UNIT IV

SECTIONS OF SOLIDS

- We have seen in projection of solids that hidden lines (or) edges were shown by dashed lines (- - - - -).
- However, if there are many dashed lines in a projection, it would be difficult to interpret the shape of the object.
- Therefore, sectional views of objects / machine components is necessary for an engineer to communicate his/her ideas in pictorial form.
- Eg: I. C Engines → Mechanical Engineering
  D.C Motors, Generators, Transformers → Electrical Engineering
  Computer Parts → CSE, ECE, IT
  Electronic Components → EEE.

Types of Section planes

(1) Plane perpendicular to one of the reference planes and perpendicular/parallel/inclined to the other reference plane.

(2) Plane parallel to one of the reference planes and perpendicular to the other.

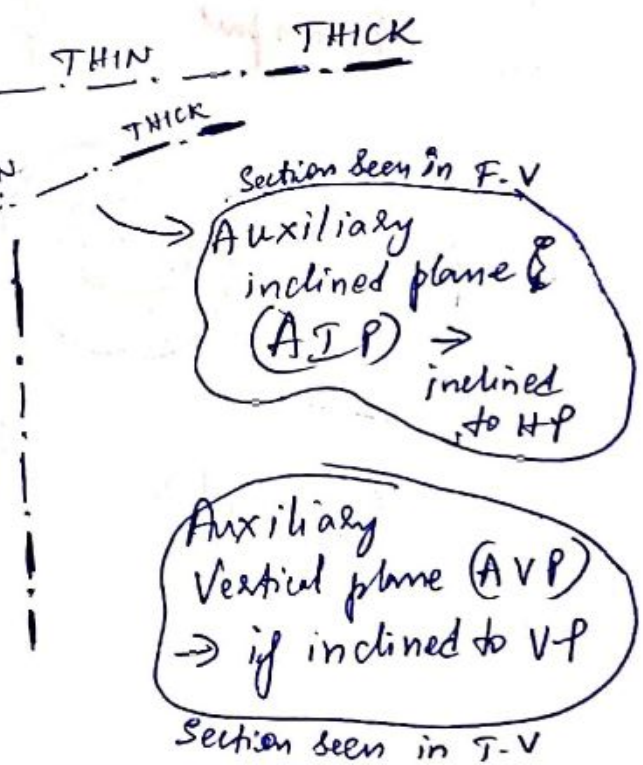
Symbolic representation of Section planes

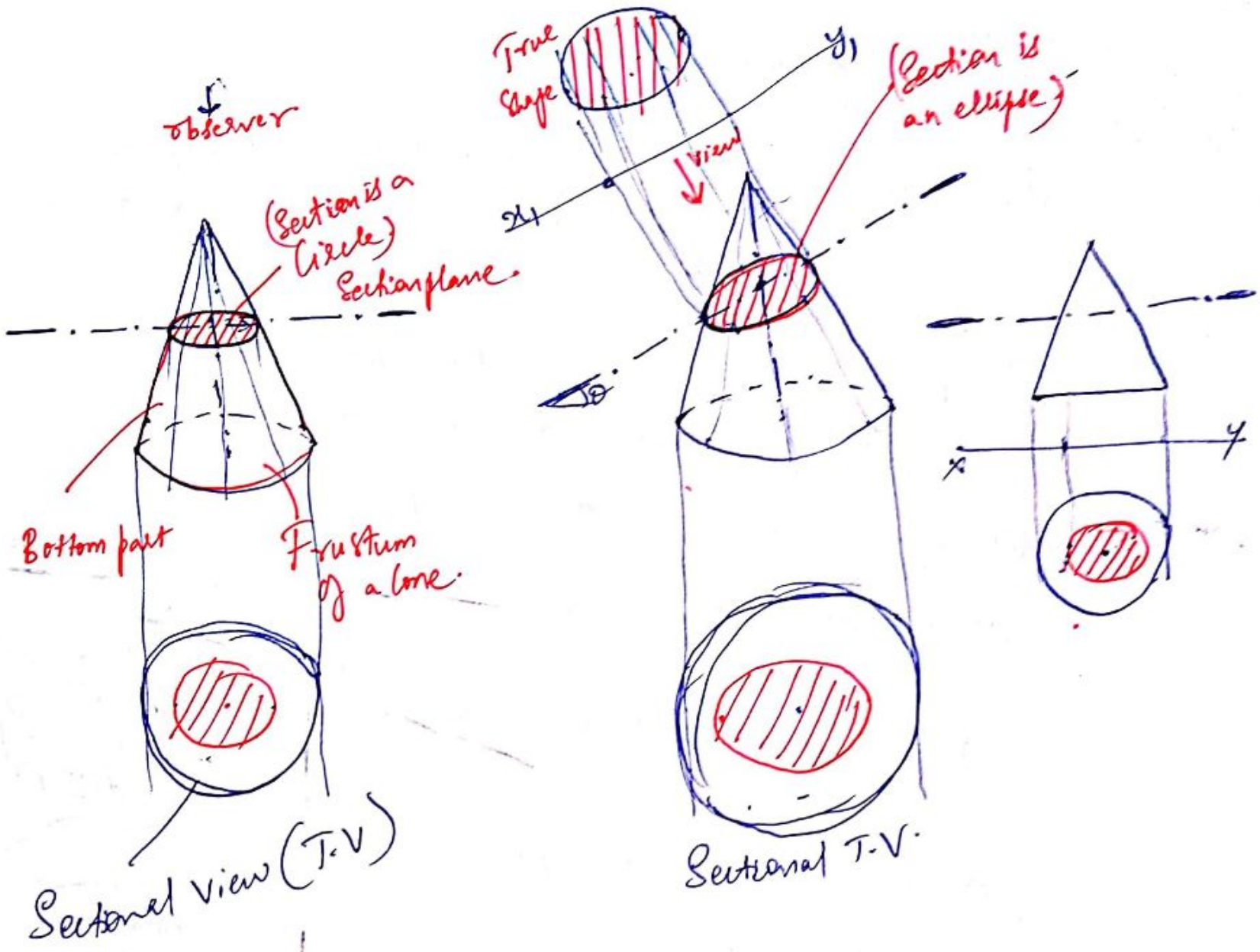
(i) Parallel Cutting plane — THICK — THIN — THICK

(ii) Inclined Cutting plane — THICK — THIN — THICK

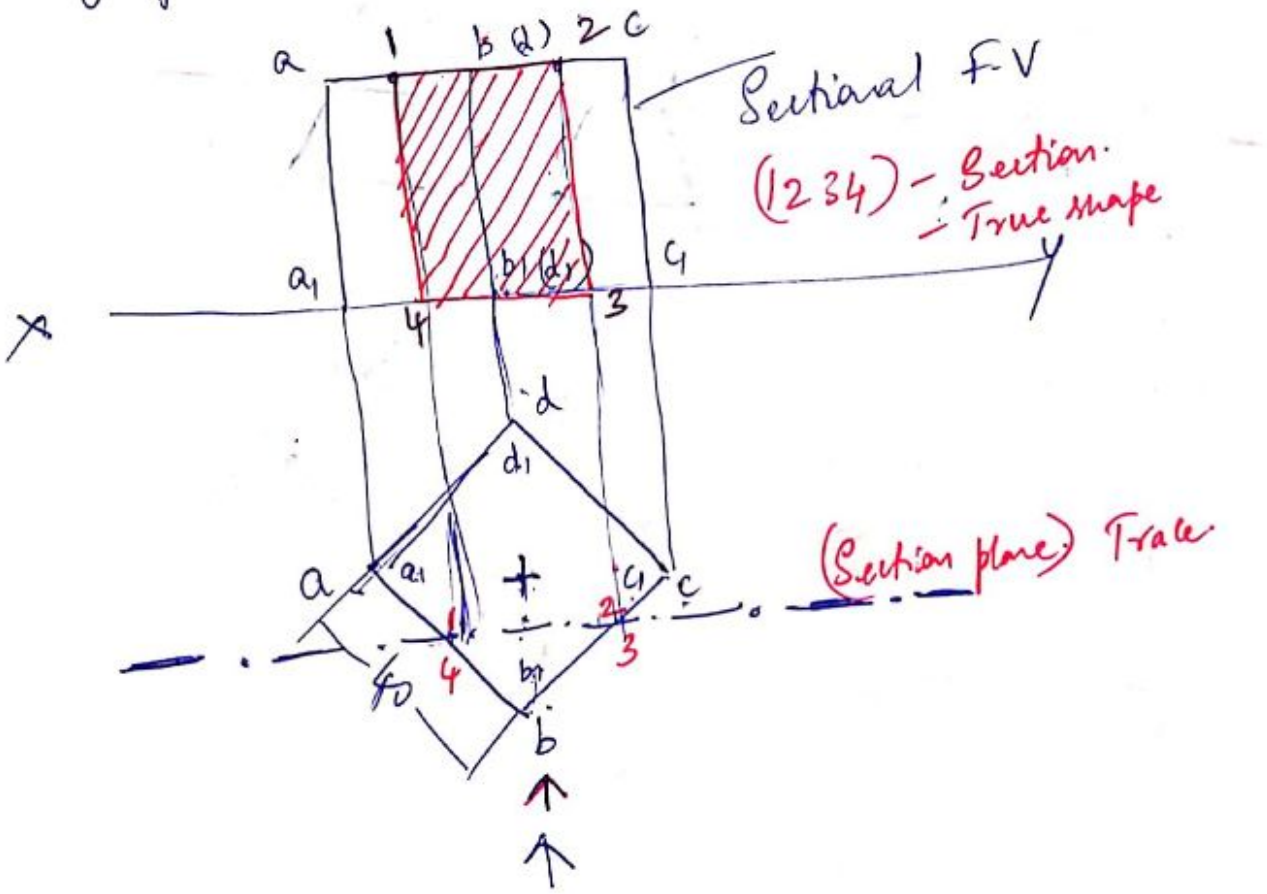
(iii) Perpendicular Cutting plane

(Also called trace of a plane) Above (i), (ii), & (iii)

