Chapter 6

ORTHOGRAPHIC PROJECTIONS OF SIMPLE MACHINE BLOCKS

6.1 INTRODUCTION

We have already made you aware of many simple geometrical shapes (laminae), projected on such planes (vertical plane, horizontal plane and other auxiliary planes) while projecting the various views of simple regular geometrical solids. Similarly, it is necessary to understand any machine block as combination of the geometrical solids by adding solids together or removing geometrical solids out of a single solid. For example, a hexagonal nut is formed out of a hexagonal prism by removing a small cylinder and cutting internal helical groove (internal threads). Reverse of it is square bolt in which square prism and small cylinder is one integral solid with external helical groove (external threads) cut on it.

In figure 6.1 a cube of 15 mm is removed out from a single solid i.e. a rectangular prism.

An orthographic projection is one position drawing. It takes several drawings to show and understand all the machine block form. The views are placed relative to each other according to either of two schemes. FIRST ANGLE PROJECTION METHOD OR THIRD ANGLE PROJECTION METHOD.

Note : However we are following only first angle method of projection in all the exercises (According to CBSE prescribed syllabus)

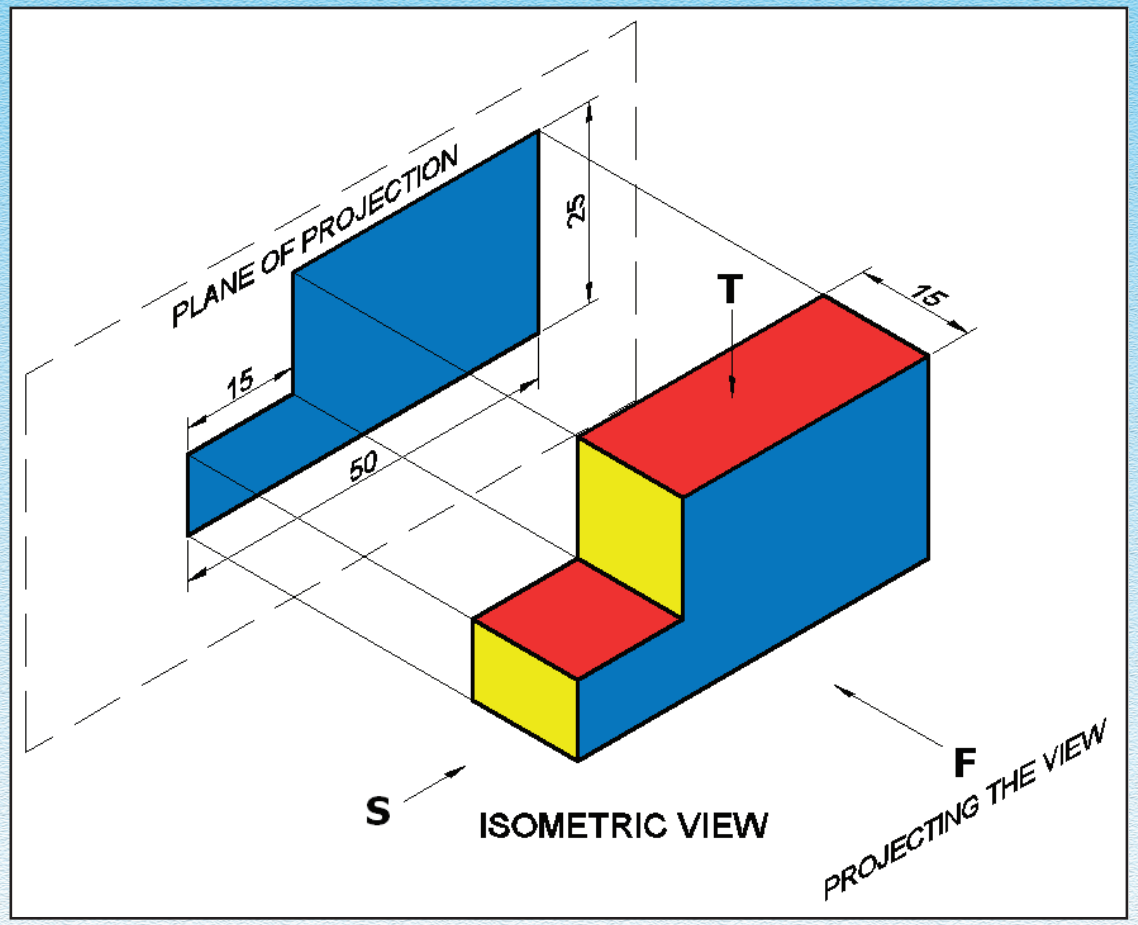
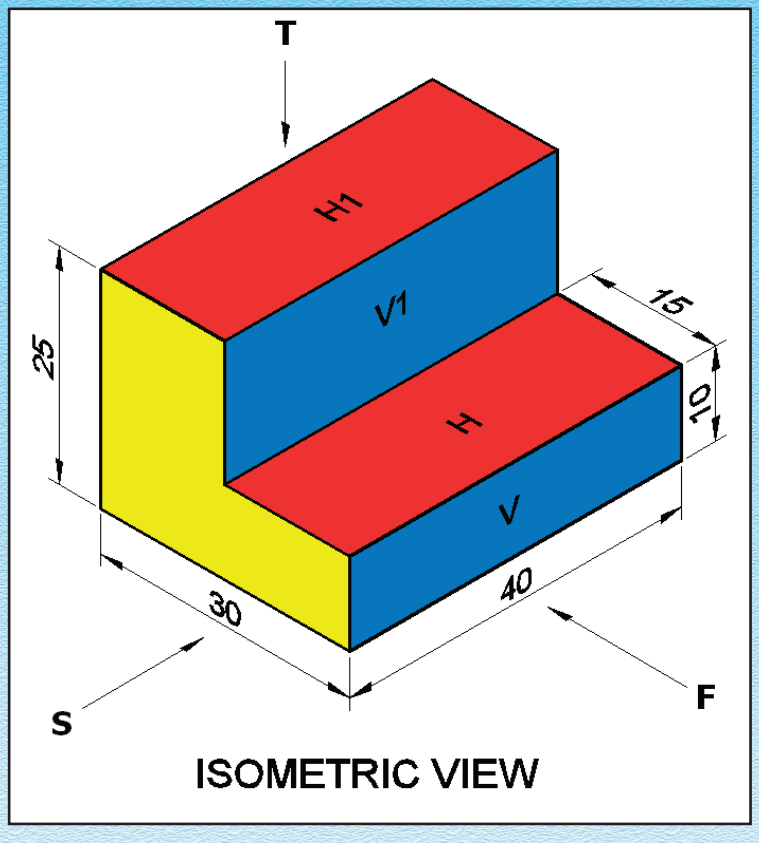


Fig. 6.1

6.2 UNDERSTANDING : SIMPLE MACHINE BLOCKS



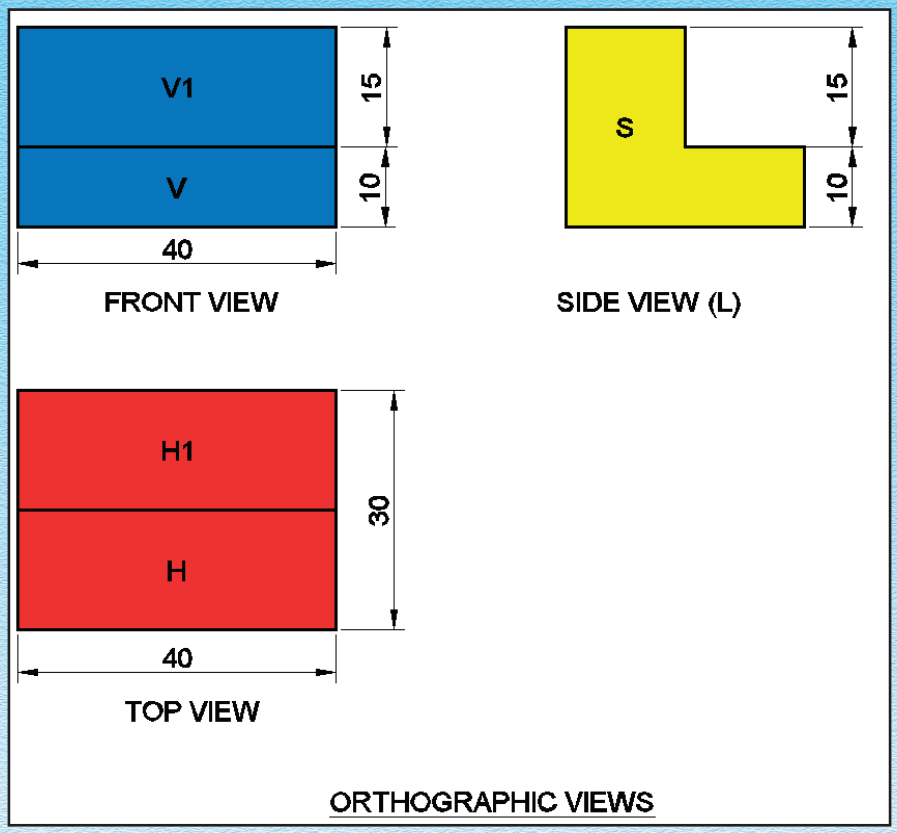


FIG. 6.2 DO IT YOURSELF

(i) No. of Vertical Faces.....

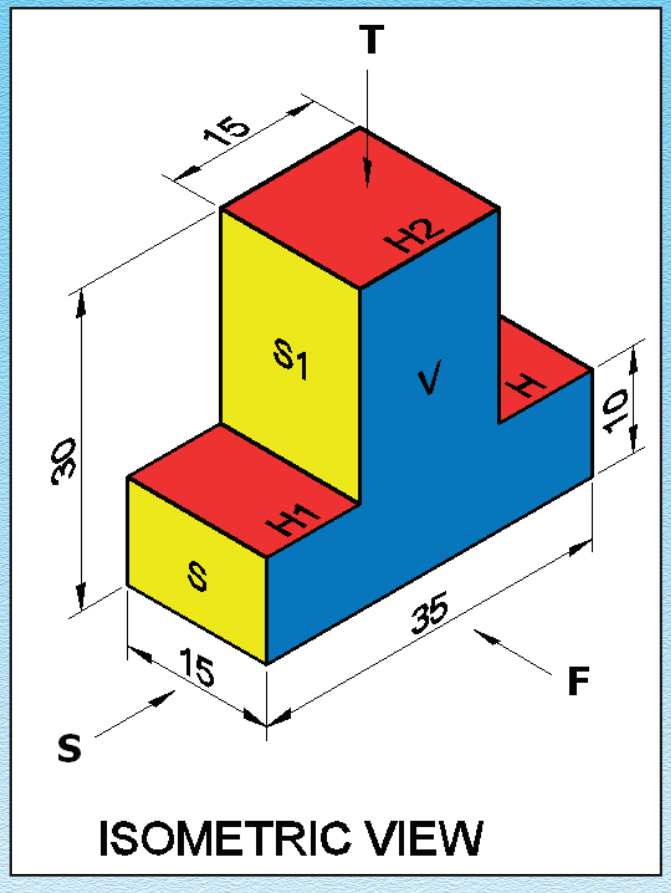
(ii) No. of Horizontal Faces.....

(iii) Give the dimension of Face 'H1' .....

(iv) Give the dimension of Face 'V_1' .....

(v) No. of side Faces .....

