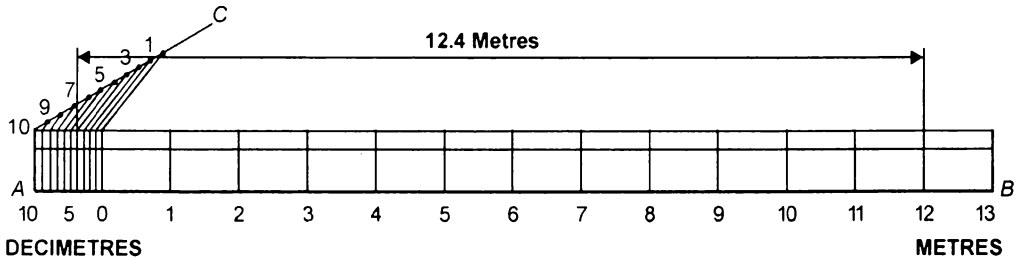
$$= \frac{1}{100} \times (14 \times 100) \text{ cm}$$

$$= 14 \text{ cm}$$

First of all, draw a line 14 cm long and divide it into 14 equal parts, each representing 1 m. Place zero at the end of the first division. Divide the first division (towards left of zero) into 10 equal parts, each representing 1 dm (decimetre) Complete the scale as shown in Fig. 5.1.



Scale 1:100 RF = $\frac{1}{100}$

Fig. 5.1

Exercise 2

Draw a scale of 1 : 50 (representative fraction 1/50) to show metres and decimetres, and long enough to measure up to 6 metre.

Solution

Length of scale = RF × maximum length to be measured

$$= \frac{1}{50} \times (6 \times 100) = 12 \text{ cm}$$

Draw a line *AB*, 12 cm long and divide it into six equal parts, each representing a metre. Name the divisions as is shown and subdivide the zero division into 10 equal parts, each representing a decimetre. Complete the scale as shown in Fig. 5.2.

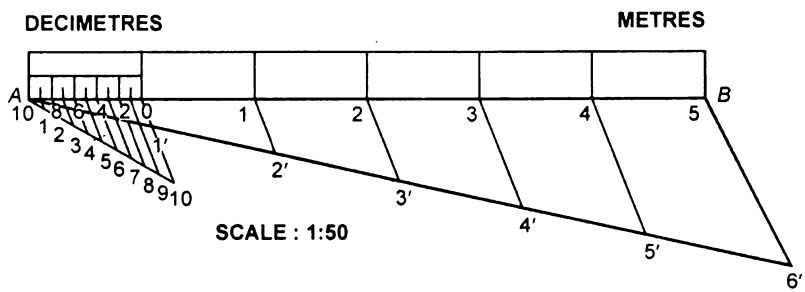


Fig. 5.2

or $$1 \text{ cm} = \sqrt{\frac{4,000}{16,000}}$$

$$= 0.5 \text{ km}$$

$$RF = \frac{1}{0.5 \times 1000 \times 100}$$

$$= \frac{1}{50,000}$$

Assume the length of scale to be 16 cm. The maximum distance which this scale can measure is 16 × 0.5 = 8 km. Therefore, draw a line AB 16 cm long and divide it into 8 equal parts, each part representing 1 km. Subdivide the first division (towards left of zero) into 10 equal parts, each showing single hectometre. Then, using the method of diagonal division subdivide each small division in 10 equal parts each representing 1 decametre. The distance of 6 kilometre, 5 hectometre and 7 decametre is indicated in Fig. 5.10.

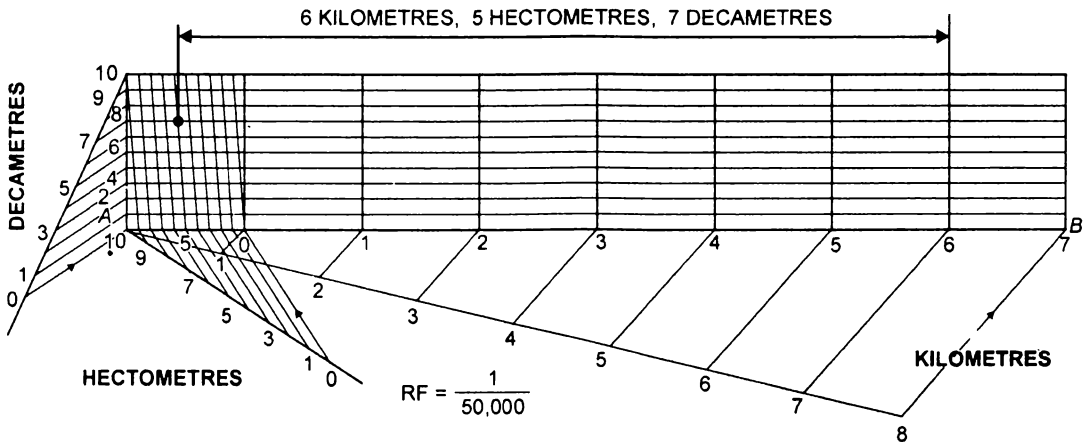


Fig. 5.10

Exercise 10

The distance between two stations is 600 kilometres. It is represented on a railway map by a line 15 cm long. Construct a diagonal scale to measure up to kilometres and find its RF. Indicate a distance of 346 km on the map.

