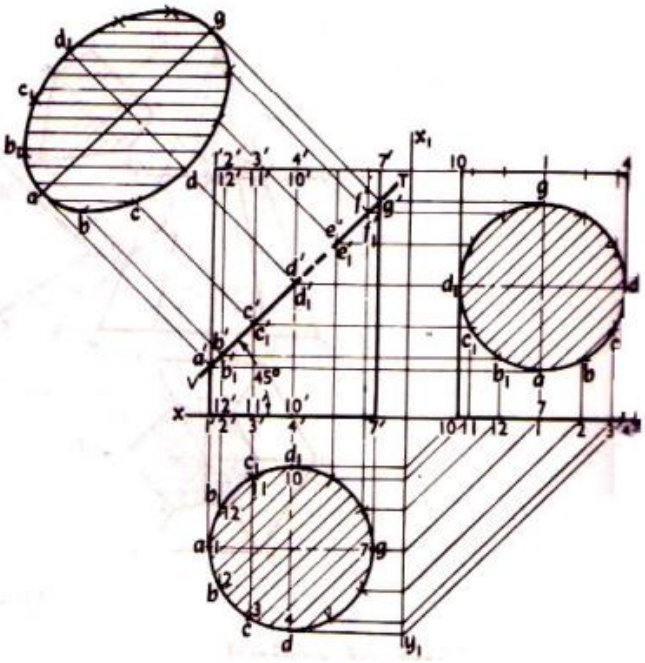


Draw the top view, sectional front view and the auxiliary front view on an AVP parallel to the section plane.

Sections of Cylinders: Section plan inclined to the base

Ex. 1-A cylinder of 40 mm diameter, 60 mm height and having its axis vertical is cut by a section plane, perpendicular to the VP, inclined at 45 to the HP and intersecting the axis 32 mm above the base. Draw its front view, sectional top view, sectional side view and the true shape of the section.




45°