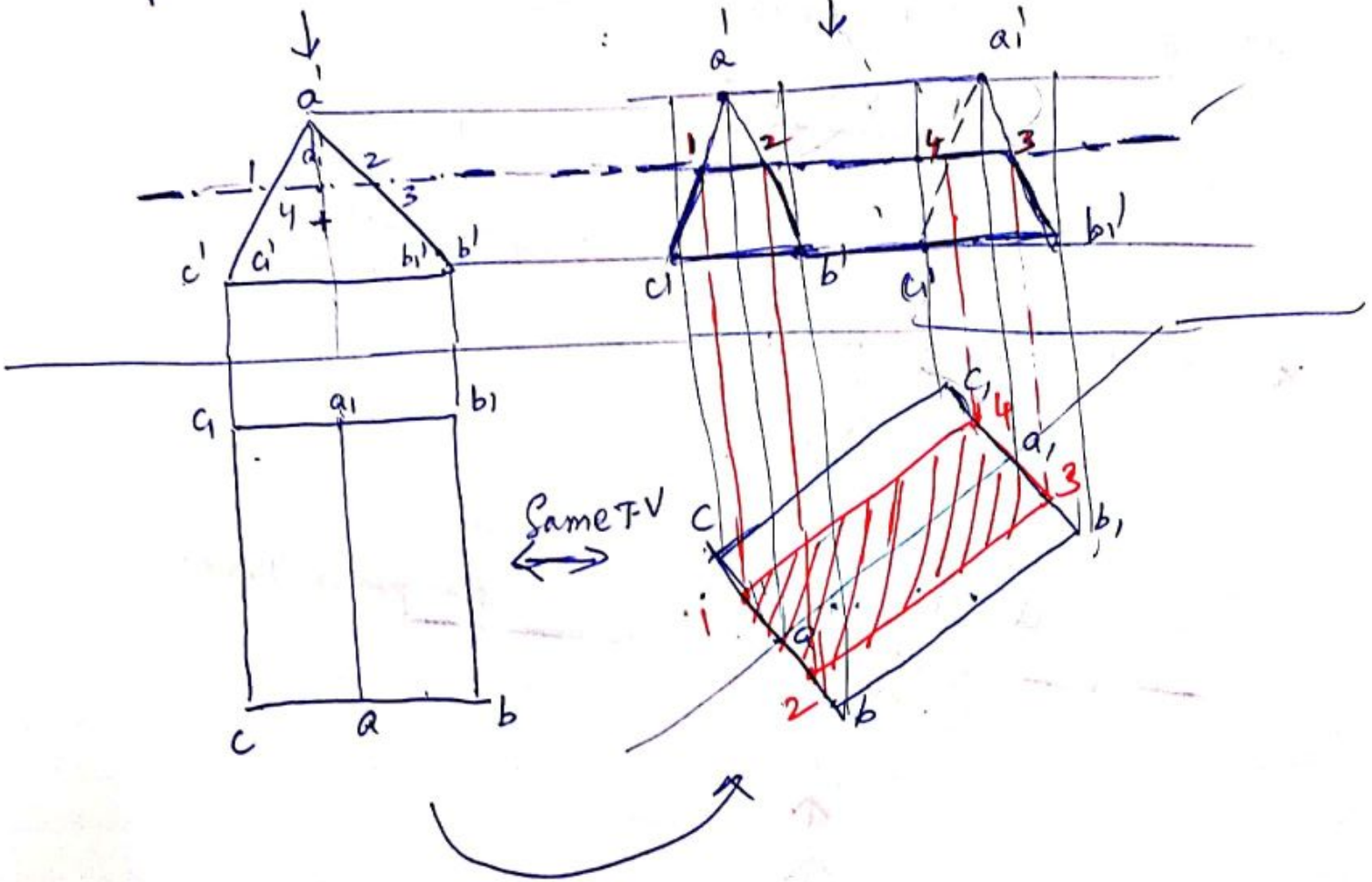




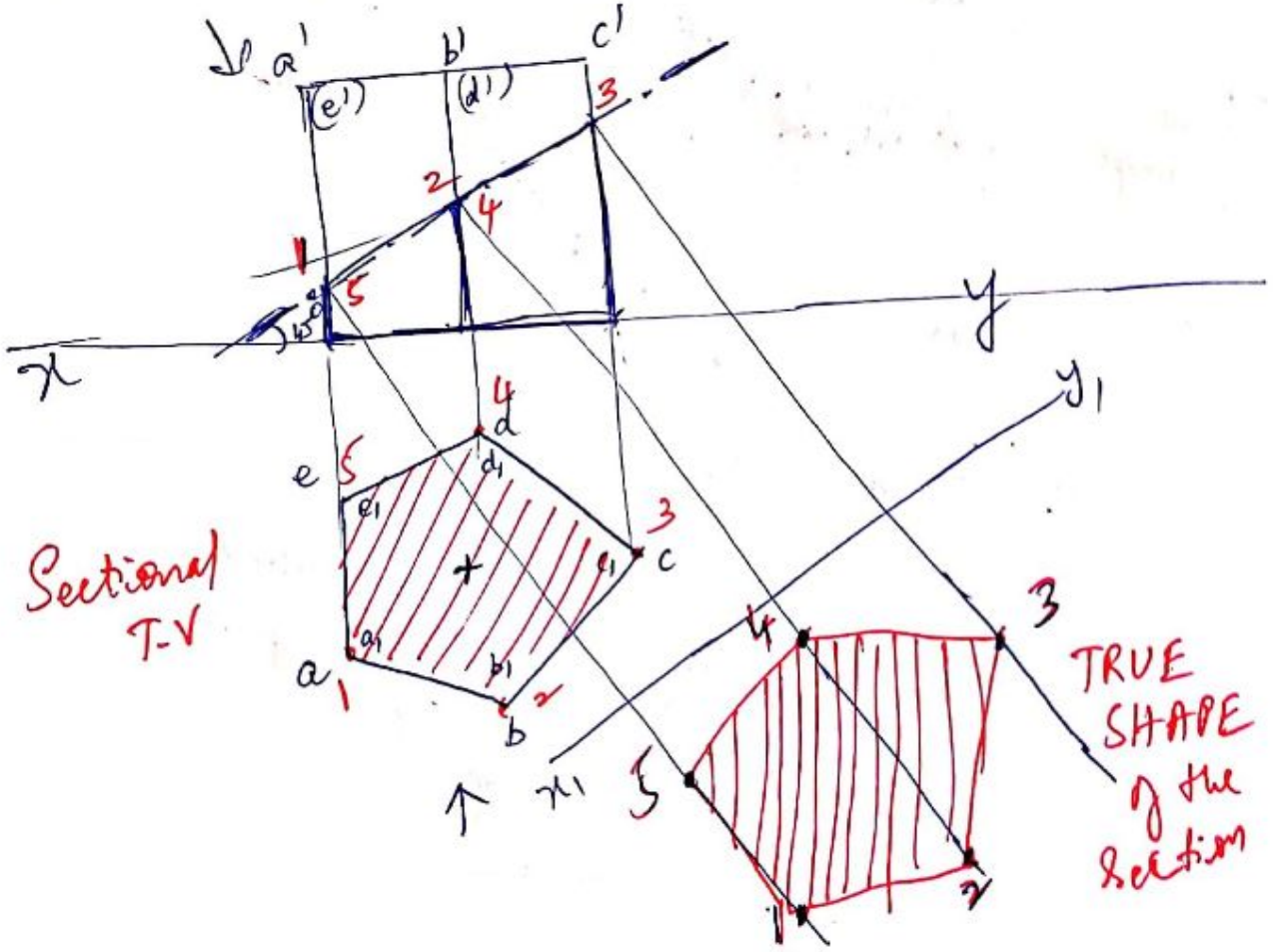
Pr: 1 A Cube of side 40mm is resting on H.P such that its edges are equally inclined to V.P. Its axis 50mm infront of V.P. A Vertical section plane is cutting the Cube at a distance of 10mm away from the axis & away from the V.P. Draw its sectional front view & its T.V



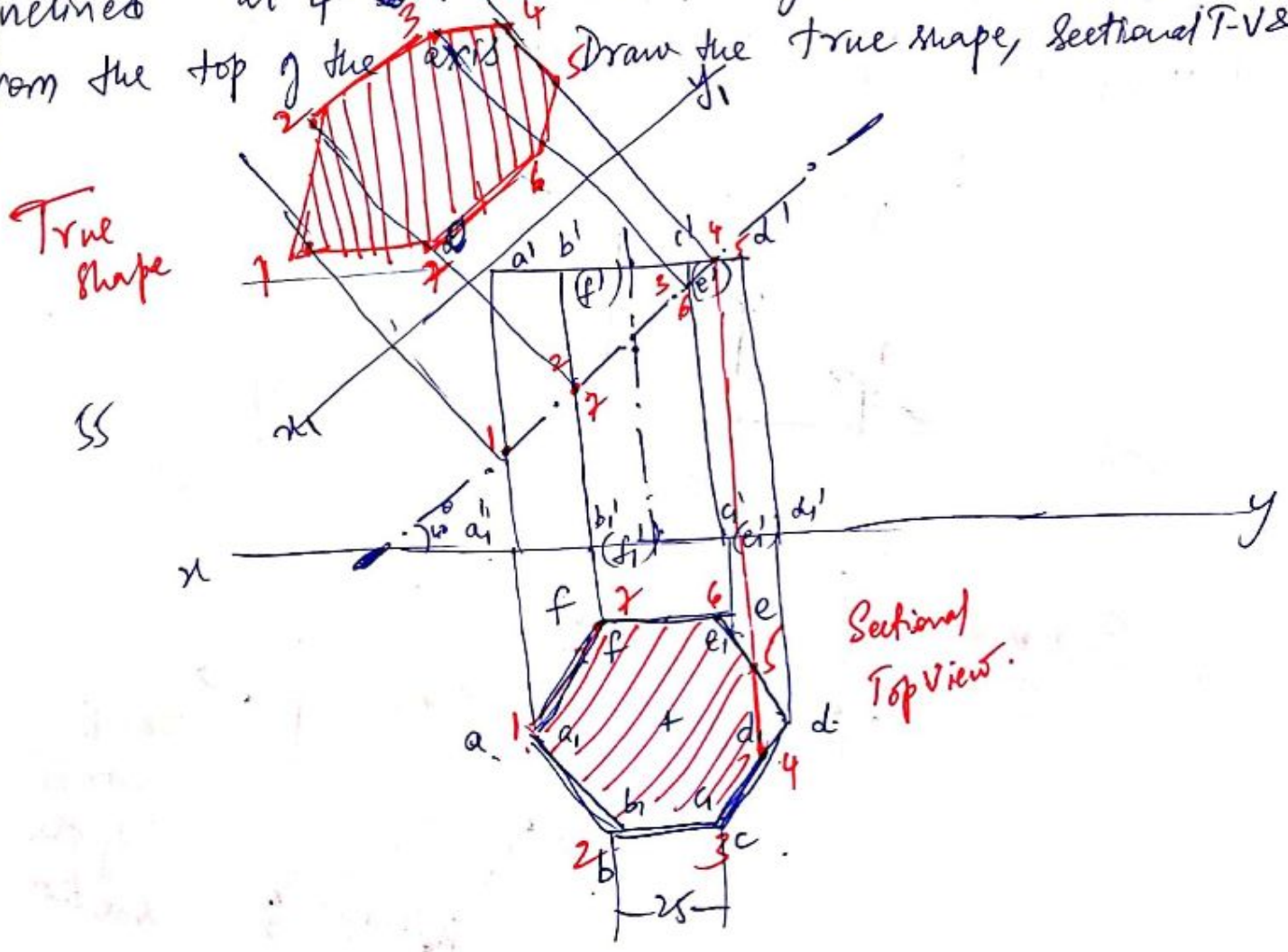
Pr.2 A triangular prism of side of base 30mm & axis 50mm is resting with its faces on H.P such that its axis is inclined at 30° to V.P. It is cut by a horizontal section plane at a pt. 5mm above the axis. Draw its F.V & sectional T.V.



Pr.3 A pentagonal prism of side of base 28mm & axis 65mm long is resting on H.P with its base edge ⊥ to V.P and axis is ∥ to & 50mm infront of V.P: An auxiliary inclined plane (AIP) making an angle of 45° to H.P is bisecting the axis. Draw the Sectional T.V, True shape and the F.V of the Prism.



