Finding Auxiliary Vanishing Points

(1) Identify the set of sloped lines for which we will need the auxiliary vanishing point. If they are sloping upwards as they go away from the spectator then the vanishing point will be above the horizon. If the lines are sloping downwards as they go away from the spectator then the vanishing point will be below the horizon.

(2) Draw a line from S parallel to this set of lines as they appear in plan. Extend this line until it hits the picture plane.

Note: In this example it will be the same line as that used to find VP2. The auxiliary vanishing point will be in line with VP2.

(3) In this step we find how high the auxiliary VP is above the horizon. Step the length of one of the sloped lines (as it appears in plan) out from the spectator, length ab. Step the difference in height between the start and finish of this sloped line, height bc, out perpendicular to the 'length' at b.

(4) This triangle abc is now continued on and enlarged giving the height, at the picture plane, that the auxiliary VP is above the horizon, see Fig. 7.29.

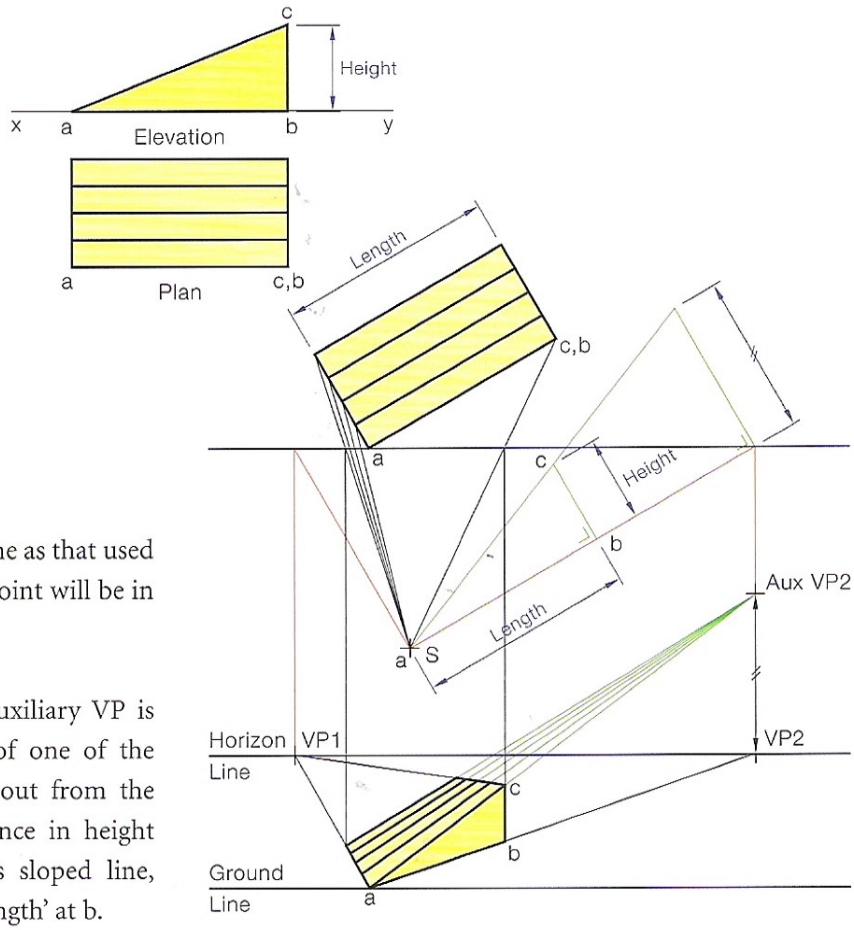

Fig. 7.29

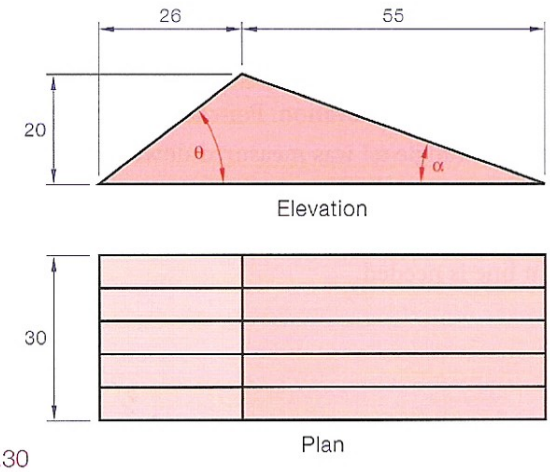

Fig. 7.30

Finding Auxiliary Vanishing Points (Alternative Method)

This method of finding auxiliary vanishing points is almost identical to the first method but uses true angles instead of distances.

Given the solid shown in Fig. 7.30 draw a two-point perspective of this solid using auxiliary vanishing points where appropriate.

