KSU CET UNIT

FIRST YEAR NOTES

CET UNIT

8

Perspective projection

8.1. Introduction

Perspective projection is the representation of an object as it appears to an observer looking at the object from a particular position. It is the three dimensional view of the object on an imaginary transparent vertical plane called picture plane. A picture taken by a camera is a real perspective. The four elements involved in photography, namely the object, light rays, camera lens and film are in the perspective projection, the object, visual rays, point of sight (station point) and the picture plane respectively. The size and shape of perspective depends on the distance of picture plane and station point from the object. When the object is behind the picture plane, the size of the perspective will be smaller than the actual size of the object. Refer Fig.8.1.

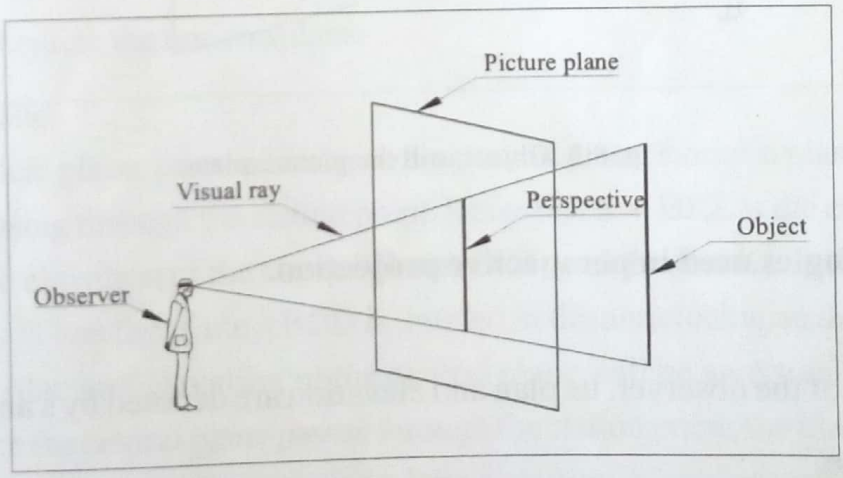

Fig. 8.1. Object is behind the picture plane.

When the object is in front of the picture plane, the size of the perspective will be larger than the actual size of the object. Refer Fig. 8.2.

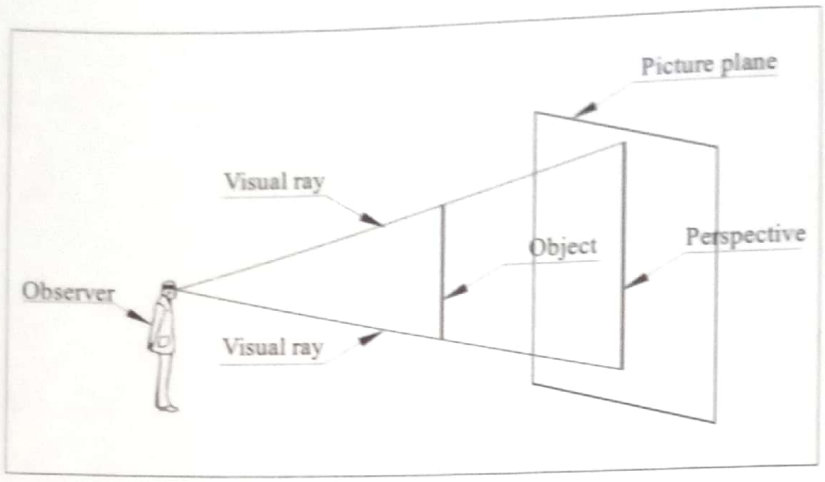

Fig. 8.2. Object is in front of picture plane.

When the object is in the picture plane, the size of the perspective will be the actual size of the object. Refer Fig. 8.3.

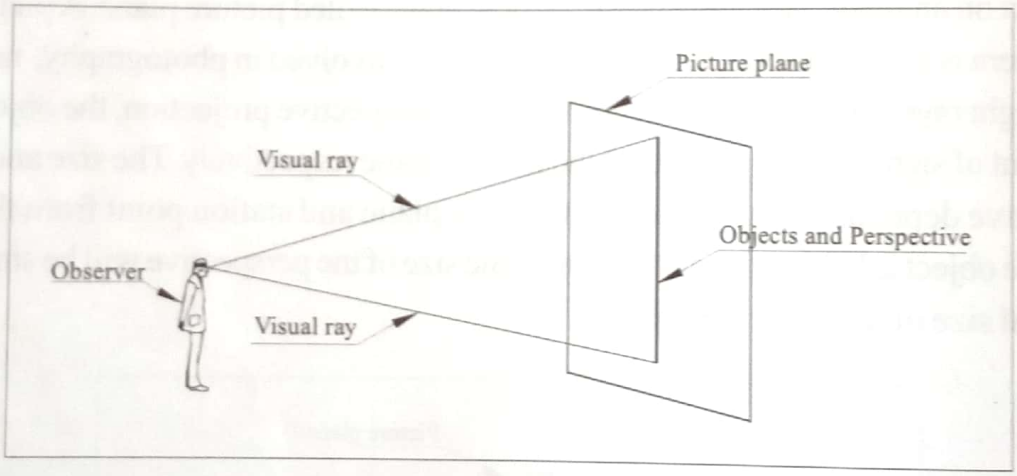

Fig. 8.3. Object is in the picture plane.

8.2. Terminologies used in perspective projection.

i) Station point.

It is the eye of the observer, its plan and elevation are denoted by s and s′.

ii) Ground plane.

It is a horizontal plane on which the observer stands. Being a horizontal plane (plane parallel to HP and perpendicular to VP); its elevation is a horizontal line. Refer Fig. 8.4.

ABCD is the ground plane (GP). Line AB is the elevation of ground plane (EGP).

iii) Picture plane.

It is an imaginary transparent vertical plane on which the perspective of the object is obtained. Being a vertical plane (plane perpendicular to HP), its plan is a horizontal line. Refer Fig. 8.4. CDEF is the picture plane (PP). Line EF is the plan of the picture plane (PPP).

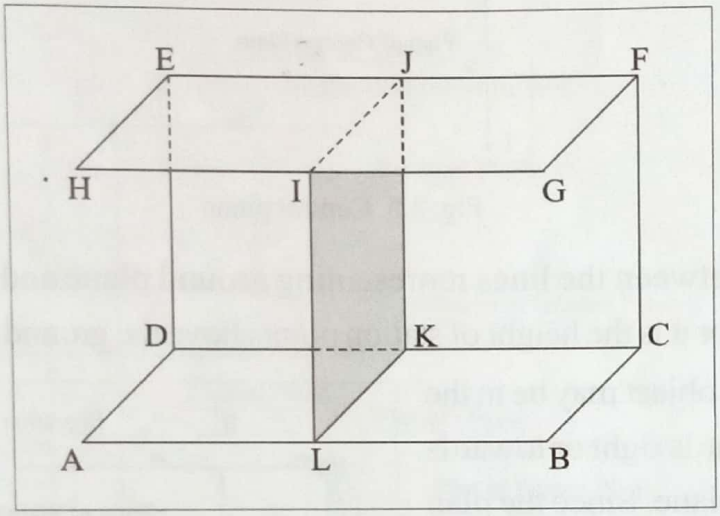

Fig. 8.4. Different planes.

iv) Horizon plane.

It is an imaginary horizontal plane passing through the station point. Being a horizontal plane its elevation is a horizontal line. Refer Fig. 8.4. EFGH is the horizon plane (HP). The line HG is the elevation of horizon plane (EHP). The elevation of station point, s′, will be in this line representing the horizon plane.

v) Central plane.

It is a vertical plane, perpendicular to the ground plane, horizon plane and the picture plane and passing through the station point. Refer Fig. 8.4. IJKL is the central plane(CP). Line JK is the elevation of the central plane (ECP) and the line KL is the plan of central plane (PCP). When the plane ABCD is rotated in the anticlockwise direction about the line CD, the plan and elevation of the central plane will be a vertical line as shown in Fig.8.5. Since the central plane passes through the station point, the plan of station point, s will be in the plan of central plane and the elevation of station point, s′ will be in the elevation of central plane. Plan and elevation of station point, s and s′, are in the same vertical line representing the central plane.

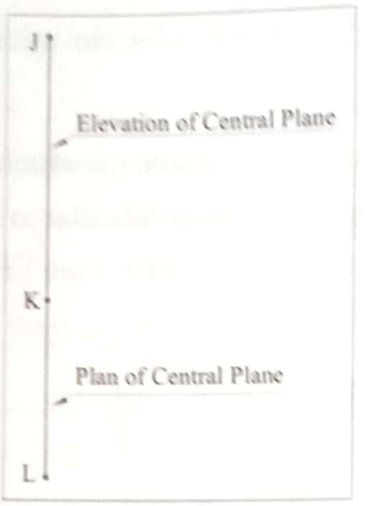

Fig. 8.5. Central plane

The distance between the lines representing ground plane and horizon plane is the height of observer or it is the height of station point above the ground plane. Refer. Fig.8.6.

The position of the object may be in the central plane, towards right or towards left of the central plane. Since the plan and elevation of the station point are in the vertical line representing the central plane, the distance of central plane from the object itself is the distance of the station point from the object. Refer Fig.8.7.

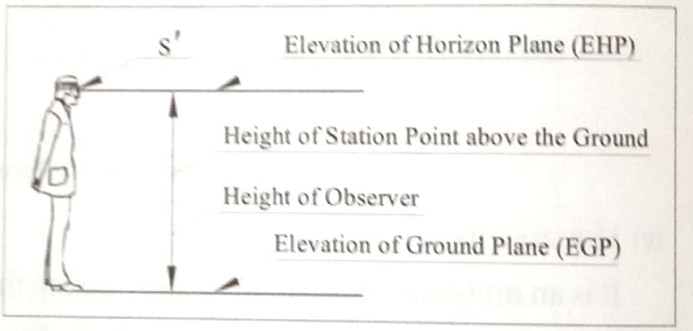

Fig. 8.6. Central plane

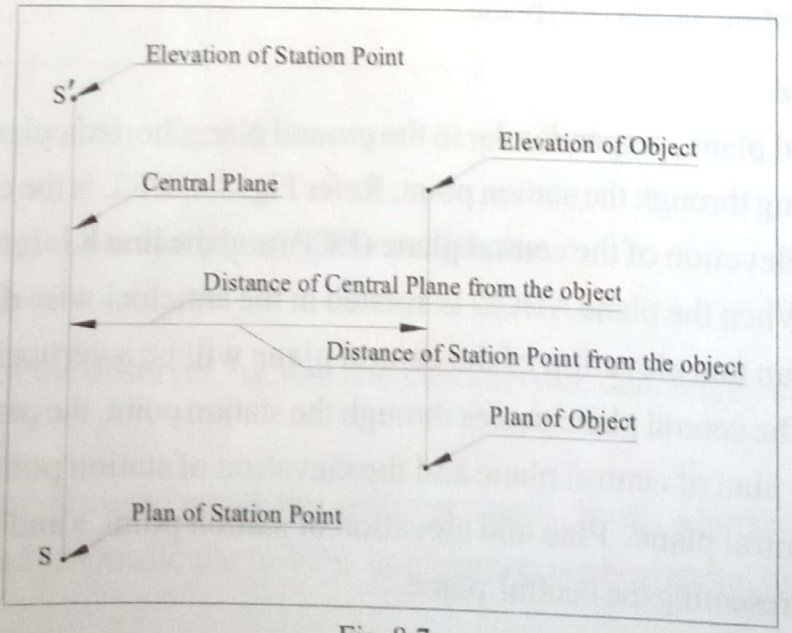

Fig. 8.7.

Fig.8.8 shows the distance of station point and the object from the various planes.

a. is the distance of object from the picture plane. When the object is behind the picture plane, the plan of the object will be above the line representing the picture plane. When the object is in front of the picture plane, the plan of the object will be below the line representing the picture plane.

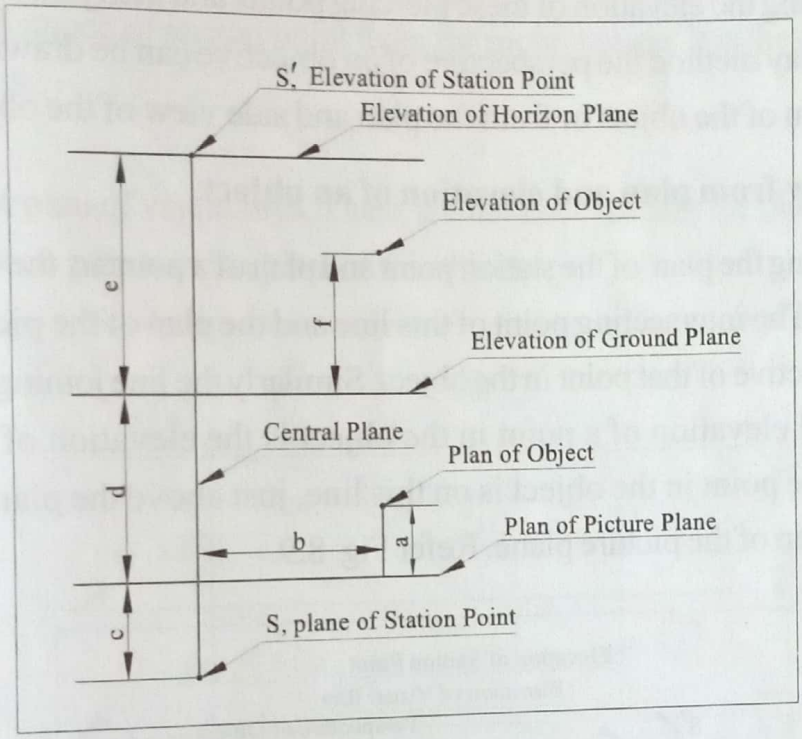

Fig. 8.8. Distance of object and station point from various planes.

b. is the distance of central plane from the object which is also the distance of station point from the object.

c. is the distance of station point from the picture plane.

d. is the distance between the plan of picture plane and the elevation of ground plane. It can be any convenient distance.

e. is the distance of station point from the ground or it is the height of observer.

f. is the distance of object from the ground plane.

8.3. Methods of drawing perspective projection.

Perspective projection of an object can be drawn by one of the following methods.

1. Visual ray method

a. Using plan and elevation of the object

b. Using plan and side view of the object

2. Vanishing point method

i) Visual ray method.

Visual rays from the eye of the observer (station point) reach at various points in the object. These rays pierce through the picture plane. The perspective view of the object is obtained by locating the elevation of these piercing points and then joining these elevation points. In visual ray method the perspective of an objective can be drawn either from the plan and elevation of the object or from the plan and side view of the object.

Perspective view from plan and elevation of an object.

The line joining the plan of the station point and plan of a point in the object is the plan of the visual ray. The intersecting point of this line and the plan of the picture plane is the plan of the perspective of that point in the object. Similarly the line joining the elevation of station point and elevation of a point in the object is the elevation of visual ray. The perspective of the point in the object is on this line, just above the plan of perspective which is in the plan of the picture plane. Refer Fig. 8.9.

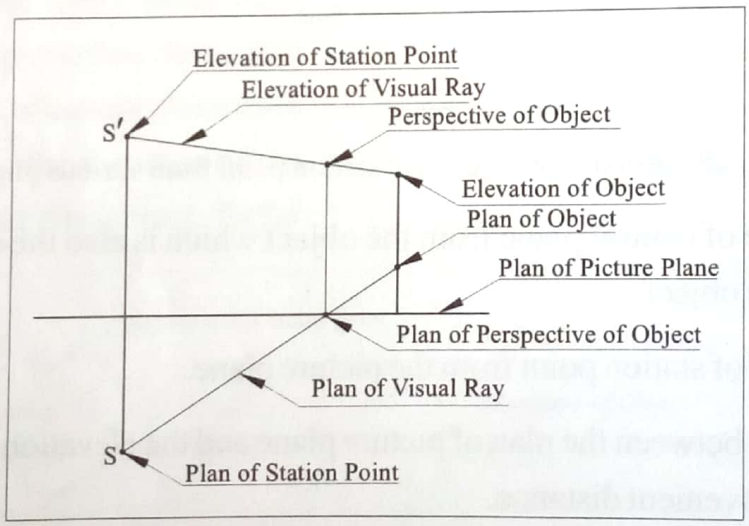

Fig. 8.9. Perspective view from plan and elevation of object.

Procedure for drawing perspective from plan and elevation of an object.

Step 1 Draw a horizontal line representing the plan of picture plane [PPP].