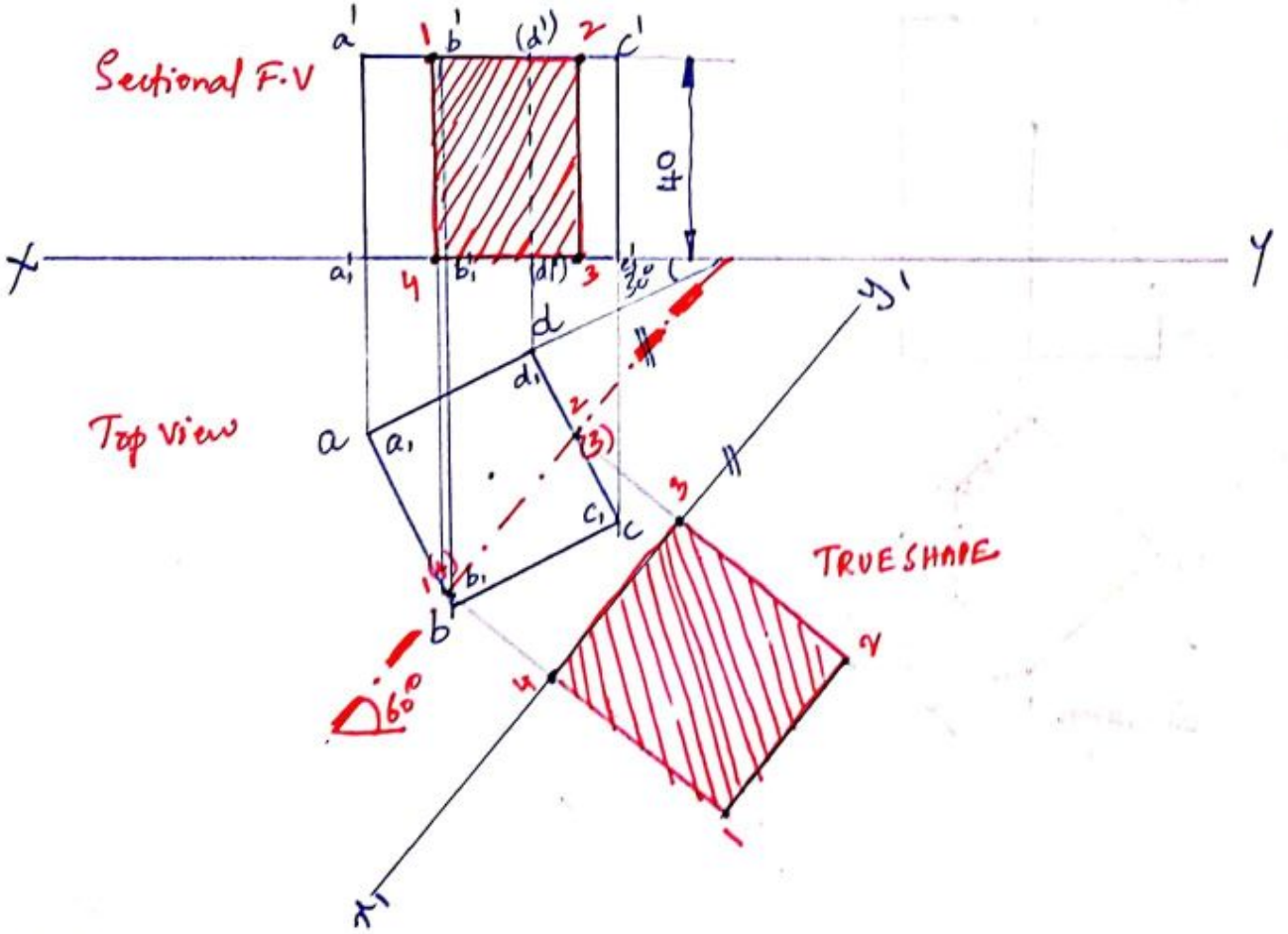
Pr: 4 A Hexagonal prism of side of base 25mm & axis 55mm long is resting with its base on H.P with one of its faces parallel to and 10 mm infront of V.P. A section plane perpendicular to V.P & inclined at 40° to H.P is cutting the axis at a pt. 15mm from the top of the axis. Draw the true shape, Sectional T-V & T-V.



Pr:5

1·2

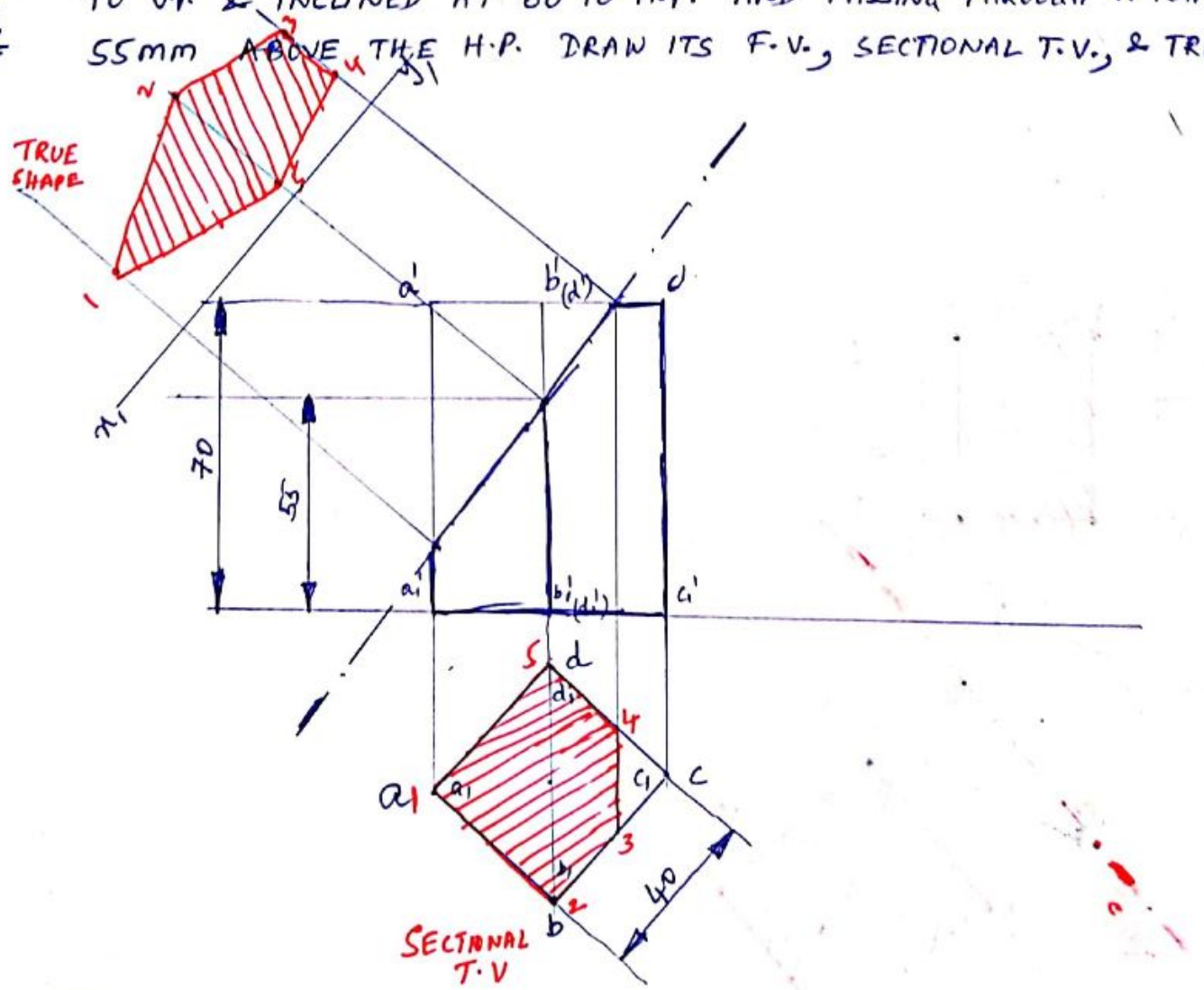
A CUBE OF 40MM LONG IS RESTING ON H·P. ON ONE OF ITS FACES INCLINED AT 30° TO VP. IT IS CUT BY A SECTION PLANE INCLINED AT 60° TO V·P AND PERPENDICULAR TO H·P. SOTHAT THE FACE WHICH MAKES 60° WITH V. P. IS CUT INTO TWO HALVES. DRAW THE SECTIONAL F·V, T·V, & TRUE SHAPE.



Pr: 6

1.6

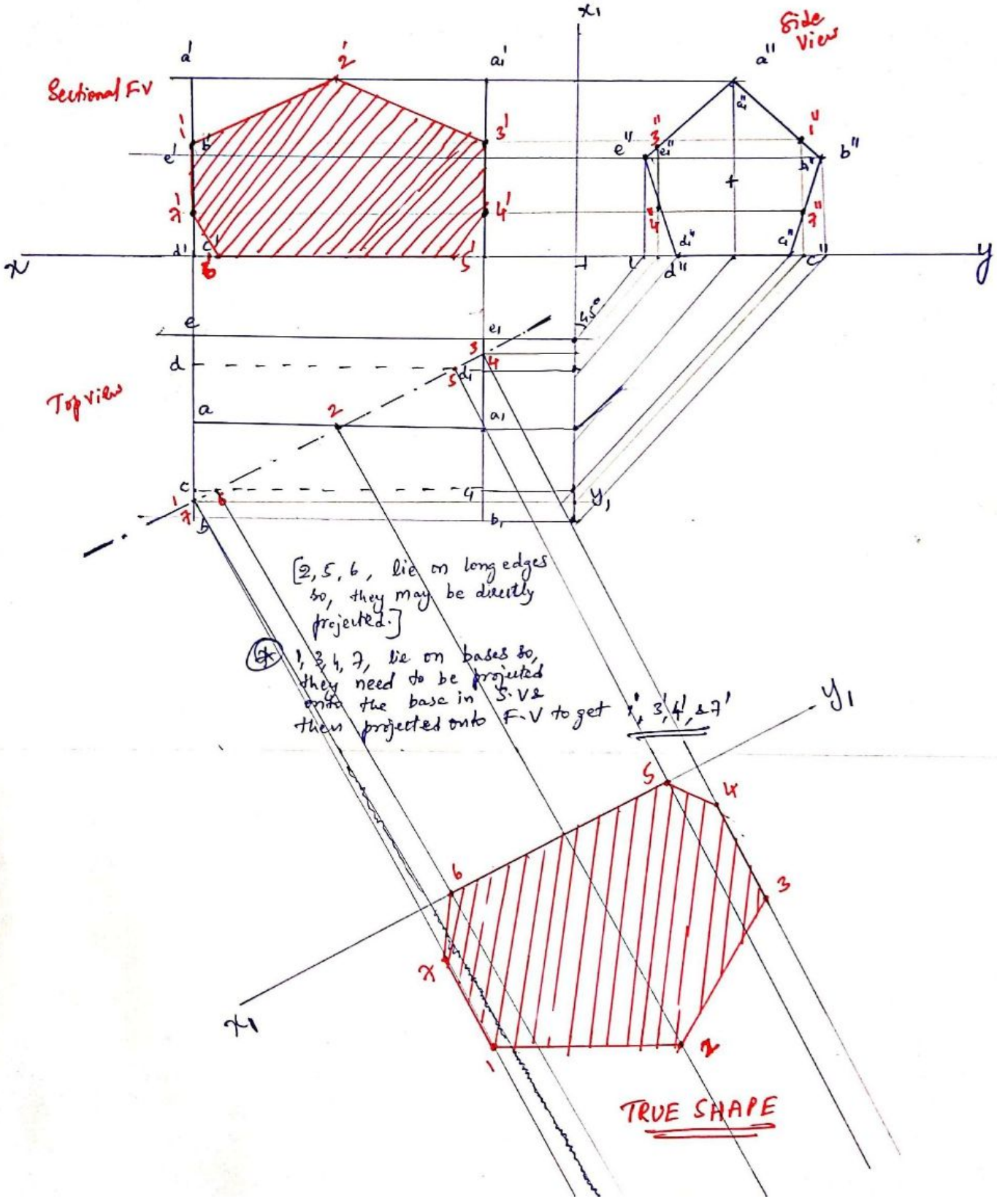
A SQUARE PRISM OF BASE 40MM SIDE, AXIS 70MM LONG HAS ITS BASE IN H.P & ITS FACES EQUALLY INCLINED TO V.P. IT IS CUT BY A PLANE PERPENDICULAR TO V.P & INCLINED AT 60° TO H.P. AND PASSING THROUGH A POINT ON AXIS 55mm ABOVE THE H.P. DRAW ITS F.V., SECTIONAL T.V., & TRUE SHAPE.



