UNIT-IV

Content

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone

Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

Unit-IV

Development of Surfaces of Right Regular Solids:

Imagine that a solid is enclosed in a wrapper of thin material, such as paper. If this covering is opened out and laid on a flat plane, the flattened-out paper is the development of the solid. Thus, when surfaces of a solid are laid out on a plane, the figure obtained is called its development.

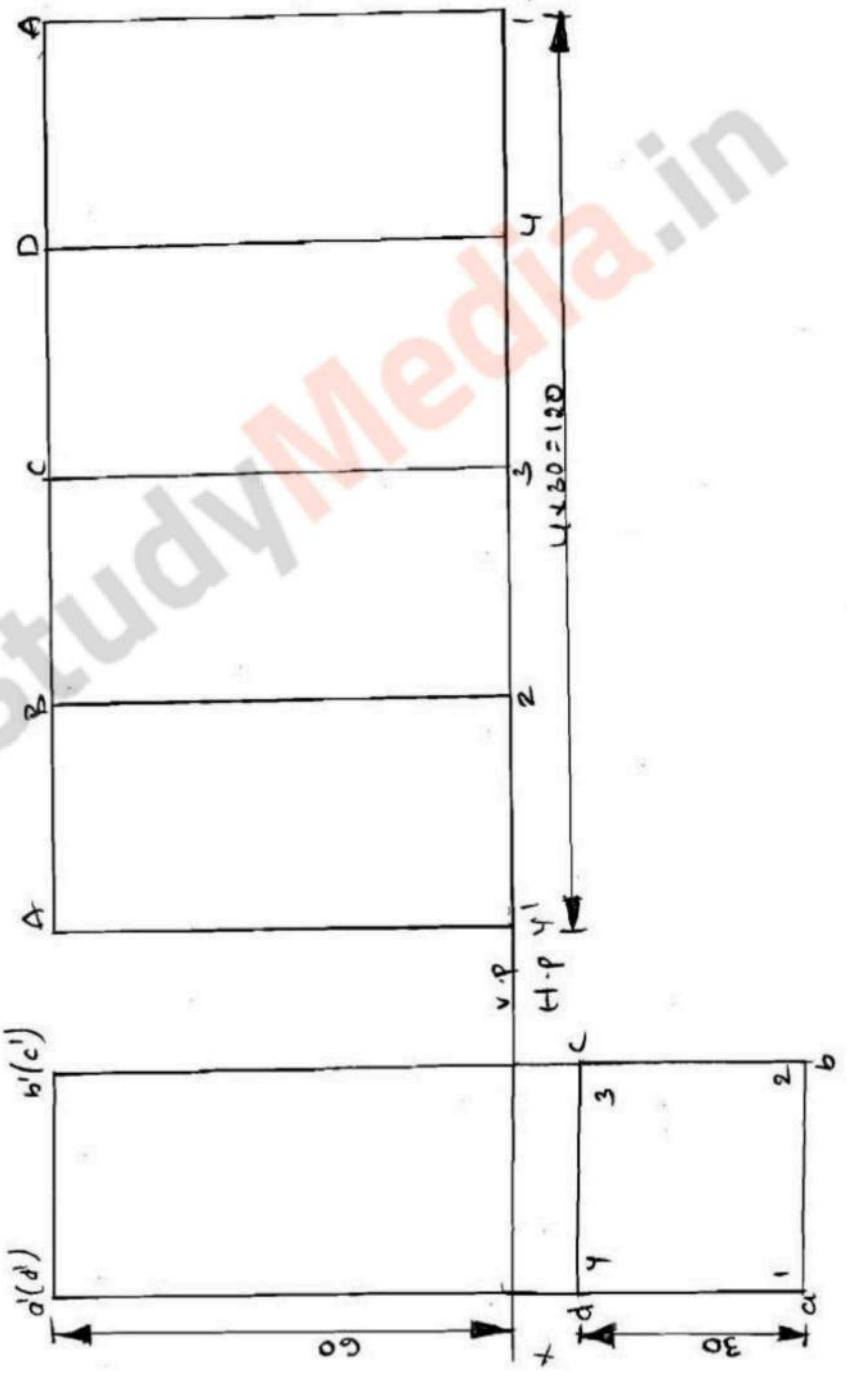
Intersection of Solids:

The intersecting surfaces may be two plane surfaces or two curved surfaces of solids. The lateral surface of every solid taken as a whole is a curved surface. This surface may be made of only curved surface as in case of cylinders, cones etc. or of plane surfaces as in case of prisms, pyramids etc. In the former case, the problem is said to be on the intersection of surfaces and in the latter case, it is commonly known as the problem on interpenetration of solids. It may, however, be noted that when two solids meet or join or interpenetrate, it is the curved surfaces of the two that intersect each other. The latter problem also is, therefore, on the intersection of surfaces.

1. A square prism of base side 30mm and axis 60mm is resting on its base on the H.P. with a rectangular face ||el to V.P develope the surface of the prism.

Base = 30mm , Square prism

Axis = 60mm.