V = Vertical Face, H = Horizontal Face, I = Inclined Face, F = Front, S = Side and T = Top



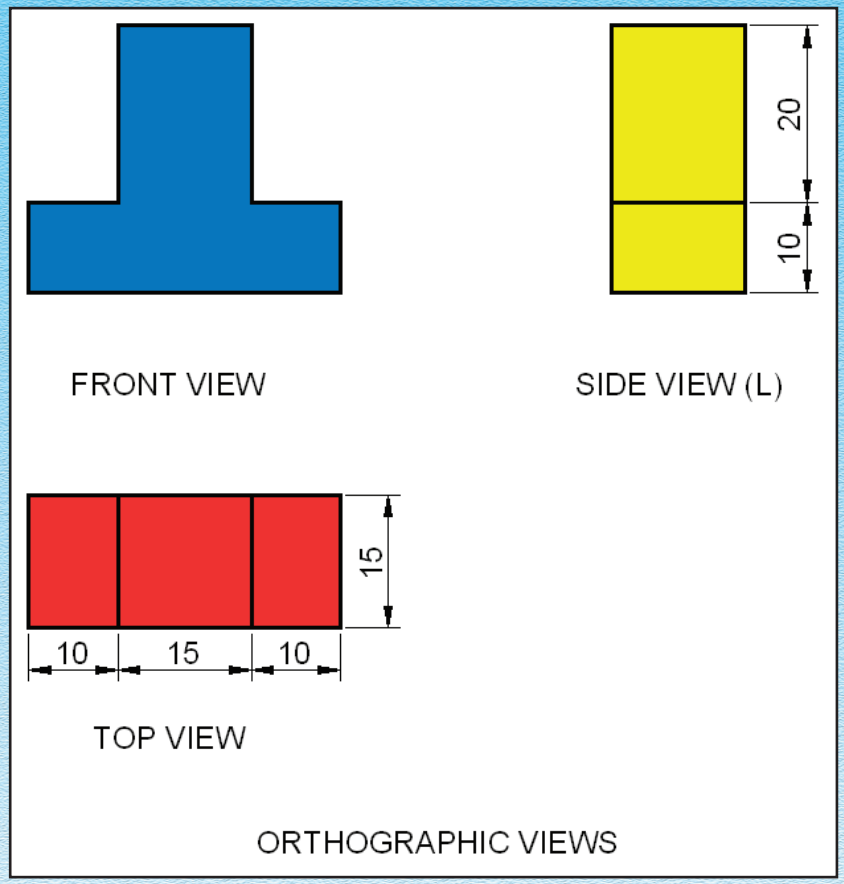


FIG. 6.3 DO IT YOURSELF

(i) No. of Vertical faces.....

(ii) No. of Horizontal faces.....

(iii) Give the dimension of face 'V_1' .....

(iv) Give the dimension of face 'H_1' .....

(v) No. of side faces .....

V = Vertical Face, H = Horizontal Face, I = Inclined Face, F = Front, S = Side and T = Top

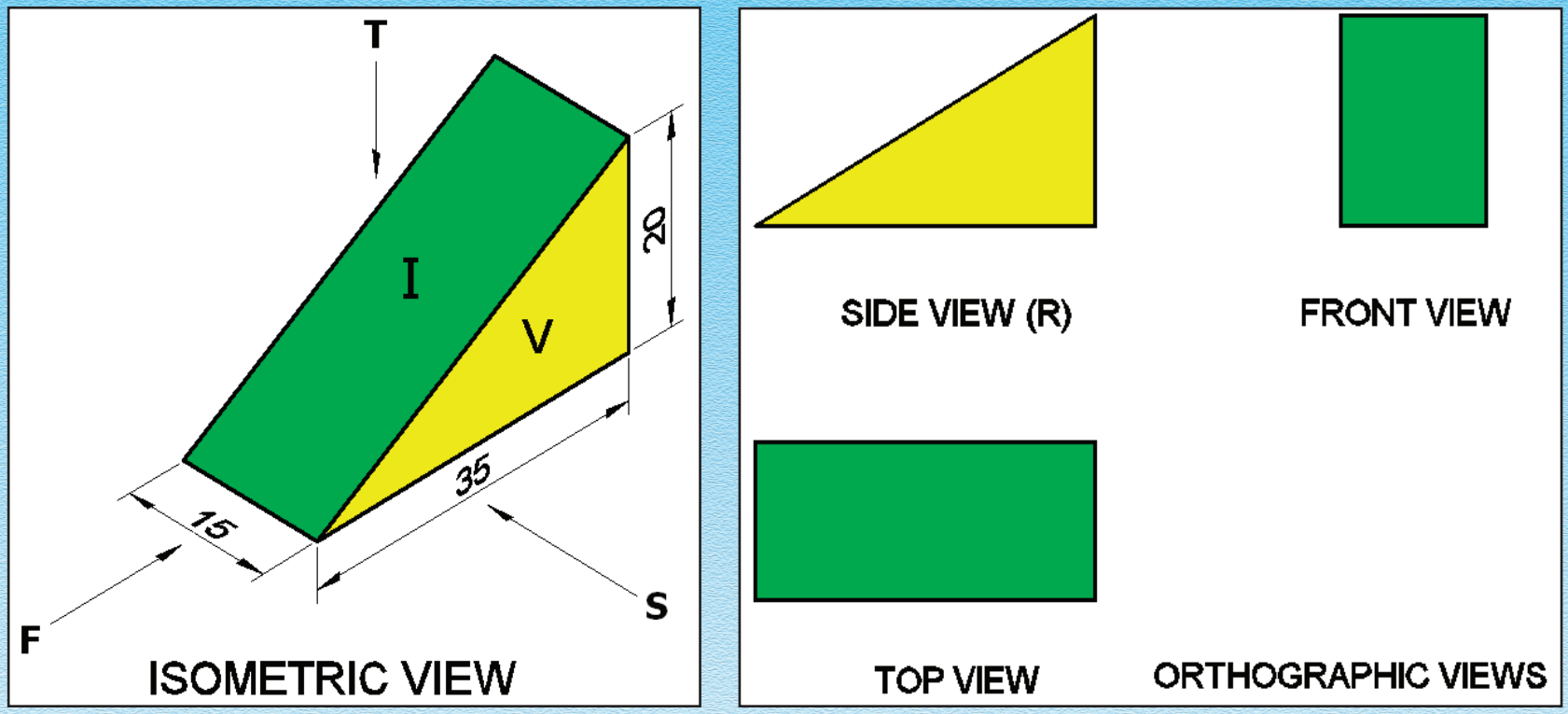


FIG. 6.4 DO IT YOURSELF

(i) No. of Vertical faces.....

(ii) No. of Horizontal faces.....

(iii) No. of Inclined faces.....

(iv) Give the dimension of face I in Top View .....

Note : This inclined face is seen in Top View and in Front View

V = Vertical Face, H = Horizontal Face, I = Inclined Face, F = Front, S = Side and T = Top

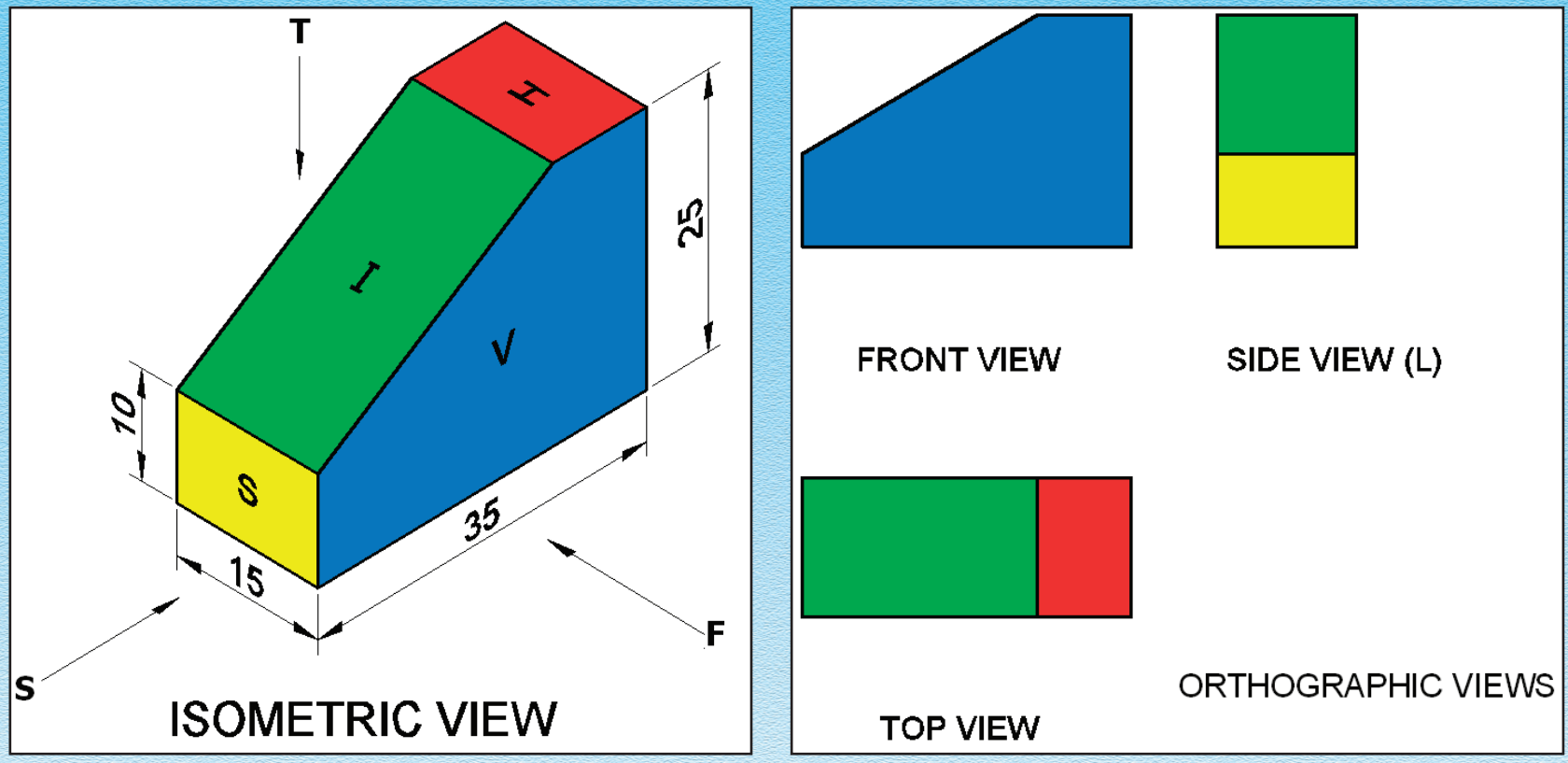


FIG. 6.5 DO IT YOURSELF

(i) No. of Vertical faces.....

(ii) No. of Horizontal faces.....

(iii) No. of Inclined faces.....

(iv) Give the dimension of face I in Side View .....

Note : This inclined face is seen in Top View and in Front View

V = Vertical Face, H = Horizontal Face, I = Inclined Face, F = Front, S = Side and T = Top

IMPORTANT OBSERVATIONS :

If the surface/face of an object is either parallel to the vertical plane or horizontal plane (Principal Planes) they appear to be in TRUE SHAPE in one of the three views and appear as a "line only" in other two views (as these faces are perpendicular to the plane of projection).

When a surface/face is inclined or making an angle with two planes at the same time, that surface/face is not seen in its TRUE SHAPE in the plane to which it is inclined. It is seen in the plane to which it is inclined as a plane of reduced size due to foreshortening.

6.3 LET US FIND

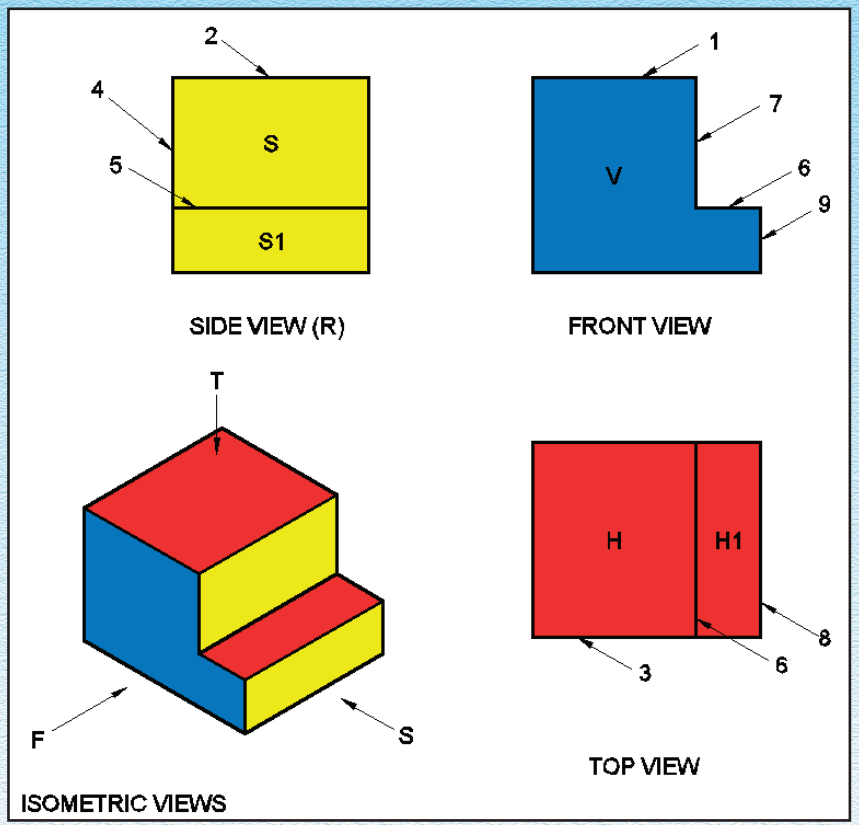


Fig. 6.6

Fill in the blanks by the corresponding line (as indicated)/True shape by observing the following views.