Pr: 7

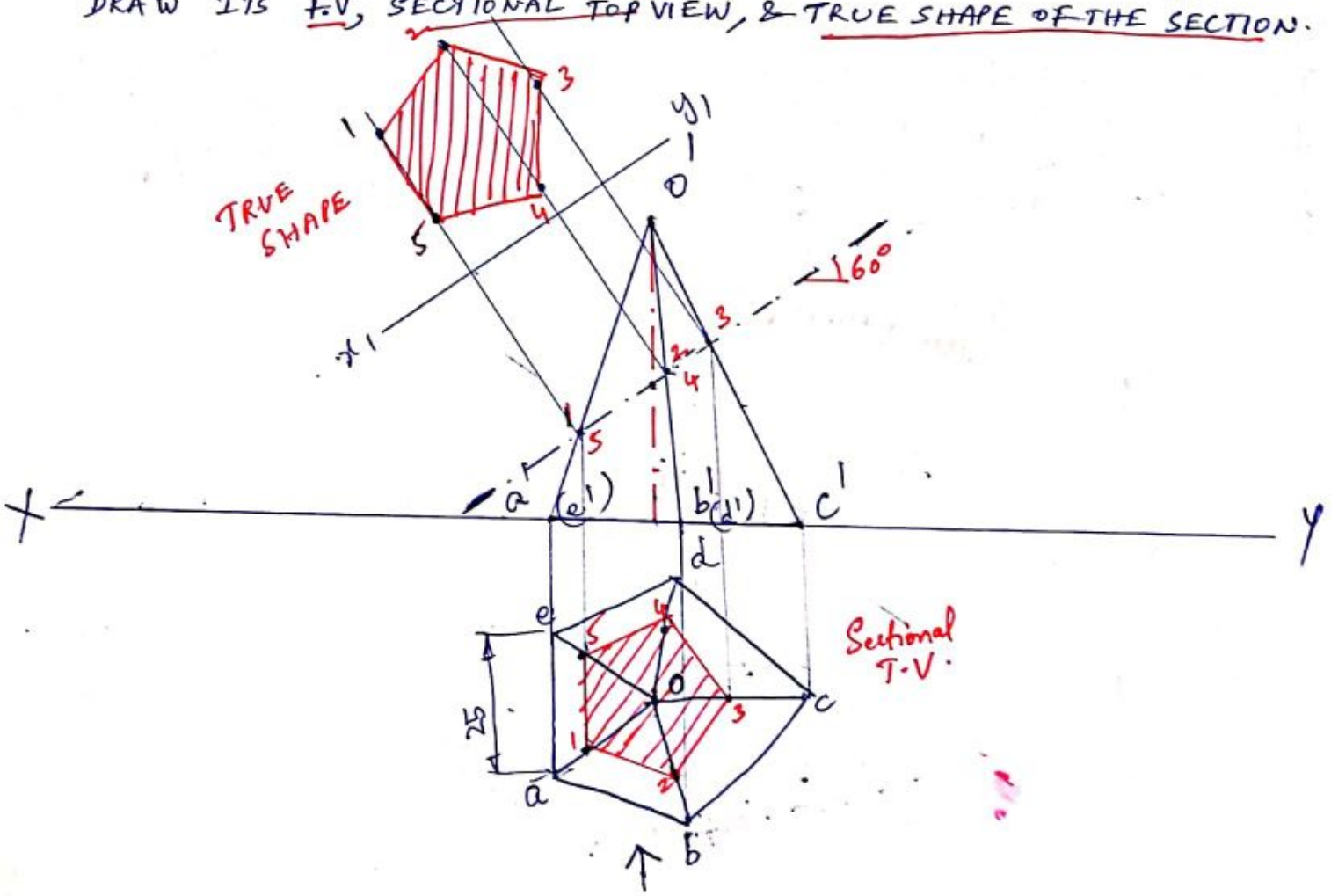
1·8

A PENTAGONAL PRISM, SIDE OF BASE 40mm & AXIS 75mm HAS A RECTANGULAR FACE ON H.P. AND AXIS PARALLEL TO V.P. IT IS CUT BY A VERTICAL SECTION PLANE THE H.T OF WHICH MAKES AN ANGLE OF 30° WITH X-Y AND BISECTS THE AXIS. DRAW THE SECTIONAL F.V., T.V., & TRUE SHAPE OF THE SECTION.