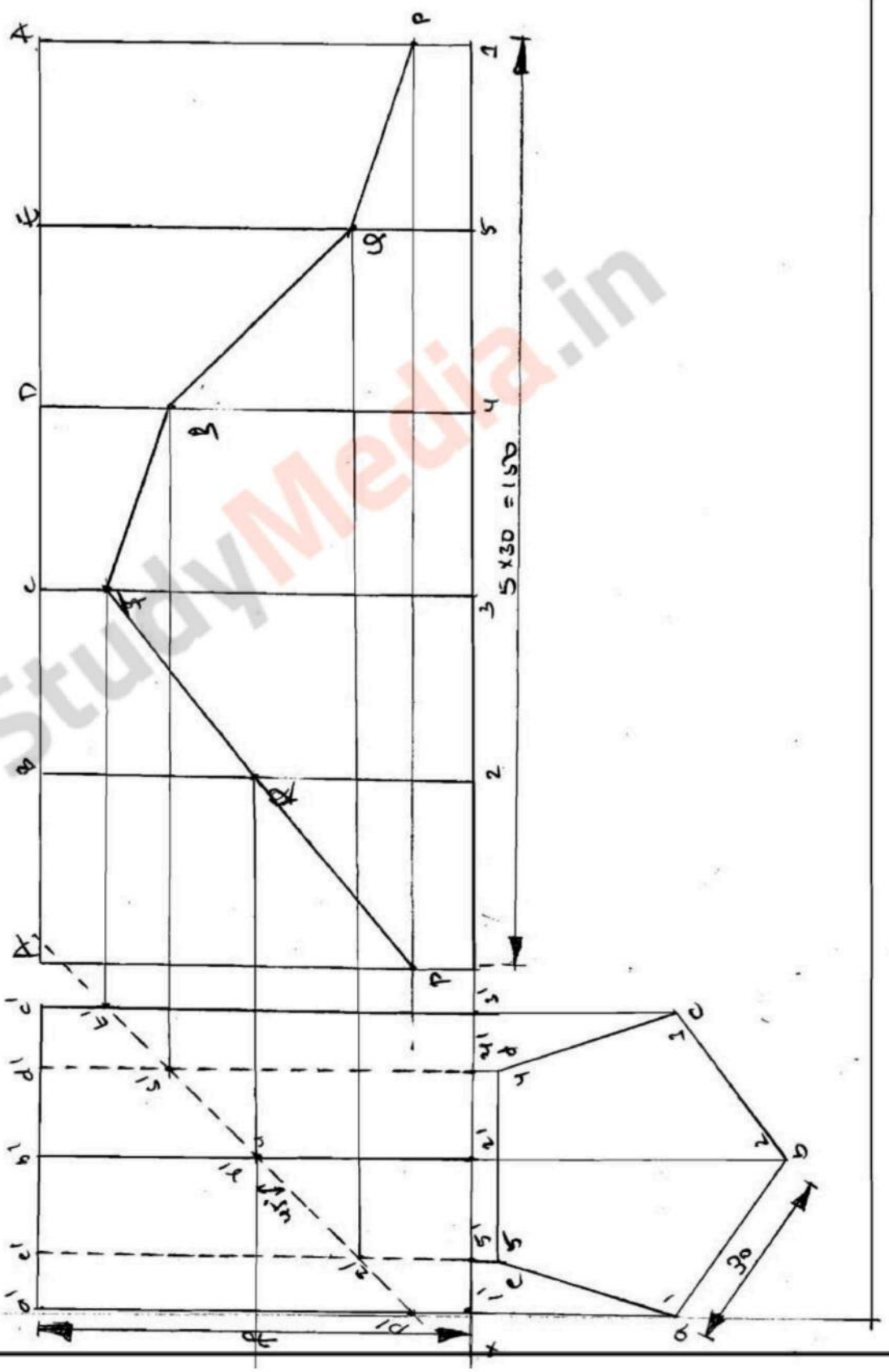


Q: A Pentagonal Prism base side 30mm and axis 70mm is resting on its base on the H.P. with rectangular face ||el to the V.P if it is cut by a A.I.P. whose V.T is inclined at 45° to the Reference line and Passes through the midpoint of the axis. Draw the develop-ment of Lateral surface of Truncated prism.