Pictorial View	Orthographic View		
Surfaces	Indicated As		
	Front View	Top View	Side View
(I) H	1	True Shape	2
(ii) H_1			
(iii) V			
(iv) S			
(v) S_1			

6.4 MACHINE BLOCKS WITH (HORIZONTAL AND VERTICAL FACES)

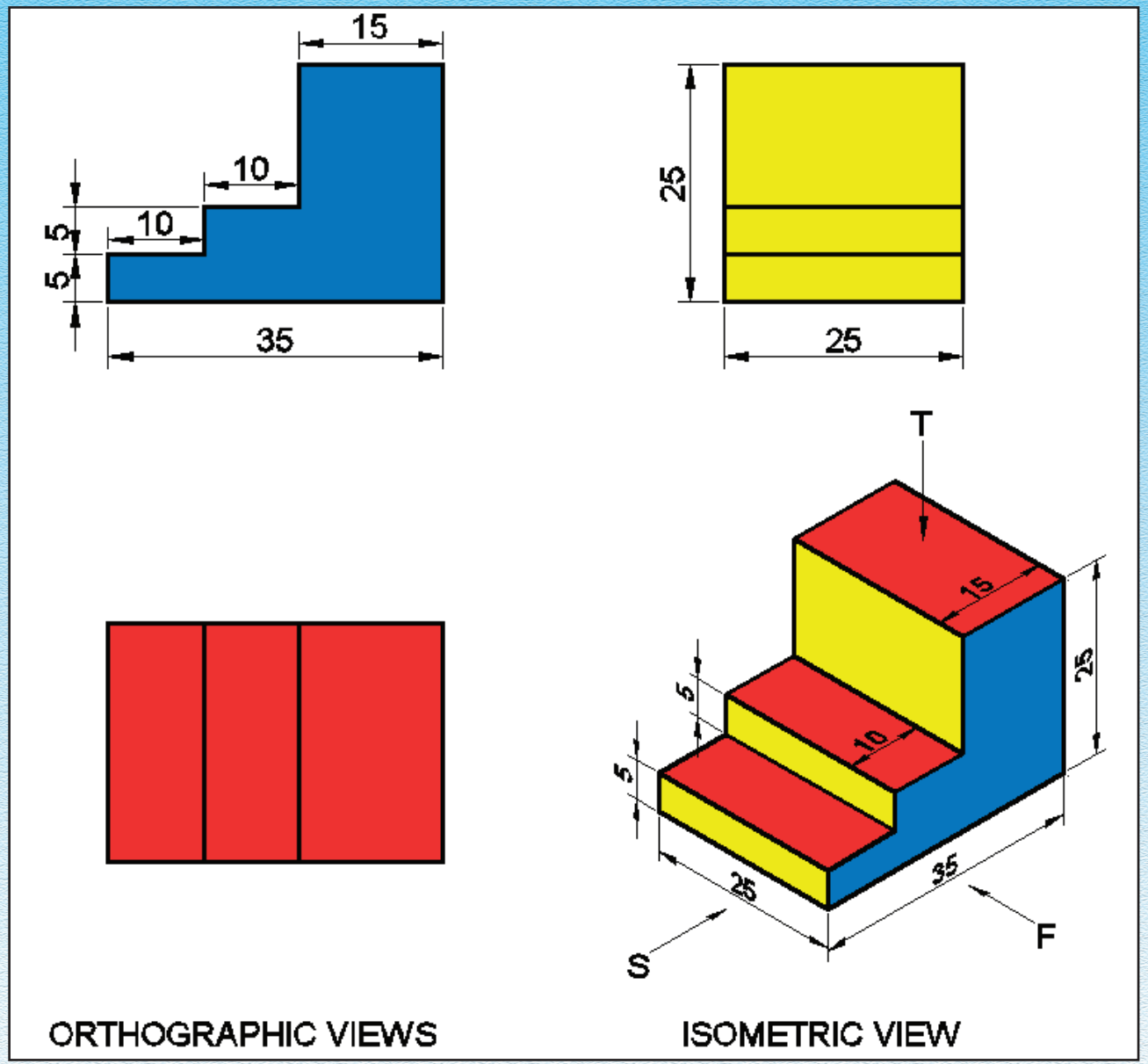
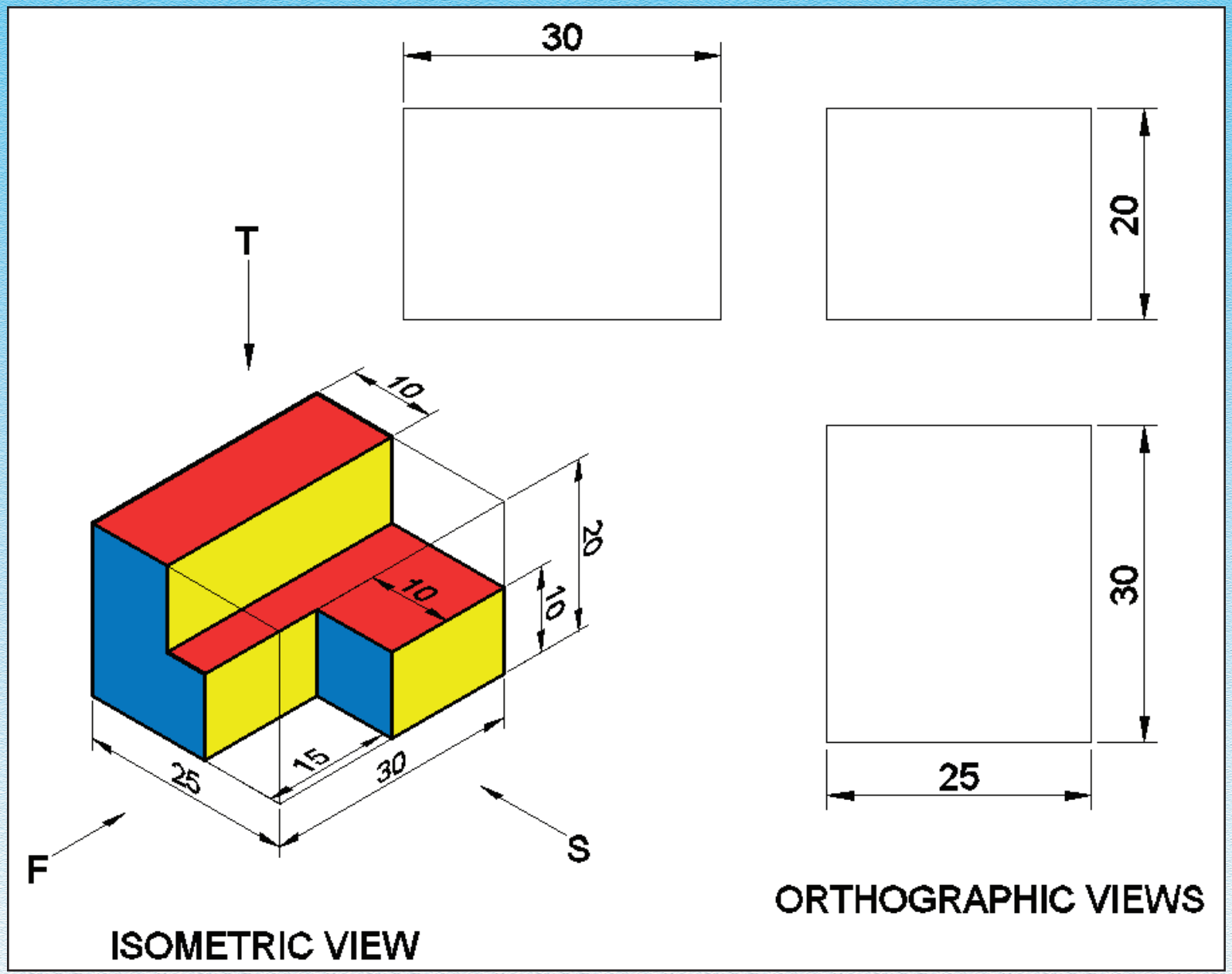


Fig. 6.7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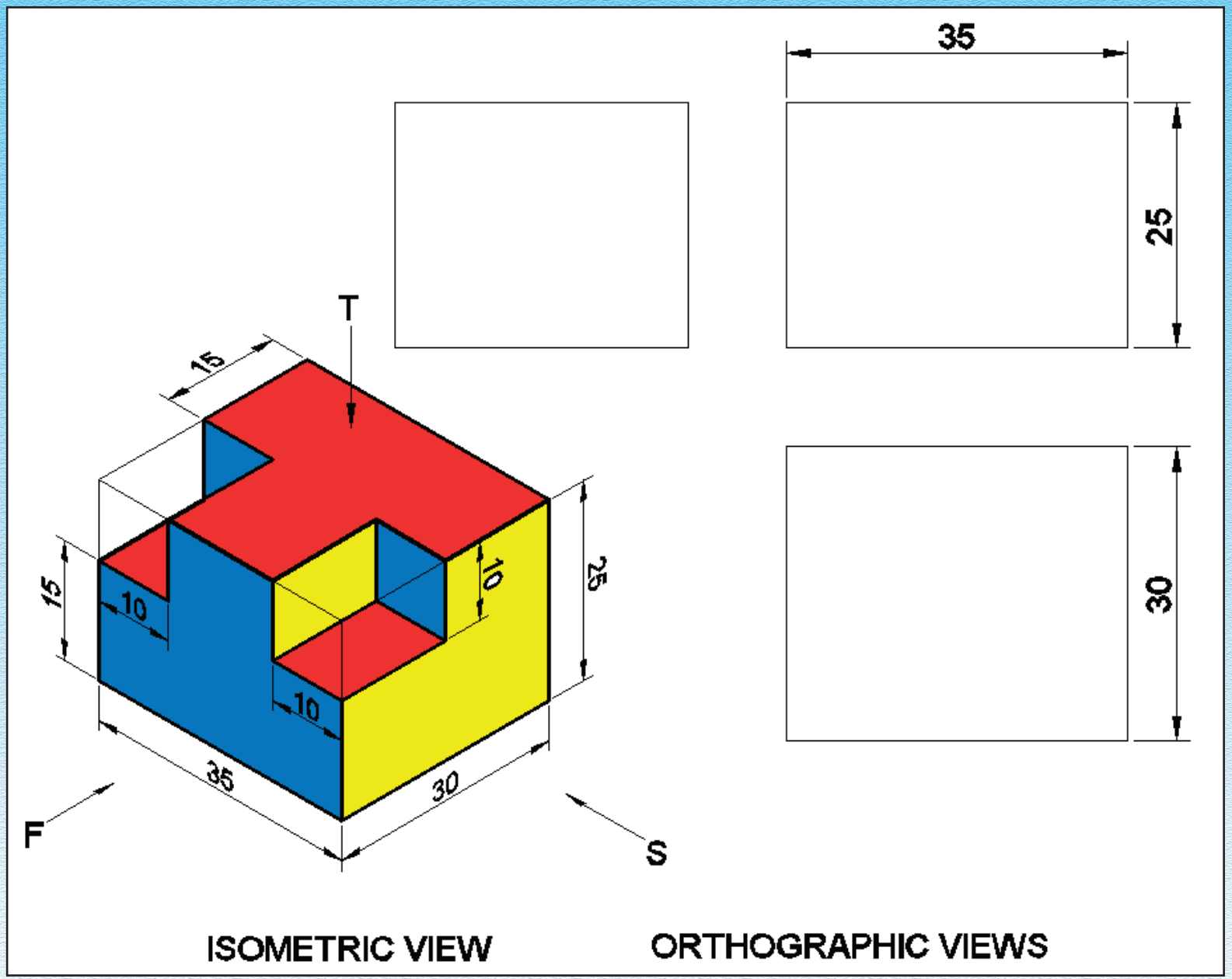
ISOMETRIC VIEW
ORTHOGRAPHIC VIEWS