Step 2 Draw the plan of the object satisfying all the given conditions with respect to the picture plane. It should be noted that the plan should be drawn above the line representing the picture plane when the object is behind the picture plane and the

plan should be drawn below the line representing the picture plane when the object is in front of the picture plane.

Step 3 Locate the plan of the station point, s. For this two distances are required.

(i) The distance of the station point from the object (distance of central plane from the object). It is the distance b shown in Fig.8.8 and

(ii)The distance of station point from the picture plane. It is the distance c shown in Fig. 8.8 .

Step 4.

Draw the plan of visual rays. These are the lines joining the plan of station point and various points in the plan of the object.

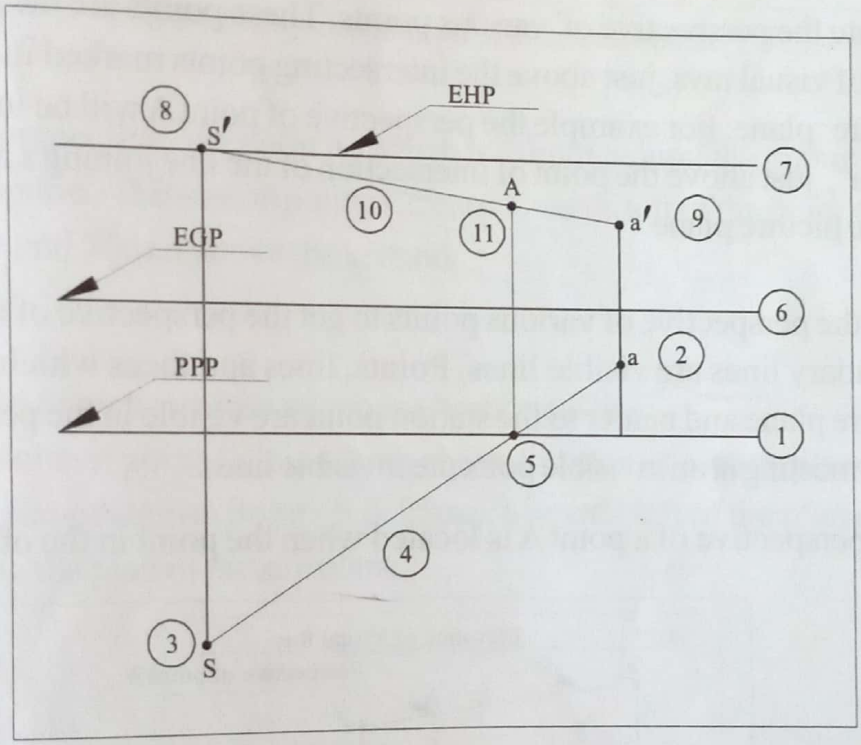

Fig. 8.10.

Step 5.

Mark the intersecting points of these plan of visual rays with the line representing the picture plane.

Step 6.

Draw a horizontal line representing the elevation of ground plane at any convenient distance above the plan of picture plane.

Step 7.

Draw another horizontal line, above the elevation of ground plane, representing

the elevation of horizon plane, at the given distance of station point from the ground plane.

Step 8

Mark the elevation of station point, s′ in the elevation of horizon plane, just above the plan of station point.

Step 9.

Draw the elevation of the object.

Step 10.

Draw the elevation of visual rays. These are the lines joining the elevation of station point and various points in the elevation of the object.

Step 11

Locate the perspective of various points. These points are the points in the elevation of visual rays, just above the intersecting points marked in the plan of the picture plane. For example the perspective of point A will be in the line joining s′ and a′, just above the point of intersection of the line joining s and a with the plan of the picture plane.

Step 12

Join the perspective of various points to get the perspective of the object. All the boundary lines are visible lines. Points, lines and faces which are nearer to the picture plane and nearer to the station point are visible in the perspective. All the lines meeting at an invisible point are invisible lines.

In Fig. 8.11, perspective of a point A is located when the point in the object is behind

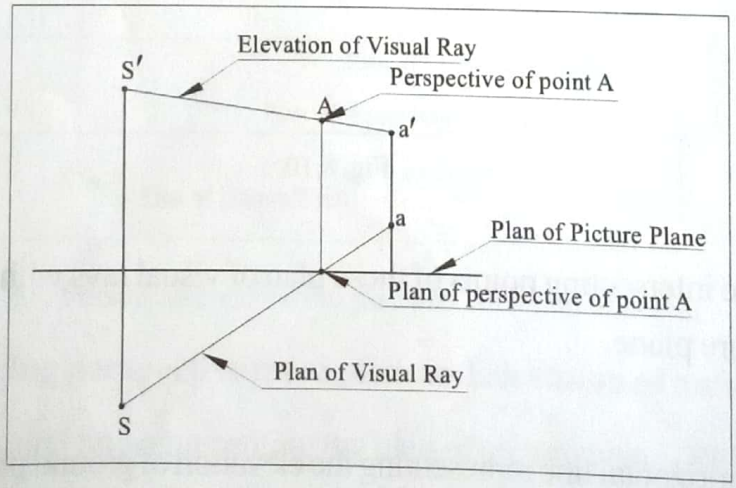

Fig. 8.11. Object is behind the picture plane

the picture plane. In Fig.8.12, perspective of a point A is located when the point in the object is in front of the picture plane. Here the line joining s and a should be extended to

get the piercing point with the picture plane. Similarly the line joining s′and a′ should be extended to locate the perspective of point A.

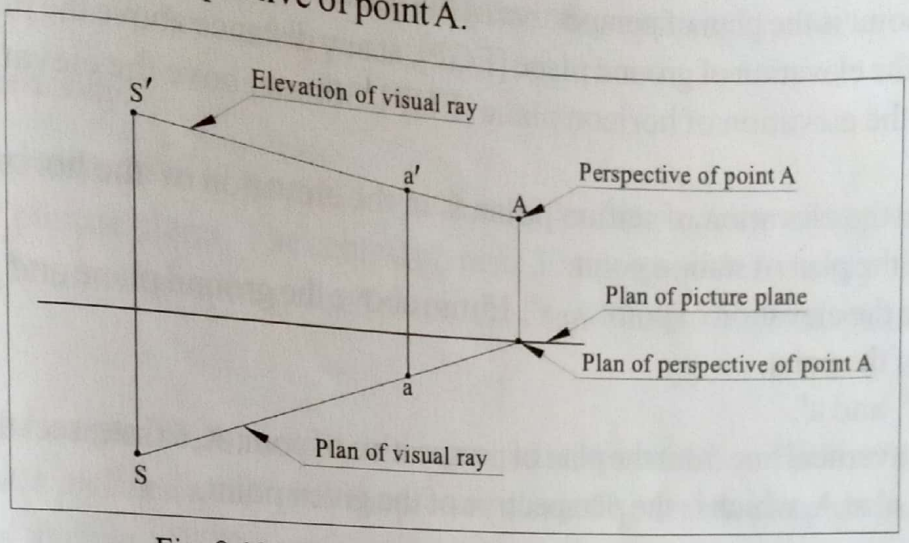

Fig. 8.12. Object is in front of the picture plane

Example 8.1.

Locate the perspective of a point A, which is 10mm behind the picture plane and 15 mm above the ground. The station point is 25mm towards left of the point A, 15mm from the picture plane and 25mm above the ground.

Solution.

1. Draw the plan of picture plane which is a horizontal line.
2. Locate the plane of point A. It is 10mm above the plan of picture plane.
3. Locate the plan of station point. It is 25mm towards left of the plan of point A and 15mm below the plan of picture plane.
4. Join s and a

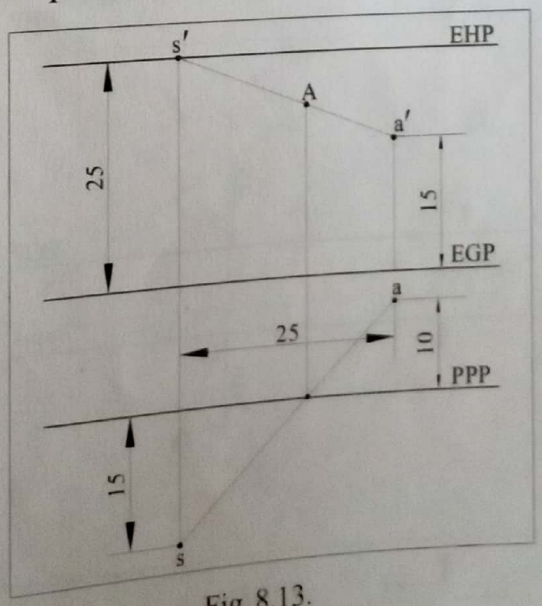

Fig. 8.13.

5. Mark the intersecting point of the line joining s and a and the plan of picture plane. This point is the plan of perspective of the point A.
6. Draw the elevation of ground plane [EGP], at any distance above the plan of point A.
7. Draw the elevation of horizon plane [EHP], 30mm above the elevation of ground plane.
8. Locate the elevation of station point, s′ in the elevation of the horizon plane, just above the plan of station point.
9. Locate the elevation of point A, a′, 15mm above the ground plane and just above the plan of the point.
10. Join s′ and a′.
11. Draw a vertical line from the plan of perspective of point A, to intersect the line joining s′ and a′ at A, which is the perspective of the given point.

Problem for practice.

Locate the perspective of a point A which is 20mm above the ground plane and 15 mm behind the picture plane. The station point is 30mm towards right of the point A, 25mm away from the picture plane and 35mm above the ground plane.

Example 8.2.

Locate the perspective of a point A, which is 10mm in front of the picture plane and 15mm above the ground plane. The station point is 25mm towards left of the point A, 25mm from the picture plane and 20mm above the ground.

Solution.

The plan of the point, a should be marked 10mm below the plan of picture plane. The

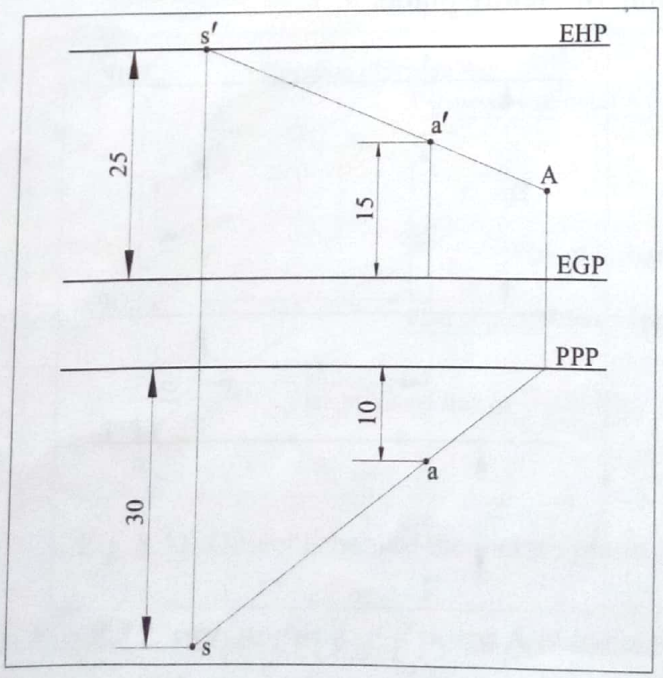

Fig. 8.14.

line joining s and a should be extended to intersect the plan of picture plane. Draw a vertical line from this point to intersect the extension of line joining s′ and a′ at A as shown in Fig 8.14.

Problem for practice.

Locate the perspective of a point A which is 20mm above the ground plane and 10 mm in front of picture plane. The central plane is 30mm towards right of point A. The station point is 30mm above the ground plane and 25mm from the picture plane.

Example 8.3.

A line AB of length 30mm is kept on the ground with end A 5mm behind the picture plane. The line is inclined at 30° with the picture plane. The central plane passes through the mid point of the line AB. The station point is 20mm in front of picture plane and 25mm above the ground. Draw the perspective of the line AB.

Solution.

Since the line AB is on the ground, the length of plan, ab will be the true length of the line, which is 30mm, ab = 30mm. Draw the plan of picture plane which is a horizontal

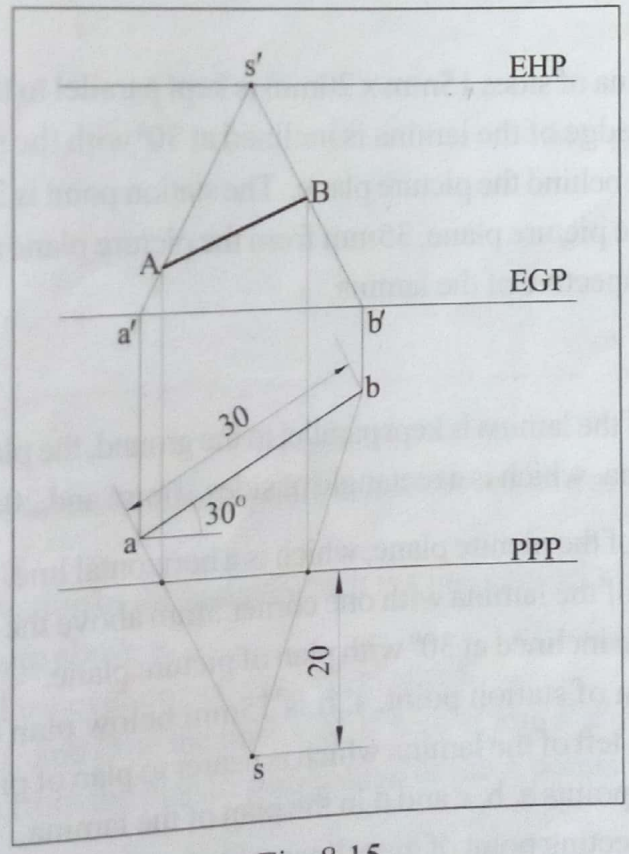

Fig. 8.15.

line. Draw the plan ab with a 5mm above plan of picture plane and inclined at 30° with horizontal. Locate the plan of station point. It is in the central plane passing through the mid point of AB and 20mm below the plan of picture plane. Join this point s with the plan points a and b. Mark the intersecting points of these lines with the plan of picture plane. Draw the elevation of ground plane, which is a horizontal line. This line can be drawn at any convenient position above the plan of line, ab. Locate a′ and b′ on this line, just above a and b. Draw the elevation of horizon plane, which is a horizontal line 25mm above the elevation of ground plane. Locate s′ on this line, just above the plan of station point s. Join s′ with a′ and b′. Locate A and B on s′ a′ and s′ b′ respectively as shown in Fig 8.15. Join the points A and B.

Problem for practice.

A line AB of length 40mm is kept parallel to the ground plane and 10mm above it. The end A is 5mm in front of picture plane and the end B is behind the picture plane. The line AB is inclined at 35° with the picture plane. The station point is 20mm towards right of point A, 30mm from the picture plane and 35mm above the ground. Draw the perspective of the line Ab.

Example 8.4.

A rectangular lamina of sides 15mm x 20mm is kept parallel to the ground and10mm above it. The 20mm edge of the lamina is inclined at 30° with the picture plane and the nearest corner is 5mm behind the picture plane. The station point is 25mm towards left of the corner nearer to the picture plane, 35mm from the picture plane and 40mm above the ground. Draw the perspective of the lamina.

Solution.

Since the surface of the lamina is kept parallel to the ground, the plan of the lamina is the true shape of the lamina, which is a rectangle of sides 10mm and 20mm.

1. Draw the plan of the picture plane, which is a horizontal line.
2. Draw the plan of the lamina with one corner 5mm above the plan of picture plane and 20mm edge inclined at 30° with plan of picture plane.
3. Locate the plan of station point, s. It is 35mm below plan of picture plane and 25mm towards left of the lamina which is nearer to plan of picture plane.
4. Join **s** with the points a, b, c and d in the plan of the lamina.
5. Mark the intersecting point of these lines with the plan of picture plane.

6. Draw the elevation of the ground plane which is a horizontal line. It can be drawn at any distance above the plan of the lamina.
7. Draw the elevation of horizon plane which is a horizontal line, 40mm above the elevation of ground plane.