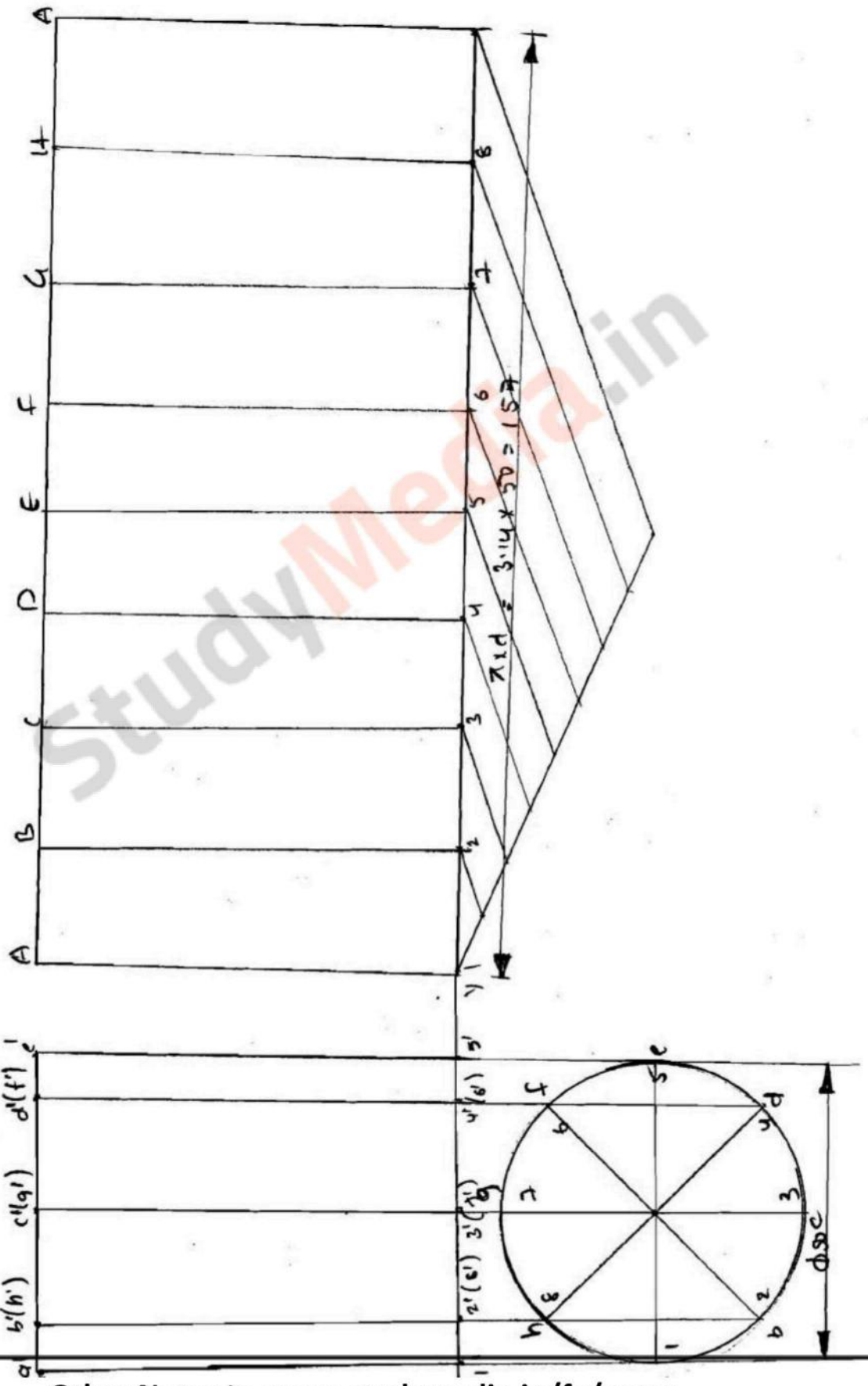
Pentagonal Prism

Base = 30mm

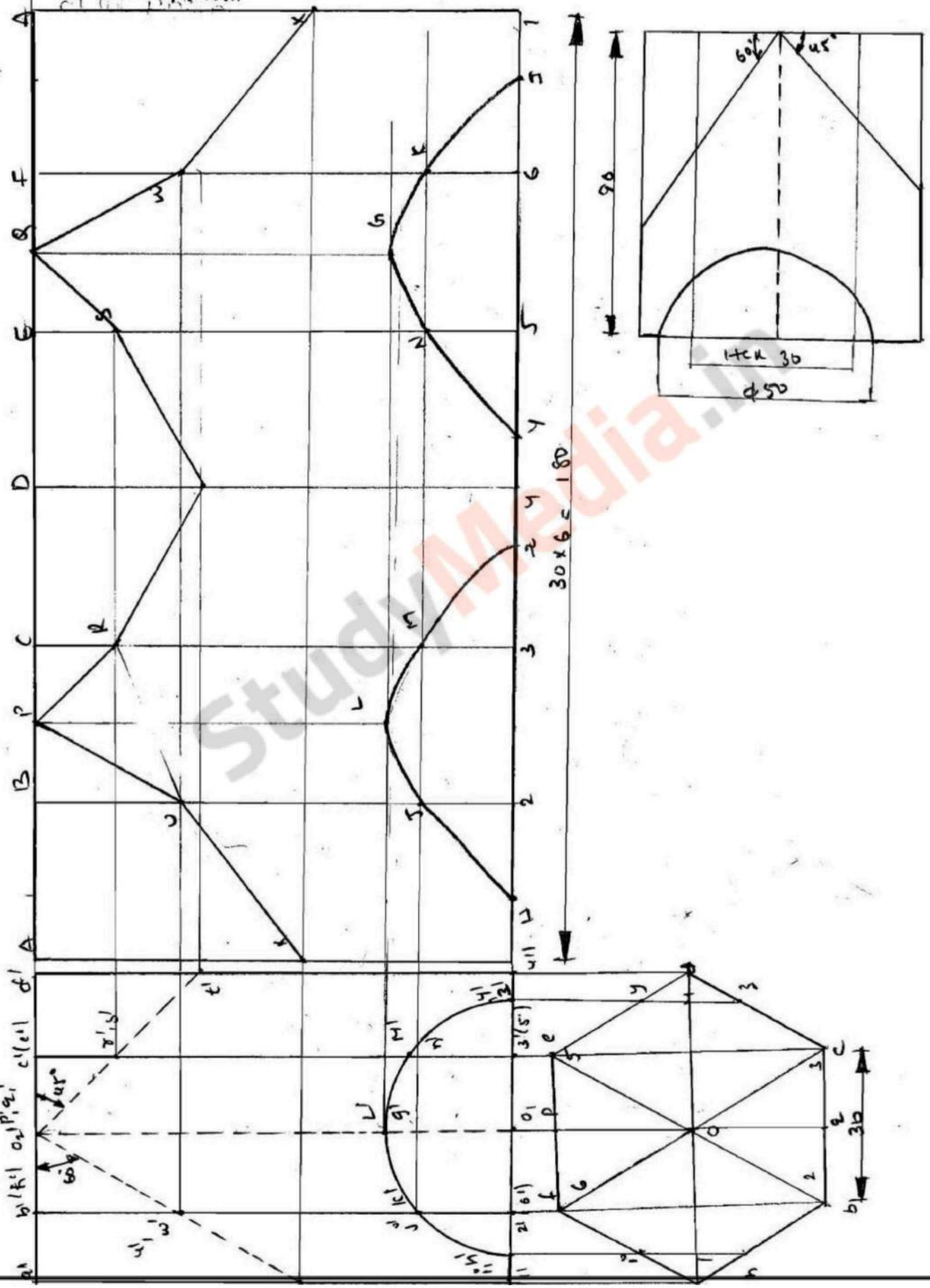
Axis = 70mm



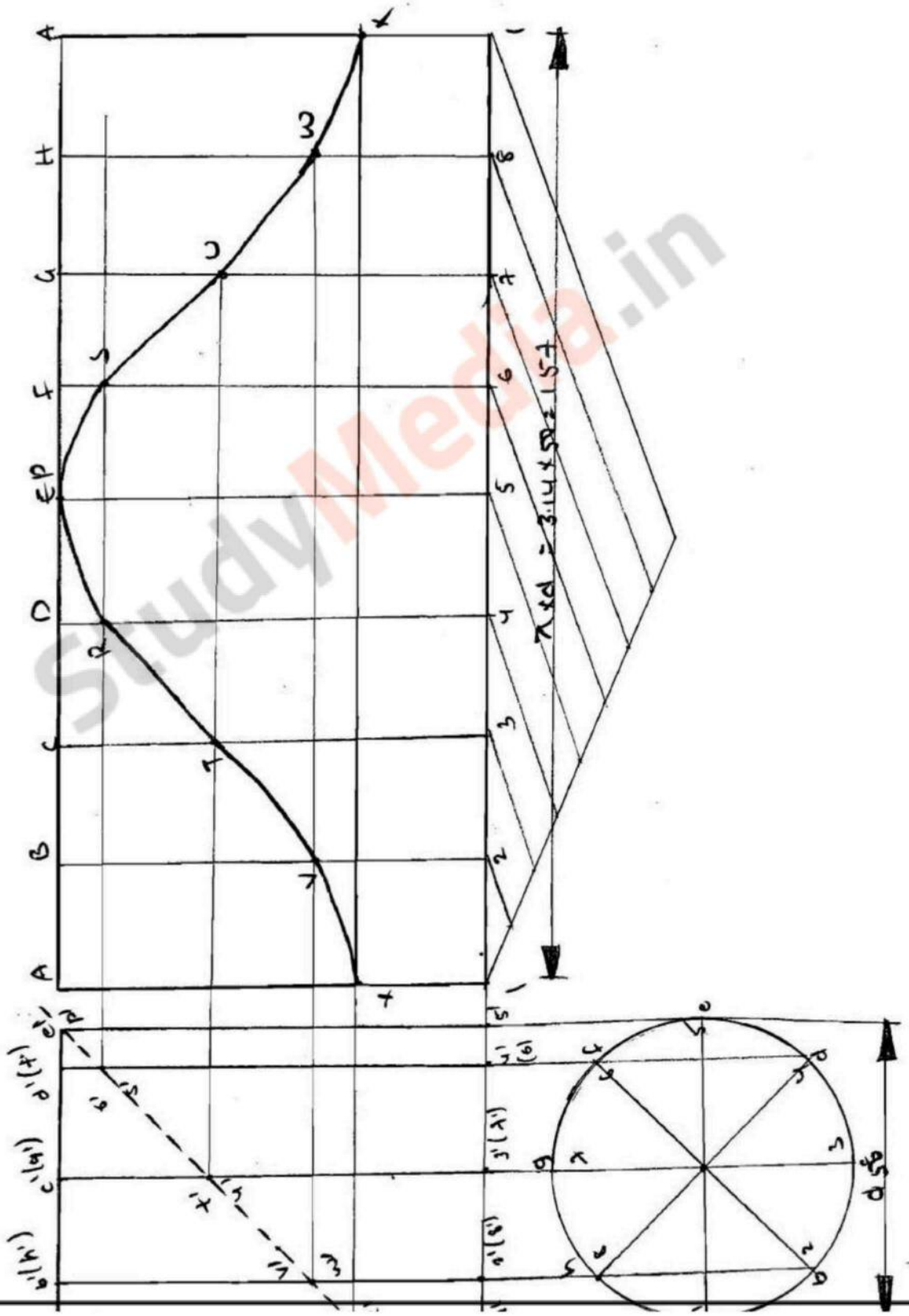
3. A cylinder of base diameter 50mm and axis 70mm is resting on the ground with its axis vertical. Draw the development of lateral surface of cylinder.



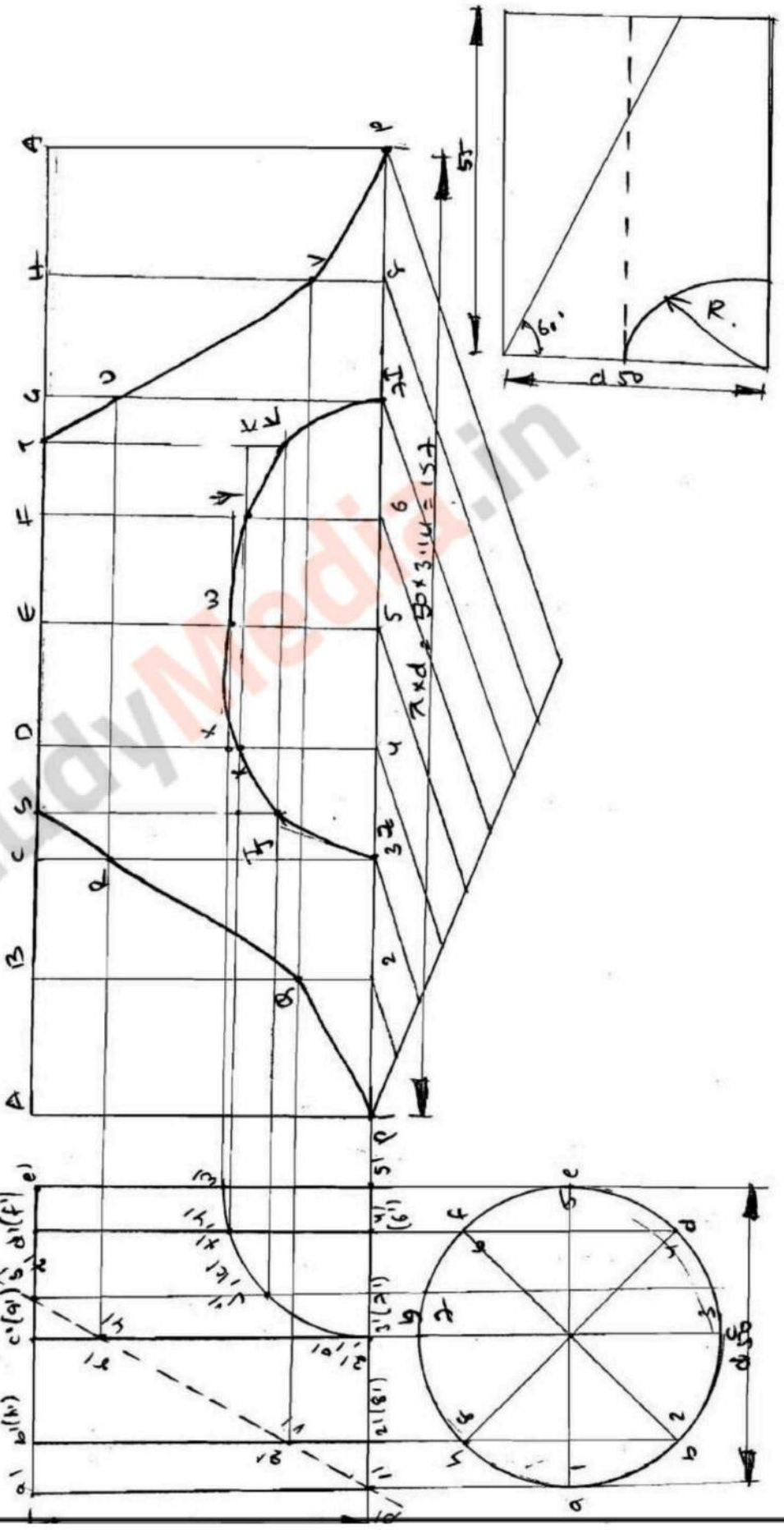
Q:- The figure shows the f.v of a truncated hexagonal prism of base side 30mm and axis 90mm. The prism is resting on the H.P with the base side parallel to V.P. Develope the Lateral surface of the prism.