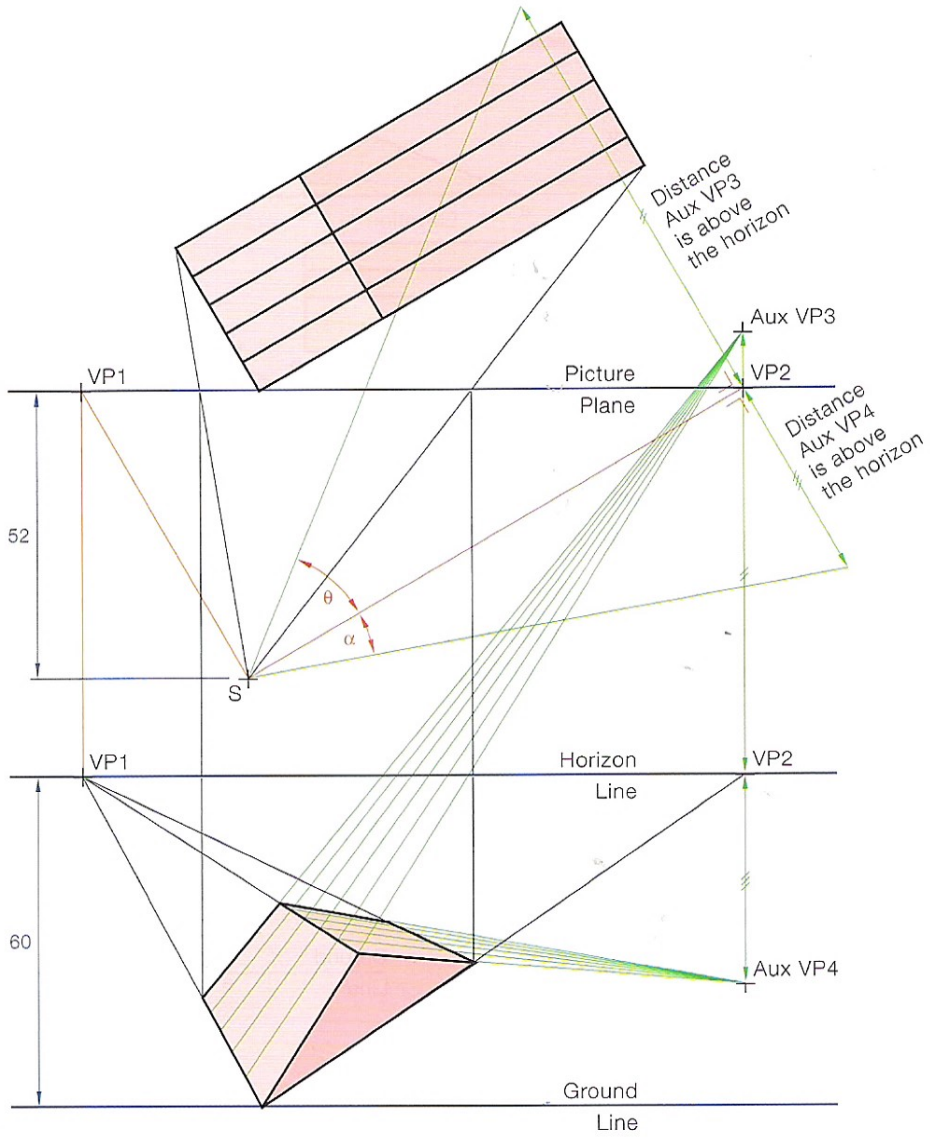

Fig. 7.31

(1) It is worth noting that all perspectives can be drawn by using height lines and avoiding the use of auxiliary vanishing points but the perspective can be completed quicker and more accurately if they are used.
Draw a line from the spectator parallel to the set of lines for which we are finding the auxiliary VP and continue it to hit the picture plane. In this example both sets of inclined parallel lines are running parallel to S, VP2.

(2) From this line create an angle at S equal to the true slope of the lines in elevation. For clarity, since we have two sets of lines, one angle (angle θ) was measured upwards and the other (angle α) was measured downwards, Fig. 7.31

(3) A perpendicular to S, VP2 at the picture plane is produced to intersect each angle. This gives, for angle θ, the distance the auxiliary VP is above the horizon and for angle α, the distance the auxiliary VP is below the horizon.

(4) The perspective is completed in the normal way. No height line is needed.

Worked Example

It should be noted that extra care should be taken when using angles so that it is the **true angle** that is used, not the apparent angle. The following example will attempt to demonstrate the difference.

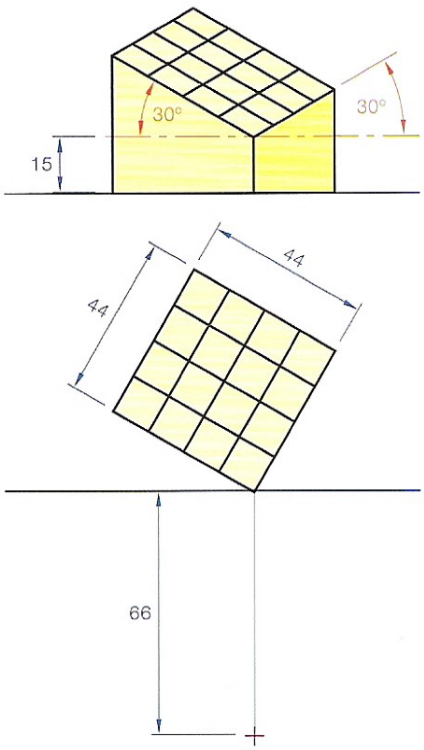

Fig. 7.32

Given the solid shown in Fig. 7.32. Draw a two-point perspective of this solid when the position of the spectator is as shown and the horizon line is 24 mm above the ground line. Use auxiliary vanishing points where appropriate.

(1) In elevation, edge ab and all lines parallel to it appear to make an angle of 30° to the horizontal plane but their true angle is much less, as shown in Fig. 7.33.
Line ab has a true angle of θ to the horizontal plane and line ac has a true angle of α to the horizontal plane.

(2) The perspective is completed using these angles as shown in Fig. 7.34.