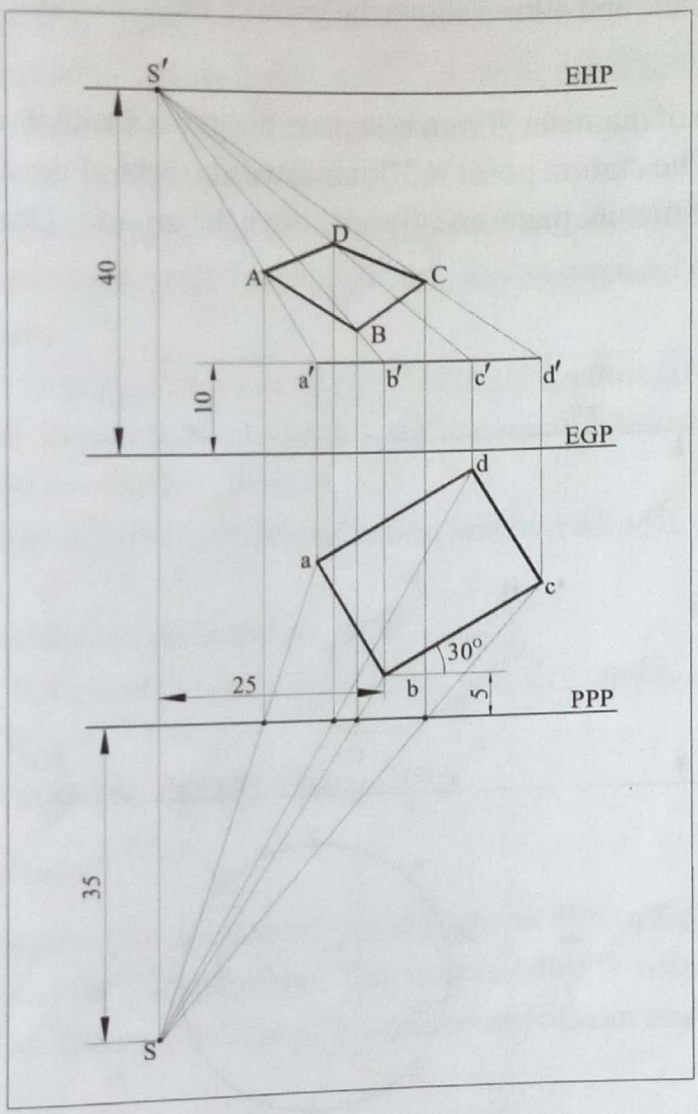

Fig.8.16.

8. Locate the elevation of station point, s′ just above s and in the elevation of horizon plane.
9. Draw the elevation of the lamina which is a line parallel to the elevation of ground plane and 5mm above it.
10. Join s′ with the elevation points a′, b′, c′ and d'.
11. Locate A, B, C and D on the lines s′ a′, s′ b′, s′ c′ and s′ d′ respectively by drawing vertical lines from the plan of perspective of these points which are in the plan of picture plane.
12. Join the points A,B,C and D.

Problem for practice.

A rectangular lamina, side of base 30mm x 40mm is kept on the ground with one of the corners touching the picture plane and the 40mm edge inclined at 35° with the picture plane. The station point is 20mm towards left of the corner in the picture plane, 30mm in front of the picture plane and 40mm above the ground. Draw the perspective of the lamina.

Example 8.5.

A circular lamina of diameter 30mm is kept on the ground with its centre 20mm behind the picture plane. The station point is 30mm towards right of the centre of the lamina, 25mm in front of the picture plane and 40mm above the ground. Draw the perspective of the circular lamina.

Solution.

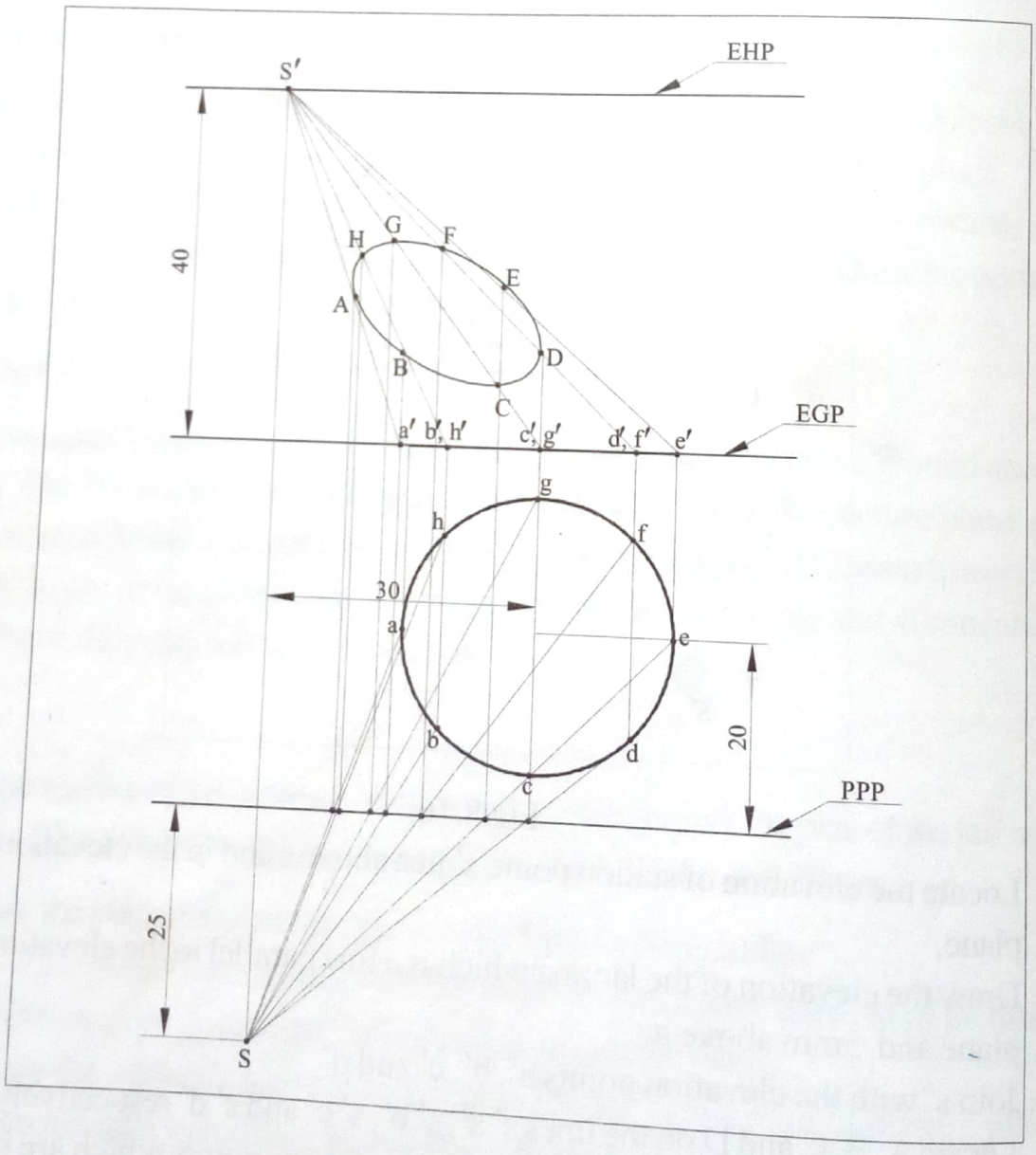

Fig. 8.17.

1. Draw the plan of picture plane, which is a horizontal line.
2. Draw the plan of the circular lamina. It is a circle of diametre 30mm, the centre of this circle should be 20mm above the plan of picture plane. Divide the circumference of this circle into 8 or 12 number of equal divisions and mark the division points as a, b, c, d etc.
3. Locate the plan of station point, s. It is 30mm towards left of the centre of lamina and 25mm below the plan of picture plane.
4. Join s with the points a, b, c, d etc.
5. Mark the intersecting point of these lines with the plan of picture plane.
6. Draw the elevation of the horizon plane at any convenient distance above the plan of the lamina.
7. Draw the elevation of horizon plane, 40mm above the elevation of ground plane.
8. Locate the elevation of station point, s′ on the elevation of horizon plane, just above the plan of station point, s.
9. Draw the elevation of the circular lamina which is a line in the elevation of ground plane.
10. Join s′ with the elevation points, a′, b′, c′ etc.
11. Locate A, B, C, D etc in the line joining s′ and a′, s′ and b′, s′ and c′ etc, as shown in Fig.8.17.
12. Join these points by a smooth curve.

Problem for practice.

Draw the perspective of a circular lamina of diameter 40mm kept on the ground with its centre 25mm behind the picture plane. The station point is 40mm towards right of the centre of the lamina, 45mm from the picture plane and 50mm above the ground.

University question.

Draw the perspective view of the circular lamina of diameter 50mm lying on the ground plane touching the picture plane. The station point is 55mm above the ground plane, 60mm in front of picture plane and contained in the central plane which passes at a distance of 40mm from the centre of the circle. [CUSAT June 2012].

Example 8.6.

A rectangular pyramid base 30mm x 20mm and axis 40mm long is resting on its base on the ground plane such that one of its longer edges of base is touching on the picture plane. Draw the perspective view of the pyramid, if the station point is 30mm in front of

picture plane 45mm above ground plane and in the central plane which is 40mm to the left of the axis of the pyramid.

Solution.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan of the pyramid which is a rectangle of 30mm x 20mm, with all the corners joined with the centre of rectangle. 30mm edge should be kept on the plan of picture plane.
3. Locate the plan of station point, s. It is 40mm towards left of the axis of the pyramid and 30mm below the plan of picture plane.

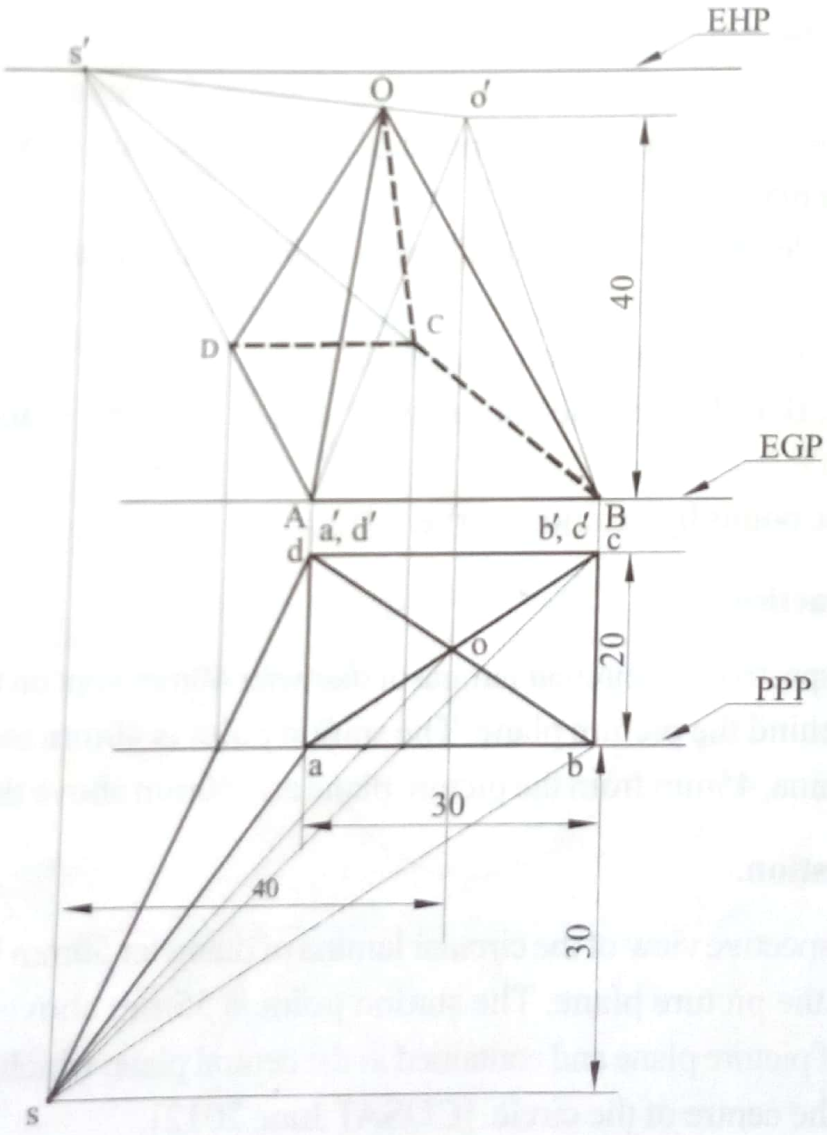

Fig. 8.18.

4. Join s with the points a,b,c,d and o in the plan of the pyramid.
5. Mark the intersecting point s of these lines with the plan of picture plane.

6. Draw the elevation of ground plane. It is a horizontal line and can be drawn at any convenient distance above the plan of the object.
7. Draw the elevation of the horizon plane 50mm above the elevation of ground plane.
8. Locate elevation of station point, s′, in the elevation of horizon plane, just above the plan of station point, s.
9. Draw the elevation of the pyramid with base on elevation of ground plane.
10. Join s′ with a′, b′, c′, d′ and o′.
11. Locate A,B,C,D and O on the line joining s′ and a′, s′ and b′, s′ and c′, s′ and d′, s′ and a′ respectively.
12. Join the points A, B, C, D and O as shown in Fig.8.18.

The boundary lines OD, DA, AB and BO are visible lines. In the plan, the point a is nearer to picture plane compared to the point c. Hence point A in the perspective is visible and point C is invisible. The lines meeting at the invisible point C, OC, CD and CB are invisible lines.

Problem for practice.

A square pyramid side of base 40mm and axis height 50mm is kept with its base on the ground with one of the base edges parallel to the picture plane and 15mm behind it. The station point is 40mm in front of picture plane, 35mm towards right of the axis and 60mm above the ground. Draw the perspective of the pyramid.

University questions.

1. A rectangular pyramid base 30mm and 20mm and axis 35mm long is placed on the ground plane on its base, with the longer edge of the base parallel to and 30mm behind the picture plane. The central plane is 30mm to the left of the apex and the station point is 50mm in front of the picture plane and 25mm above the ground plane. Draw the perspective of the pyramid. [CUSAT June 2012 and June 2010].
2. A square pyramid side of base 30mm and altitude 50mm stands on the ground vertically with an edge of base parallel to and 15mm behind picture plane. The station point is 35mm in front of picture plane and 60mm above the ground. The central plane is located at 35mm to the left of the axis of the solid. Draw the perspective projection of the pyramid. [CUSAT June 2013].
3. A square pyramid 50mm base and height 65mm rests on ground with its nearest edge of the base parallel to and 10mm behind the picture plane.The station point is 60mm

in front of the picture plane, 40mm right of the apex and 70mm above the ground. Draw the perspective view. [KU May 2009].

Example 8.7.

Draw the perspective of a pentagonal pyramid of base 20mm side and height 40mm. The nearest edge of the base is parallel to and 5mm behind the picture plane. The station point is situated at a distance of 35mm in front of picture plane and 45mm above the ground plane and 30mm to the left of the apex of the pyramid.

Solution.

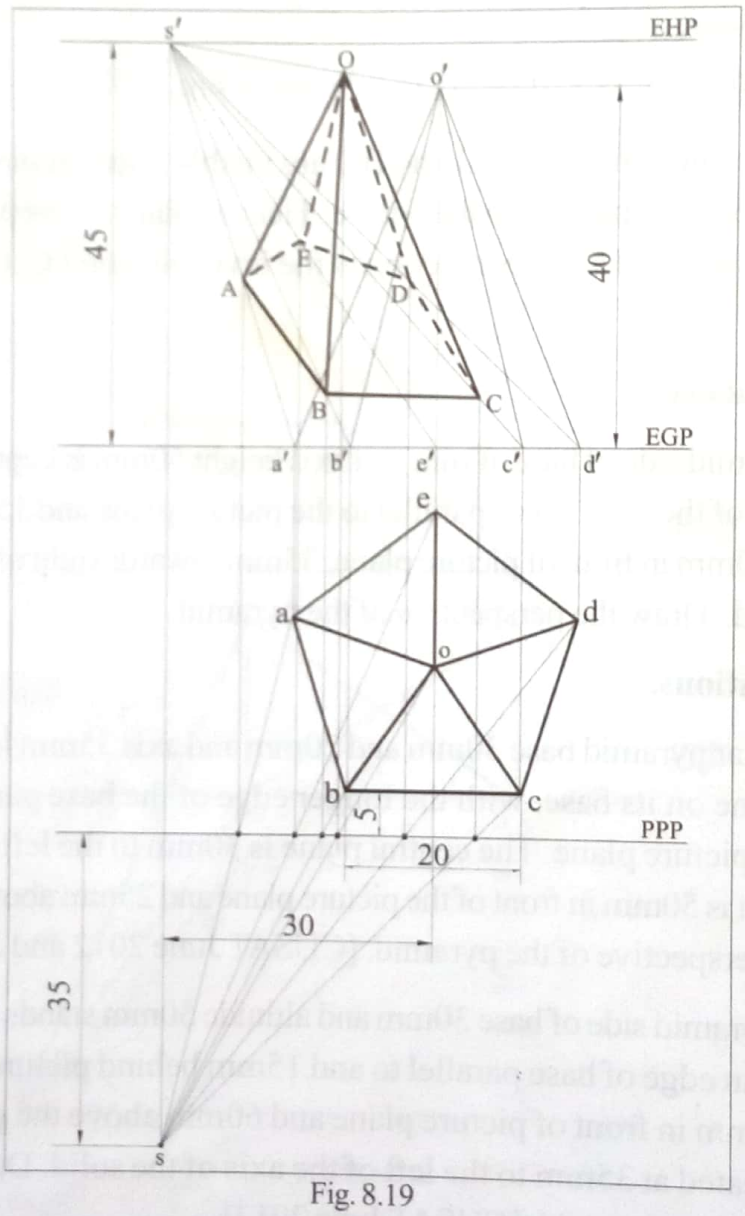

Fig. 8.19

1. Draw the plan of picture plane which is a horizontal line.
2. Draw the plan of pyramid which is a pentagon with all the corners joined with the centre of the pentagon. One of the sides should be kept parallel to the plan of picture

plane and 5mm above it.