Q: A cylinder of base diameter 50mm and axis 70mm is resting on the ground with its axis vertical. It is cut by a sectional plane ⊥r to V.P. Inclined at 45° to the H.P, passing through the top of a generator and cuts the all the generators. Draw the development of its Lateral surface.



Q:- Figure shows the F.V of a truncated cylinder of diameter 50mm resting on its base on the H.P. Draw the development of its lateral surfaces.

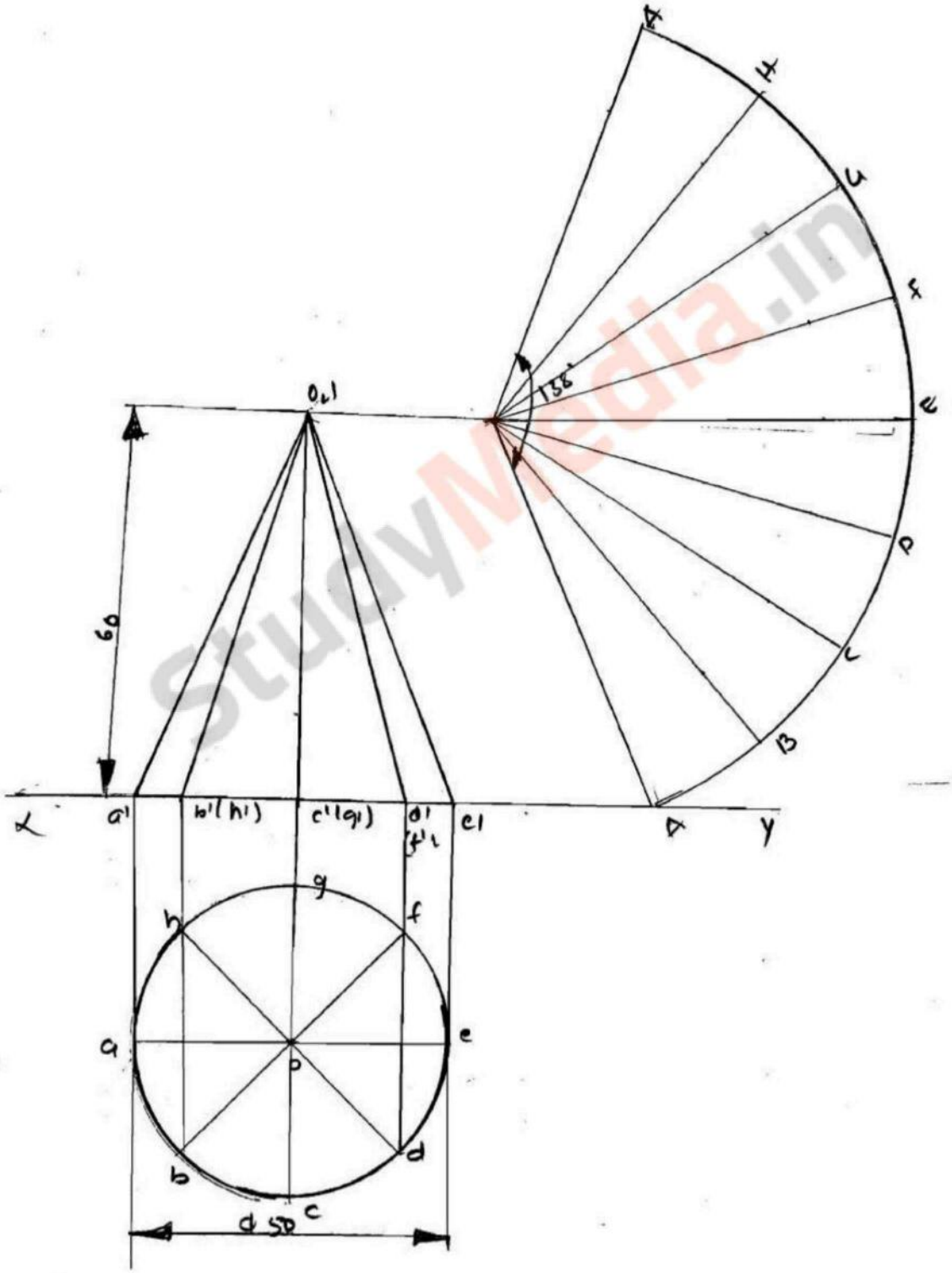


Q. A cone of base diameter 50mm and axis 60mm is resting on its base on the H.P. Draw the development of its lateral surface.