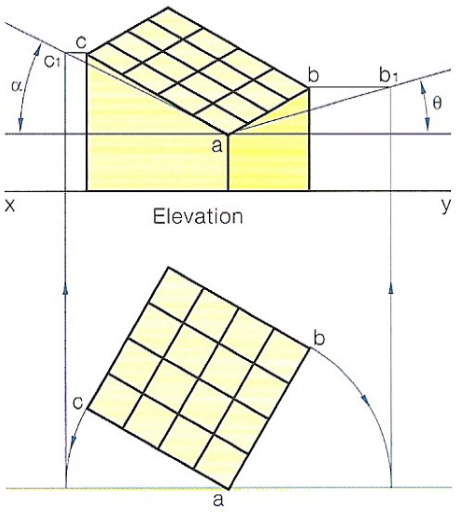

Fig. 7.33

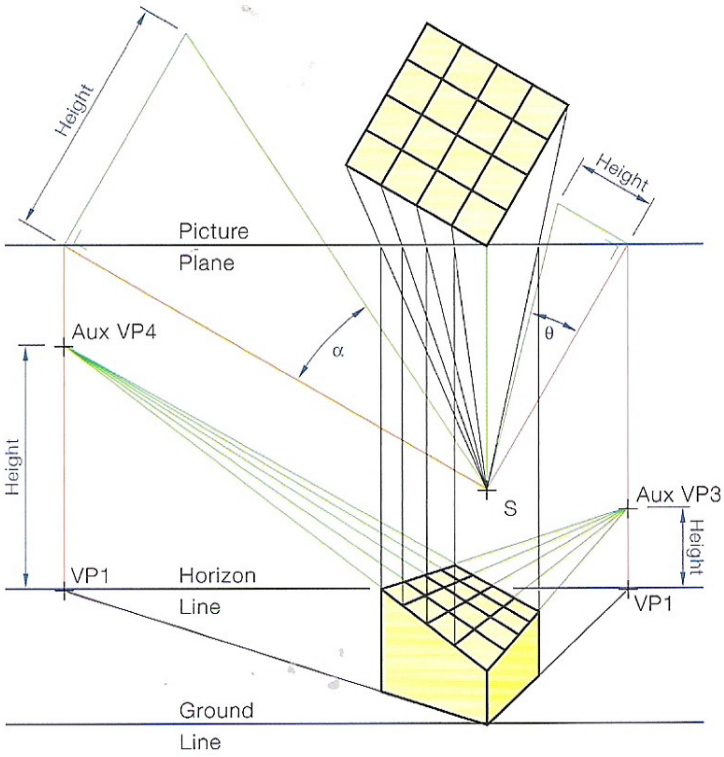

Fig. 7.34

Given the structure shown in Fig. 7.35 which has a plan based on semi-hexagonal prisms. Draw a perspective view of the structure. The picture plane passes through corner A. The spectator is 10 m from corner A and the horizon line is 10 m above the ground line. Use auxiliary vanishing points where appropriate.

On examining this question it can be seen that edges AE and CE and all edges parallel to them have a true angle of 30° to the horizontal plane. It should be noted however that neither edge AB nor edge CD have a true angle of 30° to the HP even though they appear to be inclined at 30° in the elevation.