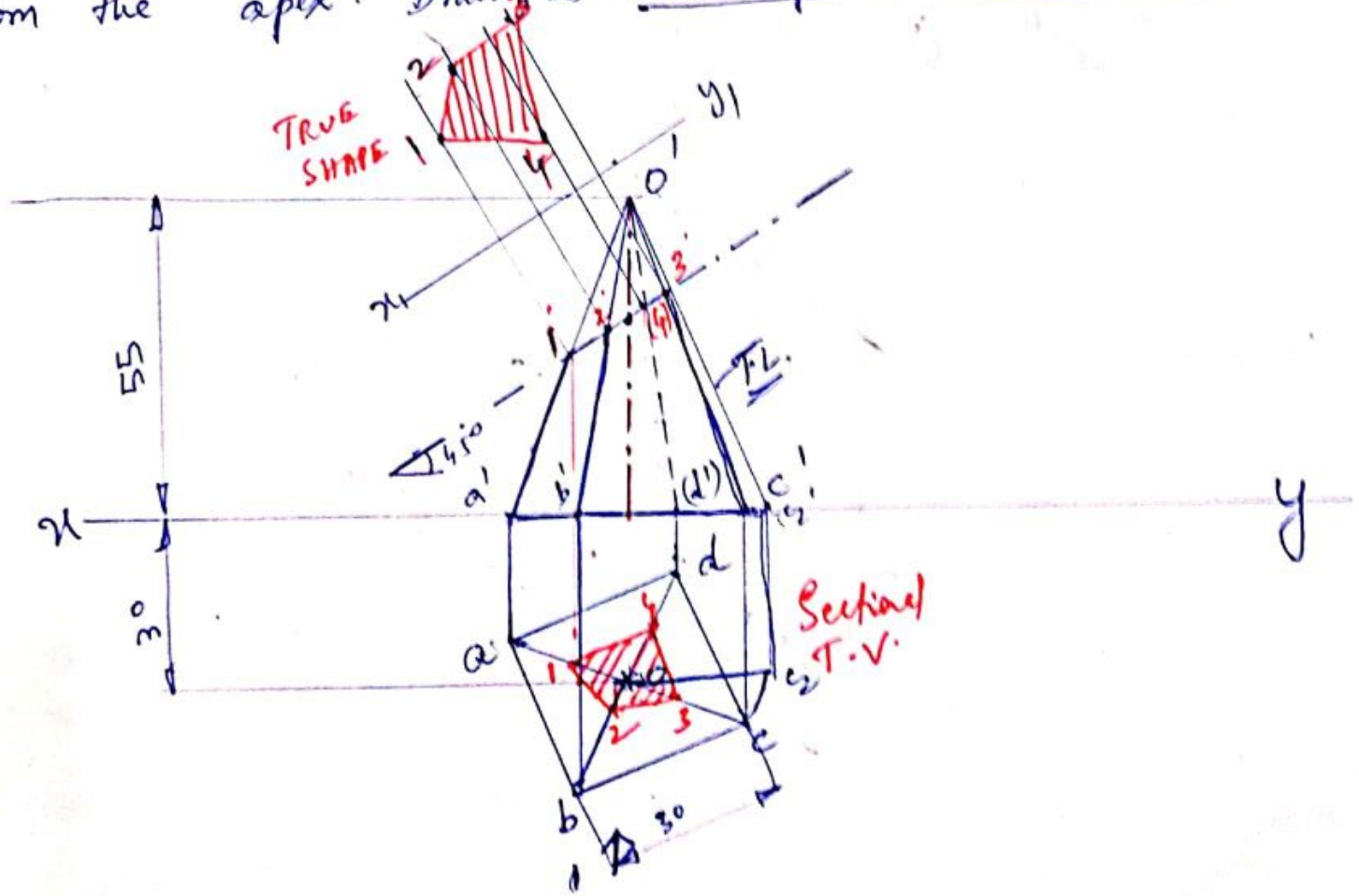


Pr: 8

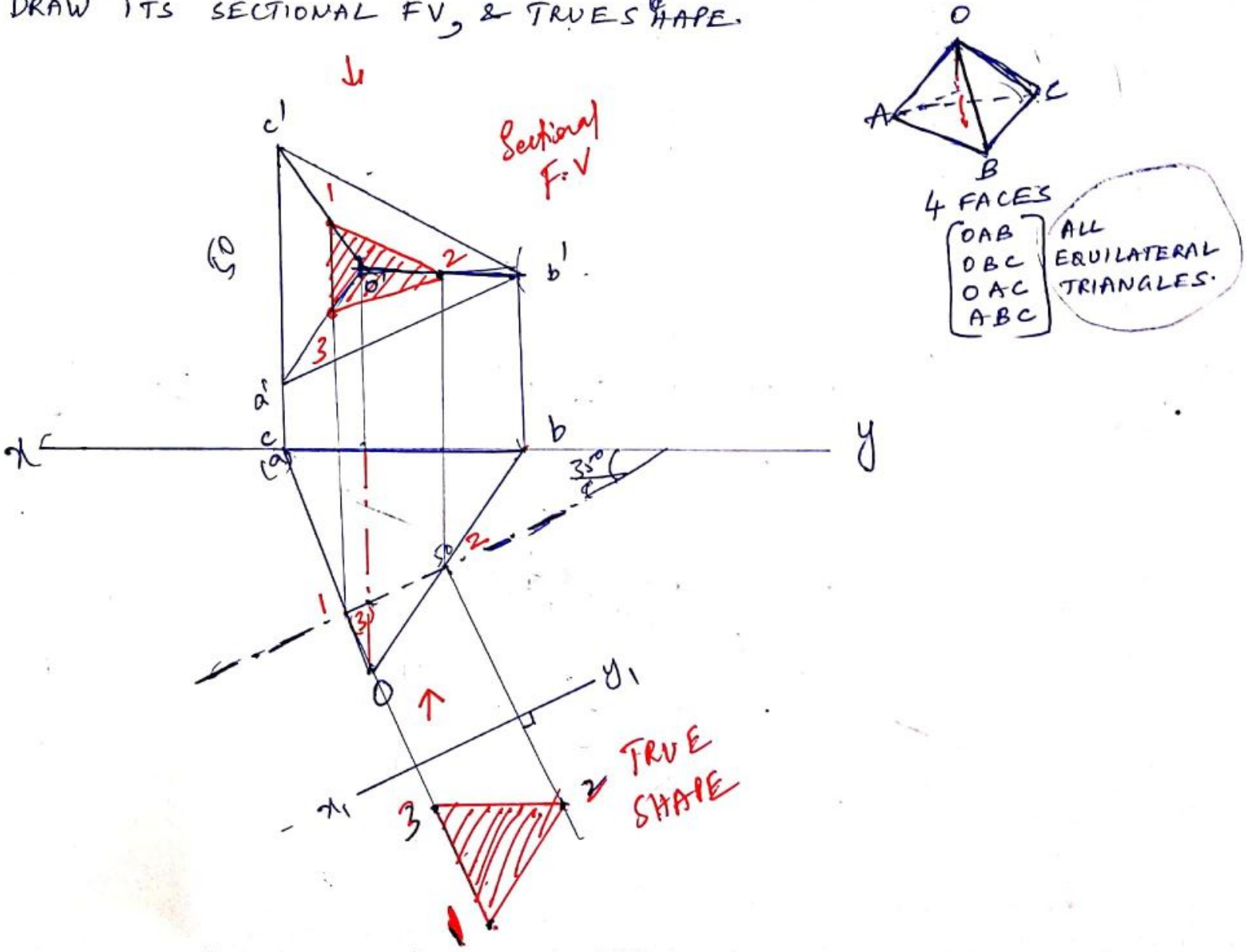
A PENTAGONAL PYRAMID OF SIDE OF BASE 25mm & AXIS 60mm LONG has its AXIS ⊥lar to H.P., ITS BASE is ||le to and 20 mm above H.P, ONE OF ITS BASE EDGE ⊥lar to V.P, and its axis is 35mm Infront of V.P. A SECTION PLANE ⊥lar to V.P & INCLINED AT 60° to H.P IS BISECTING THE AXIS. DRAW ITS F.V, SECTIONAL TOP VIEW, & TRUE SHAPE OF THE SECTION.



Pr. 9 A Square pyramid of Side of base 30mm & axis 55mm long is resting with its base on H.P. One of its base edges is making 20° to V.P and the axis is 30mm infront of V.P. Draw its projections when it is cut by a section plane perpendicular to V.P, inclined at 45° to H.P, and passing through a pt. 25mm from the apex. Draw its true shape & sectional top view.

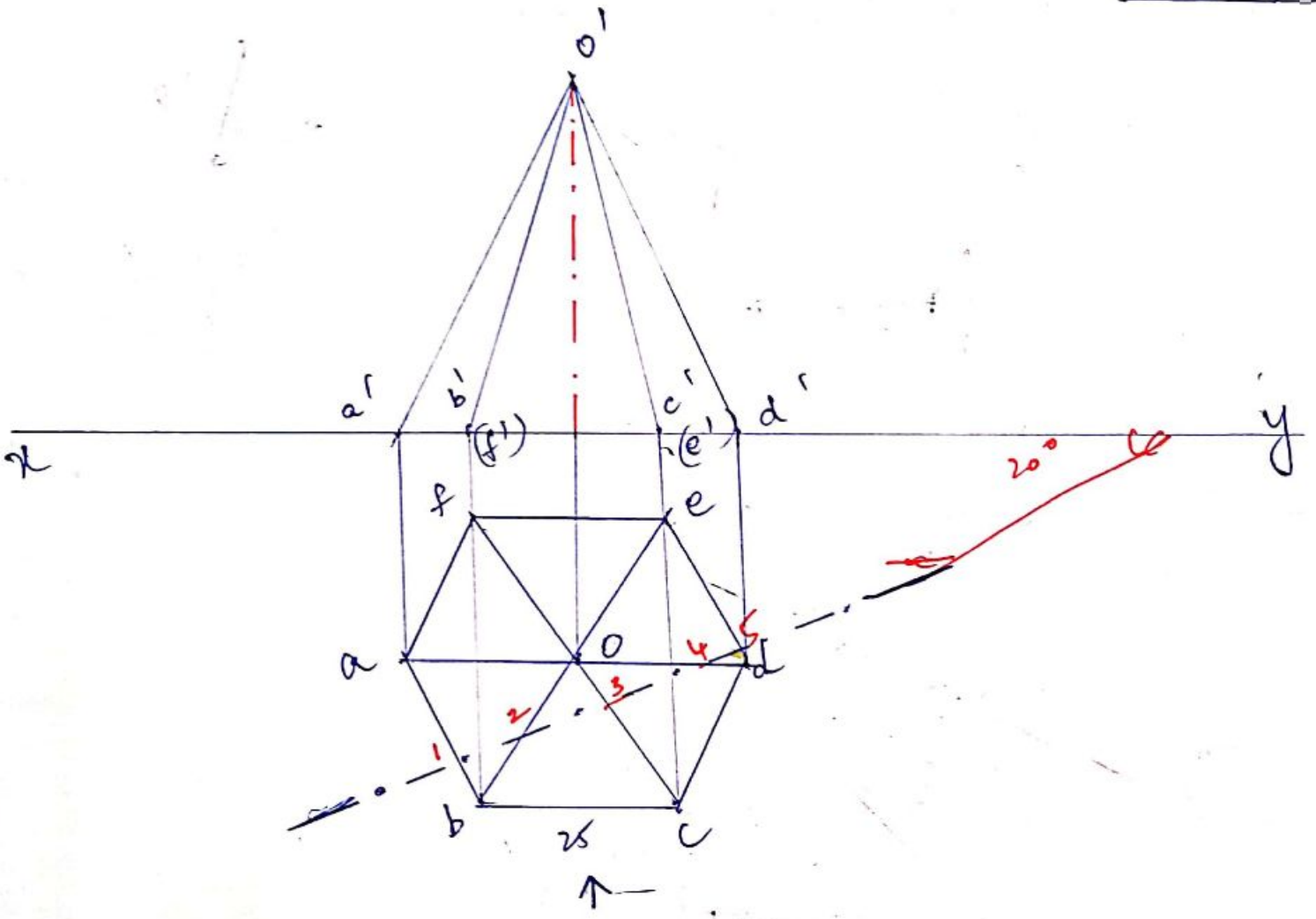


Pr: 10 A TETRAHEDRON OF SIDE 50mm IS RESTING WITH ITS FACE ON V.P and ONE OF ITS BASE EDGES IS ⊥lar to H.P, ITS AXIS IS 35MM ABOVE H.P. AN AUXILIARY V.P WHOSE TRACE IS MAKING AN ANGLE OF 35° to xy IS PASSING THROUGH A POINT 15MM FROM THE APEX. DRAW ITS SECTIONAL FV, & TRUE SHAPE.

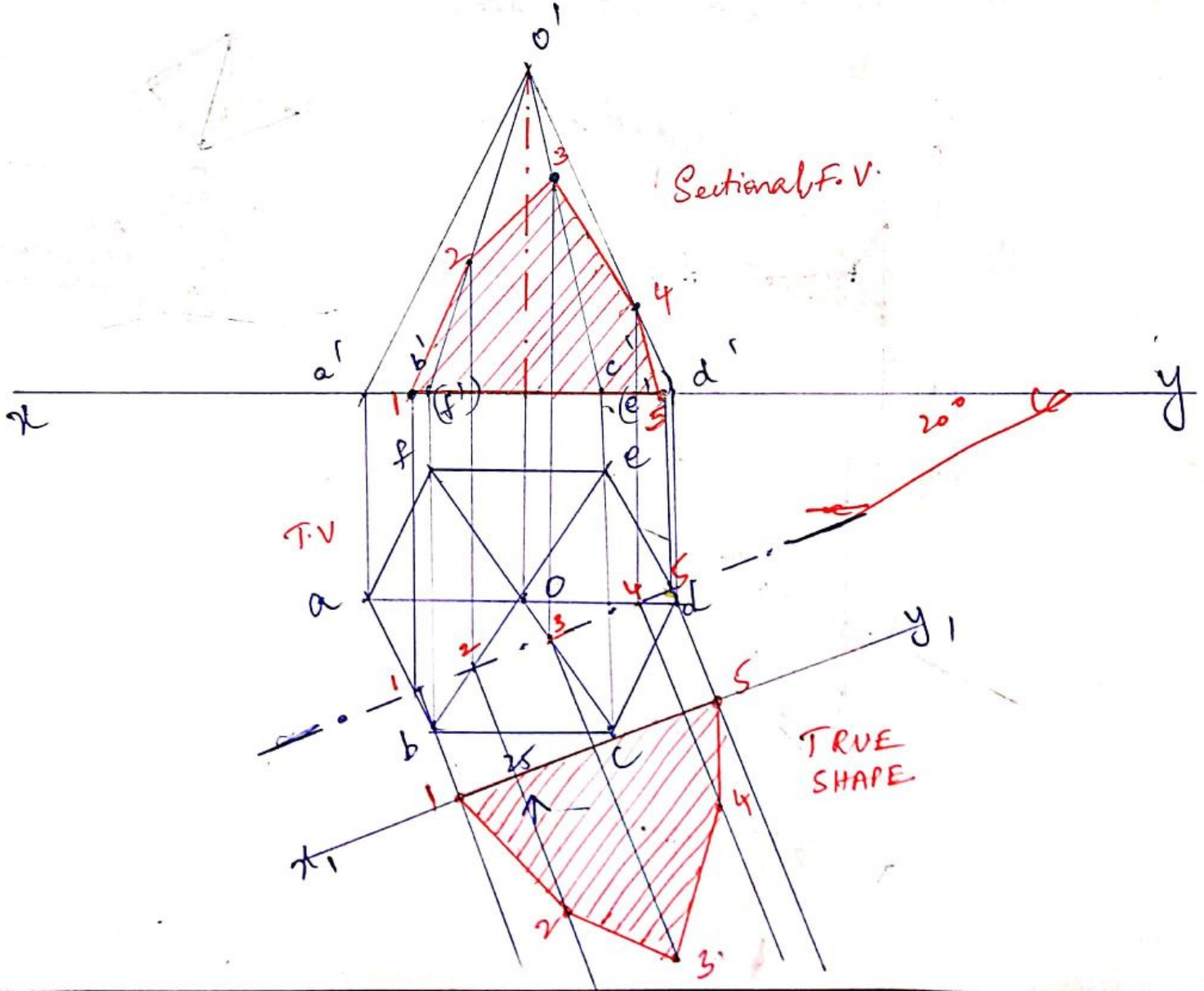


4 FACES
OAB
OBC
OAC
ABC
ALL EQUILATERAL TRIANGLES.

Pr: 11 A HEXAGONAL PYRAMID OF SIDE OF BASE 25 MM & AXIS 60MM LONG IS RESTING WITH ITS BASE ON H.P. SUCH THAT ONE OF ITS BASE EDGES IS PARALLEL TO V.P & 15MM INFRONT OF V.P. A VERTICAL SECTION PLANE MAKING 20° to V.P IS CUTTING THE PYRAMID 15MM AWAY FROM THE AXIS & TOWARDS THE OBSERVER. DRAW S.FV, T.S, T.V.