Fig. 6.8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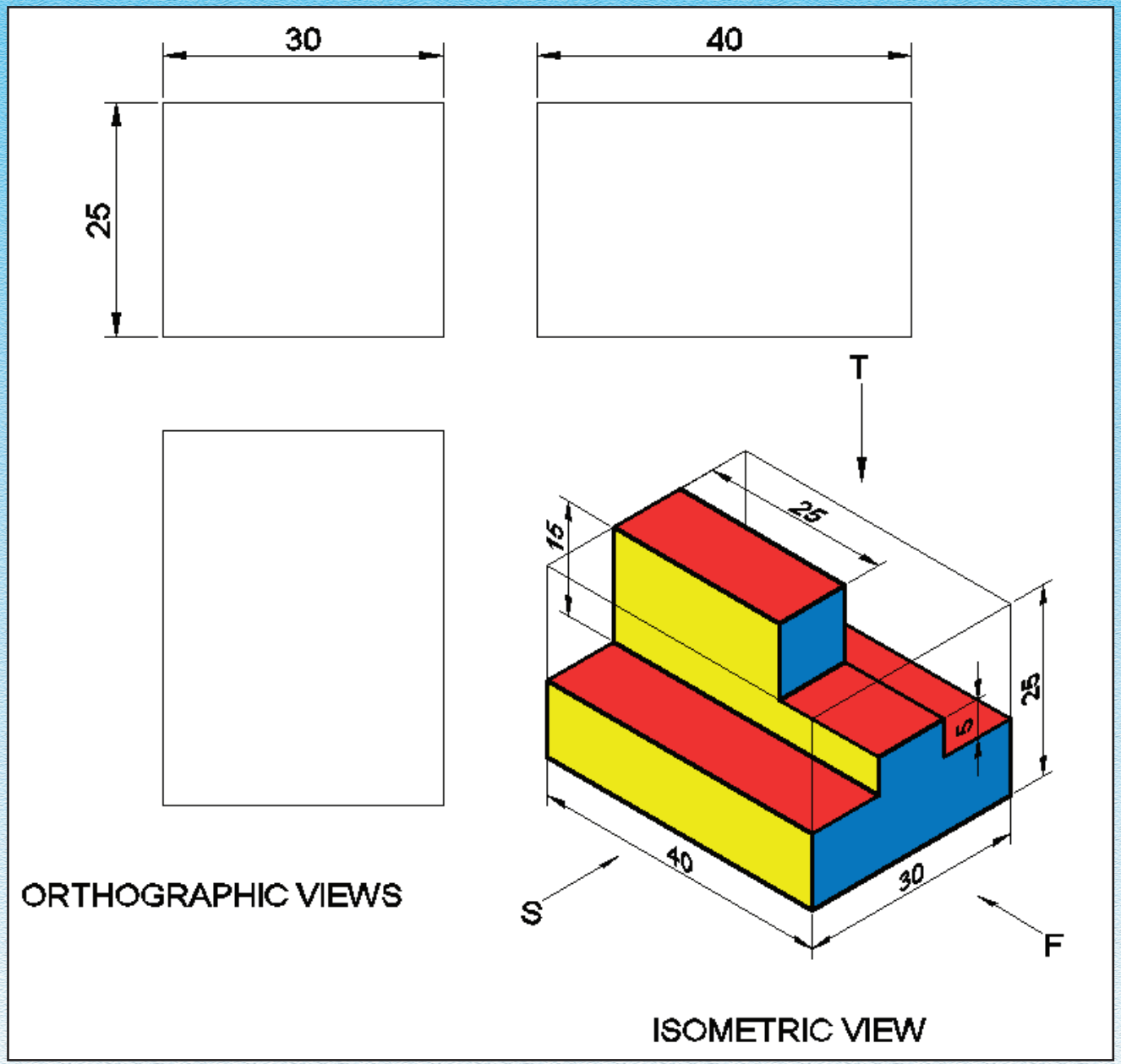
ISOMETRIC VIEW
ORTHOGRAPHIC VIEWS

Fig. 6.9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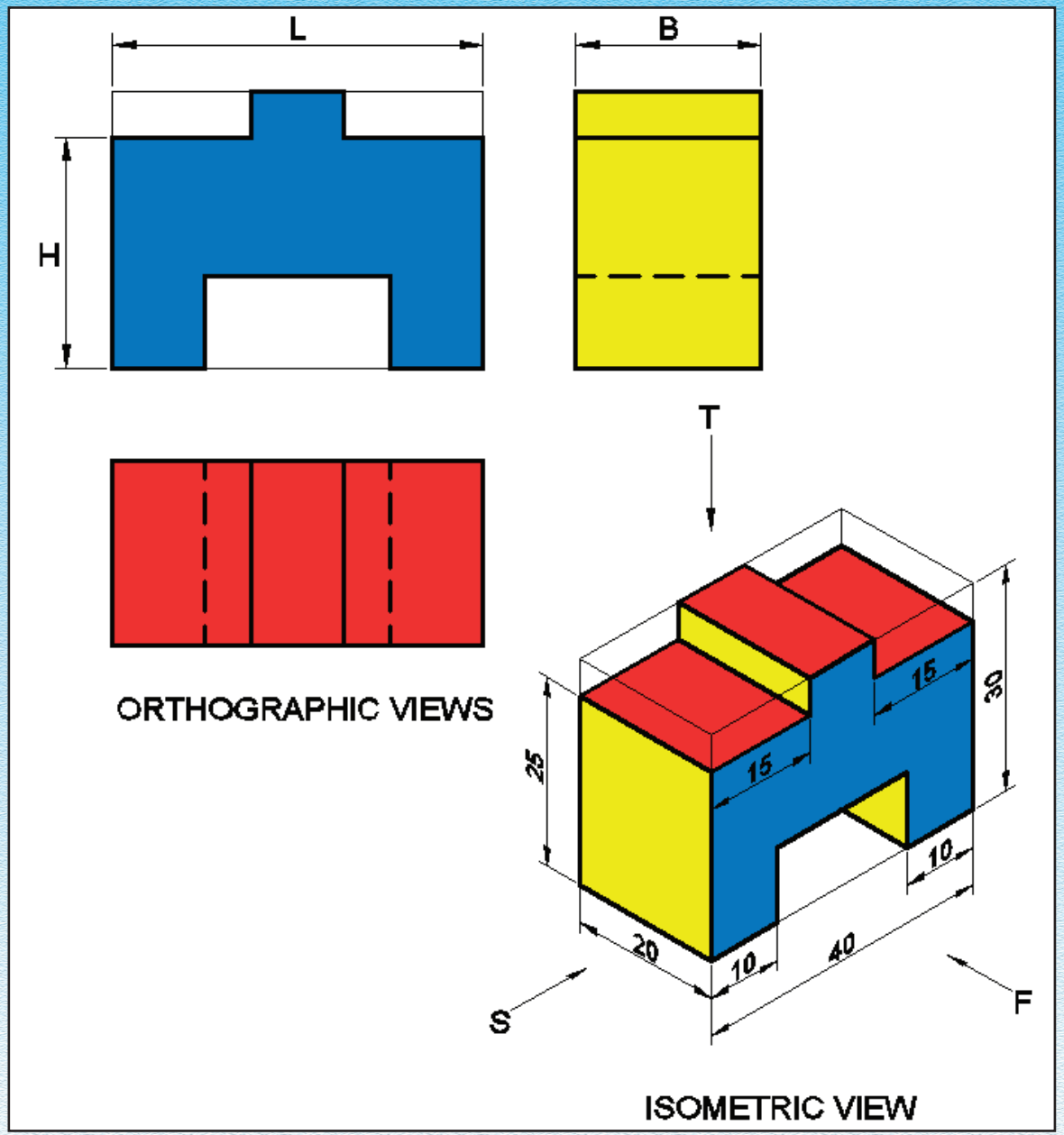
ORTHOGRAPHIC VIEWS
ISOMETRIC VIEW