3. Locate the plan of station point, s. It is 30mm to the right of the centre of pentagon and 35mm below the plan of picture plane.
4. Join s with the points a,b,c,d,e and o in the plan of the pyramid.
5. Mark the intersecting points of these lines with the plan of picture plane.
6. Draw the elevation of ground plane which is a horizontal line, just above the plan of the pyramid.
7. Draw the elevation of horizon plane 45mm above the elevation of ground plane.
8. Locate the elevation of station point, s′ on the elevation of horizon plane just above the plan of station point.
9. Draw the elevation of the pentagonal pyramid.
10. Join s′ with a′, b′, c′, d′,e′ and o′ in the elevation of the pyramid.
11. Locate A,B,C,D,E and O on the lines s′ a′, s′ b′, s′ c′, s′ d′, s′e′and s′o′, just above the respective intersecting points in the plan of picture plane.
12. Join the points A, B, C, D, E and O as shown in Fig. 8.19.

Problem for practice.

Draw the perspective of a pentagonal pyramid of base 50mm side and height 80mm. The nearest edge of base is parallel to and 30mm behind the picture plane. The station point is situated at a distance of 120mm from the picture plane and 50mm above the ground plane and 80mm to the right of the apex.

University questions.

1. A pentagonal pyramid of height 45mm and base edge 30mm is resting on its base with one base edge parallel, 10mm behind and nearer to the picture plane. The station point is 22mm in front of the picture plane, 40mm to the left of the axis and 50mm above the ground. Draw the perspective projection of the solid. [KU June 2009].
2. Draw the perspective view of a hexagonal pyramid of side of base 25mm and height 60mm, kept with one edge of base touching the picture plane. The station point is situated 150mm from picture plane and 30mm above the ground plane. The central plane containing the station point is 110mm to the left of the central plane containing the apex. [KU Jan 2009].

Example 8.8.

A cube of side 25mm is kept with one of its square faces on the ground with one of the vertical edges touching the picture plane. All the vertical square faces are equally inclined to picture plane. The station point is 35mm from the picture plane, 10mm towards

left of the centre of cube and 45mm above the ground. Draw the perspective view of the cube.

Solution.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan of cube which is a square of side 25mm. One of the corners of this square, representing the plan of vertical edge should be kept on the picture plane. The

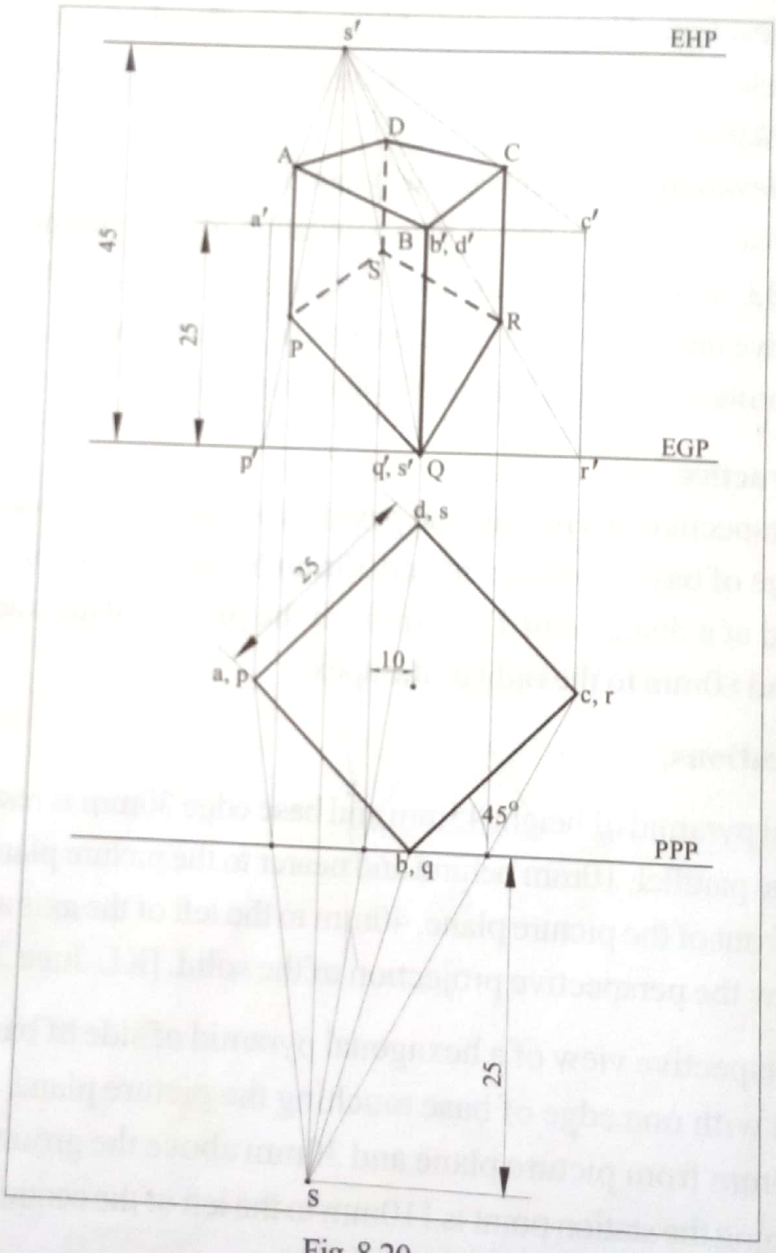

Fig. 8.20.

sides of the square representing the plan of square faces of the cube should be kept inclined at 45° with the plan of picture plane.

3. Locate the plan of station point, s. It is 35mm below the plan of picture plane and

10mm towards left of the centre of the square.

4. Join s with the points. a, b, c, d and p, q, r, s in the plan of the cube.
5. Mark the intersecting point of these lines with the plan of picture plane.
6. Draw the elevation of the ground plane which is a horizontal line which can be drawn at any distance above the plan of cube.
7. Draw the elevation of the horizon plane which is a horizontal line, 45mm above the elevation of ground plane.
8. Locate elevation of station point, s′, in the elevation of horizon plane, just above the plan of station point, s.
9. Draw the elevation of the cube and mark the points a′, b′, c′, d′ and p′, q′, r′ and s′.
10. Join s′ with the points a′, b′, c′, etc.
11. Locate the points, A, B, C, D, P, Q, R and S on the respective lines, s′a′, s′ b′ etc just above the intersecting points marked in the plan of picture plane.
12. Join the points A, B, C etc as shown in Fig 8.20.

The top face ABCD of the cube is below the station point and hence the face ABCD in the perspective is visible. The boundary lines AP, PQ, QR, and RC are also visible. The edge BQ being nearer to the picture plane, it is visible in the perspective view. Since the point s in the perspective is an invisible point, the lines PS, RS and DS are invisible lines.

Example 8.9.

A cube of 25 mm side is placed vertically with its top face on an auxiliary ground plane, which is at a height of 45 mm above the horizon plane. The nearest vertical edge of the cube touches the picture plane and the adjacent square faces of this edge are equally inclined to the picture plane. Draw the perspective view of the cube, if the station point is 35mm in front of the picture plane and lies in a central plane which is 25 mm to the right side of the centre of the cube.

Solution.

The real ground plane is always below the horizone plane. The auxiliary ground plane is an imaginary plane parallel to the actual ground plane which can be above or below the horizon plane. In the present problem it is given that the auxiliary ground plane is 45mm above the horizon plane. Hence the elevation of ground plane should be drawn 45mm above the elevation of horizon plane. The elevation of horizon plane can be drawn at any convenient distance above the plan of the cube. The line representing the elevation of top face ABCD should be kept on the auxiliary ground plane a′, b′, c′, and d′ are on the elevation of the auxiliary ground plane as shown in Fig 8.21.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan of cube which is a square of side 25mm. One of the corners of this square, representing the plan of vertical edge should be kept on the picture plane. The sides of the square representing the plan of square faces of the cube should be kept inclined at 45° with the plan of picture plane.

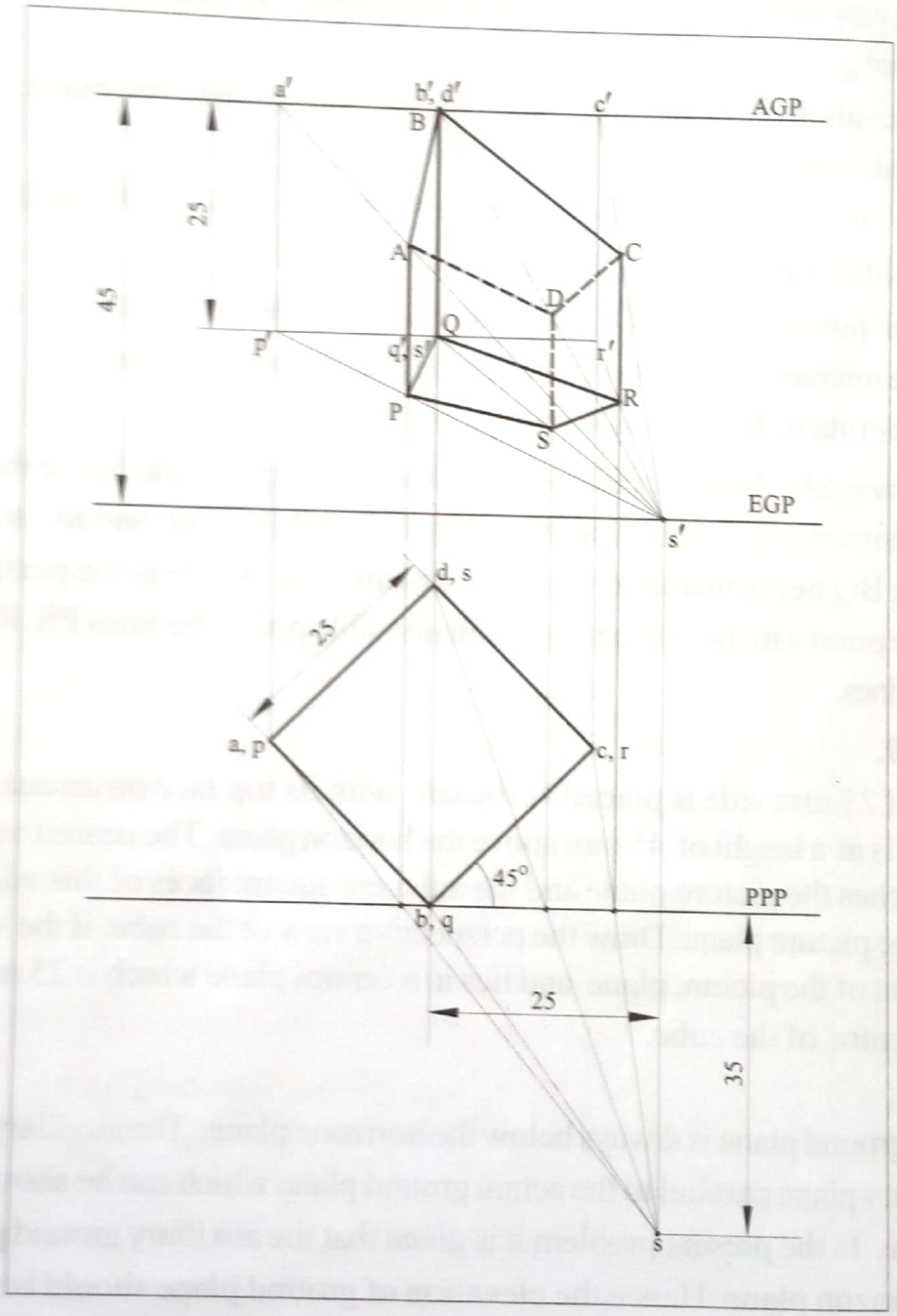

Fig. 8.21.

3. Locate the plan of station point, s. It is 35mm below the plan of picture plane and 25mm towards left of the centre of the square.
4. Join s with the points. a, b, c, d and p, q, r, s in the plan of the cube.

5. Mark the intersecting point of these lines with the plan of picture plane.
6. Draw the elevation of the horizon plane, which is a horizontal line which can be drawn at any convenient distance above the plan of cube.
7. Draw the elevation of the auxiliary ground plane which is a horizontal line, 45mm above the elevation of horizon plane.
8. Locate the elevation of the station point, s′, in the elevation of the horizon plane, above the plan of station point, s.
9. Draw the elevation of the cube with the top face touching the elevation of auxiliary ground plane.
10. Joint s′ with the points a′, b′, c′ etc. and p′, q′, r′ etc.
11. Locate the points A, B, C, D, P, Q, R, and S on the respective lines s′a′, s′b′, s′c′ etc. just above the intersecting points marked in the plan of picture plane.
12. Join the points A, B, C etc. as shown in Fig. 8.21.

Problem for practice.

Draw the perspective view of a cube 40mm edge lying on a face on the ground plane with a vertical edge in the picture plane and all the vertical faces equally inclined to the picture plane. The station point is 60mm in front of picture plane and 50mm above the ground and 10mm to the left of the centre of the cube.

University questions.

1. Draw the perspective view of a cube of 25mm edge resting on ground on one of its faces. It has one of its vertical edges in the picture plane and all its vertical faces are equally inclined to the picture plane. The station point is 55mm picture plane, 40mm above the ground and is in a central plane 9mm to the left of the centre of the cube. [KU June 2011].
2. Draw the perspective projection of a cube of 50mm side resting on one of the bases on the ground, with a vertical edge 20mm behind the picture plane. A vertical face containing the nearest vertical edge is inclined at 60^o to the picture plane. The station point is 10mm to the right of vertical edge nearer to picture plane, 75mm above the ground plane and 20mm in front of picture plane.[CUSAT June 2011].
3. A cube of 35mm long edges rests with a square face on the ground plane such that one of the vertical edges of the cube is 8mm in front of the picture plane and a vertical face containing that edge is inclined at 30^o to the picture plane. The station point is 40mm in front of the picture plane, 70mm above the ground plane and lies in a central

plane which is 45mm to the left of the centre of the cube. Draw the perspective view. [KU June 2012].

Example 8.10.

A square prism of 25mm side and 35mm long is lying on the ground plane on one of its rectangular faces in such a way that one of its square faces is parallel to and 5mm behind the picture the picture plane. The station point is located 30mm in front of picture plane and 40mm above the ground plane. The central plane is 30mm away from the axis of the prism towards the right. Draw the perspective view of the prism.

Solution

1. Draw the plan of the picture plane. It is a horizontal line.
2. Draw the plan of the object. It is a rectangle of sides 25mm and 35mm. The 25mm side of this rectangle should be kept parallel to the plan of picture plane and 5mm above it.
3. Locate the plan of station point, s. It is 30mm below the plan of picture plane and 30mm to the left of the axis of the prism.
4. Join the point s and the points in the plan, a, b, c, d, p, q, r and s.
5. Mark the intersecting points of these lines with the plan of picture plane.
6. Draw the elevation of ground plane, which is a horizontal line above the plan of the prism.
7. Draw the elevation of horizon plane which is a horizontal line, 40mm above the elevation of ground plane.
8. Locate the elevation of station point, s′ on the elevation of horizon plane, just above the plan of station point, s.
9. Draw the elevation of the prism. It is a square of side 25mm. One of the sides of this square should be kept in the elevation of ground plane.
10. Join the point s′ with the elevation points a′,b′,c′, etc.
11. Locate the points A, B, C etc on the lines joining s′ and a′, s′, and b′, s′ and c′ etc, just above the corresponding intersecting point in the plan of the picture plane.
12. Join the points A, B, C etc as shown in Fig 8.22.

Since the square face ABCD is nearer to the picture plane, the lines AB, BC, CD and DA are visible in the perspective. The boundary lines, AP, PQ, QR and RC are visible

lines. Since S in the perspective is an invisible point, the lines meeting at S, PS, RS and DS are invisible lines.