Pr. 11 A HEXAGONAL PYRAMID OF SIDE OF BASE 25 MM & AXIS 60MM LONG IS RESTING WITH ITS BASE ON H.P. SUCH THAT ONE OF ITS BASE EDGES IS PARALLEL TO V.P & 15MM INFRONT OF V.P. A VERTICAL SECTION PLANE MAKING 20° to V.P IS CUTTING THE PYRAMID 15MM AWAY FROM THE AXIS & TOWARDS THE OBSERVER. DRAW S.FV, T.S, T.V.

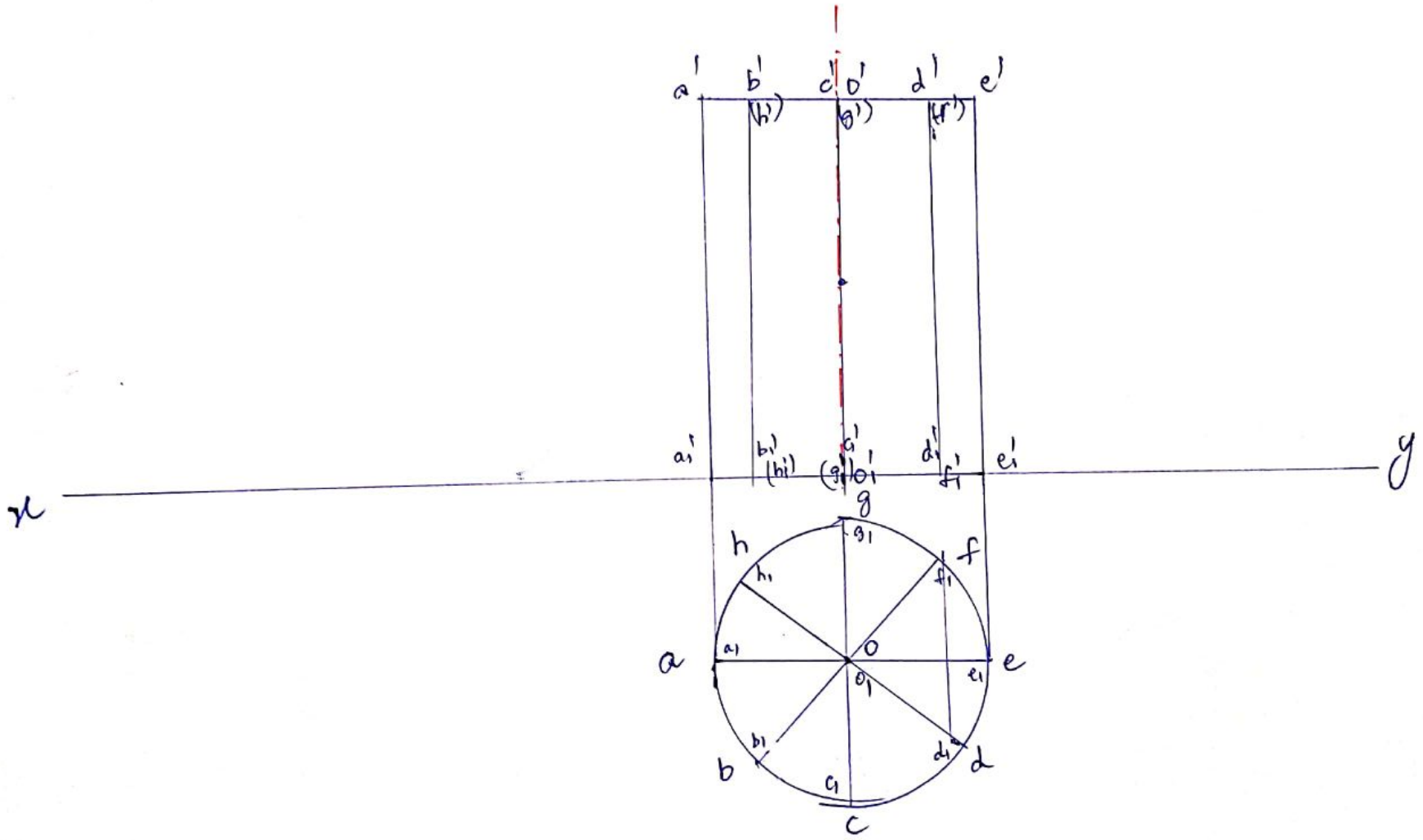


Pr:12

Sections of Cylinders & Cones.

A Cylinder is resting with its base on H.P, its axis is 50mm infront of V.P. It is cut by a section plane ⊥ar to V.P, inclined at 45° to H.P and bisecting the axis. Draw the sectional T.V, True shaped F.V

[Take ϕ = 60mm, axis = 70mm]

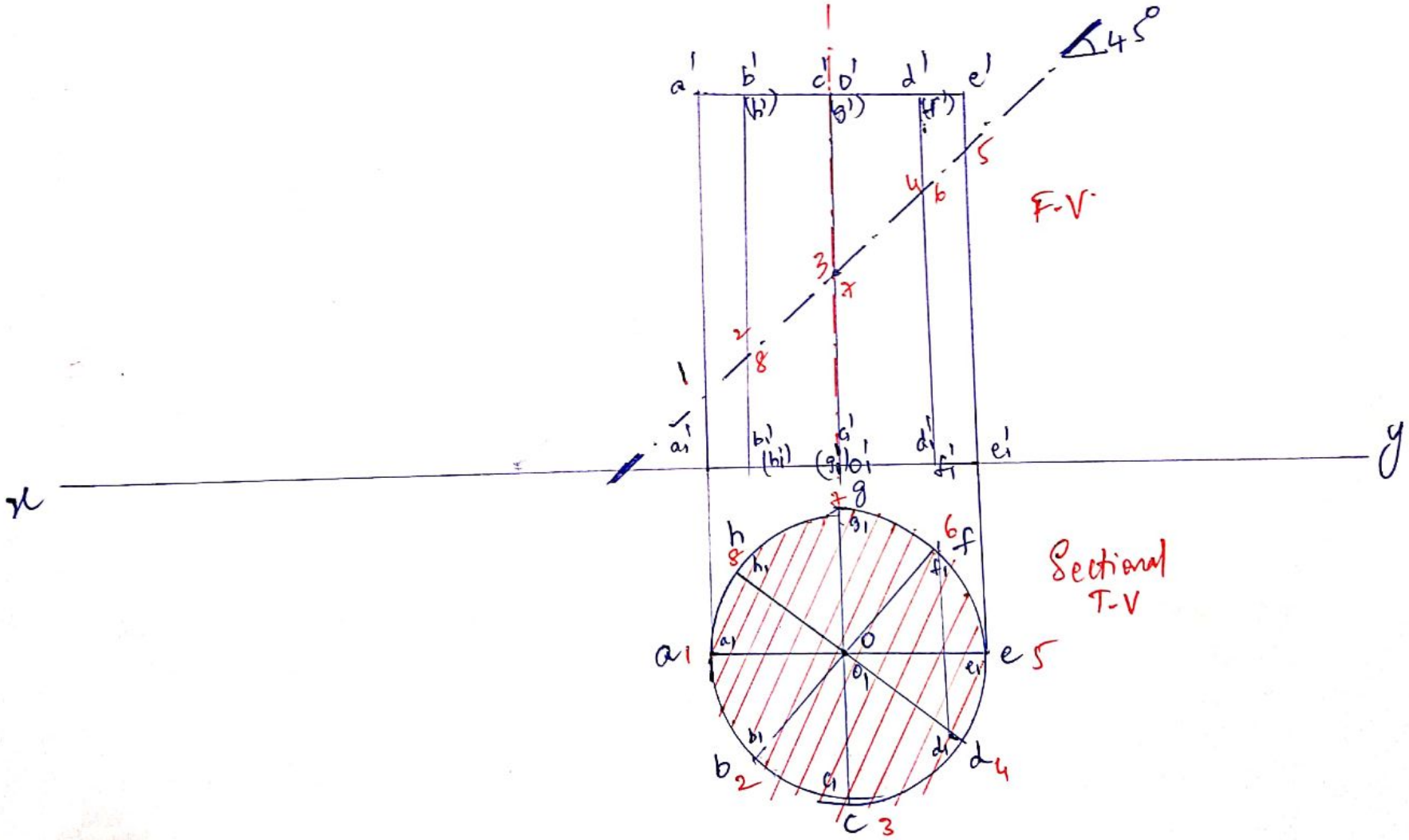


Pr: 12

Sections of Cylinders & Cones.

A Cylinder is resting with its base on H.P, its axis is 50mm infront of V.P. It is cut by a section plane ⊥ br to V.P, inclined at 45° to H.P and bisecting the axis. Draw the sectional T.V, True shaped F.V

[Take ϕ = 60mm, axis = 70mm]

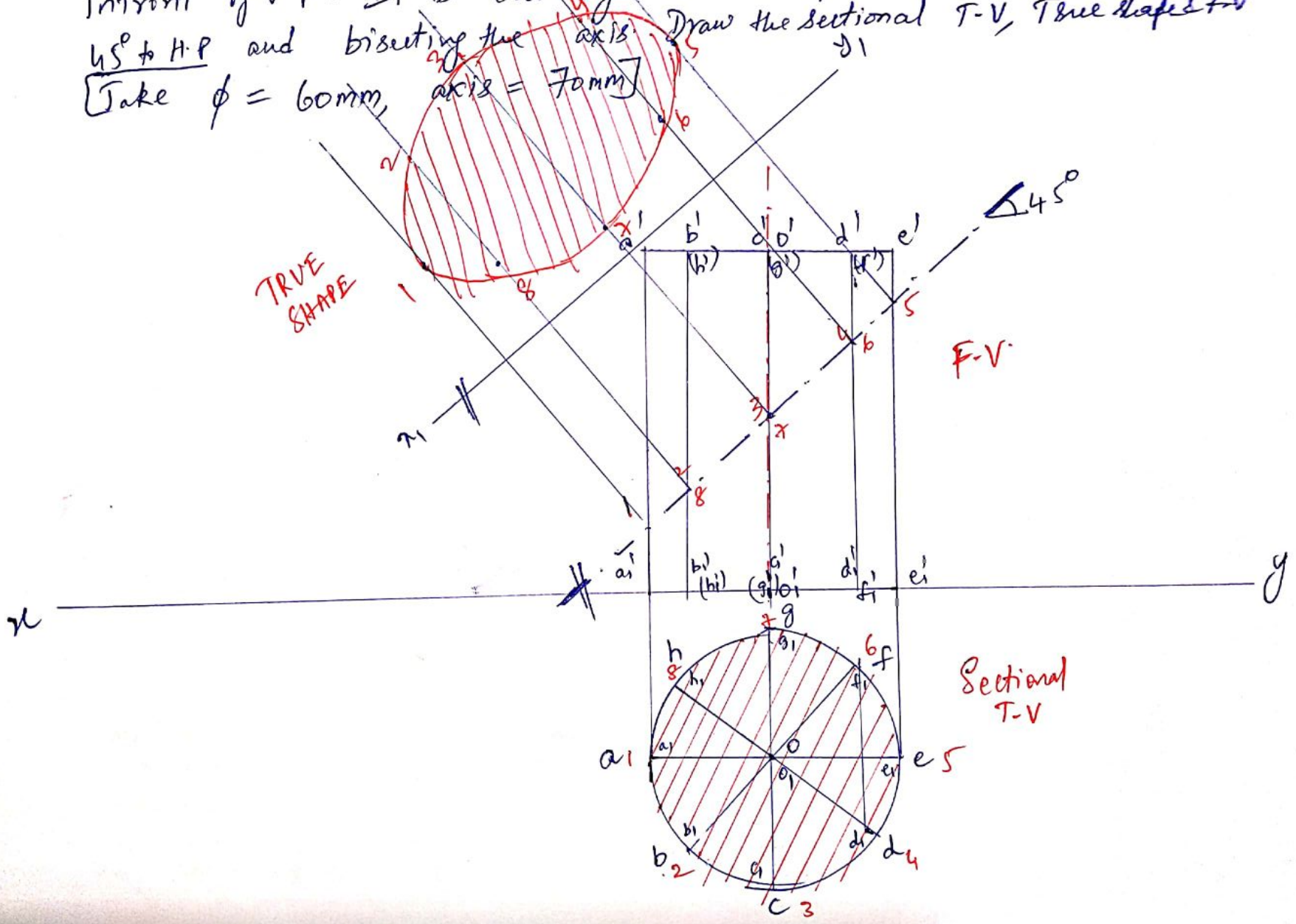


Pr: 12

Sections of Cylinders & Cones.