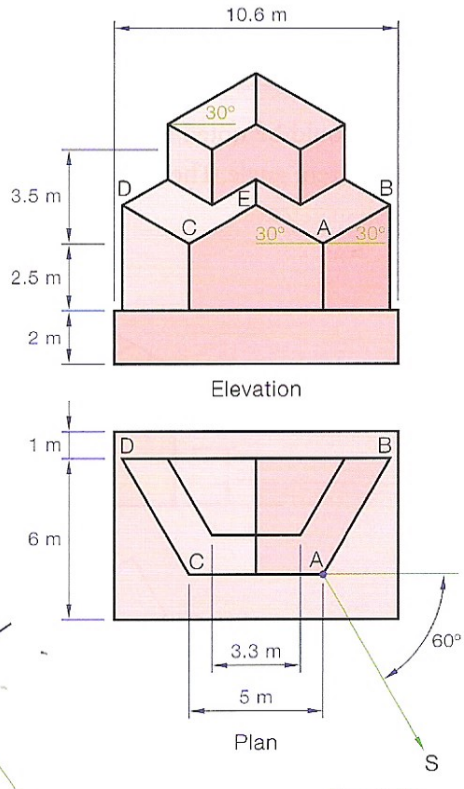

Fig. 7.35

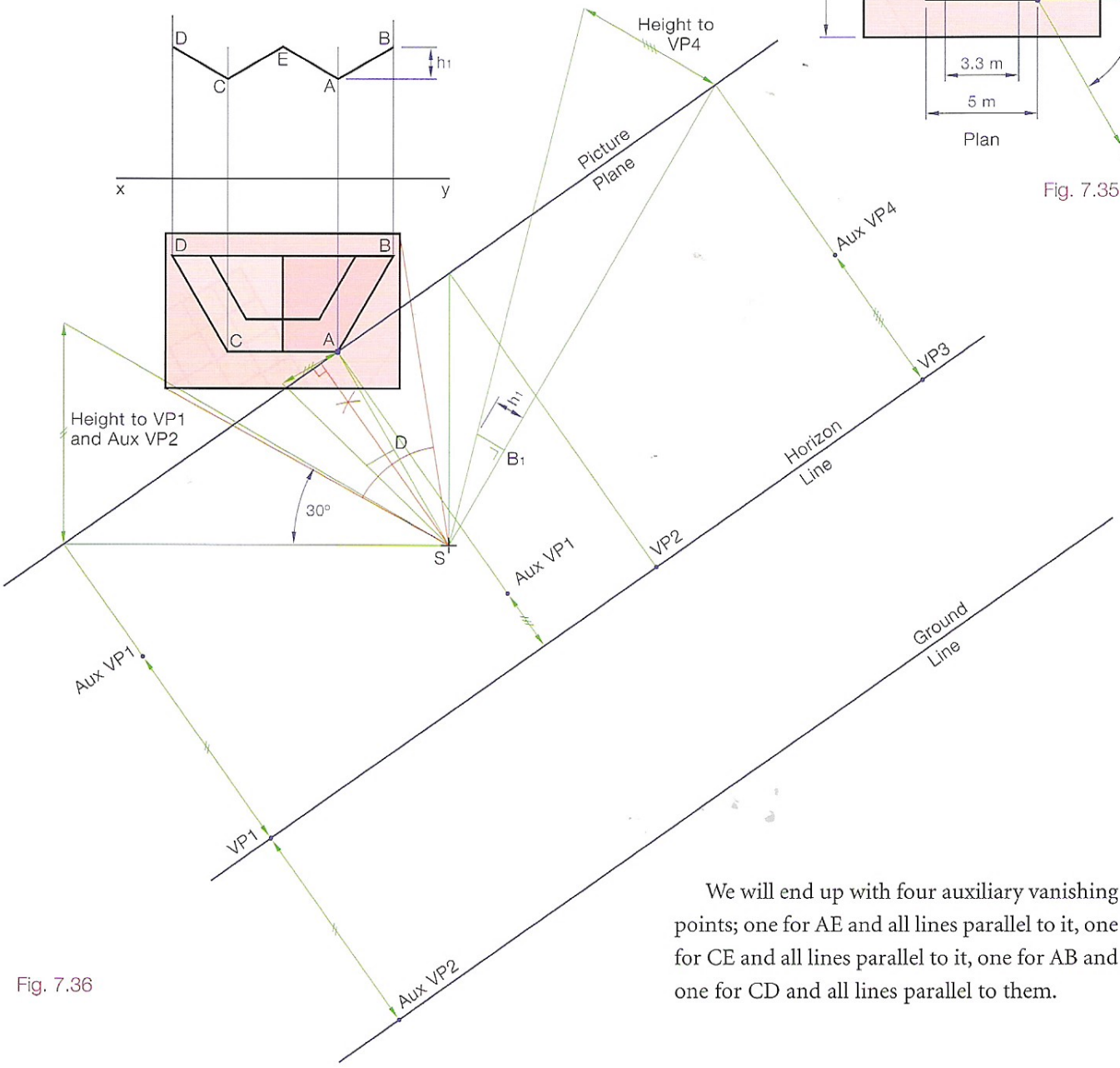

Fig. 7.36

We will end up with four auxiliary vanishing points; one for AE and all lines parallel to it, one for CE and all lines parallel to it, one for AB and one for CD and all lines parallel to them.

(1) The first step is to locate the picture plane. Join the outer corners of the plan back to the spectator. Bisect the angle formed to give the centre of vision. The picture plane is drawn perpendicular to this.

(2) Draw the ground line and horizon line and locate VP1 and VP2, the vanishing points for the horizontal base lines. These vanishing points will be on the horizon.

(3) Vanishing points for edges AE and CE will be on the VP1 line. The auxiliary vanishing point for AE will be above the horizon and the auxiliary vanishing point for CE will be below the horizon. The construction is as shown in Fig. 7.36. We can use the 30° as it is a true angle.

(4) Auxiliary vanishing point for edge AB is found as shown. A line is drawn from S parallel to AB in plan, to hit the picture plane. The length of AB in plan is stepped away from S on this line giving B_1. A perpendicular to SB_1 is drawn at B_1. The difference in height between A and B is found in elevation (h_1) and stepped out on this perpendicular. Complete the triangle and enlarge to the picture plane. We thus find the height of Aux VP4 above the horizon.

(5) Aux VP3 is found in a similar way.

(6) The perspective is completed in Fig. 7.37.