Base diameter $\phi = 50mm$

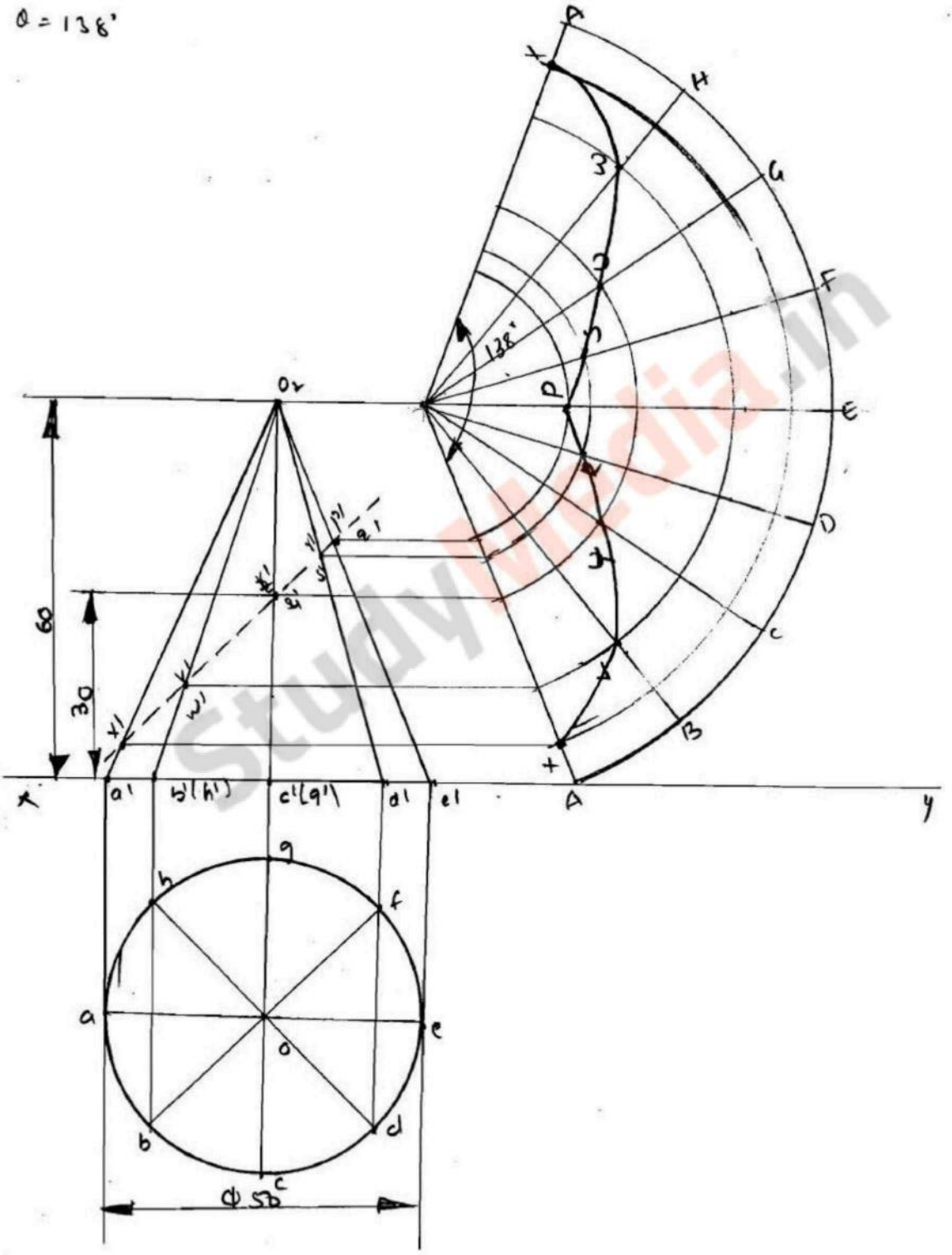
Axis = 60mm

$\theta = 138°$



Q A cone of base diameter 50mm and axis 60mm is resting on its base on the H.P. a sectional Plane ter to V.P and inclined at 45° to H.P bisecting the axis of the cone draw the development

Cone
base diameter ϕ = 50mm
AXIS = 60mm
θ = 138°

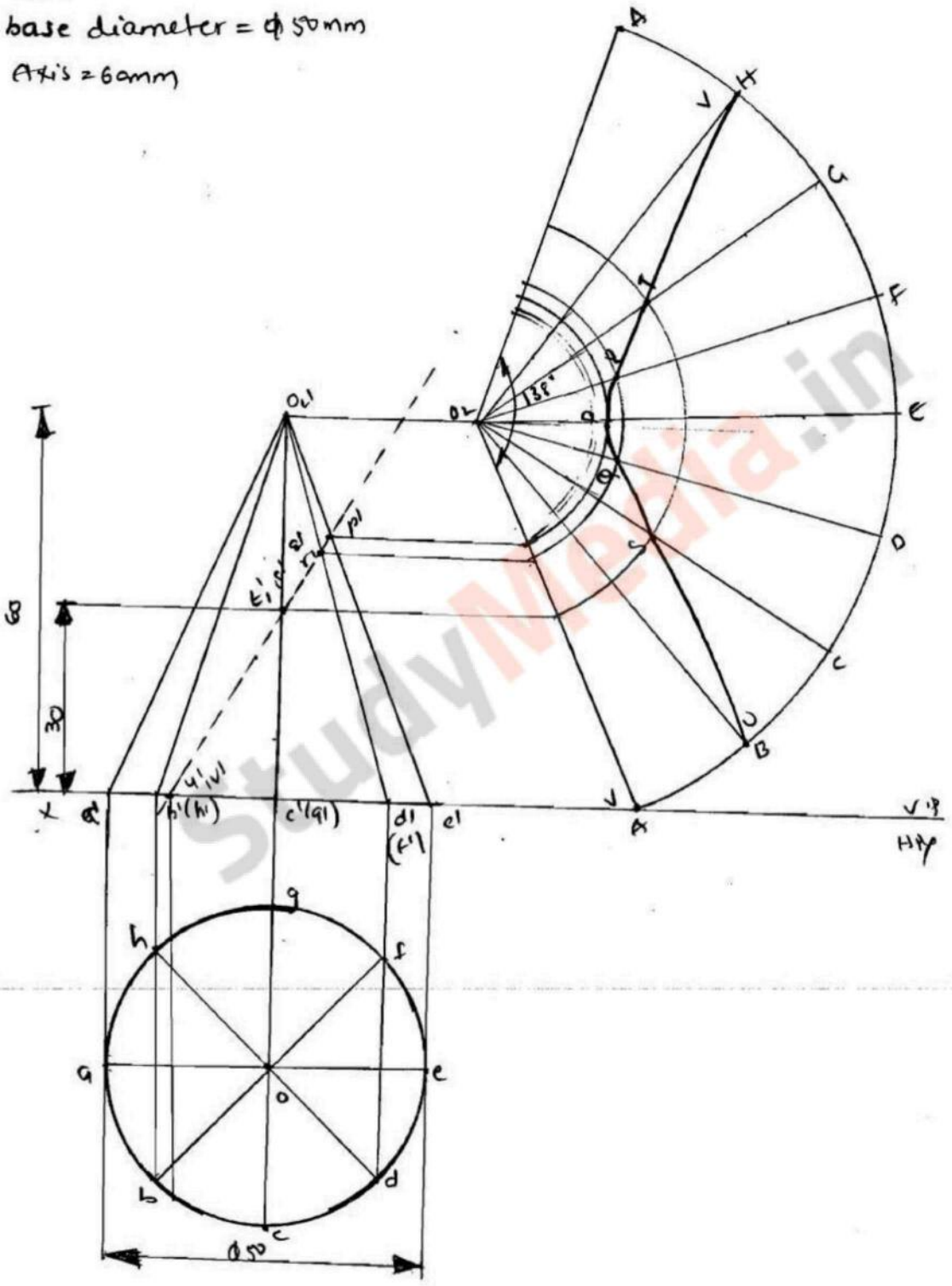


Q: A cone of base diameter 50mm and axis 60mm is resting on its base on the H.P. A sectional plane ter to V.P and inclined at 60° to H.P. bisecting the axis of the cone draw the development of lateral surface of cone