Fig. 6.10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ISOMETRIC VIEW

Fig. 6.11

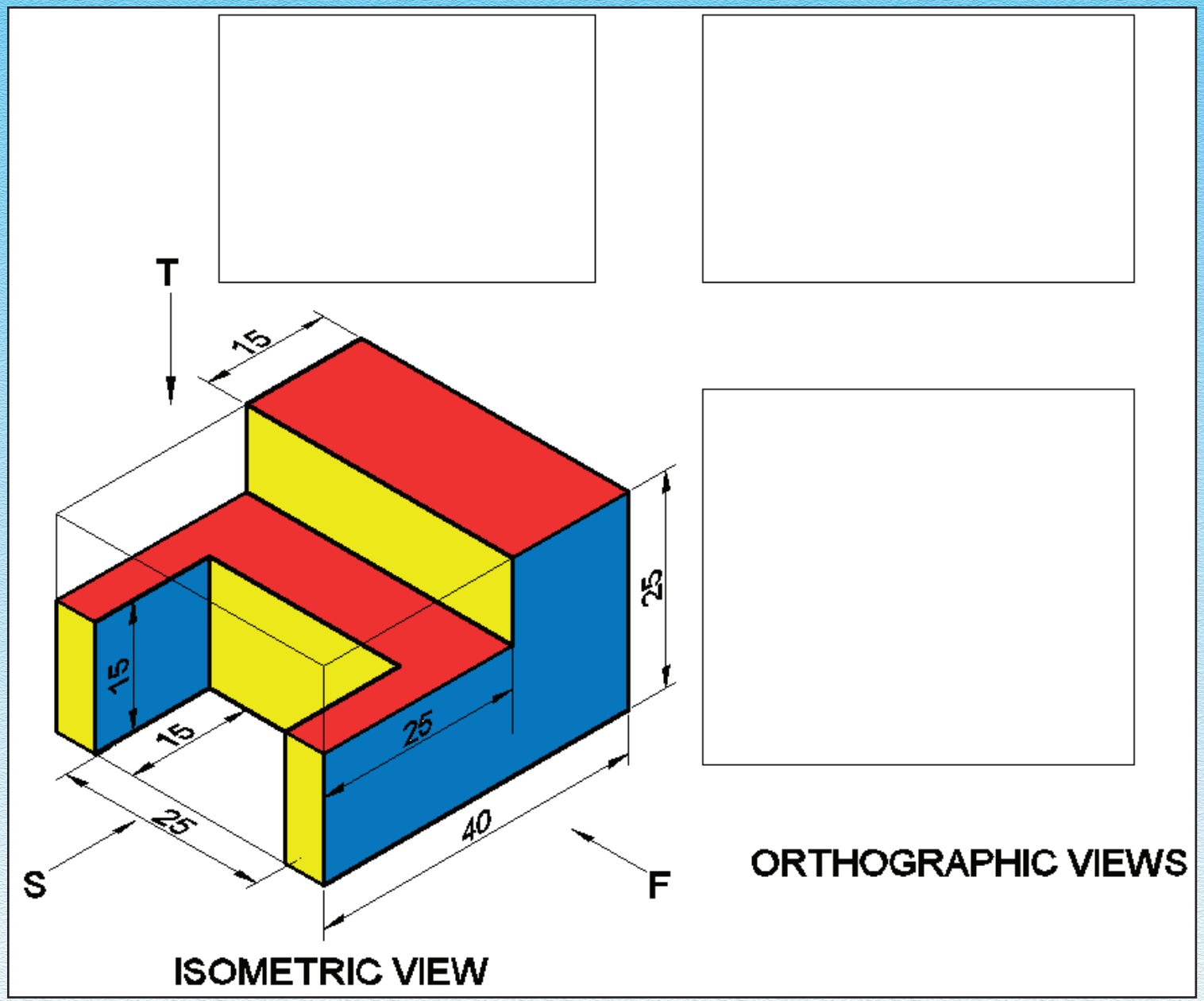


Fig. 6.12

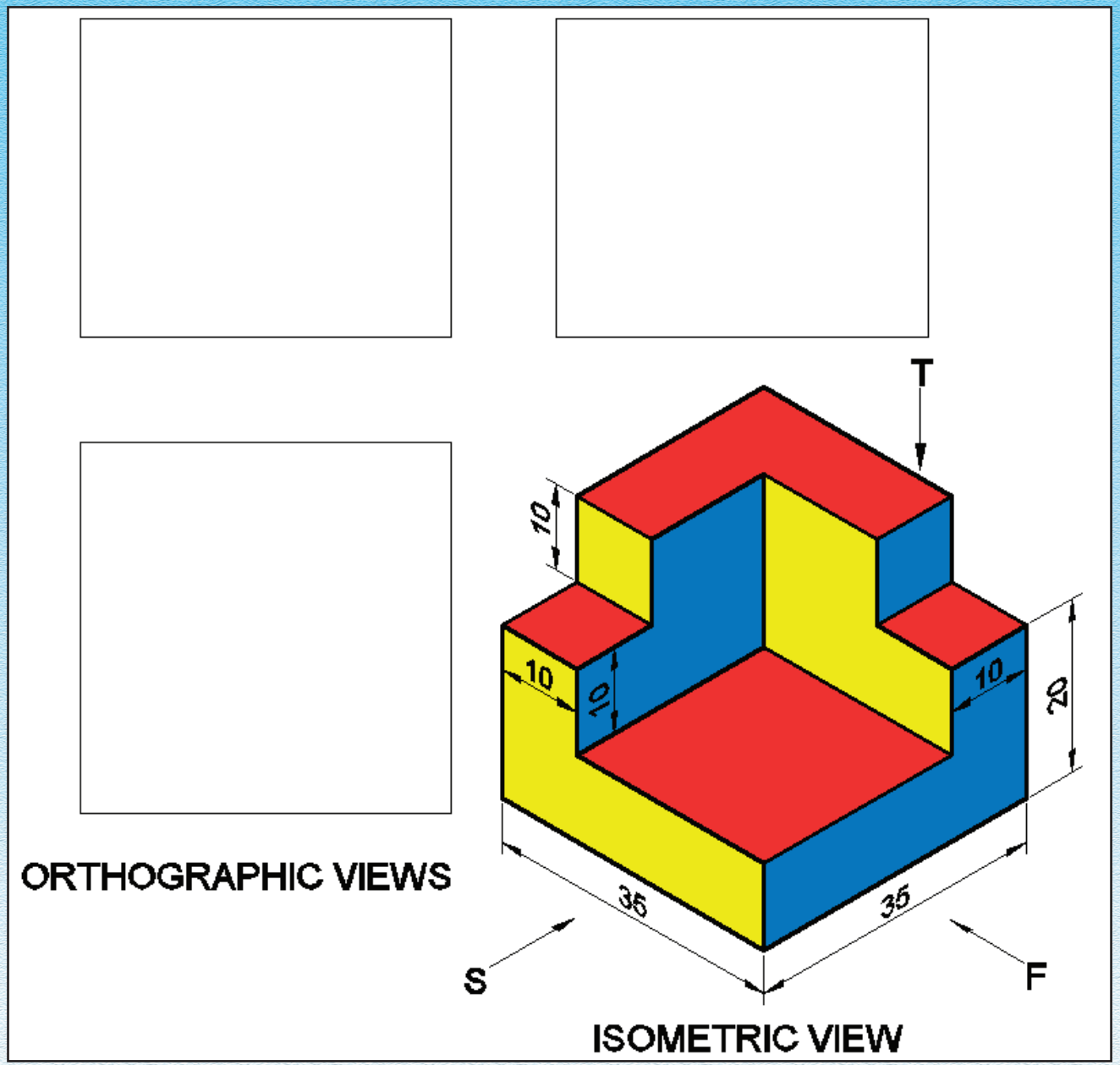


Fig. 6.13

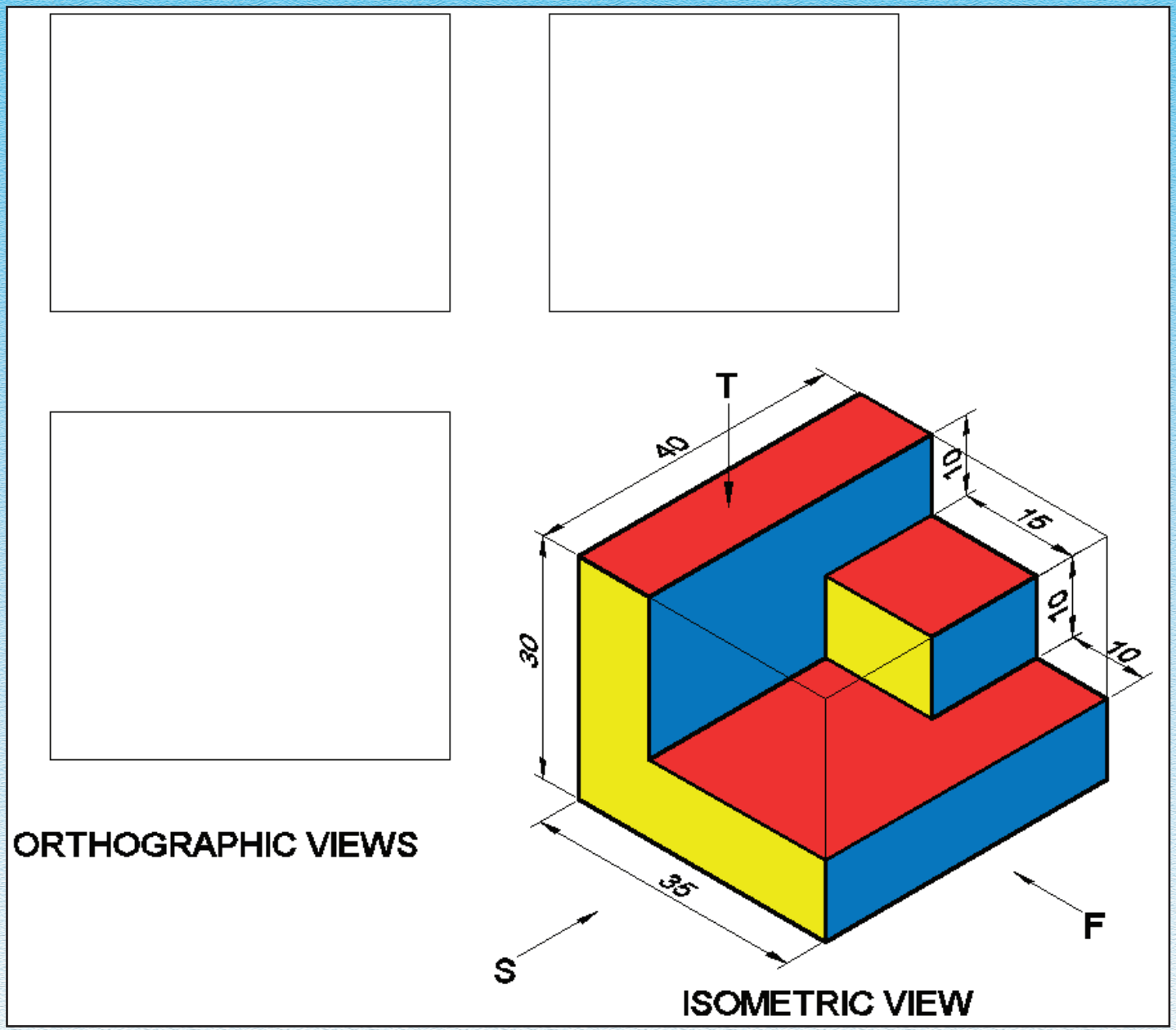


Fig. 6.14

6.5 MACHINE BLOCKS WITH (HORIZONTAL, VERTICAL AND INCLINED FACES)

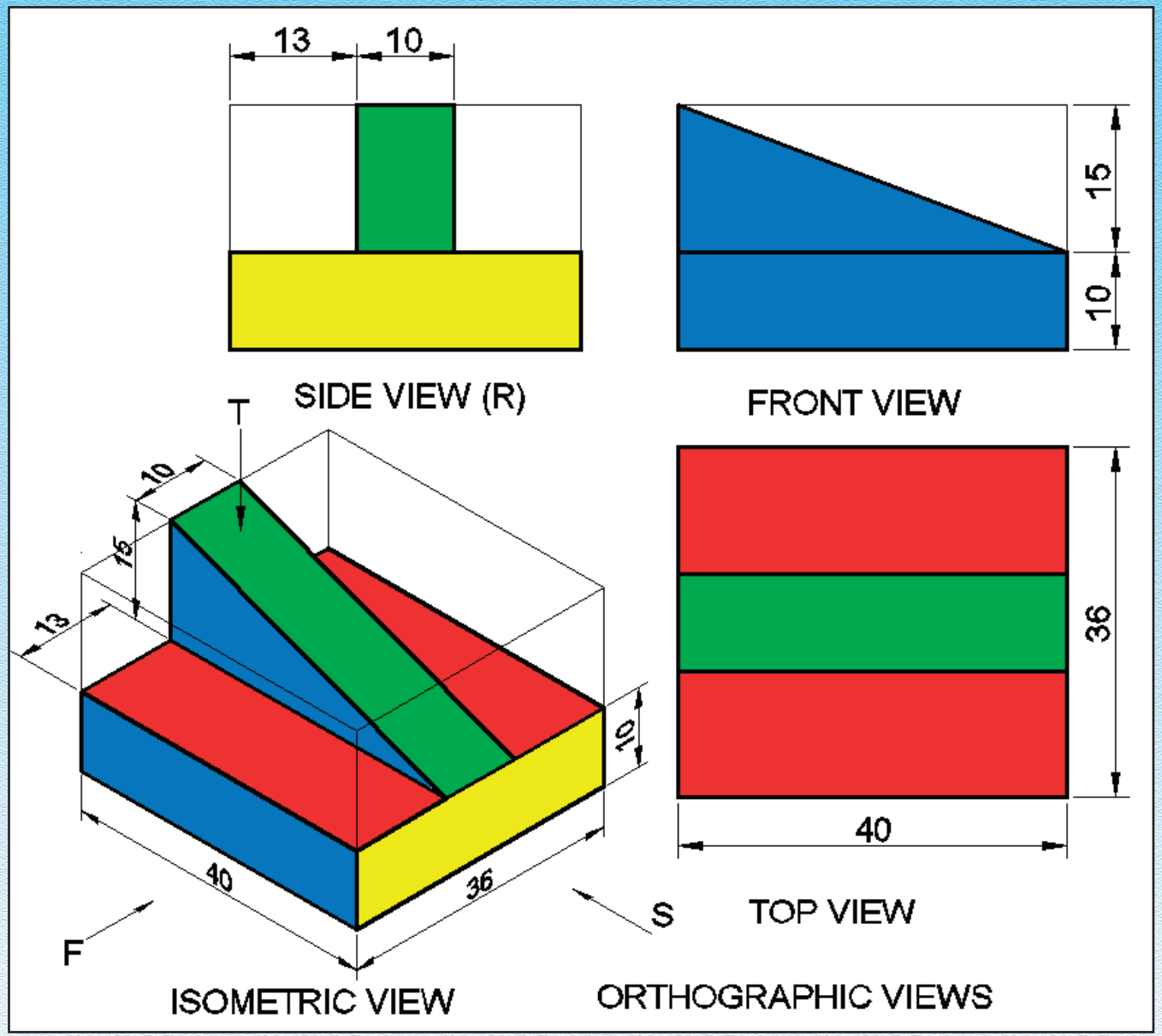
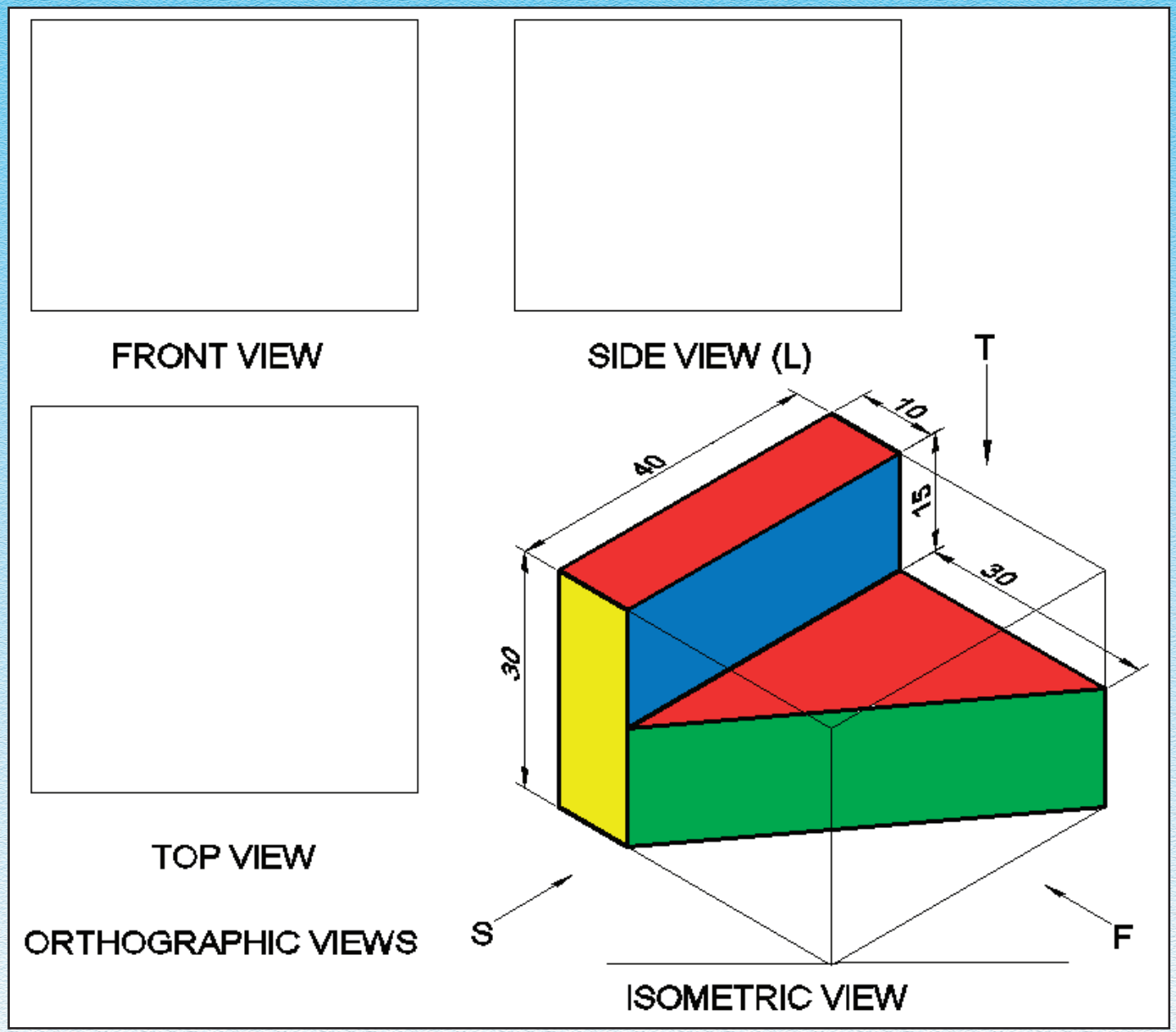