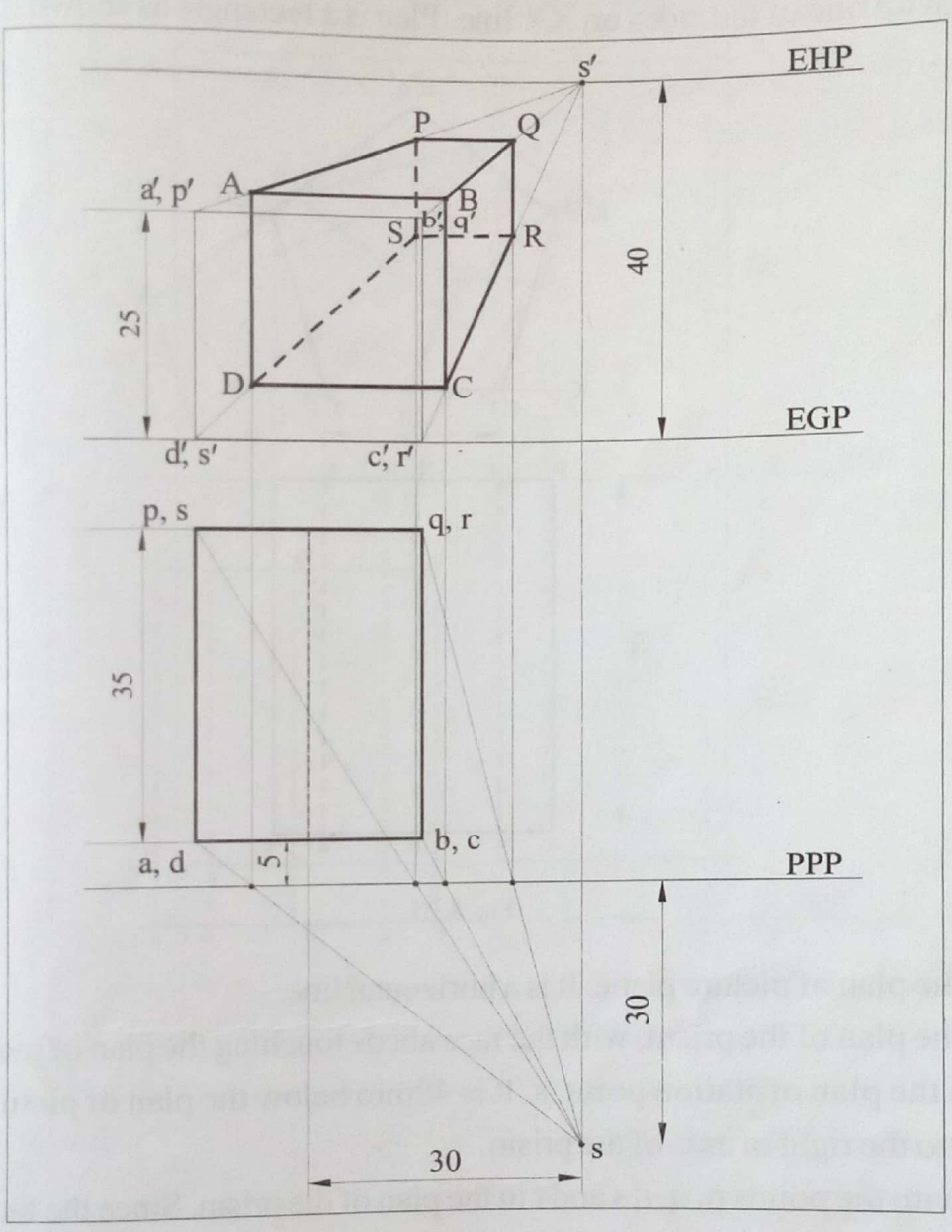

Fig. 8.22.

Example 8.11

Draw the perspective projection of a pentagonal prism of side 20mm and length 40 mm, lying on one its rectangular faces on the ground plane and one pentagonal face touching the picture plane. The station point is 40 mm in front of the picture plane and lies in the central plane which is 45 mm to the center of the prism. Station point is 45 mm above the ground plane.

Solution

Draw the elevation and plan of the pentagonal prism. Elevation is a pentagon of side 20mm kept with one of the sides on XY line. Plan is a rectangle as shown in Fig. 8.23.

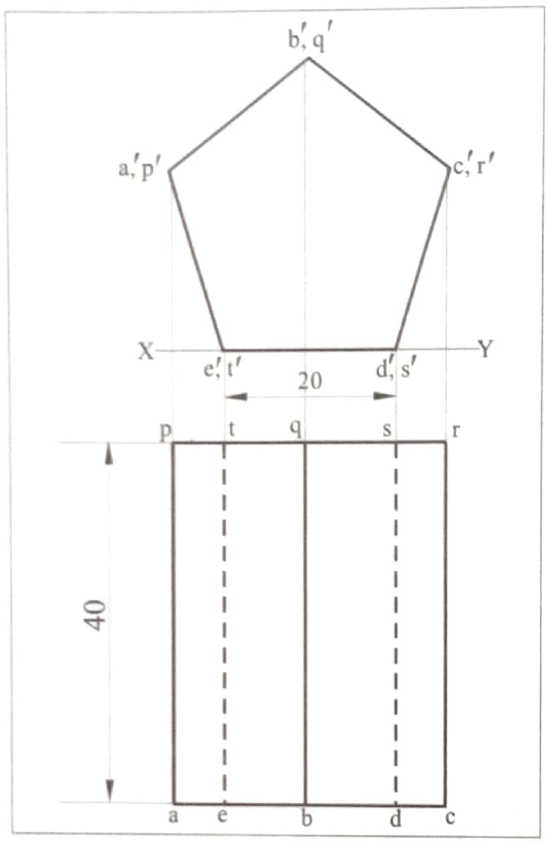

Fig. 8.23.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan of the prism, with the face abcde touching the plan of picture plane.
3. Locate the plan of station point, s. It is 40mm below the plan of picture plane and 45mm to the right of axis of the prism.
4. Join s with the points p, q, r, s and t in the plan of the prism. Since the face abcde is in the picture plane, it is not required to join s with the plan points a, b, c, d and e. Perspective of the face ABCDE will be the actual size of the pentagon, a pentagon of side 20mm itself.
5. Mark the intersecting points of the lines joining s and p, s and q etc with the plan of picture plane.
6. Draw the elevation of ground plane. It is a horizontal line and should be drawn above the plan of the prism.
7. Draw the elevation of horizon plane, 45mm above the elevation of ground plane.

8. Locate the elevation of station point, s′ in the elevation of horizon plane, just above the plan of station point, s.

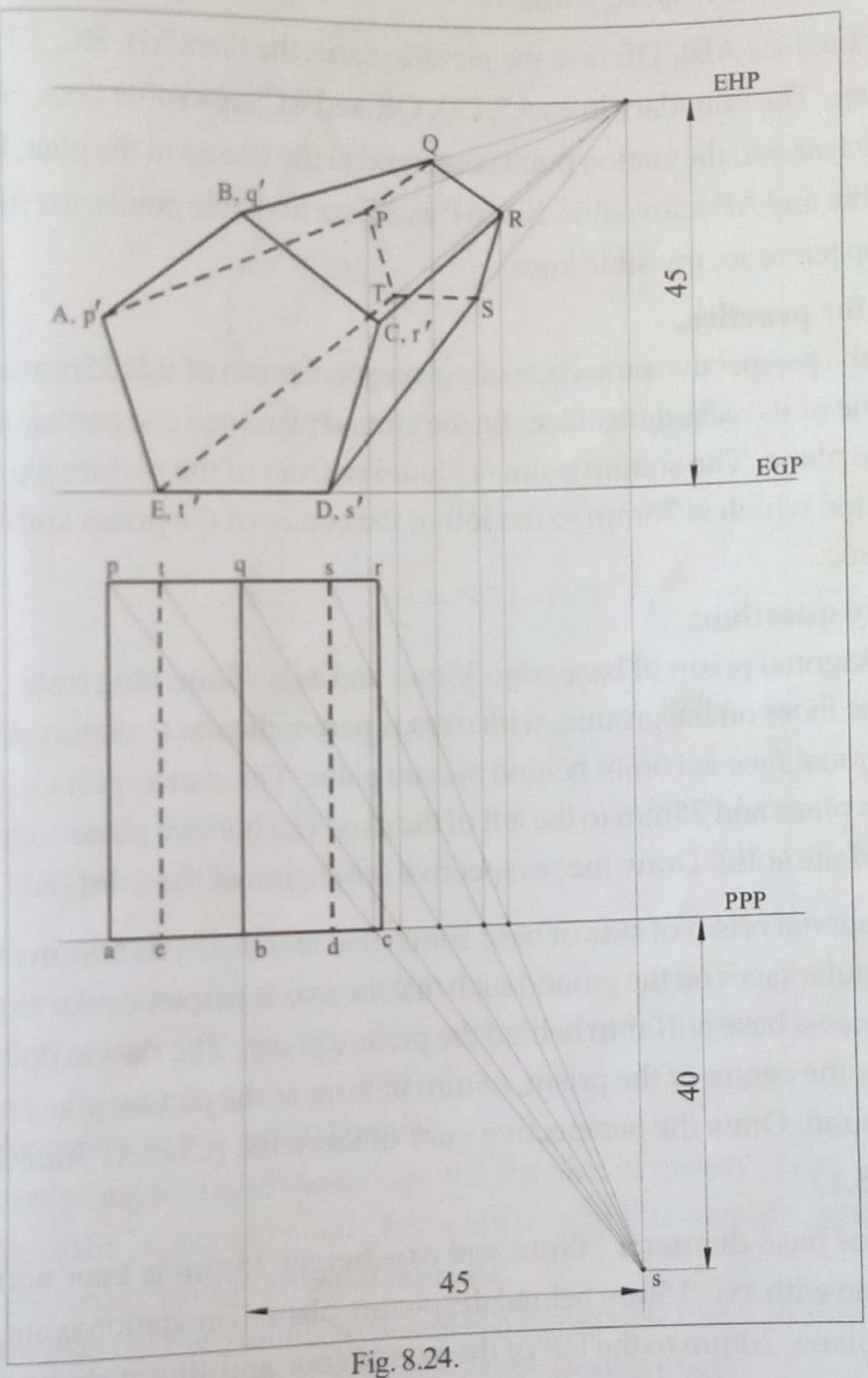

Fig. 8.24.

9. Draw the elevation of the prism. It is a pentagon of side 20mm with one of the sides touching the elevation of ground plane. Mark the angular points of the pentagon as (A, P′), (B, q′), (C, r′), (D, s′) and (E, t′).
10. Join the elevation of station point s′ with the elevation points p′, q′, r′ etc in the elevation of the prism.
11. Locate the points P, Q, R etc on the lines joining s′ and p′, s′ and q′, s′ and r′ etc. just

above the respective points marked in the plan of picture plane.

12. Join the points P, Q, R, S and T.

Since the face ABCDE is in the picture plane, the lines AB, BC, CD, DE and EA are visible lines. The boundary lines AP, EQ, QR and RC are visible lines. Since the line cr in the plan is nearer to the station point compared to the line ap in the plan, in the perspective CR is visible and AP is invisible. Since P and T are invisible points, the line QP, PT and TS in the perspective are invisible lines.

Problem for practice.

Draw the perspective projection of a pentagonal prism of side 25mm and length 50mm, lying on one of its rectangular faces on the ground plane and one pentagonal face touching the picture plane. The station point is 55mm in front of the picture plane and lies in the central plane which is 75mm to the left of the centre of the prism and 40mm above the ground plane.

University questions.

1. A pentagonal prism of base edge 35mm and axis 55mm long rests on one of its rectangular faces on the ground, with its axis perpendicular to picture plane. The nearest pentagonal face is 10mm behind picture plane. The station point is 50mm in front of picture plane and 25mm to the left of the axis. The horizon plane contains the top most edge of the solid. Draw the perspective projection of the solid [KU June 2013].
2. A hexagonal prism of side of base 30mm and length of axis 60mm rest with one of its rectangular faces on the ground such that the axis is perpendicular to the picture plane. The nearest base is 10mm behind the picture plane. The station point is 60mm to the right of the centre of the prism, 65mm in front of the picture plane and 70mm above the ground. Draw the perspective view of the solid. [CUSAT June 2010].

Example 8.12.

A cone of base diameter 30mm and axis height 35mm is kept with its base on the ground plane with axis 15mm behind the picture plane. The station point is 30mm in front of picture plane, 20mm to the left of the axis of cone and 40mm above the ground. Draw the perspective view of the cone.

Solution

1. Draw the plan of picture plane. It is a horizontal line
2. Draw the plan of the cone. It is a circle of diameter 30mm. The centre of this circle should be 15mm above the plan of the picture plane.

3. Locate the plan of station point, s. It is 30mm below the plan of picture plane and 20mm to the left of the axis of the cone.

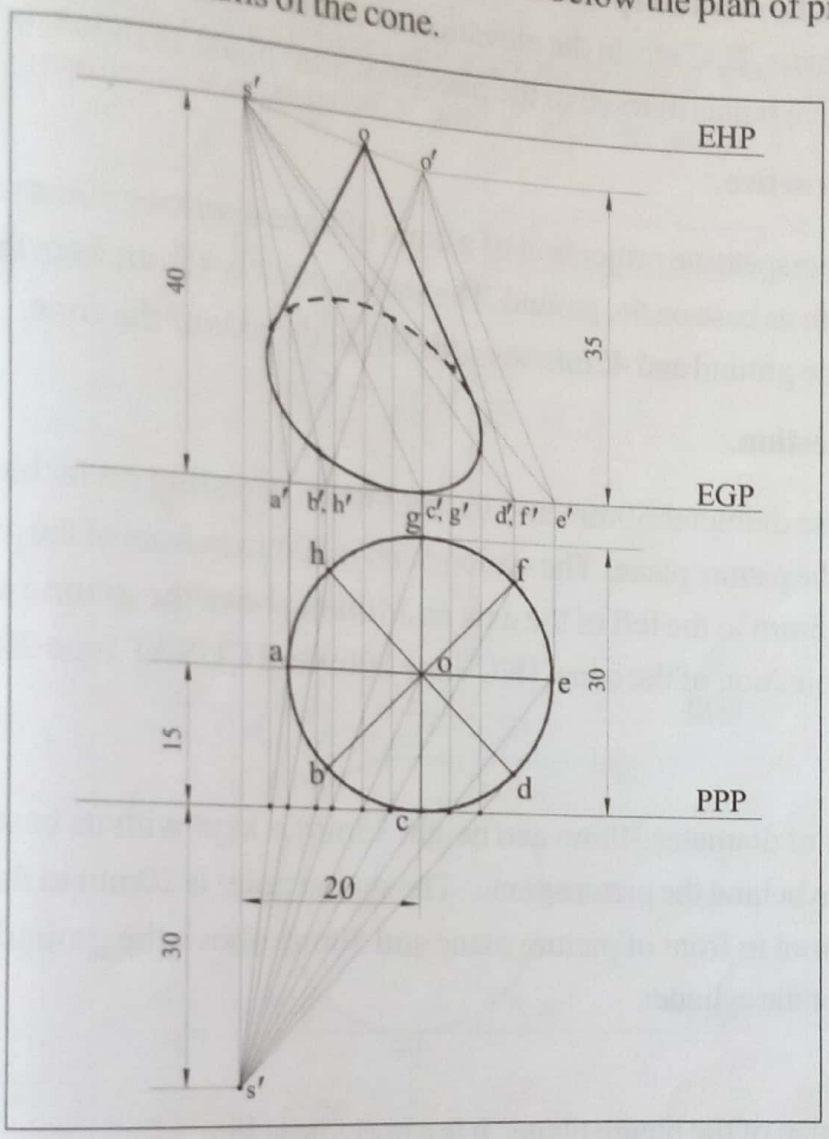

Fig. 8.25.

4. Join s and the points a, b, c etc. in the plan.
5. Mark the intersecting points of these lines wih the plan of picture plane.
6. Draw the elevation of ground plane. It is a horizontal line and can be drawn at any convenient distance above the plan of the cone.
7. Draw the elevation of horizon plane which is a horizontal line and should be drawn at a distance of 40mm above the elevation of the ground plane.
8. Locate the elevation of station point, s′. It is in the elevation of horizon plane, just above the plan of station point, s.
9. Draw the elevation of cone

10. Join s′ with the elevation points a′, b′, c′ etc in the elevation of the cone.
11. Locate points A, B, C etc. in the elevation of visual rays s′a′, s′b′, s′c′ etc. just above the respective points marked in the plan of picture plane as shown in Fig. 8.25.