cone

base diameter = ϕ 50mm

Axis = 60mm



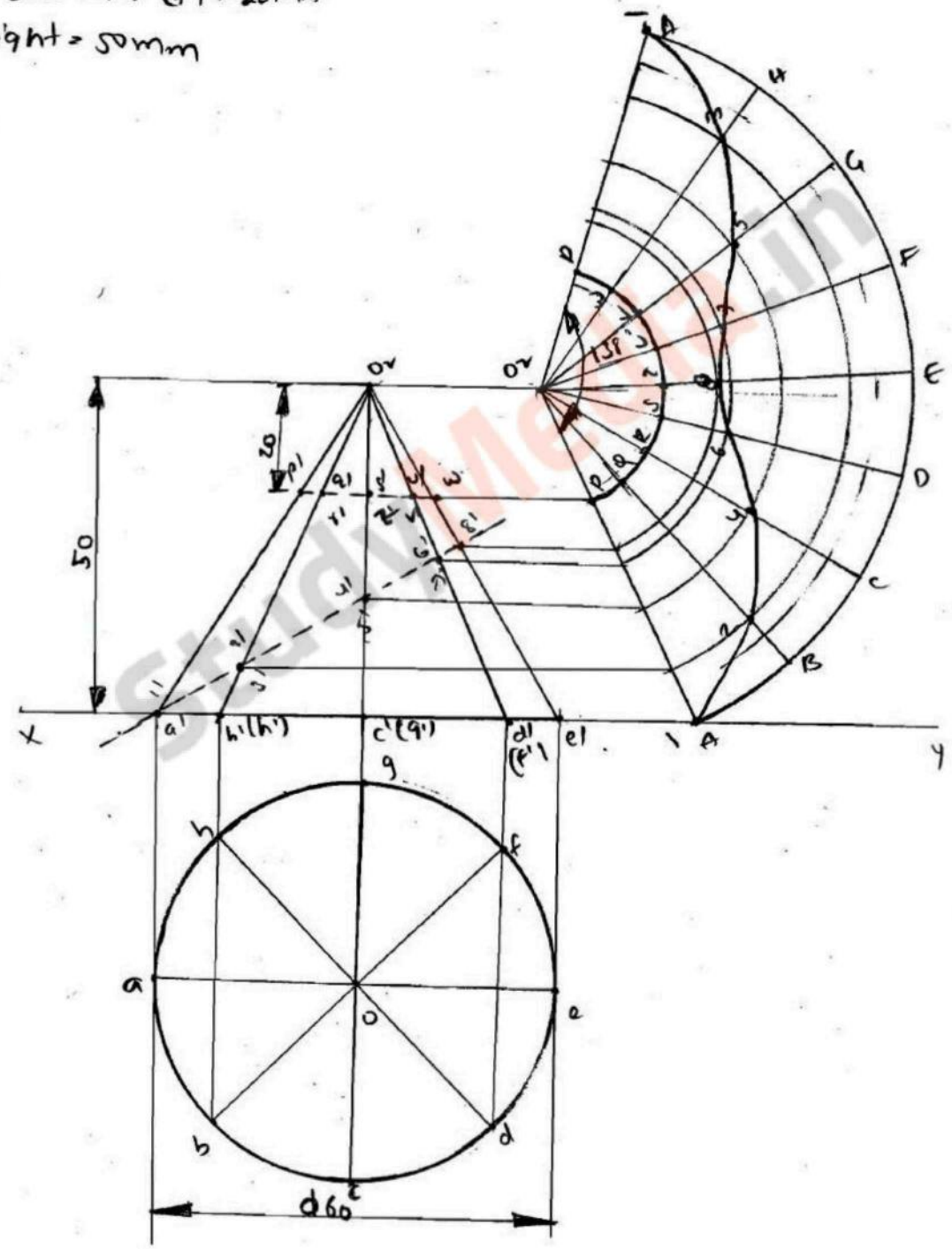
Q: The frustrum of the cone of base diameter 60mm TOP diameter 20mm and height of the 50mm is resting on the base H.P. It is cut by A.I.P and inclined at 30° to the H.P. The H.T of which is tangential to the base circle. Draw the development of the lateral surface of the retained frustrum.

Cone

base diameter (ϕ) = 60mm

TOP diameter (ϕ) = 20mm

height = 50mm



Q:- Draw the development of lateral surface of square pyramid of base side 40mm and axis 60mm is resting on its base on the H.P. such that

a) all sides of the base are equally inclined to the V.P

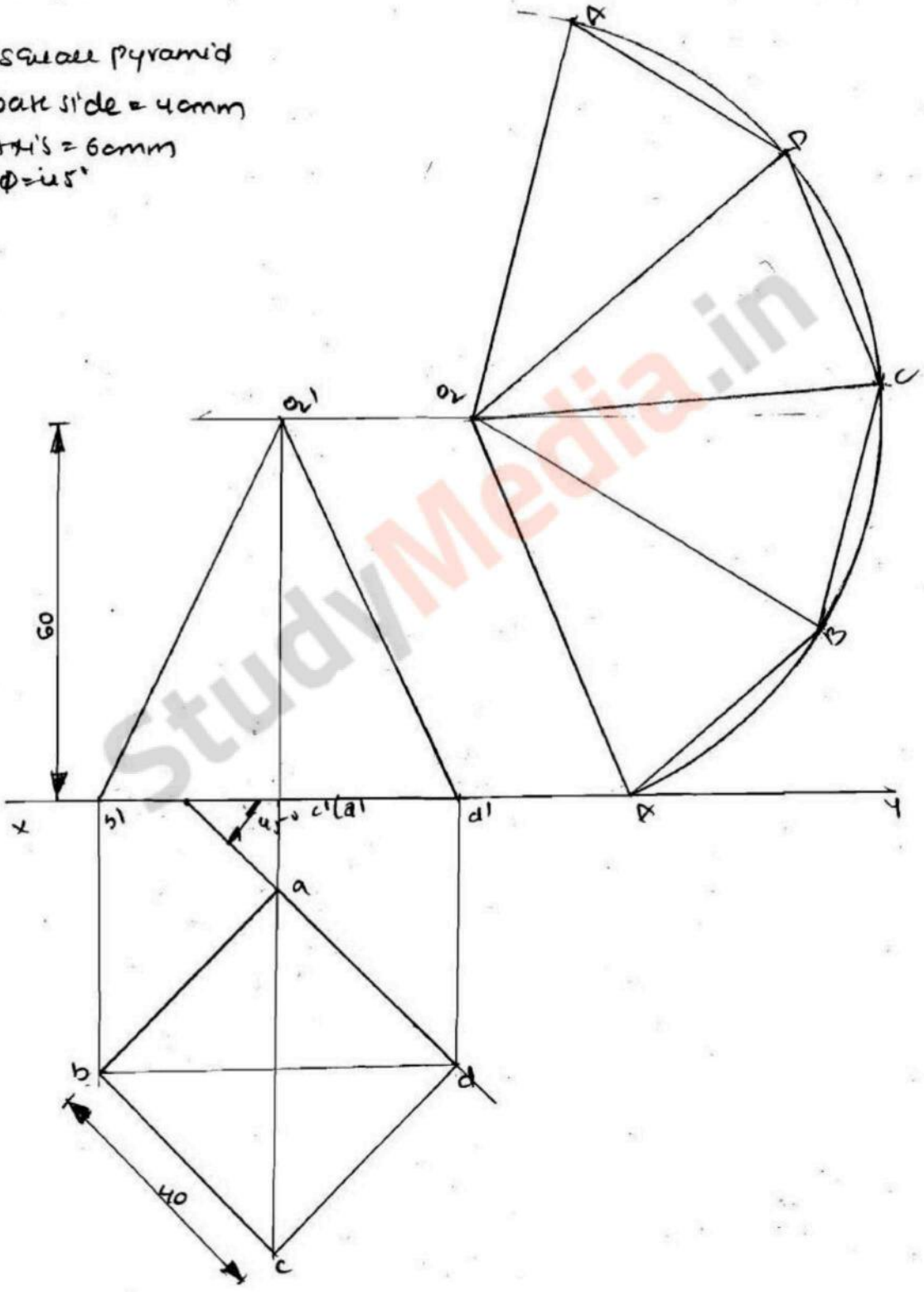
b) A side of the base is parallel to V.P