Fig. 6.15


FRONT VIEW
SIDE VIEW (L)
TOP VIEW
ORTHOGRAPHIC VIEWS
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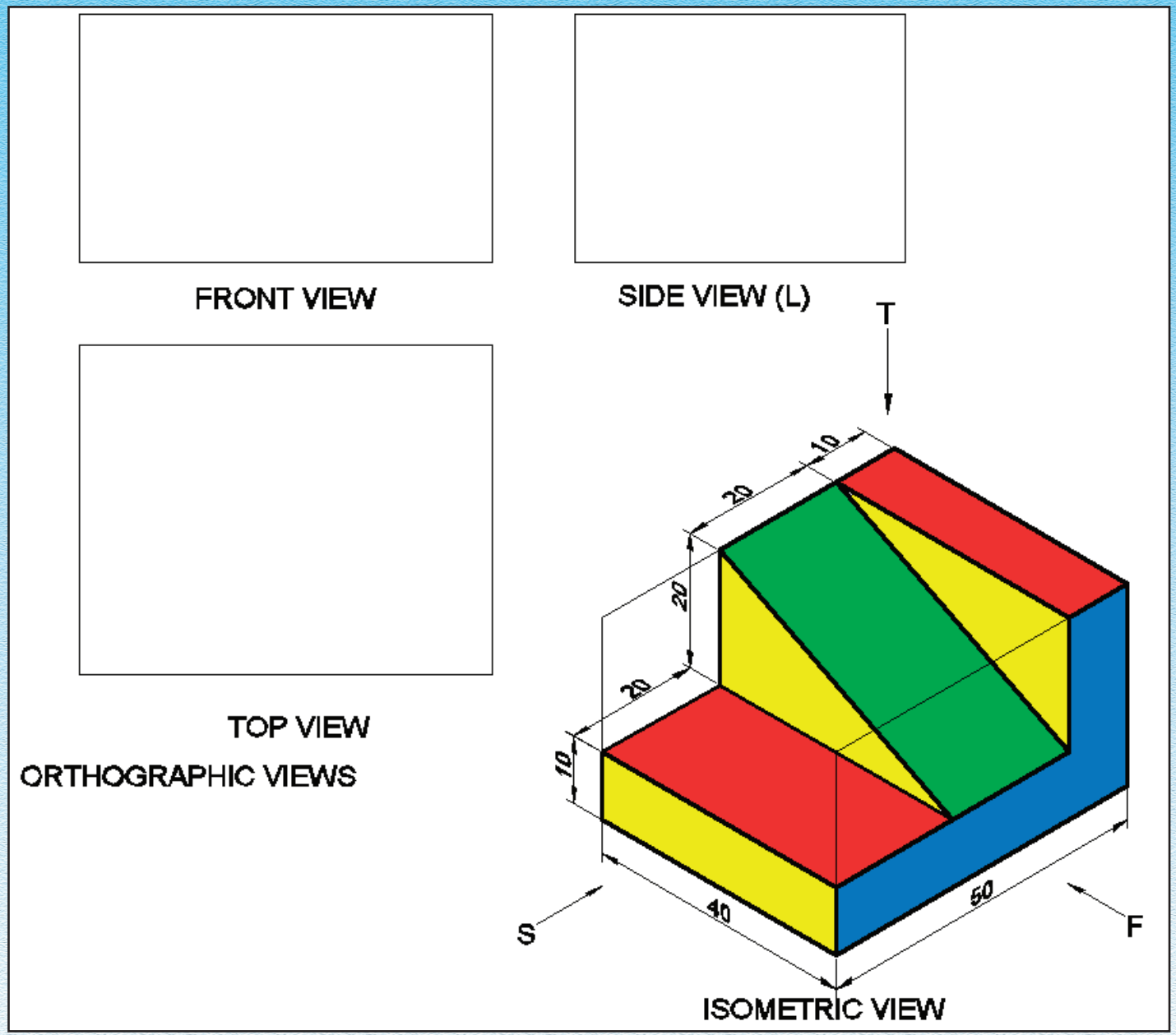
ISOMETRIC VIEW

Fig. 6.16


FRONT VIEW
SIDE VIEW (L)
TOP VIEW
ORTHOGRAPHIC VIEWS
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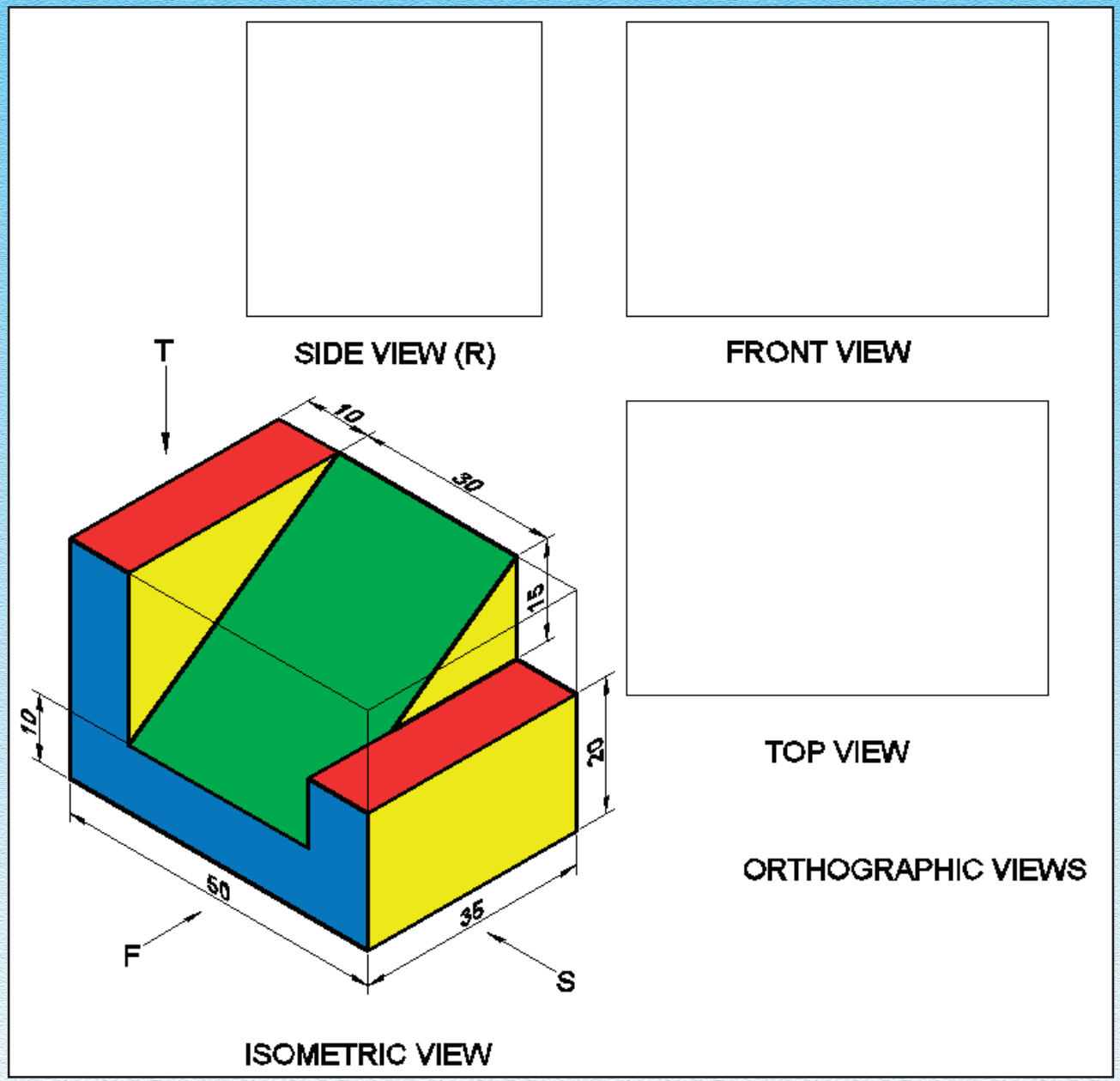
ISOMETRIC VIEW