Problem for practice.

Draw the perspective projection of a cone of base diameter 50mm and axis height 60mm, kept with its base on the ground. The station point is 45mm from the picture plane, 50mm above the ground and 45mm towards left of the axis of the cone.

University question.

A cone base diameter 50mm and height 60mm is resting on its base with its axis 40mm behind the picture plane. The station point is 30mm in front of the picture plane, the central plane 35mm to the left of the axis and 40mm above the ground plane. Draw the perspective projection of the cone. [KU June 2009 and CUSAT June 2010].

Example 8.13.

A cylinder of diameter 30mm and height 35mm is kept with its base on the ground with axis 15mm behind the picture plane. The station point is 20mm to the left of the axis of cylinder, 30mm in front of picture plane and 50mm above the ground. Draw the perspective view of the cylinder.

Solution.

1. Draw the plan of the picure plane. It is a horizontal line.
2. Draw the plan of the cylinder. It is a circle of diameter 30mm. The centre of this circle should be 15mm above the plan of picture plane.
3. Locate the plan of station point, s. It is 30mm below the plan of picture plane and 20mm to the left of the centre of the circle.
4. Join the point s and the points in the plan of the cylinder, a, b, c etc. and p, q, r etc.
5. Mark the intersecting point of these lines with the plan of picture plane.
6. Draw the elevation of ground plane. It is a horizontal line. This line can be drawn at any convenient distance above the plan of the cylinder.
7. Draw the elevation of horizon plane, 50mm above the elevation of ground plane.
8. Locate the elevation of station point, s′ in the elevation of horizon plane, just above the

plan of station point, s.

9. Draw the elevation of the cylinder and mark the points a′, b′, c′ etc and p′,q′, r′etc.
10. Join the elevation of station point, s′ with a′, b′, c′ etc and p′, q′, r′ etc.

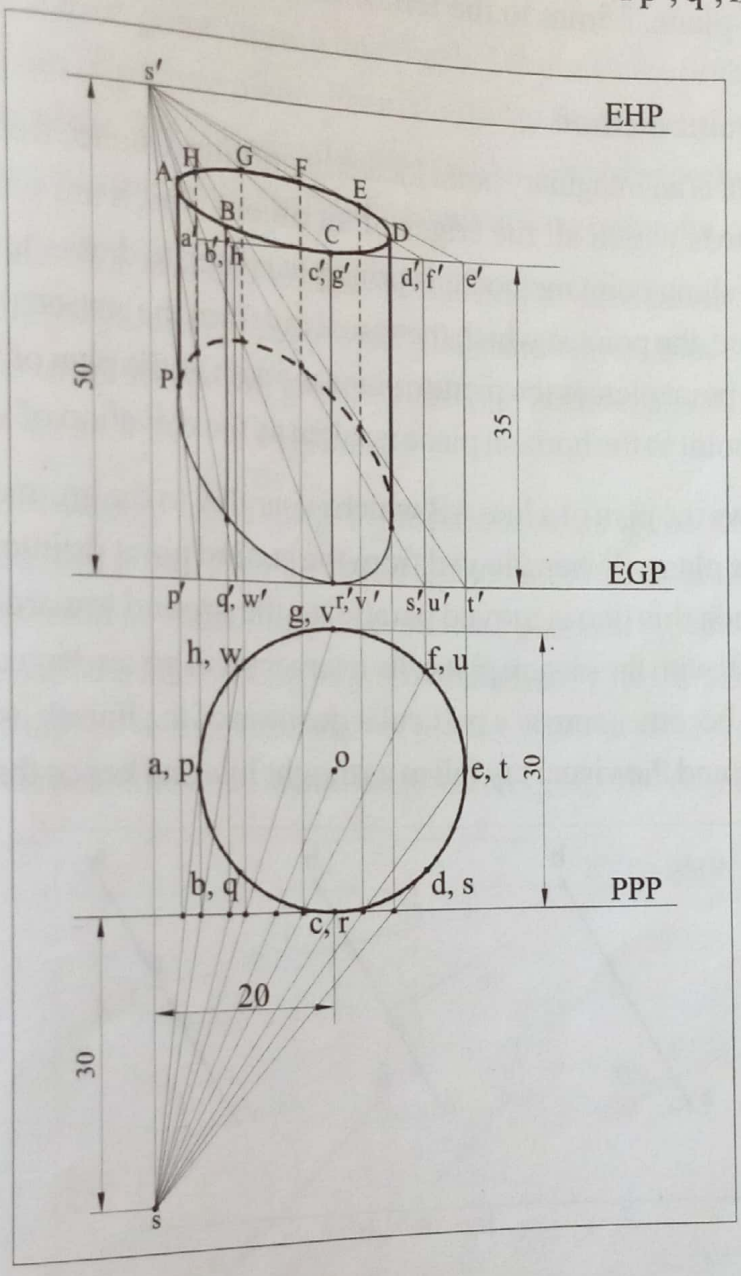

Fig 8.26.

11. Locate the points A, B, C etc and P, Q, R etc on the lines s′a′, s′b′, s′c′ etc and s′p′, s′q′, s′r′ etc, just above the intersecting points marked in the plan of picture plane as shown in Fig. 8.26.
12. Join the points A, B, C etc and P, Q, R etc by smooth curves.

Problem for practice.

Draw the perspective of a cylinder of diameter 50mm and height 60mm kept with its base on the ground. The axis is 35mm behind the picture plane. The station point is 40mm from the picture plane, 35mm to the left of axis of the cylinder and 70mm above the ground.

8.5. Vanishing point method

Vanishing point is an imaginary point located at infinite distance from the observer. This is the point towards which all the edges of an object which are parallel to each other converge. In vanishing point method this principle is used to draw the perspective view of objects. In practice, the point at which the visual ray from the station point to the infinitely distant vanishing point pierces the picture plane is taken as the plan of vanishing point and elevation of this point in the horizon plane is taken as the elevation of vanishing point.

Fig.8.27. Shows the plan of a line AB which is parallel to the ground plane and inclined at θ^0 to the picture plane. When viewed from the station point its intercept on the picture plane is a_1b_1. When this line is moved parallel to the ground towards right, keeping the same inclination θ^0 with the picture plane, its intercept will go on decreasing. The length of this intercept a_1b_1 becomes zero at a particular position of the line ab as shown in Fig.8.27. In this position ab and the visual ray fall in a straight line and hence the line ab

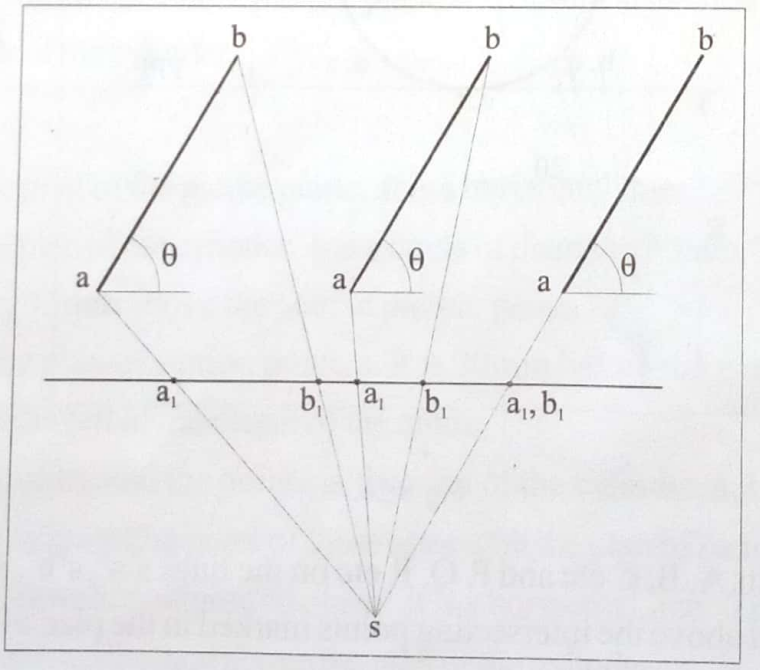

Fig. 8.27.

vanishes from the sight. The point of intersection of the visual ray in this position with the plan of picture plane is the plan of vanishing point [PVP]. The elevation of vanishing point

[EVP] which is in the elevation of horizon plane is just above the plan of vanishing point. The line joining the plan of station point and the plan of vanishing point, which is in the plan of picture plane, is always parallel to the plan of line ab. The elevation of vanishing point can be located as follows.

From the plan of station point, draw a line parallel to one of the lines in the plan of the object to meet the plan of picture plane. From this point draw a vertical line to meet the elevation of horizon plane. This point is the elevation of vanishing point. The selected line in the plan and all other lines parallel to this line converge to this point.

Consider two lines AB and CD which are parallel to each other. Let AB be on the ground plane and CD be parallel to the ground plane and 10mm above the ground plane. For a given position of station point, ground plane and horizon plane, the perspective of the lines can be drawn as shown in Fig. 8.28.

From the plan of station point s, draw a line parallel to ab to meet the plan of picture plane at a point. From this point, draw a vertical line to meet the elevation of horizon plane. This point is the elevation of vanishing point. Join the points a, b, c and d with the plan of station point s and mark the intersecting points of these lines with the plan of picture plane. Extend the lines ab and cd to meet the plan of picture plane at (a_1, b_1) and (c_1, d_1). From these points draw vertical lines and locate the points (A_1, B_1) and (C_1, D_1). Since the line

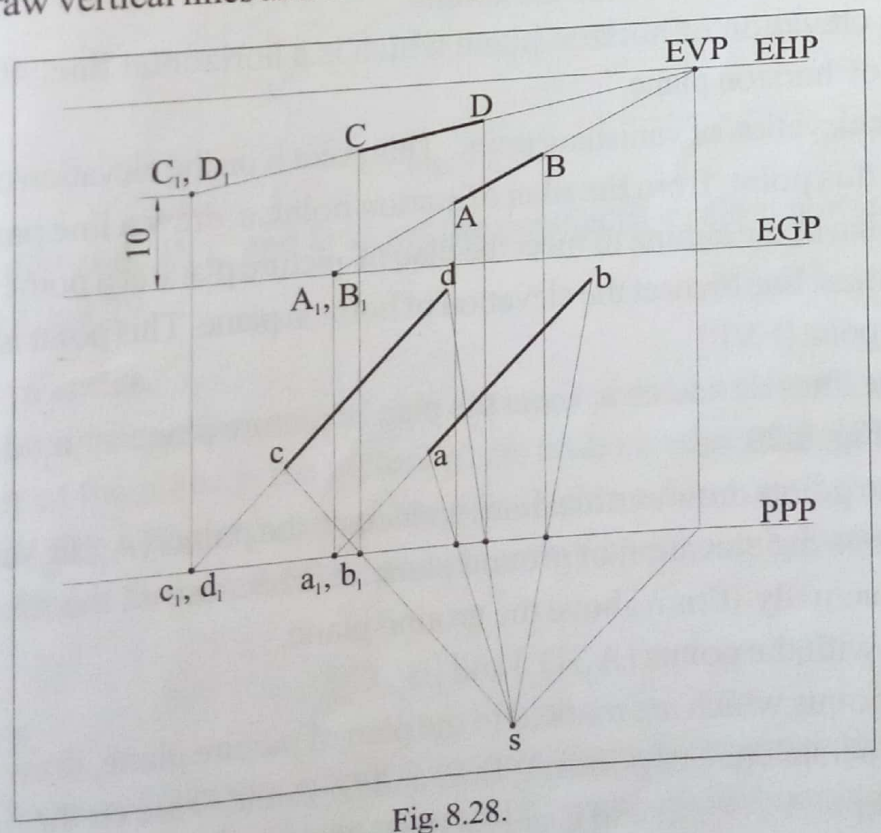

Fig. 8.28.

AB is on the ground plane (A_1, B_1) point is in the elevation of ground plane. The line CD is 10mm above the ground plane and hence the point (C_1, D_1) should be marked 10mm above the elevation of ground plane. Join the point (A_1, B_1) wih the elevation of vanishing point. The perspective of points A and B are in this line. Similarly join the point (C_1, D_1) with elevation of vanishisng point. The perspective of points C and D are in this line. From the plan of perspective of these points which are marked in the plan of picture plane, draw vertical lines to get the perspective of lines AB and CD as shown in Fig.8.28.

Example 8.14.

Solve the problem given in example 8.4, using vanishing point method.

Solution.

1. Draw the plan of the picture plane, which is a horizontal line.
2. Draw the plan of the lamina with one corner 5mm above the plan of picture plane and 20mm edge inclined at 30° with plan of picture plane.
3. Locate the plan of station point,s. It is 35mm below the plan of picture plane and 25mm towards left of the lamina which is nearer to the plan of picture plane.
4. Join **s** with the points a, b, c and d in the plan of the lamina.
5. Mark the intersecting point of these lines with the plan of picture plane.
6. Draw the elevation of the ground plane which is a horizontal line. It can be drawn at any distance above the plan of the lamina.
7. Draw the elevation of horizon plane which is a horizontal line, 40mm above the elevation of horizon plane.
8. Locate the elevation of vanishing point. This point is on the elevation of horizon plane. To locate this point, from the plan of station point, s, draw a line parallel to the line bc in the plan of the lamina to meet the plan of picture plane at a point. From this point draw a vertical line to meet the elevation of horizon plane. This point is the elevation of vanishing point [EVP]
9. Extend the lines da and cb to meet the plan of picture plane at (a_1, d_1) and (b_1, e_1) as shown in Fig. 8.29.
10. From these points draw vertical lines and locate the points (A_1, D_1) and (B_1, C_1) both 10mm above the elevation of ground plane. It is because all the four points A, B, C and D are actually 10mm above the ground plane.
11. Join EVP with the points (A_1, D_1) and (B_1, C_1).
12. From the points which are marked in the plan of picture plane, draw vertical lines to locate the perspective of points A, B, C and D. A and D are on the line joining EVP and the point (A_1, D_1). B and C are on the line joining EVP and the point (B_1, C_1).

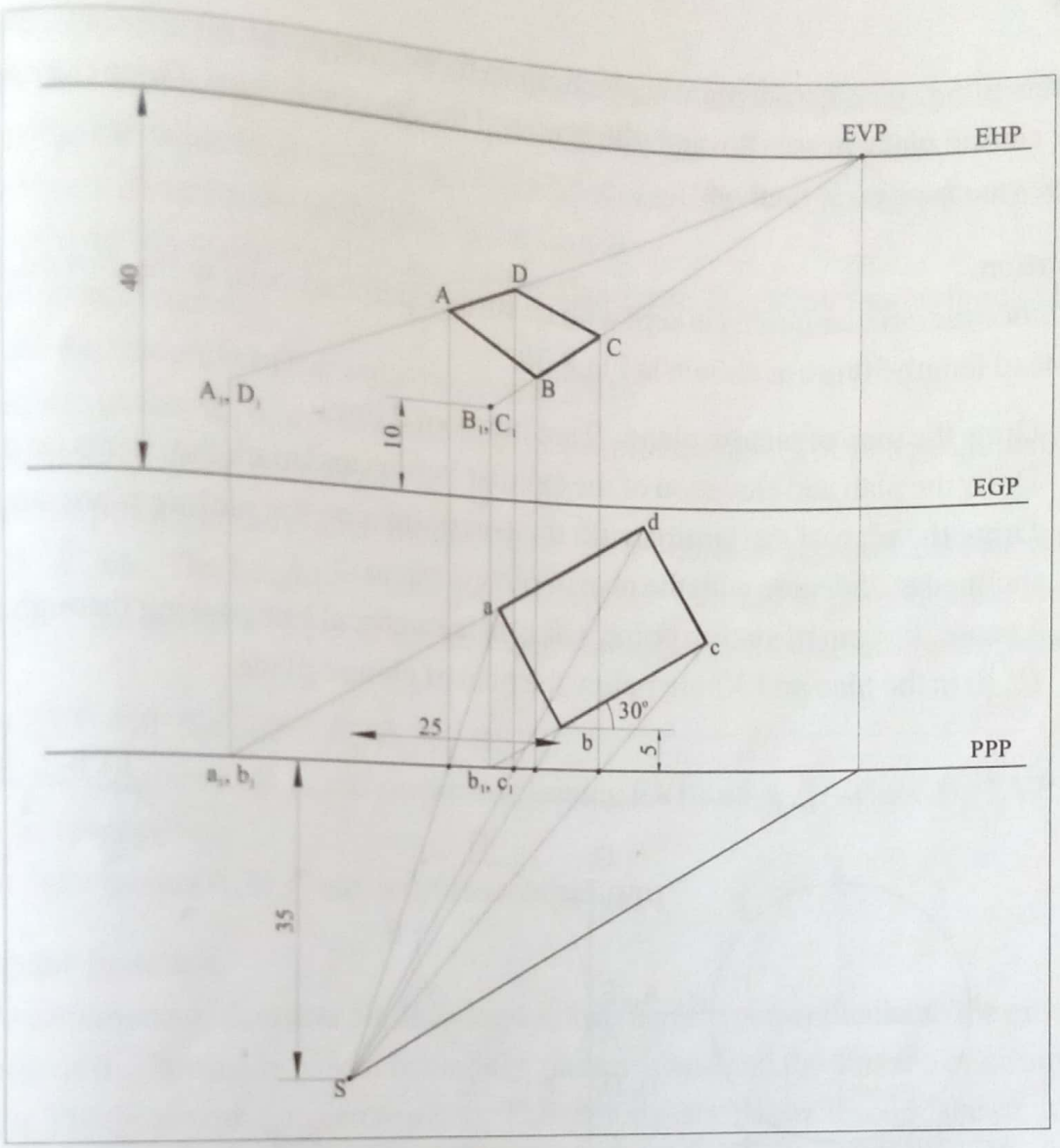

Fig. 8.29.