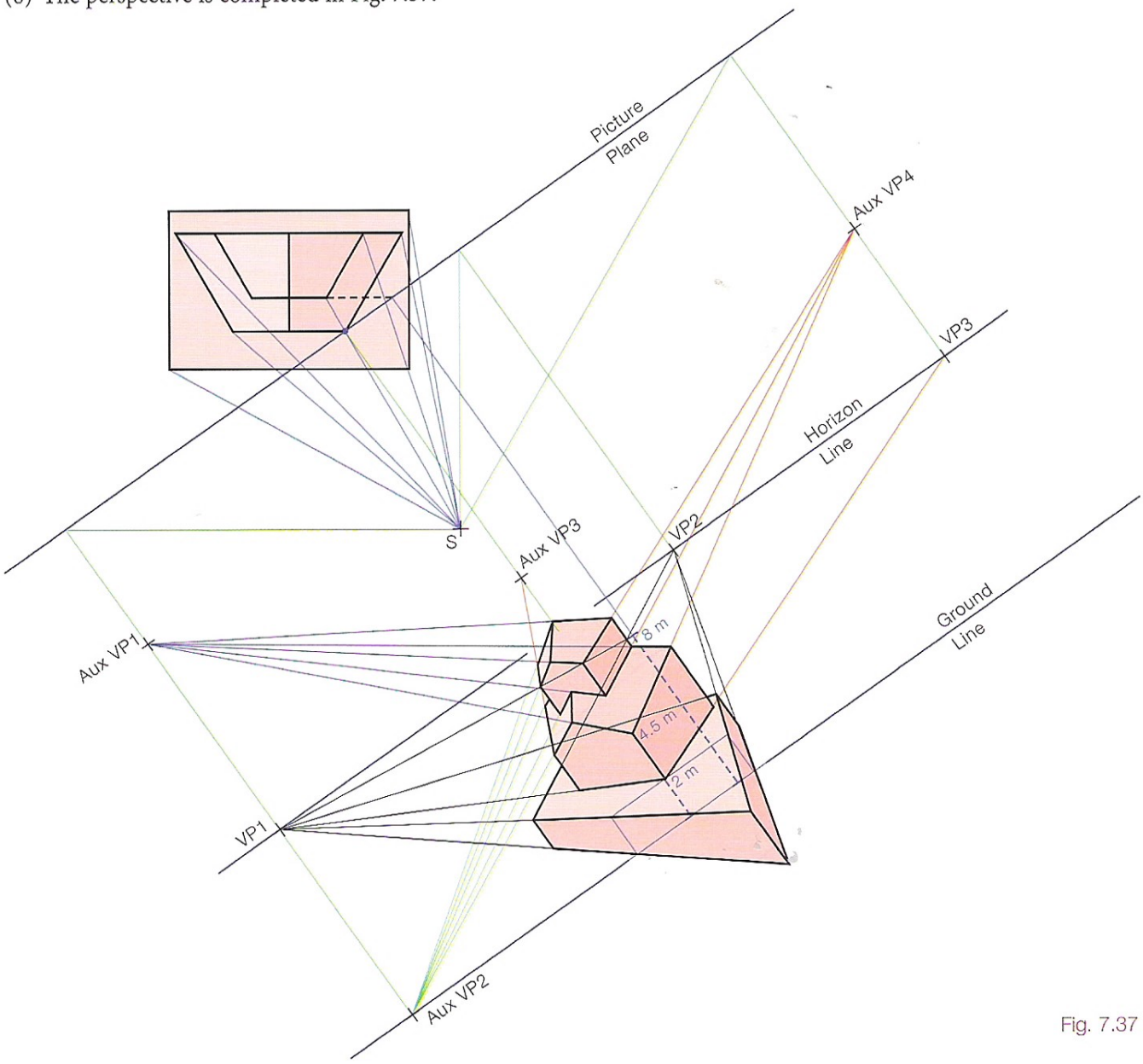

Fig. 7.37

Draw a perspective view of the structure shown in Fig. 7.38. The picture plane passes through corner A. The spectator is 10 m from corner A and the horizon line is 10 m above the ground line. Use auxiliary vanishing points where appropriate.

As before we will start by locating the picture plane, ground line and horizon line. We will also find all necessary vanishing points. It should be noted that the elevation is not needed, we only draw a small portion of it as in the previous example.