Fig. 6.17


SIDE VIEW (R)
FRONT VIEW
TOP VIEW
ORTHOGRAPHIC VIEWS
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ISOMETRIC VIEW

Fig. 6.18

6.6 MACHINE BLOCKS : (HORIZONTAL, VERTICAL AND CURVED FACES)

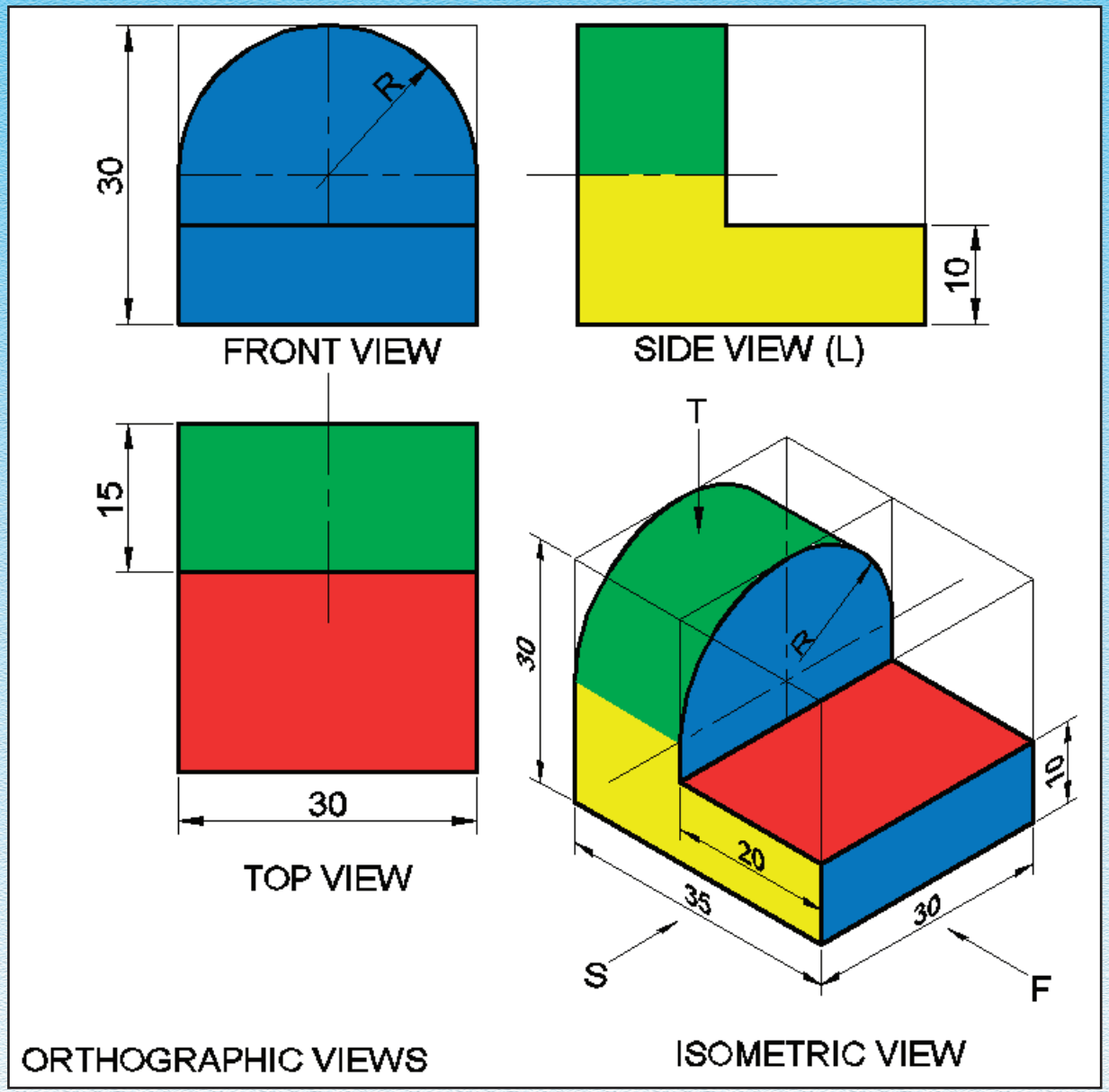
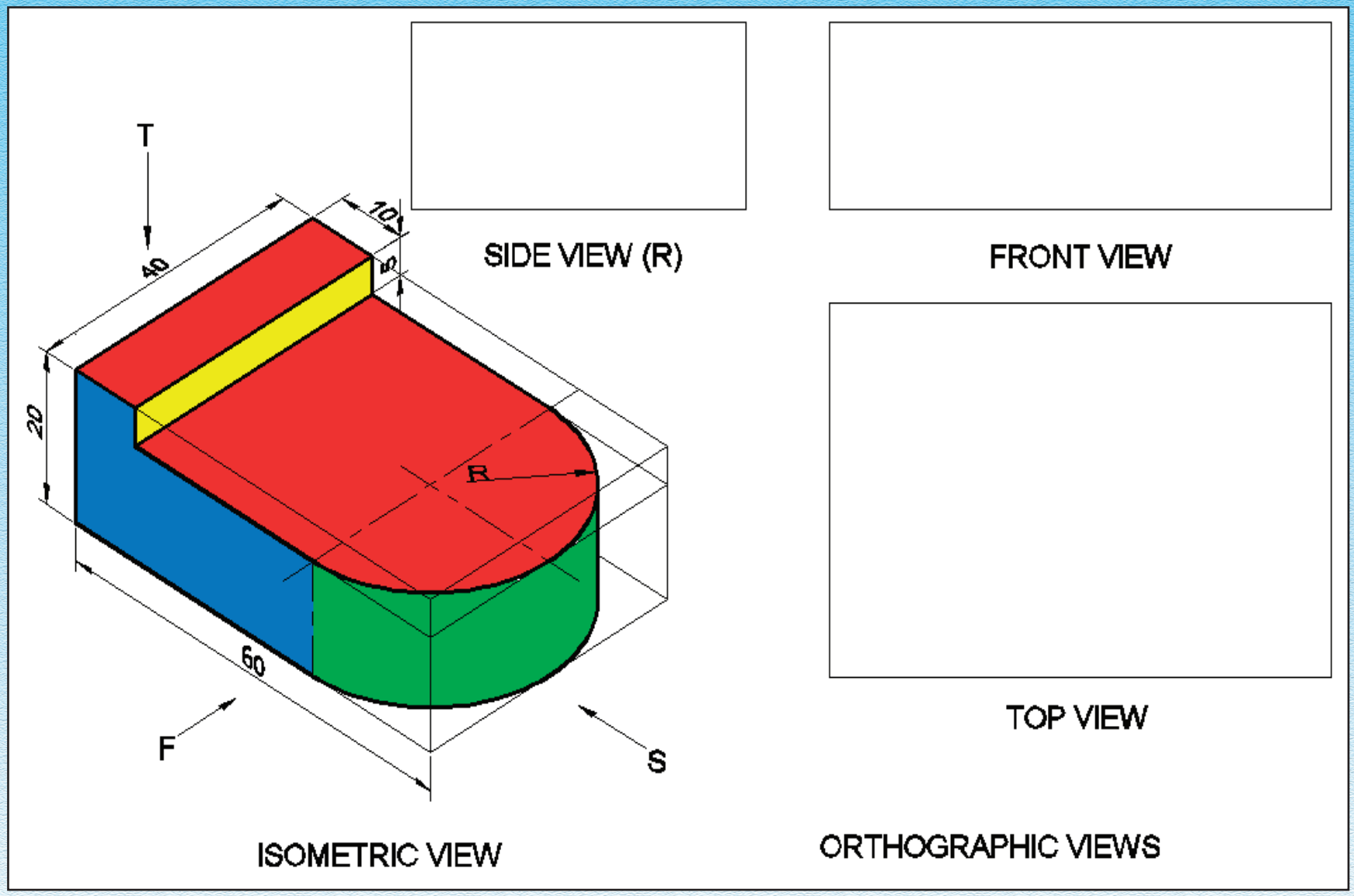


Fig. 6.19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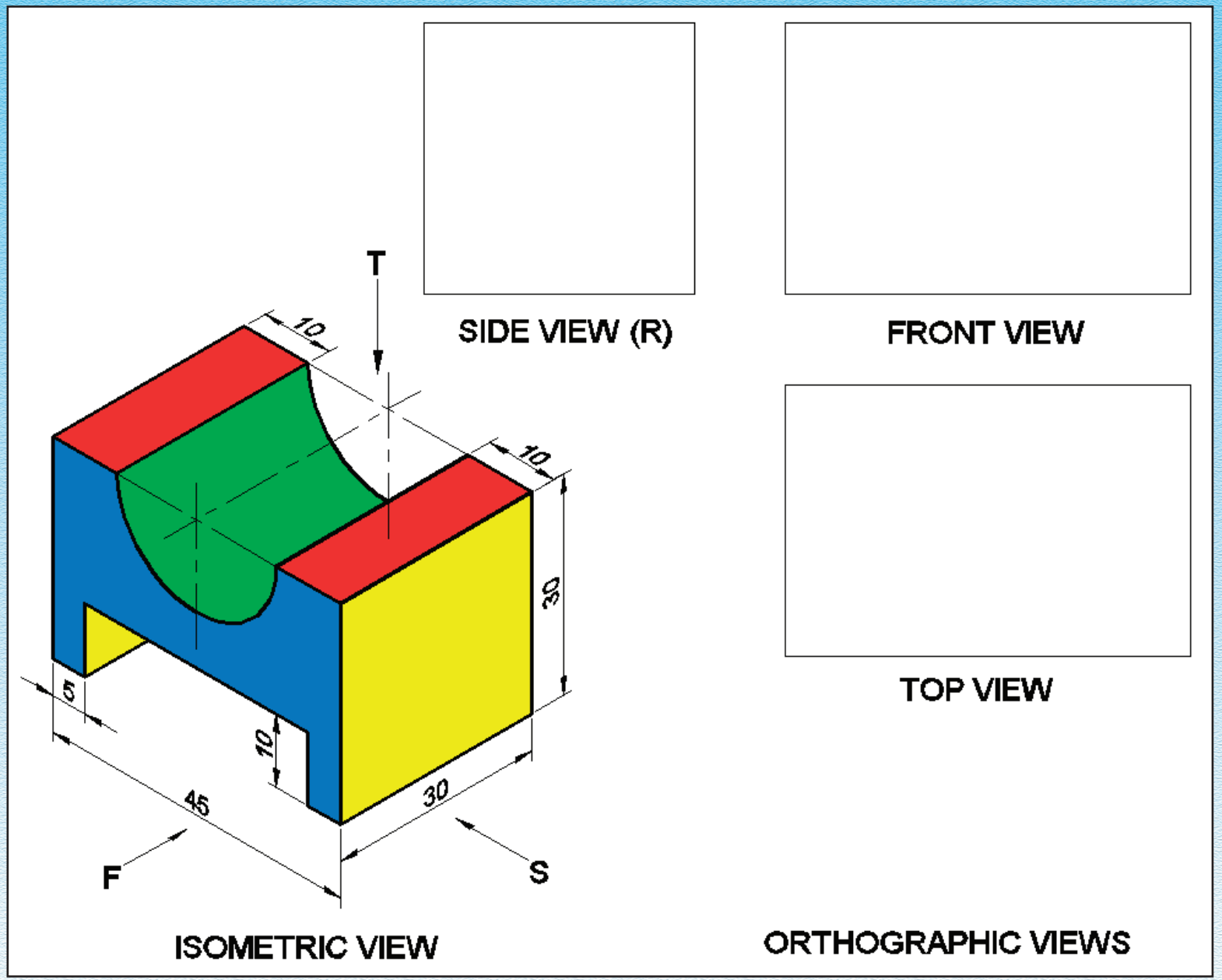
SIDE VIEW (R)
FRONT VIEW
TOP VIEW
ORTHOGRAPHIC VIEWS

Fig. 6.20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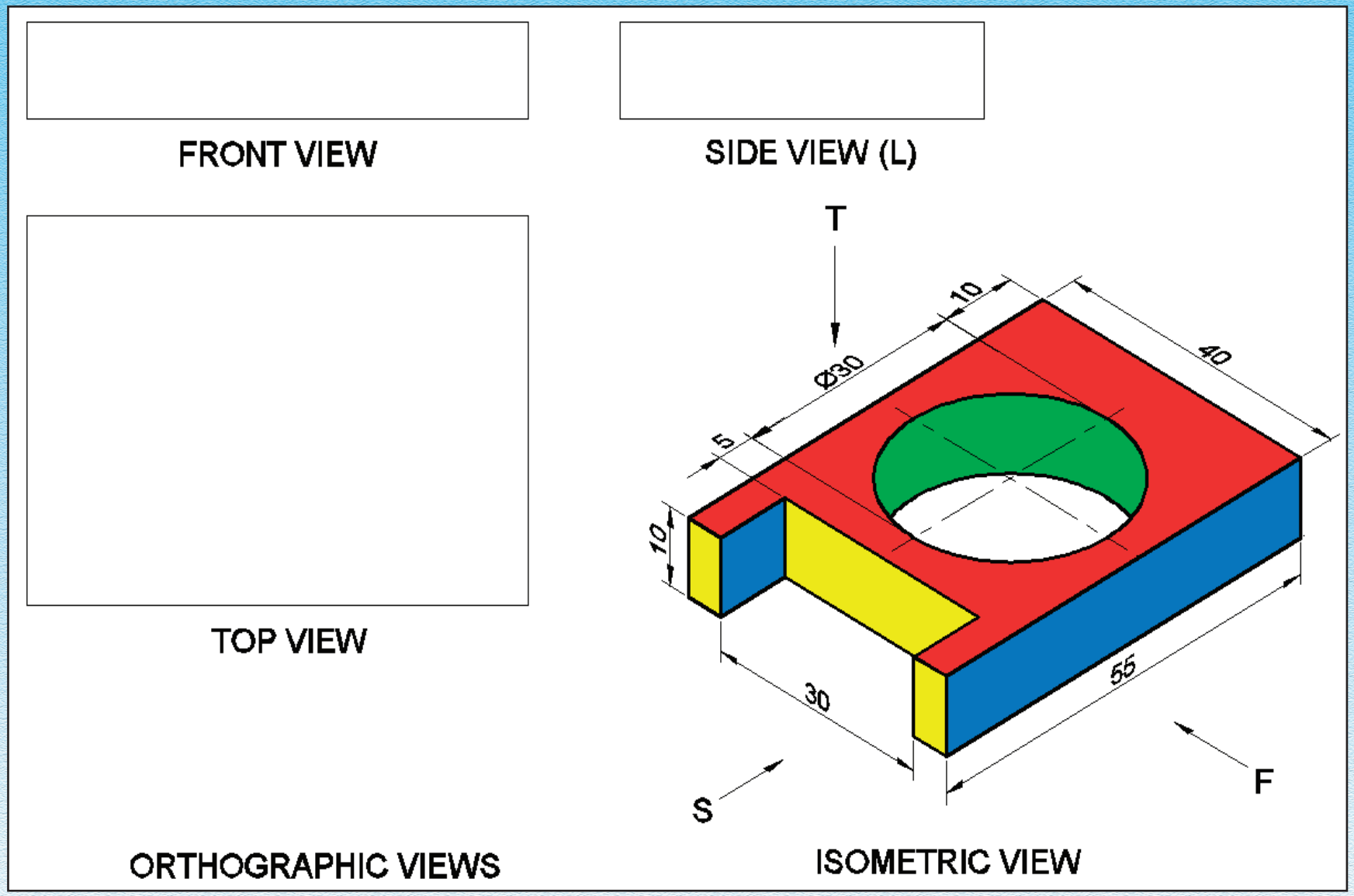
SIDE VIEW (R)
FRONT VIEW
TOP VIEW
ORTHOGRAPHIC VIEWS