A Cylinder is resting with its base on H.P, its axis is 50mm infront of V.P. It is cut by a section plane ⊥ br to V.P, inclined at 45° to H.P and bisecting the axis. Draw the sectional T.V, True shape of F.V

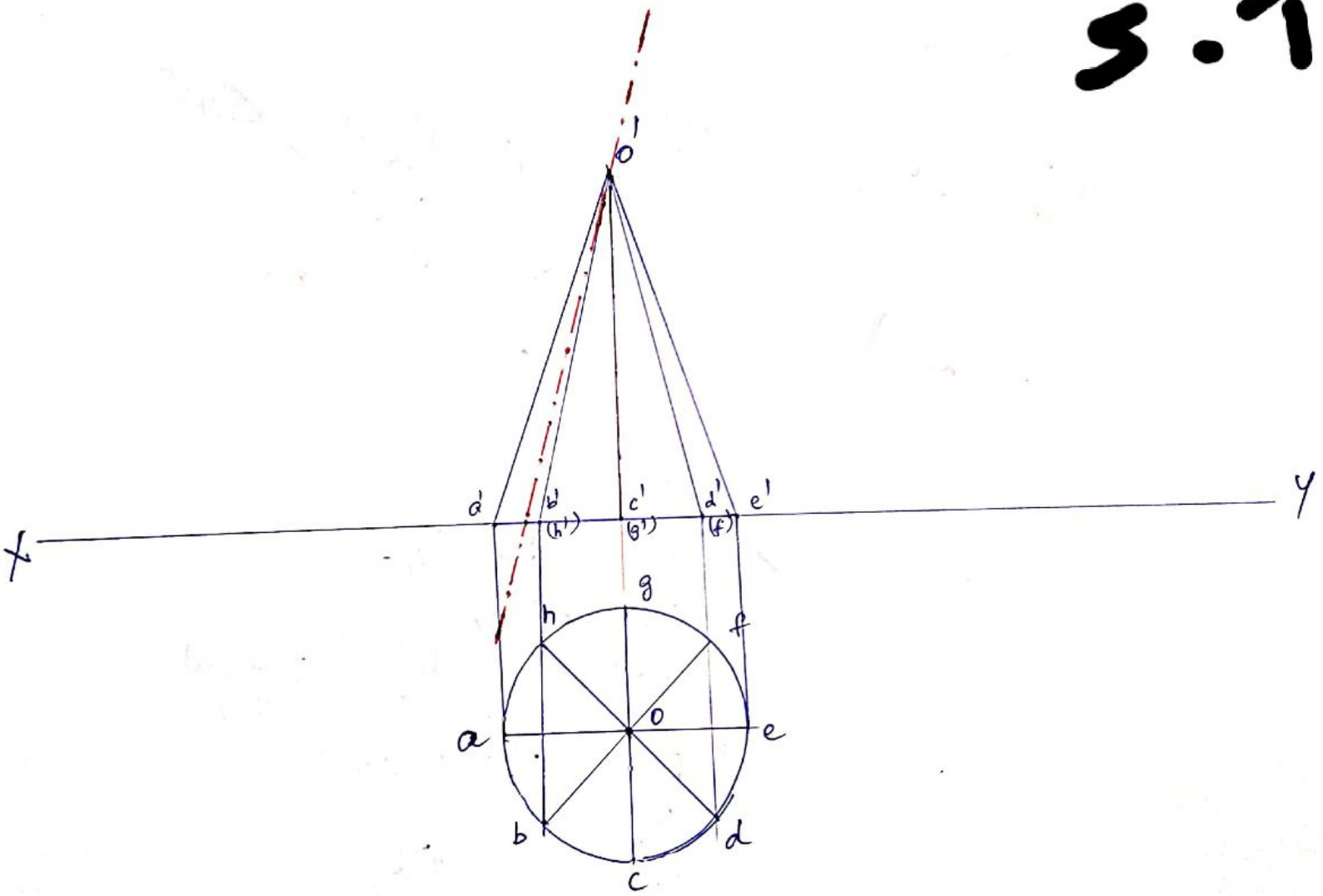
[Take ϕ = 60mm, axis = 70mm]



Pr:13 DRAW THE PROJECTIONS OF A CONE (∅ = 50mm, axis - 70 mm) IS CUT BY A SECTION PLANE PERPENDICULAR TO V.P, INCLINED AT 70° to H.P AND PASSING THROUGH A POINT AT APEX. THE CONE RESTING WITH BASE ON H.P, AXIS 35 MM INFRONT OF V.P.

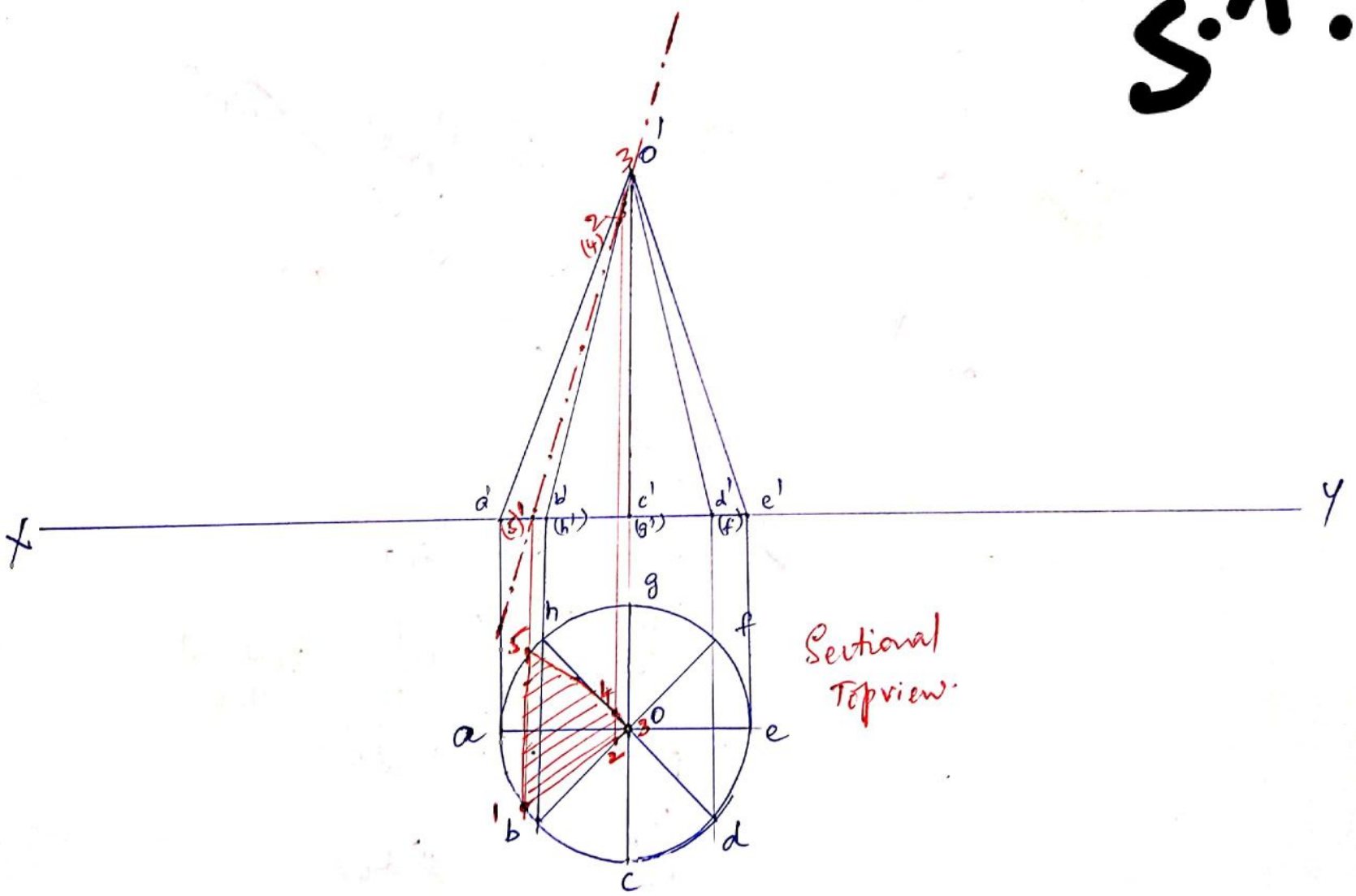
SHOW TRUE SHAPE & [illegible]