Solution

$$RF = \frac{15 \text{ cm}}{(600 \times 1000 \times 100) \text{ cm}}$$

Conversion of Pictorial View into Orthographic Views

Pictorial view is a three-dimensional view of an object. It does not show the true shape of its surfaces. Hidden parts and constructional details are not clearly shown. Therefore such parts are to be imagined.

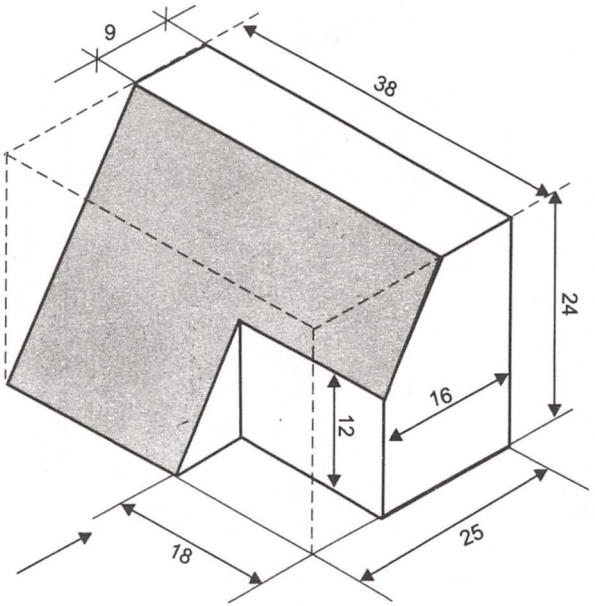
In orthographic projections, only two dimensions are seen in the front view, top view and side view. The width (W) will not be seen in the front view, as the observer looks at the object parallel to the width of the object. For top view he looks parallel to the height of the object, hence height (H) will not be seen in the top view. As he looks parallel to the length of the object for side view, the length (L) will not be seen in that view.

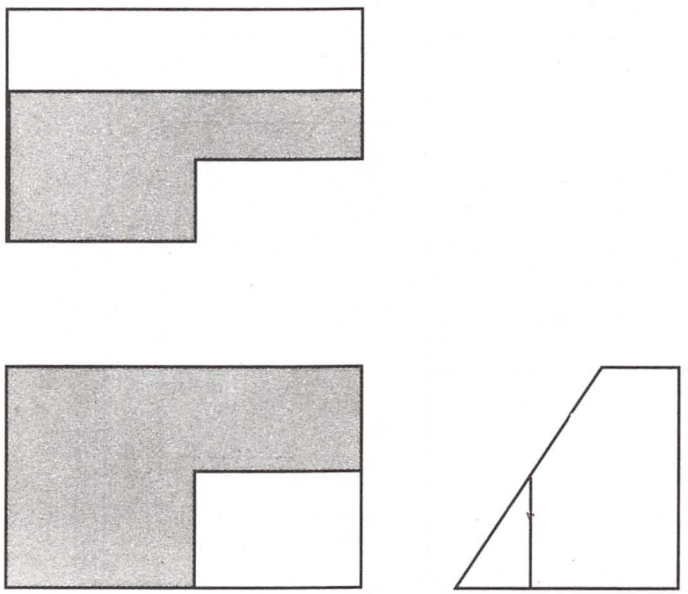
The following points are to be remembered in connection with the pictorial view.

- The hidden part of a symmetrical object is to be treated similar to the visible part.
- The holes, grooves, etc. are assumed to be drilled or cut right through, unless otherwise specified.
- When the radii for small curves of fillets are not specified, they are to be assumed.

The following points are to be considered while converting the pictorial view into orthographic views.

- The direction of the front view is the front direction and it is generally indicated by an arrow. The direction of side view (left or right) is decided from the front direction.
- The edges of the object parallel to the direction of the observer will be seen as points.
- The surfaces parallel to the direction of the observer will be seen as lines.
- The surface at right angles to the direction of the observer will be represented by the true shape of the surface. The sloping surface perpendicular to the direction of vision will be represented by a sloping line, whereas the curved surface will be shown by a curved line.
- The invisible edges of the object are to be represented by dotted lines.
- Having decided the direction of side view (either left or right), fix up the relative positions of the front view, top view and side view according to the method of projection used. While using third angle of projection, top view must be located exactly above the front view and the side view from left must be located to the left side of the front view as shown in Fig. 6.5 (*a* and *b*).
- Study the shape and dimensions of the object and determine the overall dimensions for each view. Take a convenient scale for drawing so as to accommodate the views in the drawing sheet.
- Using H pencil and with light hand, layout the rectangles for the views. Sufficient space must be kept between them (i.e. about 30 to 40 mm maximum).
- Draw the centre lines in all the views for details.





ILLUSTRATIONS OF SIMPLE OBJECTS HAVING INCLINED SURFACES