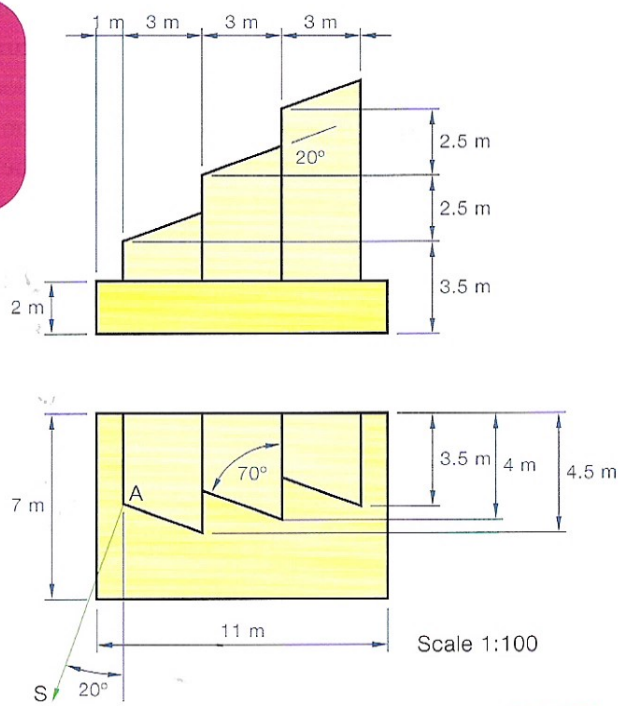

Fig. 7.38

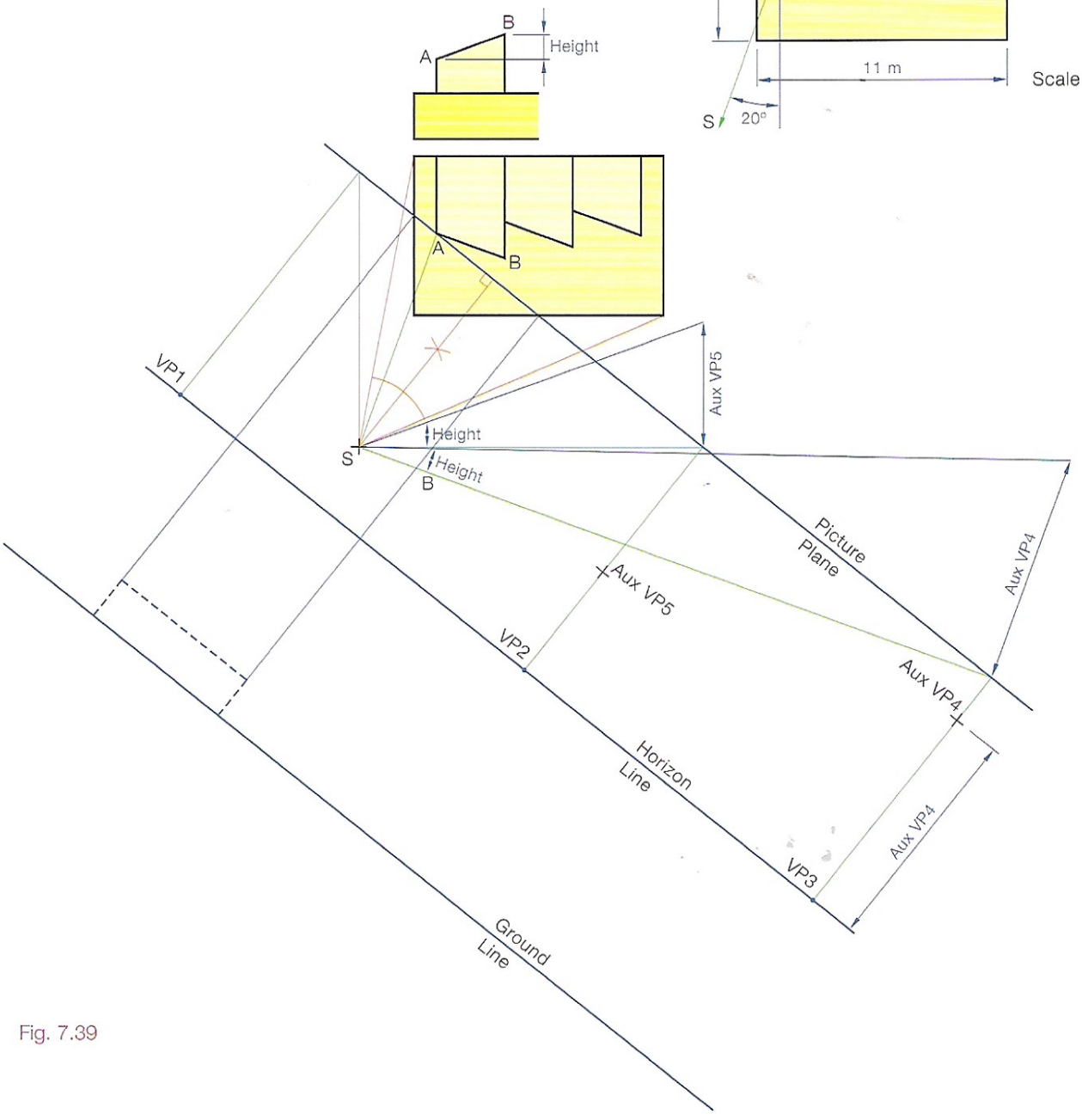

Fig. 7.39

(1) Rays are projected from the two outer corners back to S. The angle formed is bisected, giving the centre of vision. The picture plane is drawn perpendicular to this, Fig. 7.39.
(2) Horizon line and ground line are 10 m apart and parallel to the picture plane.
(3) VP1 and VP2 are vanishing points for the rectangular base. These vanishing points will be on the horizon line because they are vanishing points for horizontal lines.
(4) The line AB in plan actually represents two lines. One of these is running along the top surface of the base, is horizontal, and therefore has a vanishing point on the horizon, VP3. The other is sloping upwards as it goes away from the spectator and will therefore have an auxiliary vanishing point above the horizon.
(5) Draw a line from S parallel to AB in plan. Extend to hit the picture plane. Step the distance AB, from the plan, out from the spectator along this line, giving point B.
(6) Step the difference in height between A and B (obtained from the elevation) out perpendicularly. Create a triangle and enlarge to the picture plane. This gives the height Aux VP4 will be above the horizon. Auxiliary VP5 is found in a similar way.
(7) The perspective is finished as before. See Fig. 7.40.

Note: Height lines always vanish to vanishing points on the horizon line.