13. Join the points A, B, C and D to get the perspective of the rectangular lamina as shown in Fig.8.29.

Problem for practice.

An equilateral triangular plane of side 40mm is resting on the ground such that the nearest corner of the plane is the picture plane with an edge containing that corner is inclined at 35degree with the picture plane, 65mm above the ground plane and lies on the central plane 25mm to the left of the nearest corner of the plane. Draw the perspective projection.

Example 8.15.

A circular lamina of diameter 30mm is kept with its surface perpendicular to the ground plane. The lamina touches the picture plane and its surface is inclined at 35degree with the

picture plane. The station point is 30mm from the picture plane, 40mm above the ground. The central plane passes through the centre of the circular lamina. Draw the perspective using vanishing point method.

Solution.

Since the circular lamina is kept with its surface perpendicular to the ground, its plan is a line of length 30mm as shown in Fig.8.30.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan and elevation of the circular lamina and mark the points on it.
3. Draw the plan of the lamina with the end point a on the picture plane and the line inclined at 35degree with the plan of picture plane.
4. Locate the plan of station point, s. It is in the vertical line passing through the point (c, g) in the plan and 30mm below the plan of picture plane.

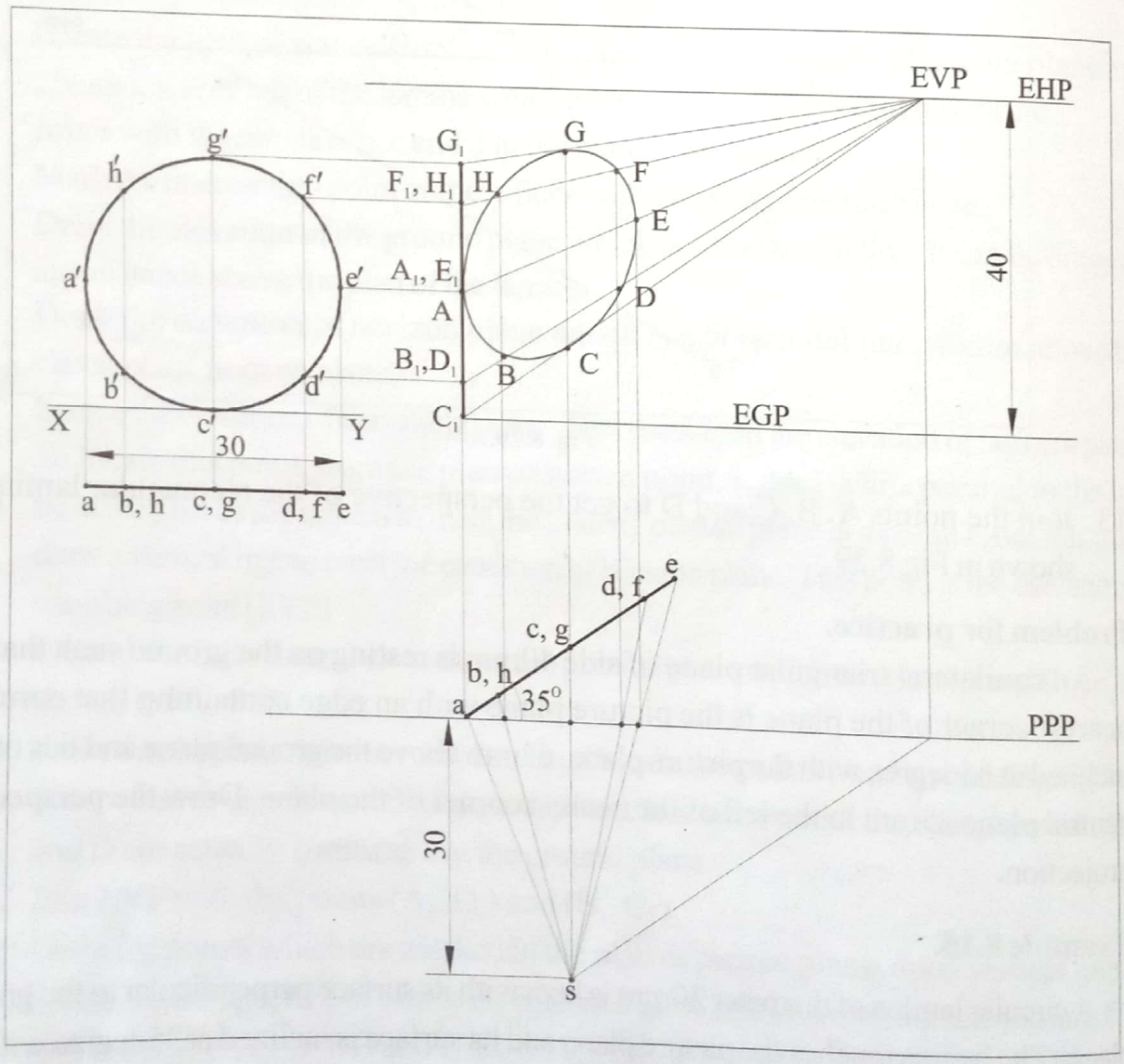

Fig. 8.30.

5. Join the point s and the points a, b, c etc. in the plan of the circular lamina.
6. Mark the intersecting points of these lines with the plan of picture plane.
7. Draw the elevation of ground plane. It is a horizontal line which can be drawn at any convenient distance above the plan of the lamina.
8. Draw the elevation of horizon plane which is a horizontal line, 40mm above the elevation of the ground plane.
9. Locate the elevation of the vanishing point (EVP).
10. Mark the points a_1, b_1, c_1 etc in the plan of the picture plane. In this problem these points are at a itself. (not shown in Fig.8.30)
11. From the point a in the plan of picture plane, draw vertical lines and locate the points A_1, B_1, C_1 etc. The height of these points from the elevation of ground plane are the height of the points a′, b′, c′, d′ etc. in the elevation of the circular lamina from the xy line.
12. Join EVP with the points A_1, B_1, C_1 etc.
13. Locate the points A, B, C etc. on the line joining EVP and A_1, EVP and B_1, EVP and C_1 etc. respectively.
14. Join these points A, B, C etc. with a smooth curve.

Problem for practice.

A circular lamina of diameter 50mm is kept with its surface perpendicular to the ground. The centre of the lamina is 35mm behind the picture plane and the surface of lamina is inclined at 35degree with the picture plane. The central plane passes through the centre of the lamina and the station point is 50mm from the picture plane and 60mm above the ground. Draw the perspective of the lamina using vanishing point method.

Example 8.16.

Solve the problem given in example 8.15, using vanishing point method

Solution.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan of the pyramid which is a square of side 20mm, with all the corners joined with the centre of square. Keep one of the corner 5mm above the plan of the picture plane. The two sides of the square containing the corner should be drawn inclined at 45^o with horizon.
3. Locate the plan of station point, s. It is 40mm below the plan of the picture plane and

on the vertical line drawn through the centre of the square.

4. Join s with the points a, b, c, d and o in the plan of the pyramid.
5. Mark the intersecting points of these lines with the plan of picture plane.
6. Draw the elevation of ground plane. It is a horizontal line and can be drawn at any convenient distance above the plan of the object.
7. Draw the elevation of horizon plane, which is a line 40mm above the elevation of ground plane.
8. Locate the elevation of vanishing point. It is on the elevation of horizon plane; to locate this point, from s draw a line parallel to the line bc in the plan to meet the plan of picture plane at a point. From this point draw a vertical line to meet the elevation of horizon plane. This point is the elevation of the vanishing point.

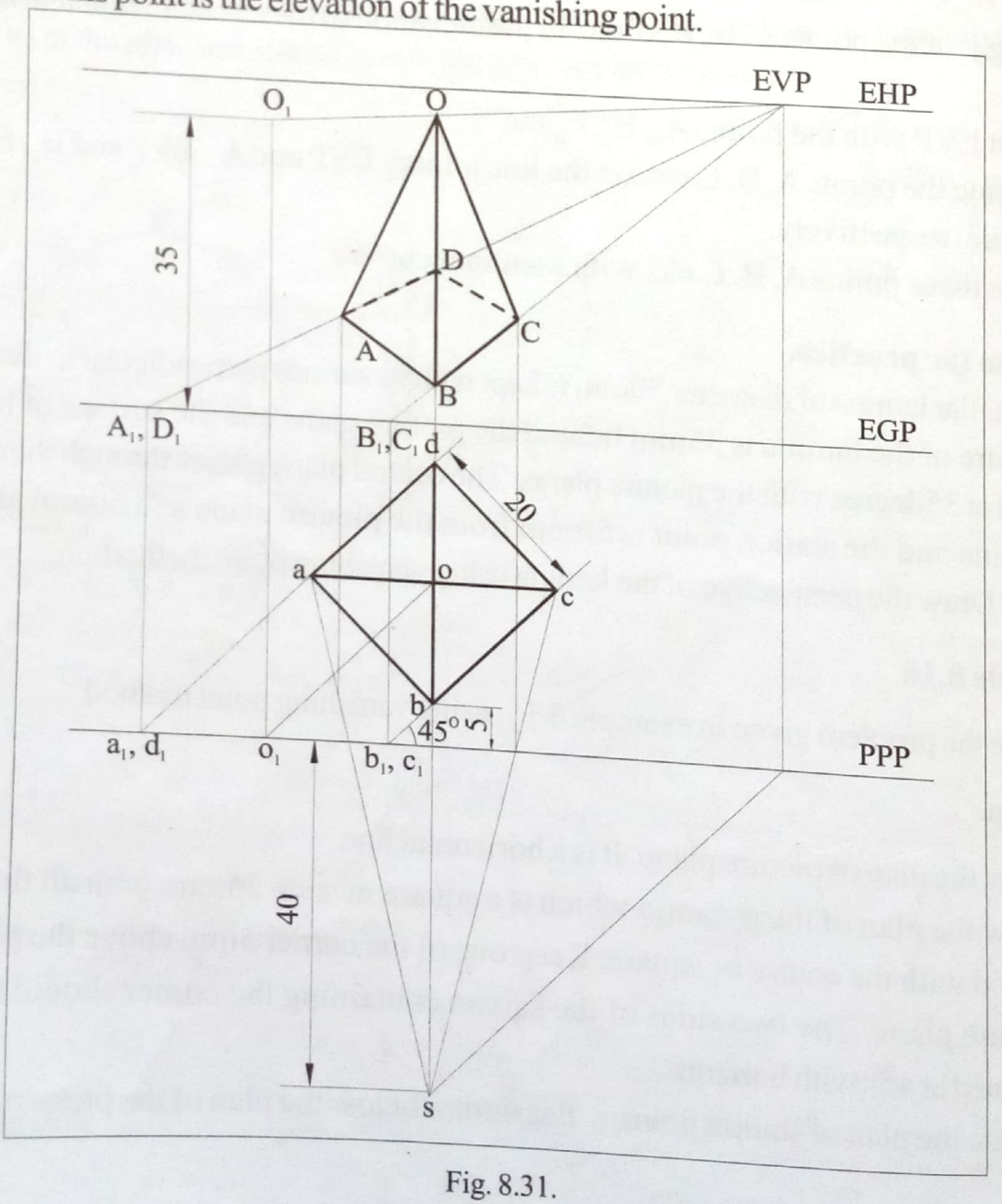

Fig. 8.31.

9. Extend the lines cb and da to meet the plan of picture plane at (b_1, c_1) and at (a_1, d_1).
10. From the point o in the plan, draw a line parallel to line cb to meet the plan of picture plane at O_1. From the points (a_1, d_1) and (b_1, c_1) draw vertical lines and mark the points (A_1, D_1) and (B_1, C_1) on the elevation of ground plane. From O_1 draw a vertical line and mark O_1, 35mm above the elevation of ground plane.
11. Join EVP with the points A_1, B_1, C_1, D_1 and O_1.
12. Locate the points A and D on the line joining EVP and the point (A_1, D_1). Locate the points B and C on the line joining EVP and the point (B_1, C_1). Similarly locate the point O on the line joining EVP and O_1. These points are just above the plan of perspective of these points which are already marked in the plan of picture plane.
13. Join these points A, B, C, D and O as shown in Fig. 8.31.

In the plan, the point b is nearer to the picture plane compared to the point d. Hence in the perspective the point B is visible and the point D is invisible. The lines meeting at D, AD, CD and OD are invisible lines and the line OB is visible line.

Problem for practice.

A hexagonal pyramid of side of base 25mm and axis height 60mm is kept with its base on the ground. The axis is 35mm behind the picture plan and two of the base edges are perpendicular to the picture plane. The central plane passes through the axis of the pyramid. The station point is 50mm from the picture plane and 70mm above the ground. Draw the perspective of the pyramid using vanishing point method..

University question.

A square pyramid of base edges 50mm long and altitude 70mm is resting on its base on ground with one of the corners of the base in the picture plane. Two adjacent base edges having this corner makes equal inclinations with the picture plane. The station point lies on the central line of the object, 60mm in front of picture plane and 90mm above the ground. Draw the perspective projection of the object. (Kannur University, April 2011).

Example 8.17.

Solve the problem given in example 8.8, using vanishing point method.

Solution.

1. Draw the plan of picture plane. It is a horizontal line.

2. Draw the plan of cube which is a square of side 25mm. One of the corners of this square, representing the plan of vertical edge should be kept on the picture plane. The sides of the square representing the plan of square faces of the cube should be kept inclined at 45° with the plan of picture plane.
3. Locate the plan of station point, s. It is 35mm below the plan of picture plane and 10mm towards left of the centre of the square.
4. Join s with the points a, b, c, d and p, q, r, s in the plan of the cube.
5. Mark the intersecting point of these lines with the plan of picture plane.
6. Draw the elevation of the ground plane which is a horizontal line which can be drawn at any distance above the plan of cube.