(a) square pyramid

base side = 40mm

Axis = 60mm

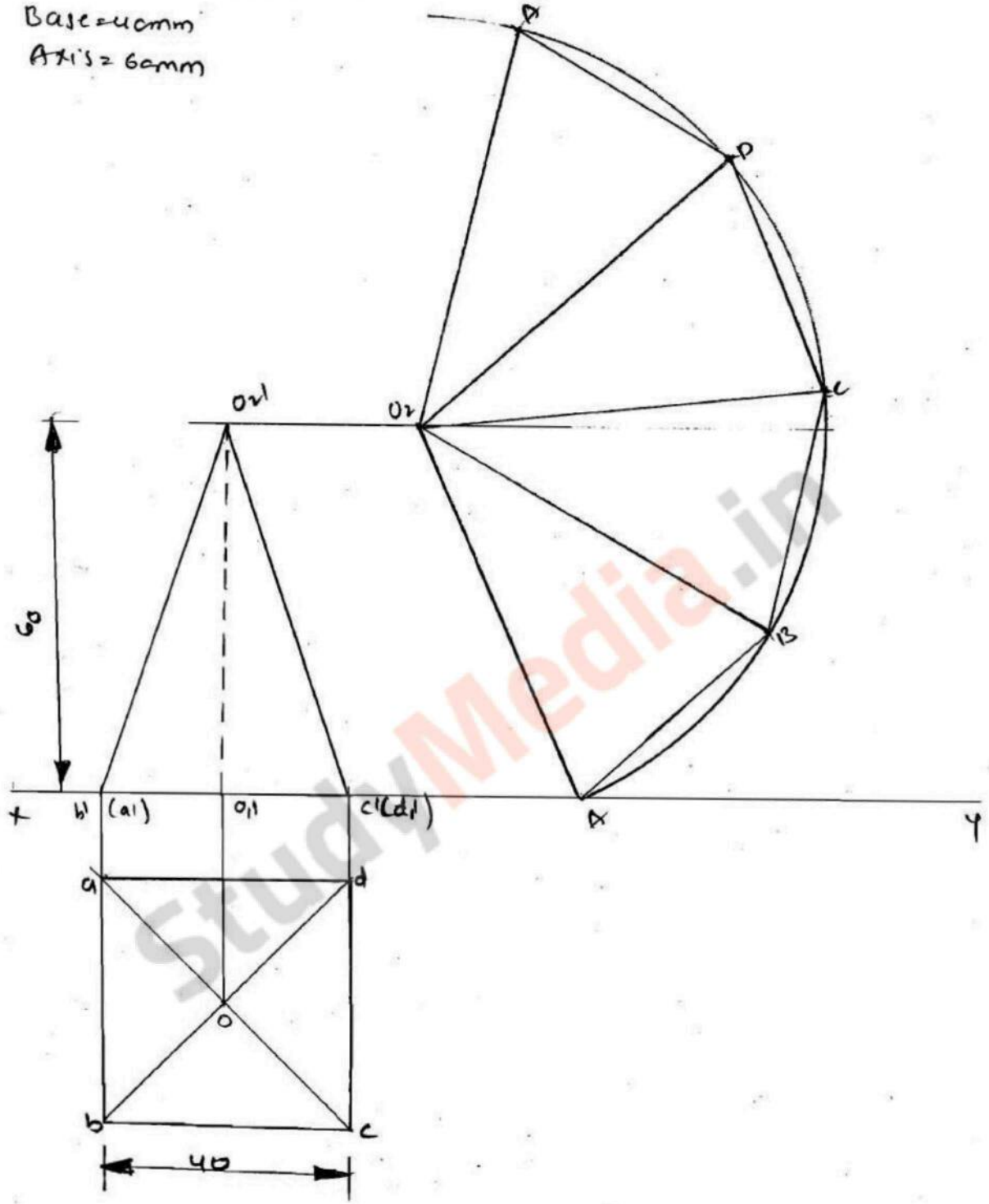
$\phi = 45°$



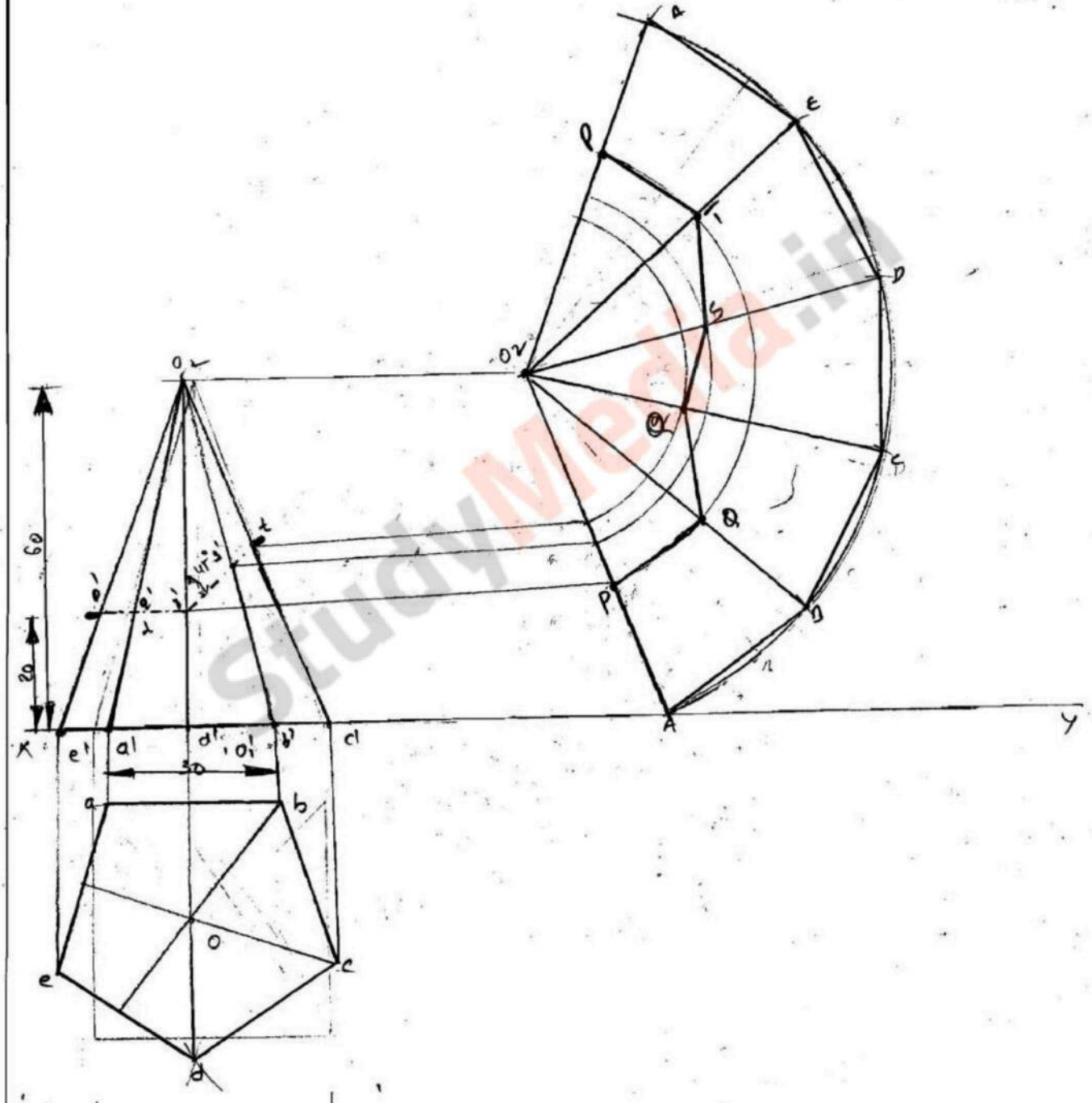
(b) Base is parallel to v.p

Base = 40mm

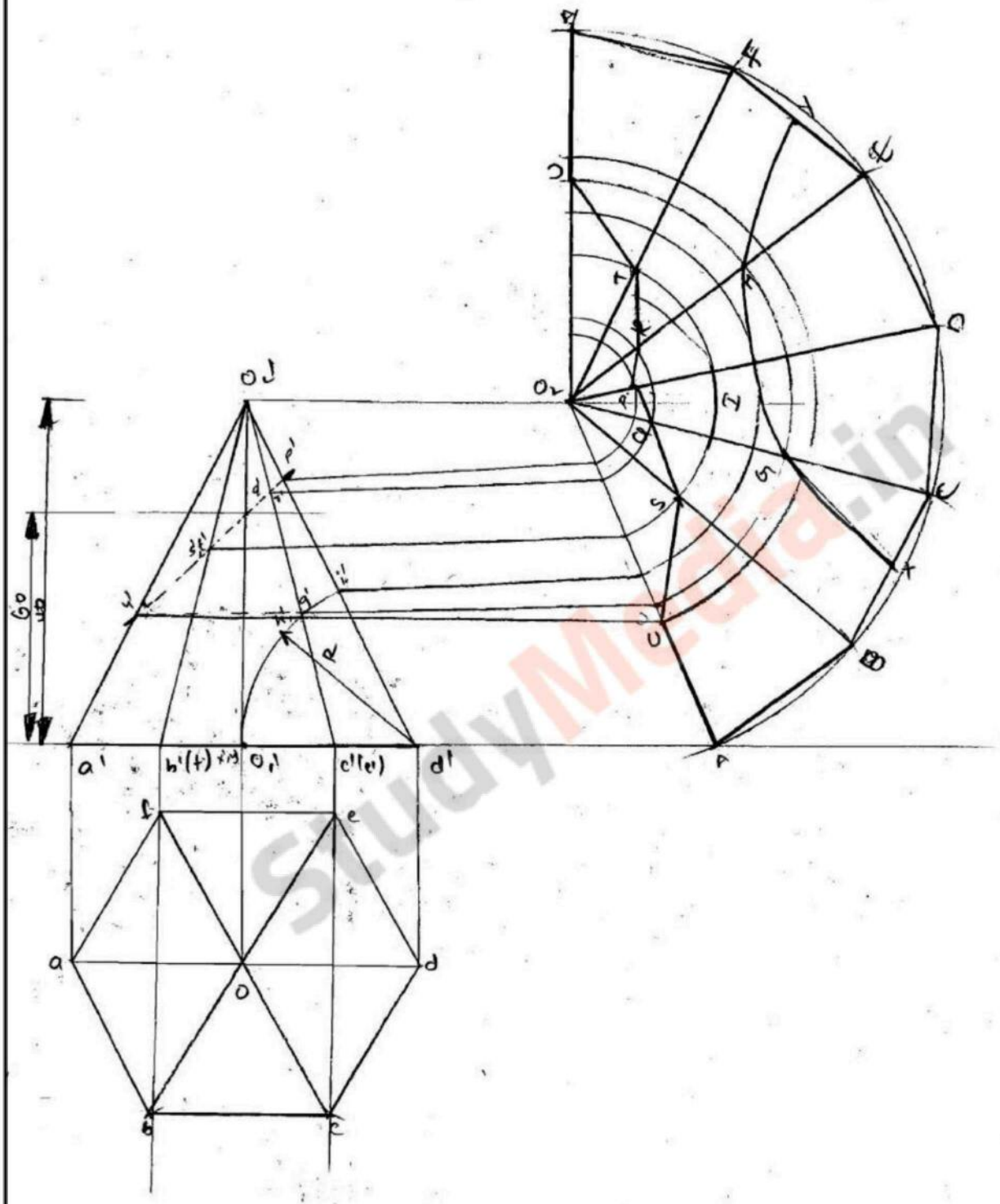
Axis = 60mm



Q. A Pentagonal Pyramid Base side 30mm and axis 60mm - rest on its base on the H.P. with the side of the base ⊥ll to V.P. It is cut by two sectional Planes meet at a height of 20mm From the base one of the sectional plane is horizontal while the other is an auxiliary inclined plane. which ⊥ to V.T at 45° to H.P. Draw the development of Lateral surface of solid when Apex is removed.



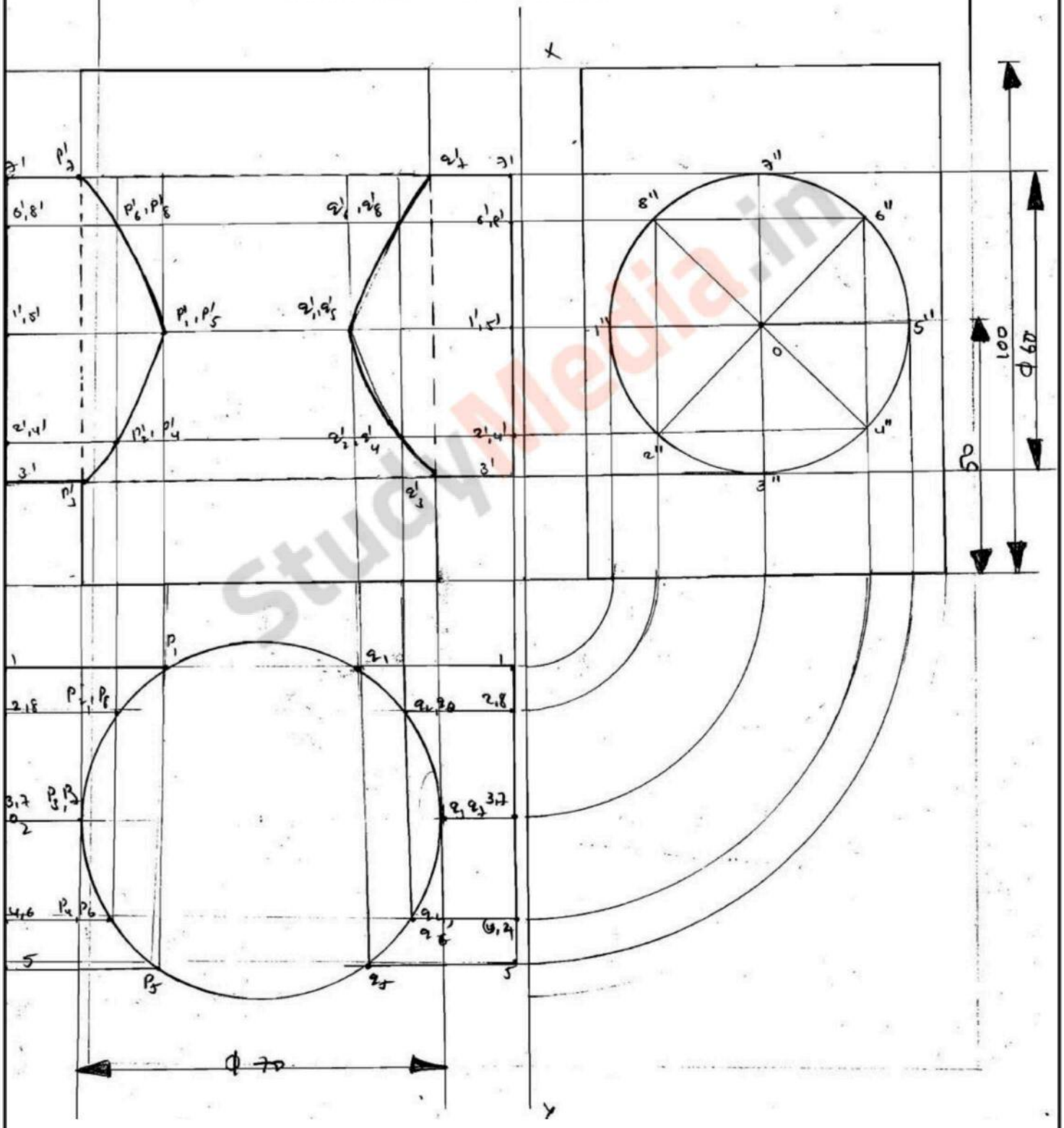
on it's base on the H.P with the side of the base parallel to V.P. It is cut by a plane perpendicular to V.P. To obtain the frontview as shown in figure. Draw the development of lateral surface of the retained solid.



4. INTERSECTION OF SOLIDS

1. A cylinder of base diameter 70mm is resting on its base on the H.P. It is penetrated by another cylinder of base diameter 60mm such that their axis's intersect each other at right angles. Draw the projections of the combination and show the curves of intersection.

Sol. Assume both cylinder height = 100mm



A square prism base side 50mm, is resting on its base on the H.P. It is completely penetrated by another square prism of base side 40mm. such that the axis of both prisms intersect eachother at right-angles and faces of both prisms are equally inclined to V.P. Draw the projections of the combination and show the lines of intersection.