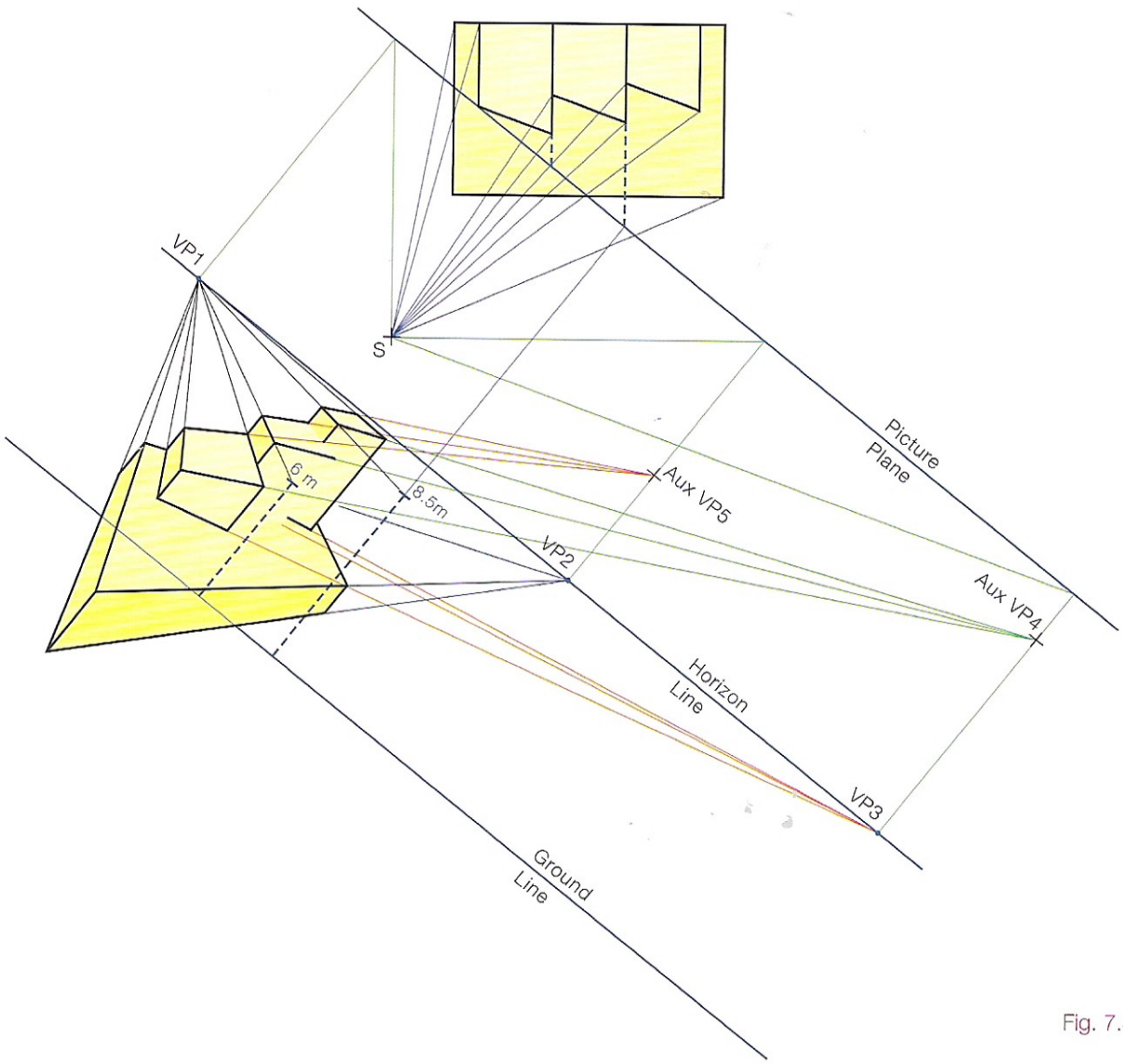

Fig. 7.40

Activities

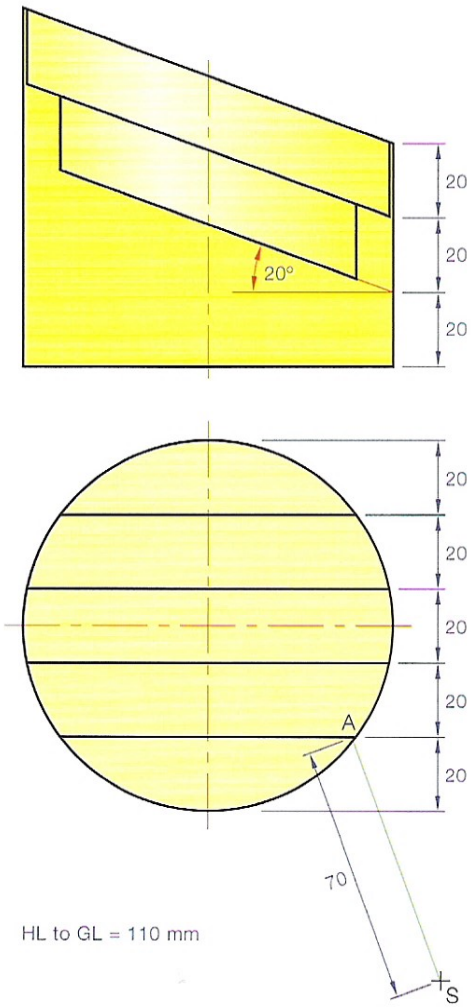

Fig. 7.41

Q1. Fig. 7.41

For each of these questions draw a perspective view using auxiliary vanishing points where appropriate. Picture plane to pass through point A.