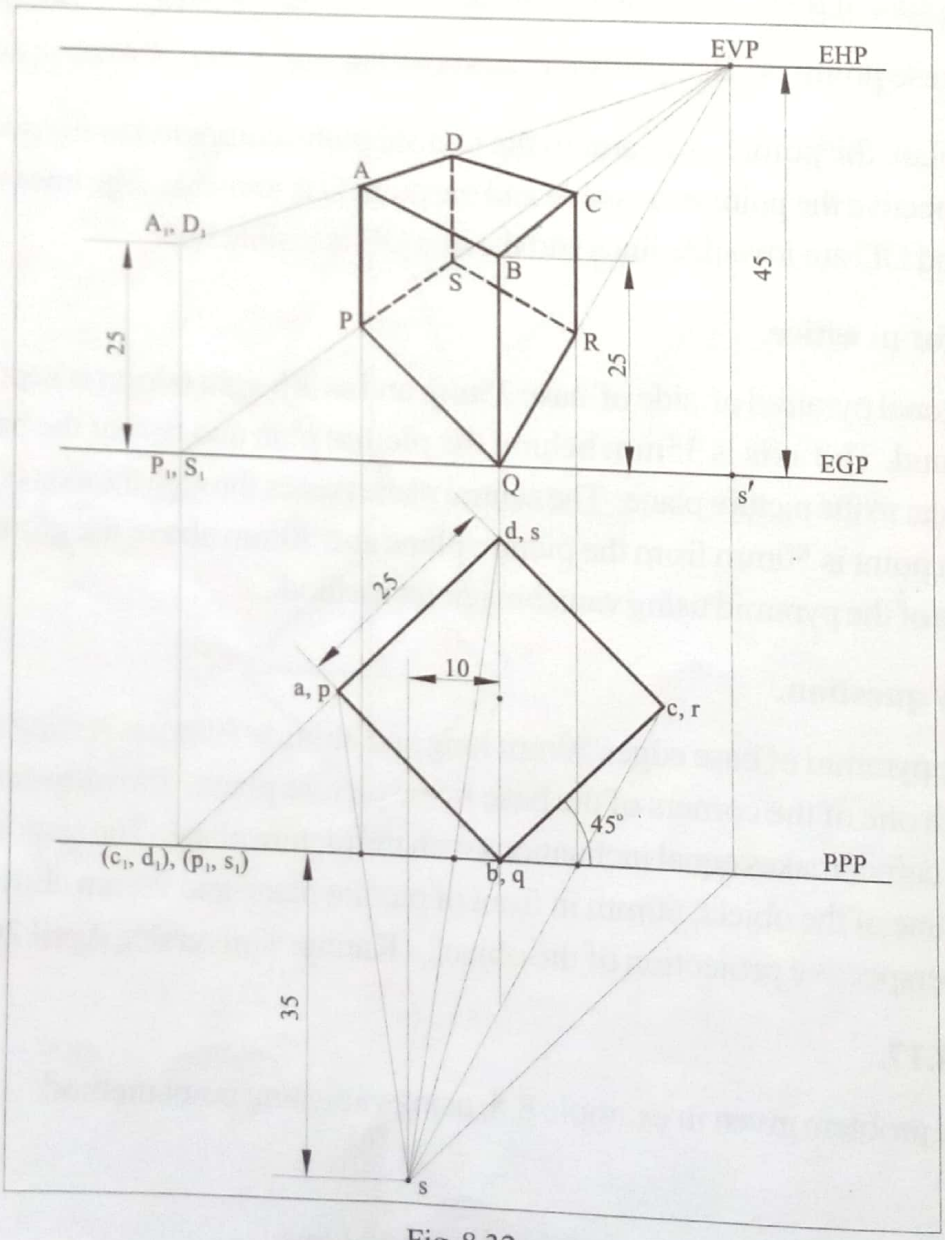

Fig. 8.32.

7. Draw the elevation of the horizon plane which is a horizontal line, 45mm above the elevation of ground plane.
8. Locate the elevation of vanishing point [EVP].
9. Since the edge BQ is in the picture plane, the length of BQ in the perspective will be the true length of BQ which is 25mm. Mark point Q on the elevation of ground plane and point B 25mm above the point Q.
10. Extend the line da (sp) in the plan to meet the plan of picture plane at (a_1, d_1), (P_1, S_1). From this point draw vertical line and mark points (P_1, S_1) on the elevation of ground plane and (A_1, D_1) 25mm above the elevation of ground plane.
11. Join EVP with the points B, Q, (A_1, D_1) and (P_1, S_1).
12. Locate the perspective points A, B, C etc. by projecting vertical lines from the points marked in the plan of picture plane.
13. Join these points A, B, C, D and P, Q, R, S as shown in Fig.8.32.

Problem for practice.

A cube of side 30mm is kept with one of its square faces on the ground with one of its vertical edges 10mm in front of picture plane. All the vertical square faces are equally inclined to the picture plane. The station point is 50mm in front of picture plane, 10mm to the left of centre of the cube and 55mm above the ground. Draw the perspective of the cube by vanishing point method.

University Questions.

1. Draw the perspective projection of a cube of 50mm side resting on one of its bases on the ground, with a vertical edge 20mm behind the picture plane. A vertical face containing the nearest vertical edge is inclined at 60degree to the picture plane. The station point is 10mm to the right of vertical edges 75mm above the ground plane and 20mm in front of the picture plane [CUSAT June 2011].
2. A cube of 35mm long edges rests with a square face on the ground plane such that one of the vertical edges of the cube is 8mm in front of the picture plane and a vertical face containing that edge is inclined at 30degree to the picture plane. The station point is 40mm in front of the picture plane, 70mm above the ground plane and lies in a central plane which is 45mm to the left of the centre of the cube. Draw the perspective view [KU June 2012].

Example 8.18.

An equilateral triangular prism of side of base 25mm and height 35mm is kept with one of its rectangular faces on ground with the axis inclined at 45degree with the picture plane.

The nearest base corner is 5mm behind the picture plane. The central plane passes through the mid point of that base edge on the ground which is nearer to the picture plane. The station point is 35mm from the picture plane and 40mm above the ground. Draw the perspective projection of the prism.

Solution.

Since the rectangular face of the prism is on the ground the plan is a rectangle of side 25mm and 35mm. Draw the plan and elevation of the prism and mark the points as shown in Fig. 8.33.

1. Draw the plan of the picture plane. It is a horizontal line.
2. Keep the plan of the prism above this line with corner c 5mm above the line and the line cr inclined at 30degree with the plan of picture plane.
3. Locate the plan of station point, s. It is on the vertical line drawn from the point b in the plan and 35mm below the plan of picture plane.
4. Joint point s with the points a,b,c and p.q.r in the plan of the prism.
5. Mark the points of intersection of these lines with the plan of picture plane.
6. Draw the elevation of the ground plane. It is a horizontal line and can be drawn at any convenient distance above the plan of the prism.
7. Draw the elevation of horizon plane. It is a horizontal line, 40mm above the elevation of ground plane.
8. Locate the elevation of vanishing point [EVP] on the elevation of horizon plane. To locate this point, from s draw a line parallel to the line cr in the plan of the prism to meet the plan of picture plane. From this point draw a vertical line to meet the elevation of horizon plane. This point is the elevation of vanishing point [EVP].
9. Extend the lines pa, qb and rc in the plan to meet the plan of picture plane at points $[a_1, p_1]$, $[b_1, q_1]$ and $[c_1, r_1]$.
10. From these points draw vertical lines and locate the points $[A_1, P_1]$ and $[C_1, R_1]$ on the elevation of ground plane and the point $[B_1, Q_1]$ at a distance equal to the height of the point $[b_1, q_1]$ in the elevation from the XY line.
11. Joint EVP with the points $[A_1, P_1]$, $[C_1, R_1]$ and $[B_1, Q_1]$.
12. Locate the points A, B, C etc.on the respective lines joining EVP and A_1, EVP and B1, EVP and C_1 etc.
13. Join the points A, B, C and P, Q, R as shown in Fig. 8.33.

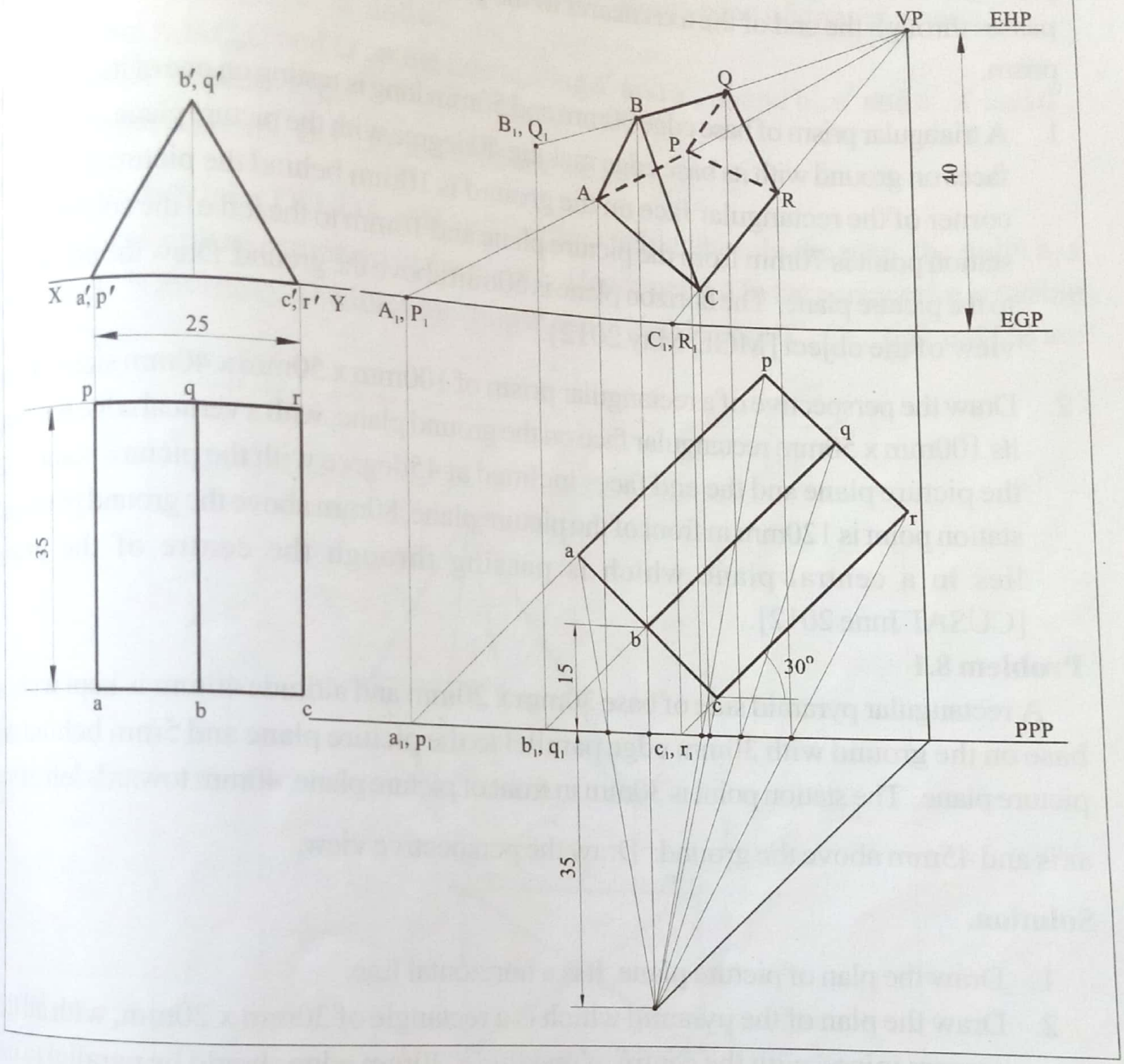

Fig. 8.33.

The triangular face ABC is nearer to the picture plane compared to the face PQR. Hence in the perspective the face ABC is completely visible and the face PQR is invisible. The line QR is a part of the boundary of the figure it is visible in the perspective. Since the point P is an invisible point, the lines meeting at P, AP, QP and RP are invisible lines.

Problem for practice.

A hexagonal prism side of base 20mm and axis height 45mm is kept with one of its square faces on the ground with the axis inclined at 35degree with the picture plane. The end of the axis nearer to the picture plane is 20mm behind the picture plane. The station

point is 45mm in front of picture plane and 50mm above the ground. The centre plane passes through the end of the axis nearer to the picture plane. Draw the perspective of the prism.

1. A triangular prism of base edge 30mm and 50mm long is resting on one of its rectangular faces on ground with its base edge making 40degree with the picture plane. The nearest corner of the rectangular face on the ground is 10mm behind the picture plane. The station point is 70mm from the picture plane and 10mm to the left of the corner nearest to the picture plane. The horizon plane is 60mm above the ground. Draw the perspective view of the object [MGU May 2012].
2. Draw the perspective of a rectangular prism of 100mm x 50mm x 40mm size lying on its 100mm x 50mm rectangular face on the ground plane, with a vertical edge touching the picture plane and the end faces inclined at 45degree with the picture plane. The station point is 120mm in front of the picture plane, 80mm above the ground plane and lies in a central plane which is passing through the centre of the prism [CUSAT June 2012].

Problem 8.1

A rectangular pyramid side of base 30mm x 20mm and altitude 40mm is kept with its base on the ground with 30mm edge parallel to the picture plane and 5mm behind the picture plane. The station point is 30mm in front of picture plane, 40mm towards left of the axis and 45mm above the ground. Draw the perspective view.

Solution.

1. Draw the plan of picture plane. It is a horizontal line.
2. Draw the plan of the pyramid which is a rectangle of 30mm x 20mm, with all the corners joined with the centre of rectangle. 30mm edge should be parallel to the plan of picture plane and 5mm above it.
3. Locate the plan of station point, s. It is 40mm towards left of the axis of the pyramid and 30mm below the plan of picture plane.
4. Join s with the points a,b,c,d and o in the plan of the pyramid.
5. Mark the intersecting point s of these lines with the plan of picture plane.
6. Draw the elevation of ground plane. It is a horizontal line and can be drawn at any convenient distance above the plan of the object.
7. Draw the elevation of the horizon plane 50mm above the elevation of ground plane.
8. Locate elevation of station point, s′, in the elevation of horizon plane, just above the

plan of station point, s.

9. Draw the elevation of the pyramid with base on elevation of ground plane.
10. Join s′ with a′, b′, c′, d′ and o′.
11. Locate A,B,C,D and O on the line joining s′ and a′, s′ and b′, s′ and c′, s′ and d′, s′ and a′ respectively.
12. Join the points A, B, C, D and O as shown in Fig.8.18.

The boundary lines OD, DA, AB and BO are visible lines. In the plan, the point a is nearer to picture plane compared to the point c. Hence point A in the perspective is visible and point C is invisible. The lines meeting at the invisible point C, OC, CD and CB are invisible lines.

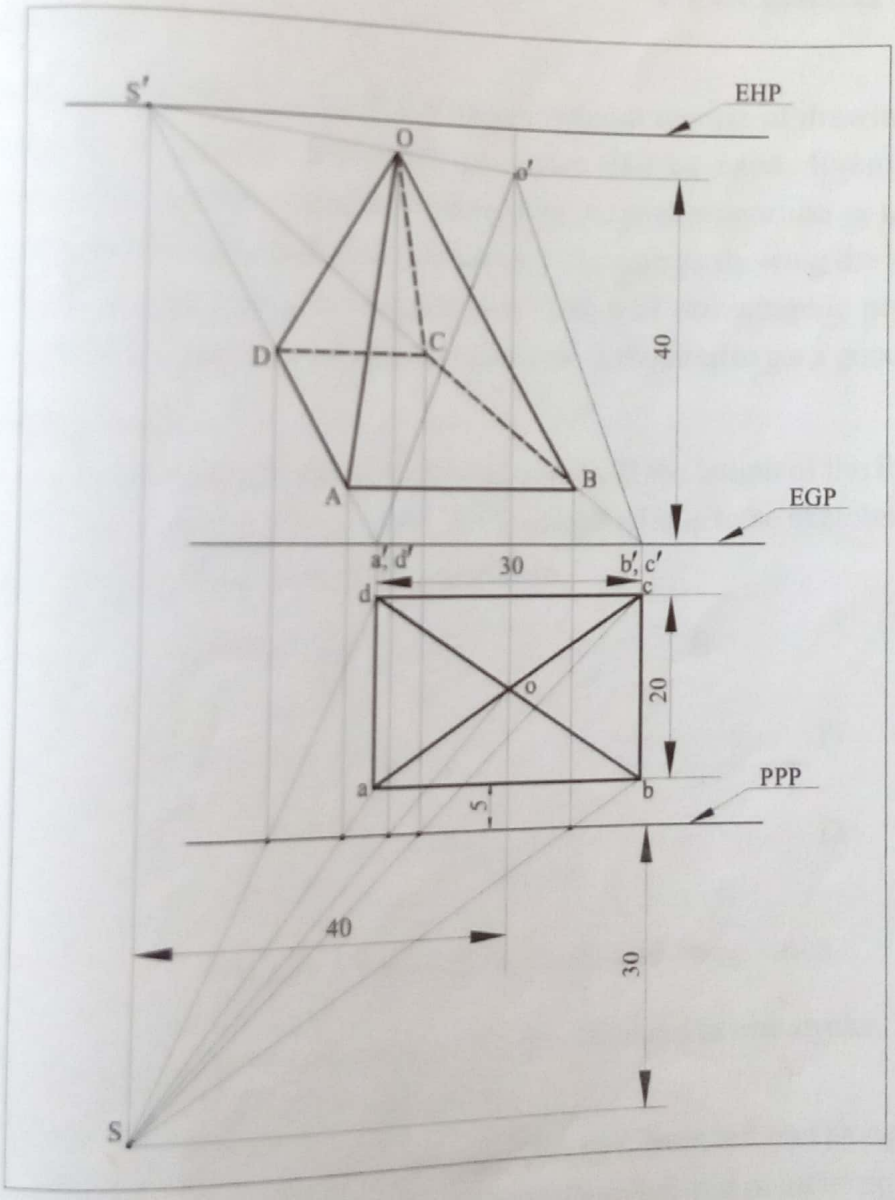

Fig. 8.34.