S.T.V



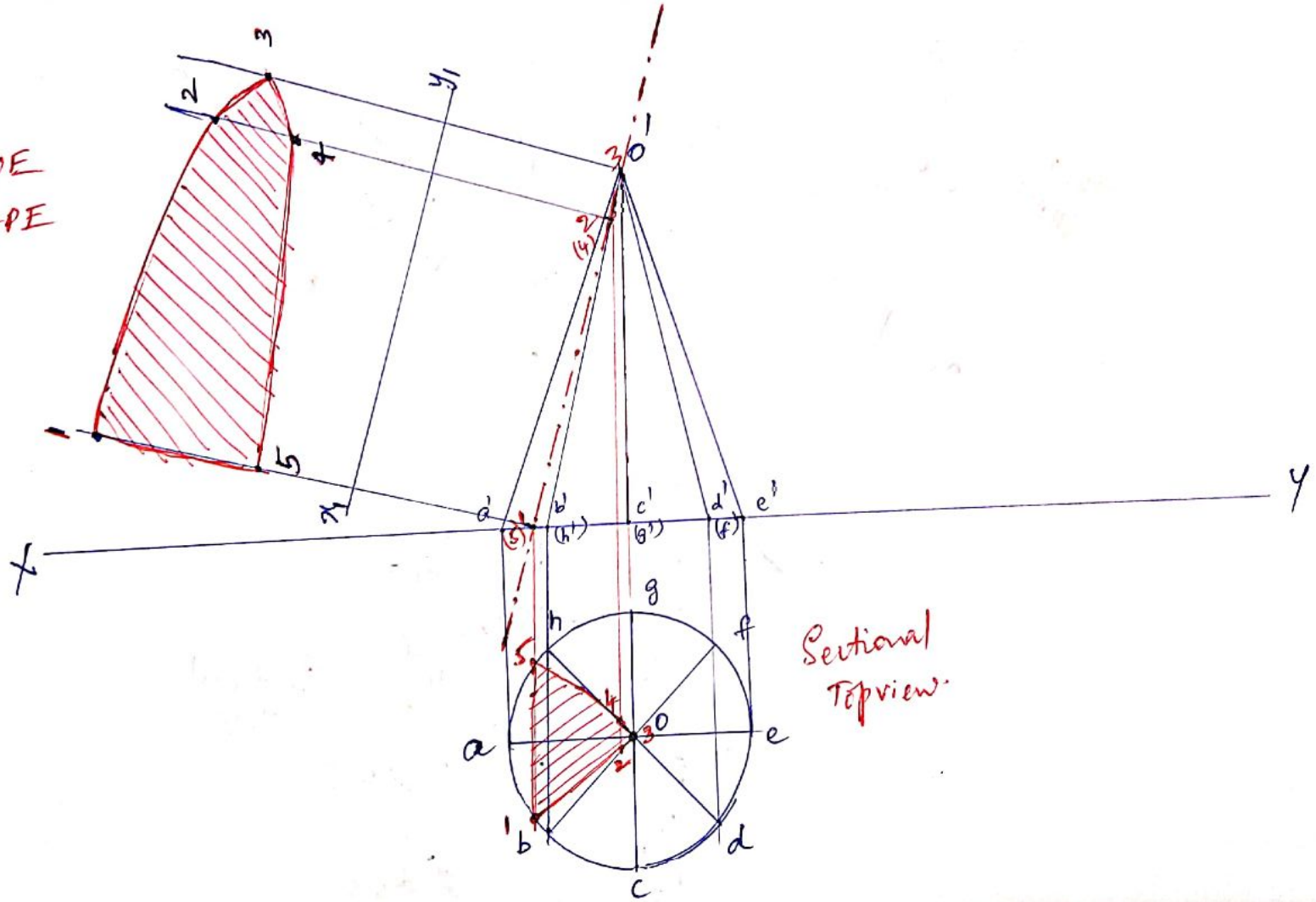
Pr:13 DRAW THE PROJECTIONS OF A CONE (ϕ = 50mm, axis = 70 mm) IS CUT BY A SECTION PLANE PERPENDICULAR TO V.P, INCLINED AT 70° to H.P AND PASSING THROUGH A POINT AT APEX. THE CONE RESTING WITH BASE ON H.P, AXIS 35 MM INFRONT OF V.P.

SHOW TRUE SHAPE & [redacted] S.T.V

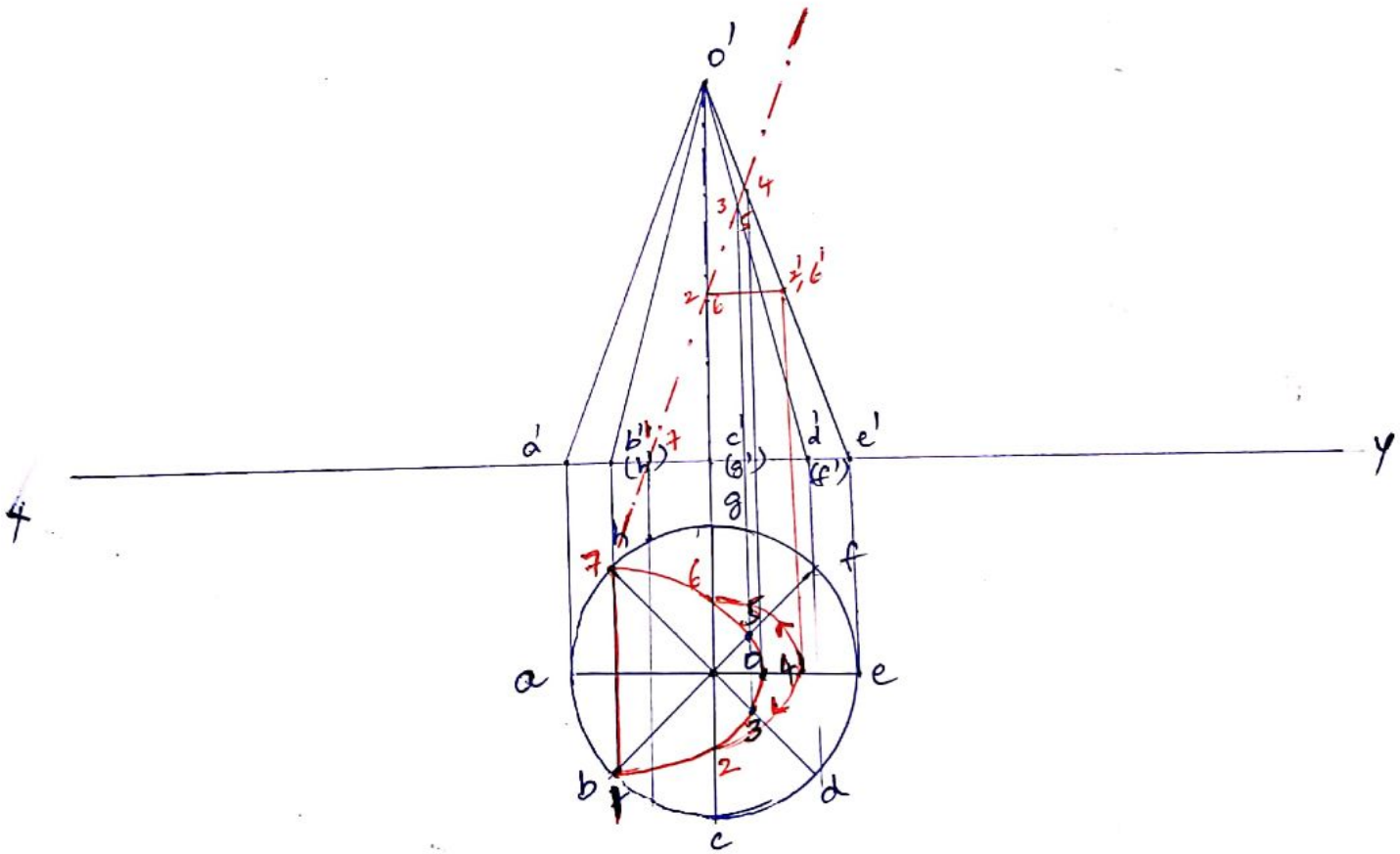


Sectional Topview.

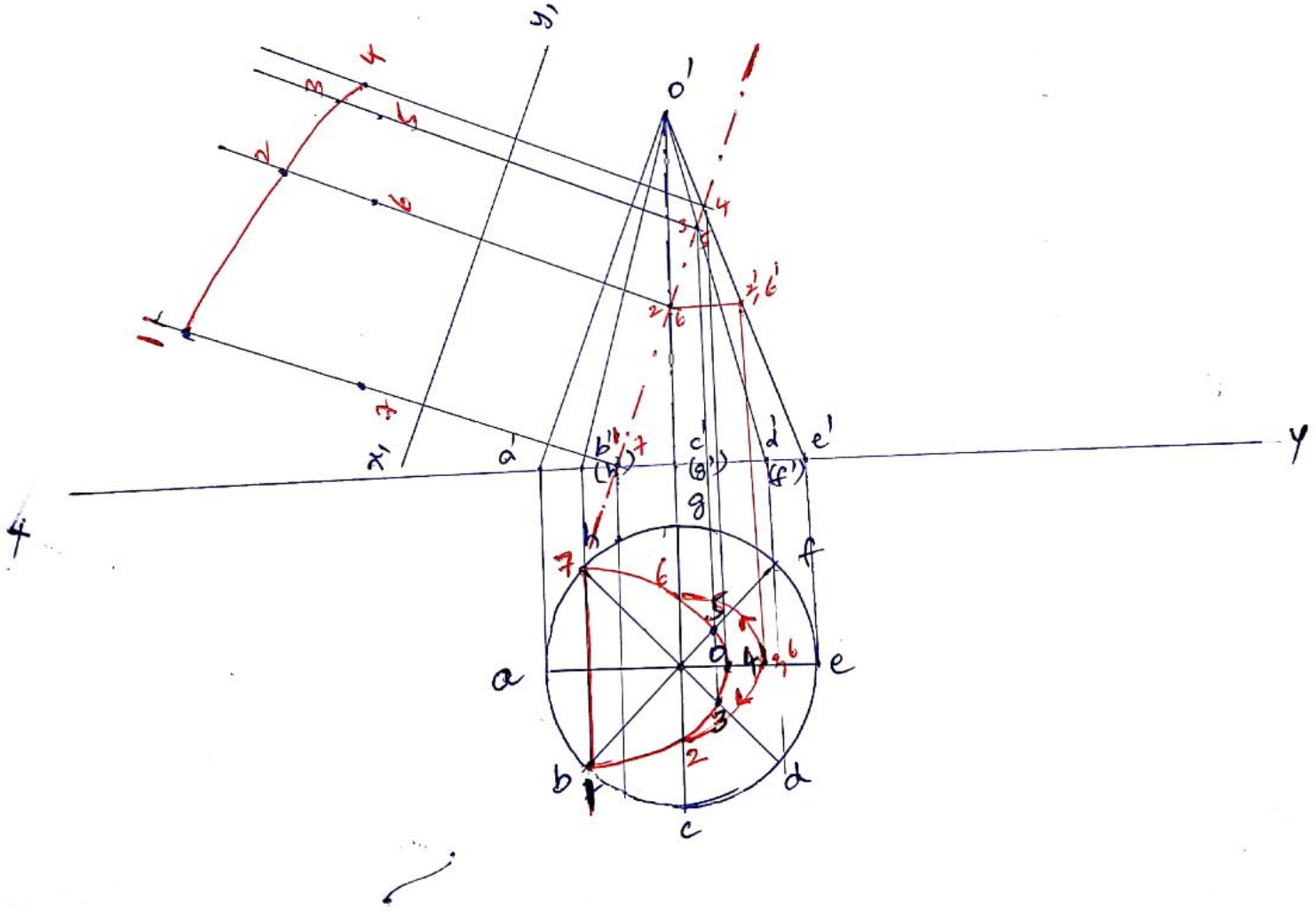
Pr:13 DRAW THE PROJECTIONS OF A CONE (∅ = 50mm, axis = 70 mm) IS CUT BY A SECTION PLANE PERPENDICULAR TO V.P, INCLINED AT 70° to H.P AND PASSING THROUGH A POINT AT APEX. THE CONE RESTING WITH BASE ON H.P, AXIS 35 MM INFRONT OF V.P. SHOW TRUE SHAPE & ~~OF~~ S.T.V.



Pr: 14 A cone of base diameter 50mm, axis 65mm long is bisected by an auxiliary inclined plane, parallel to one of the generators of cone & 10mm away. Draw its true shape, Sectional T.V, & F.V. (Assume base resting on H.P)



Pr: 14 A cone of base diameter 50mm, axis 65mm long is bisected by an auxiliary inclined plane, parallel to one of the generators of cone & 10mm away. Draw its true shape, Sectional T.V, & F.V. (Assume base resting on H.P)



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