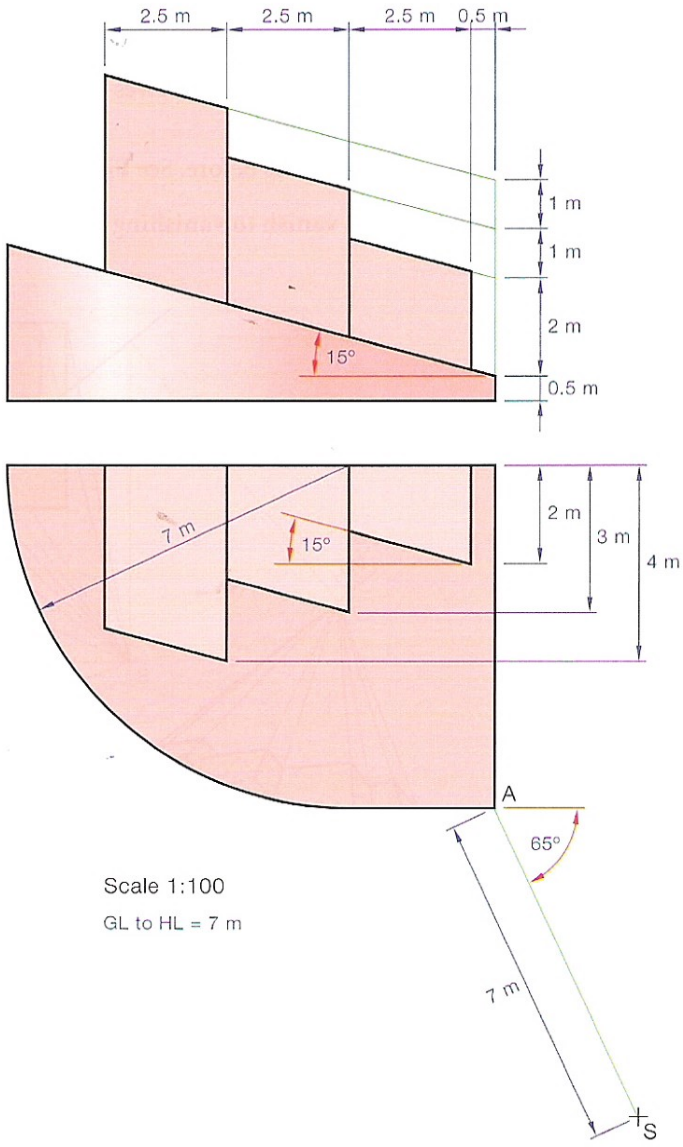

Fig. 7.42

Q2. Fig. 7.42

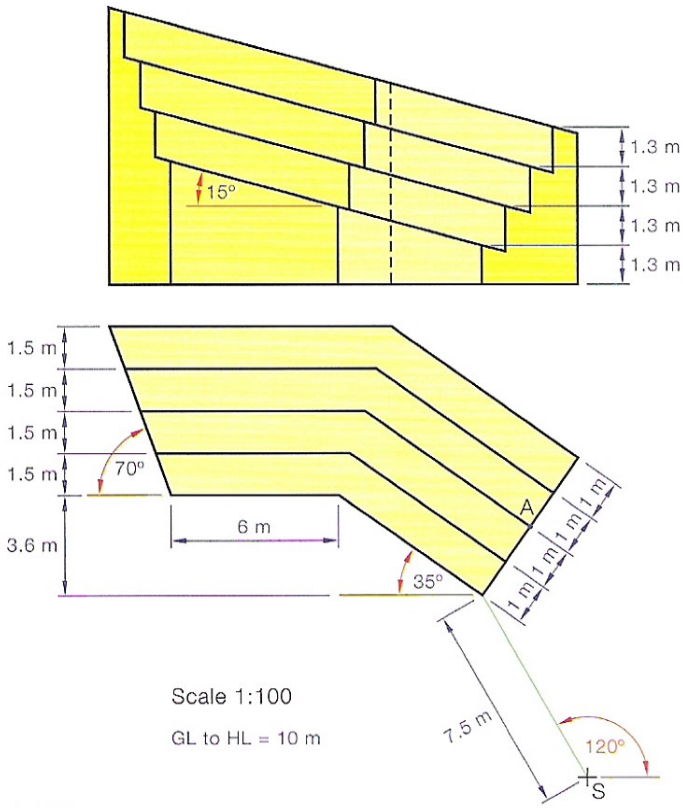

Fig. 7.43

Q3. Fig. 7.43

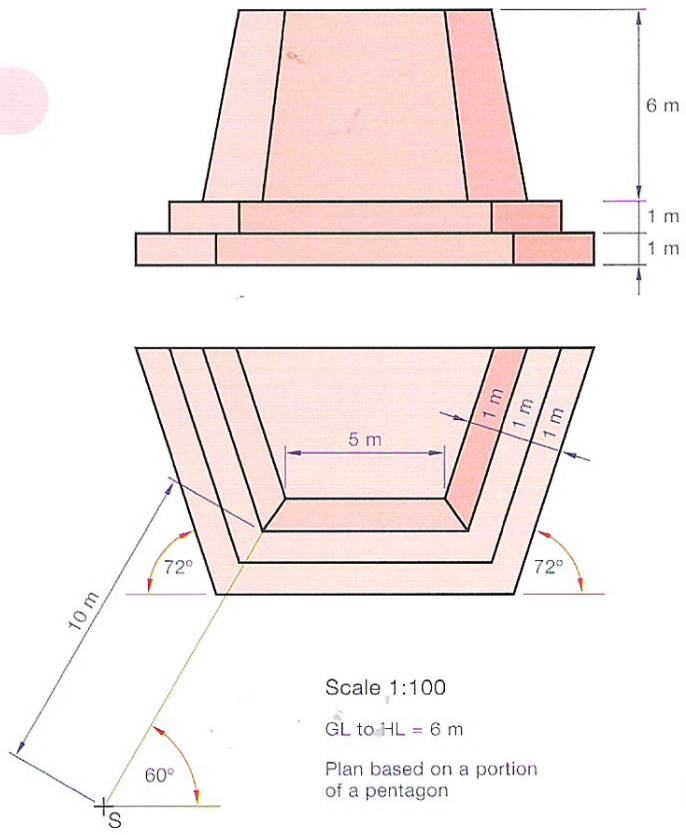

Fig. 7.44

Q4. Fig. 7.44

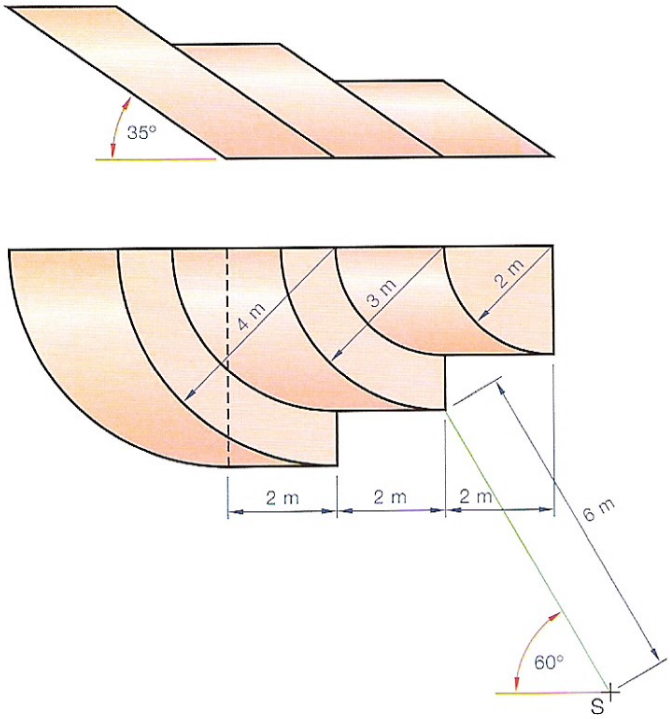

Fig. 7.45a

Q5. Fig. 7.45a and Fig. 7.45b

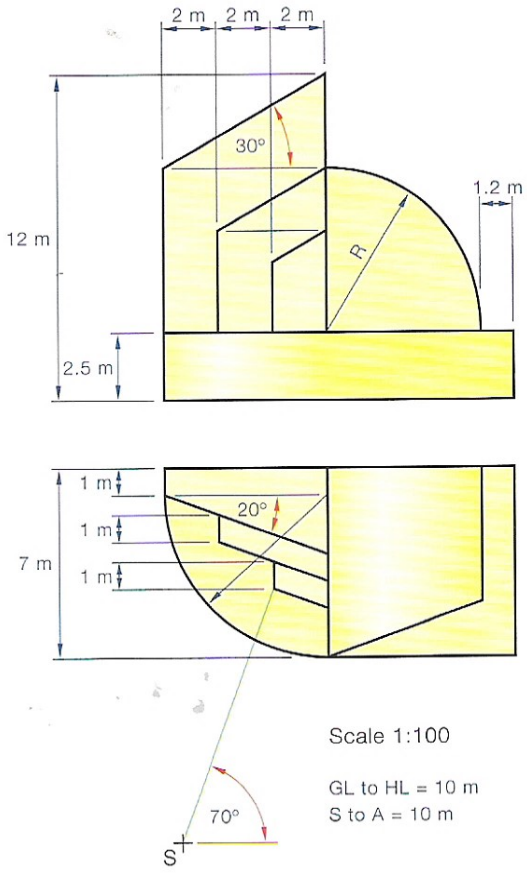

Fig. 7.45b