Fig. 6.21


FRONT VIEW
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ISOMETRIC VIEW

Fig. 6.22

6.7 MACHINE BLOCKS : (HORIZONTAL, VERTICAL, CURVED AND INCLINED FACES)

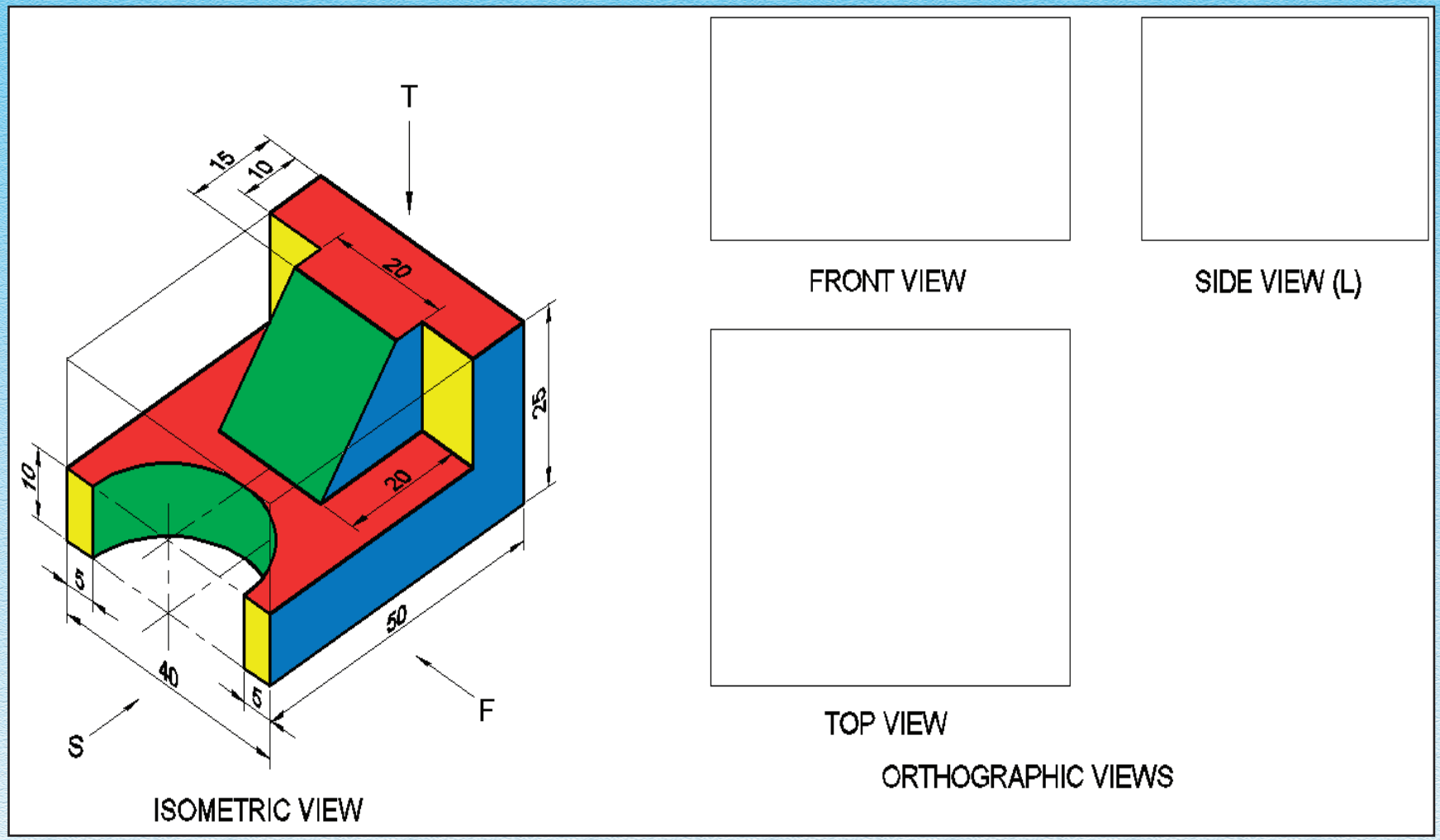
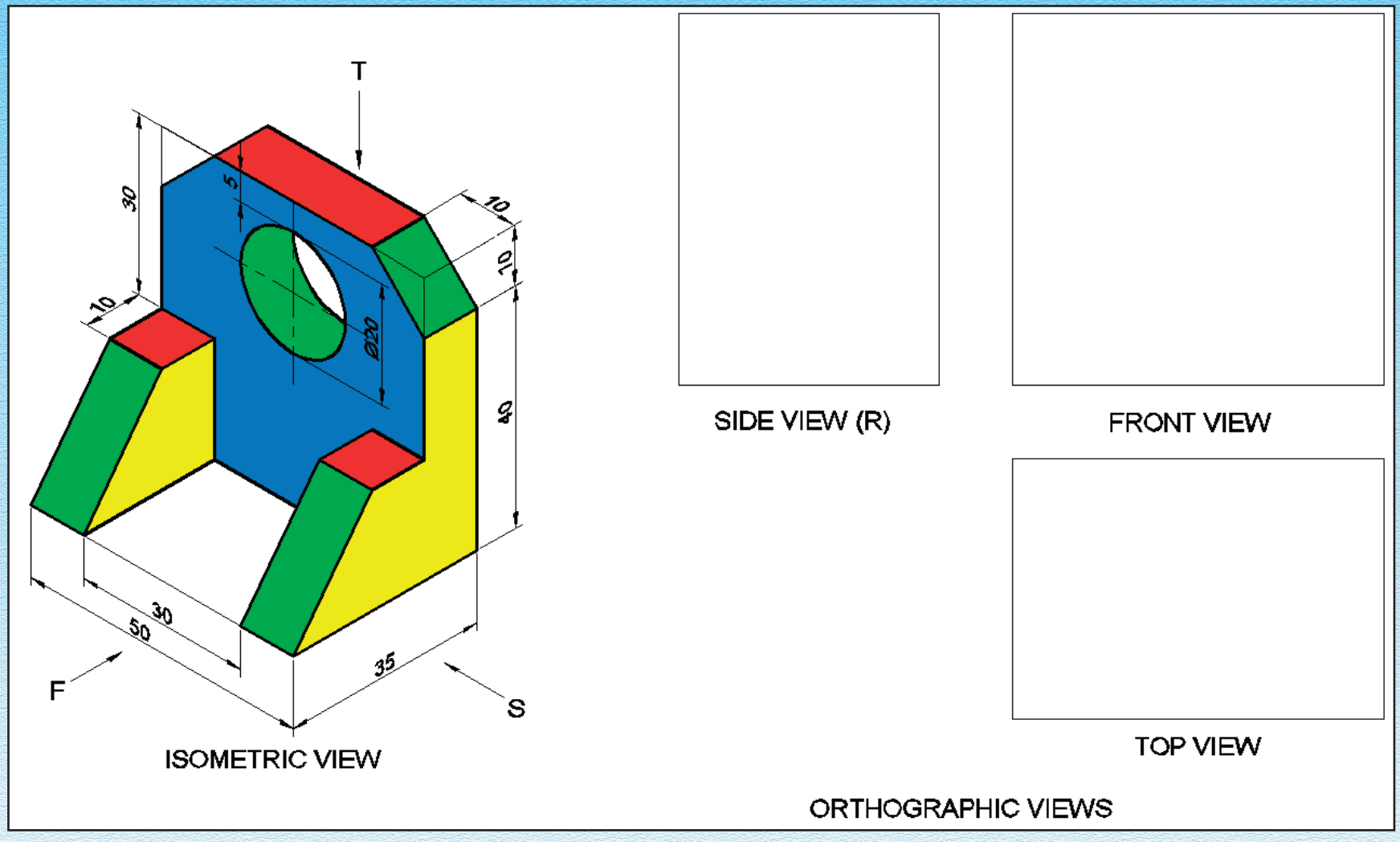


Fig. 6.23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SIDE VIEW (R)
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ORTHOGRAPHIC VIEWS

Fig. 6.24

6.8 MISCELLANEOUS EXERCISES

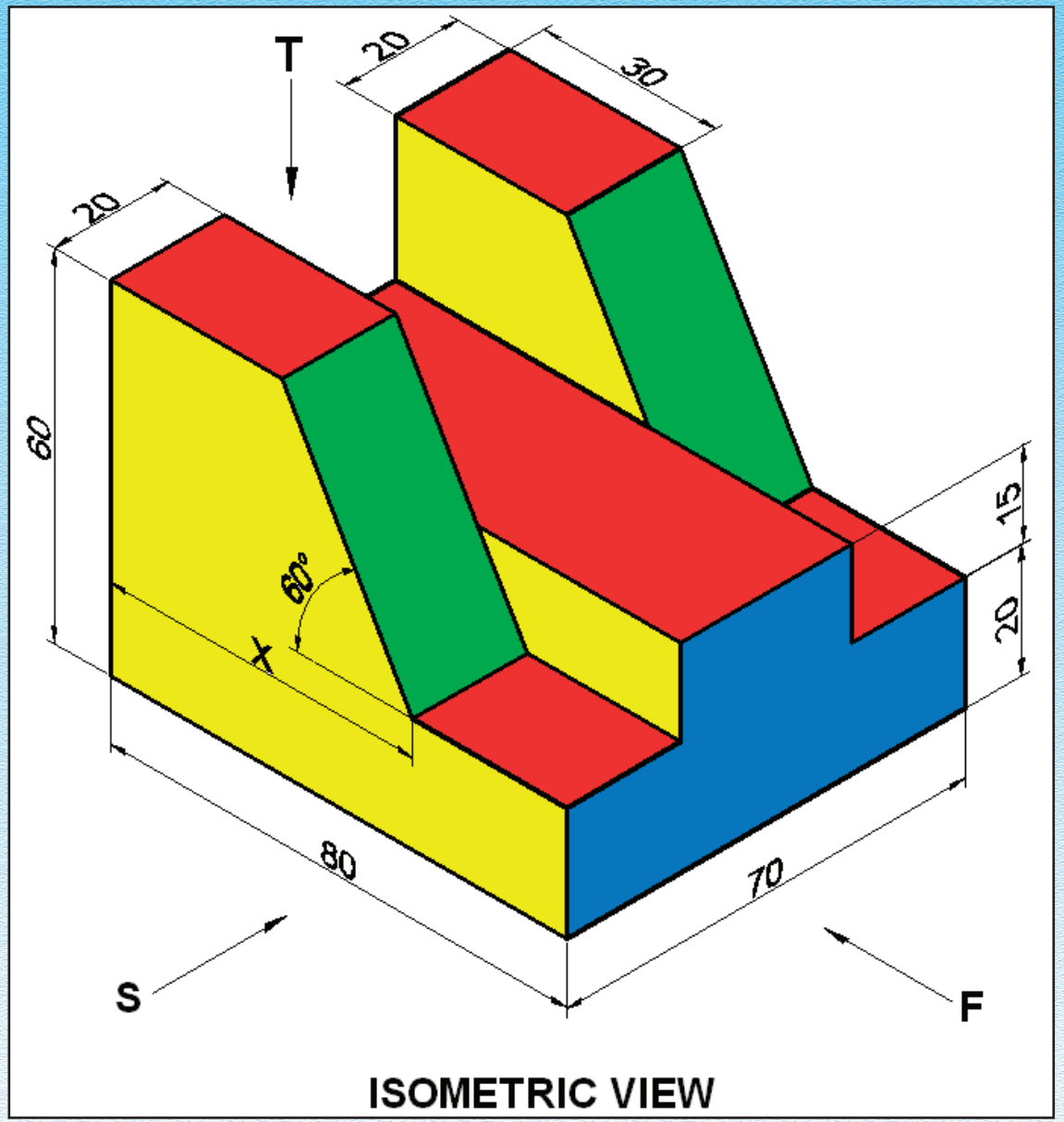


Fig. 6.25

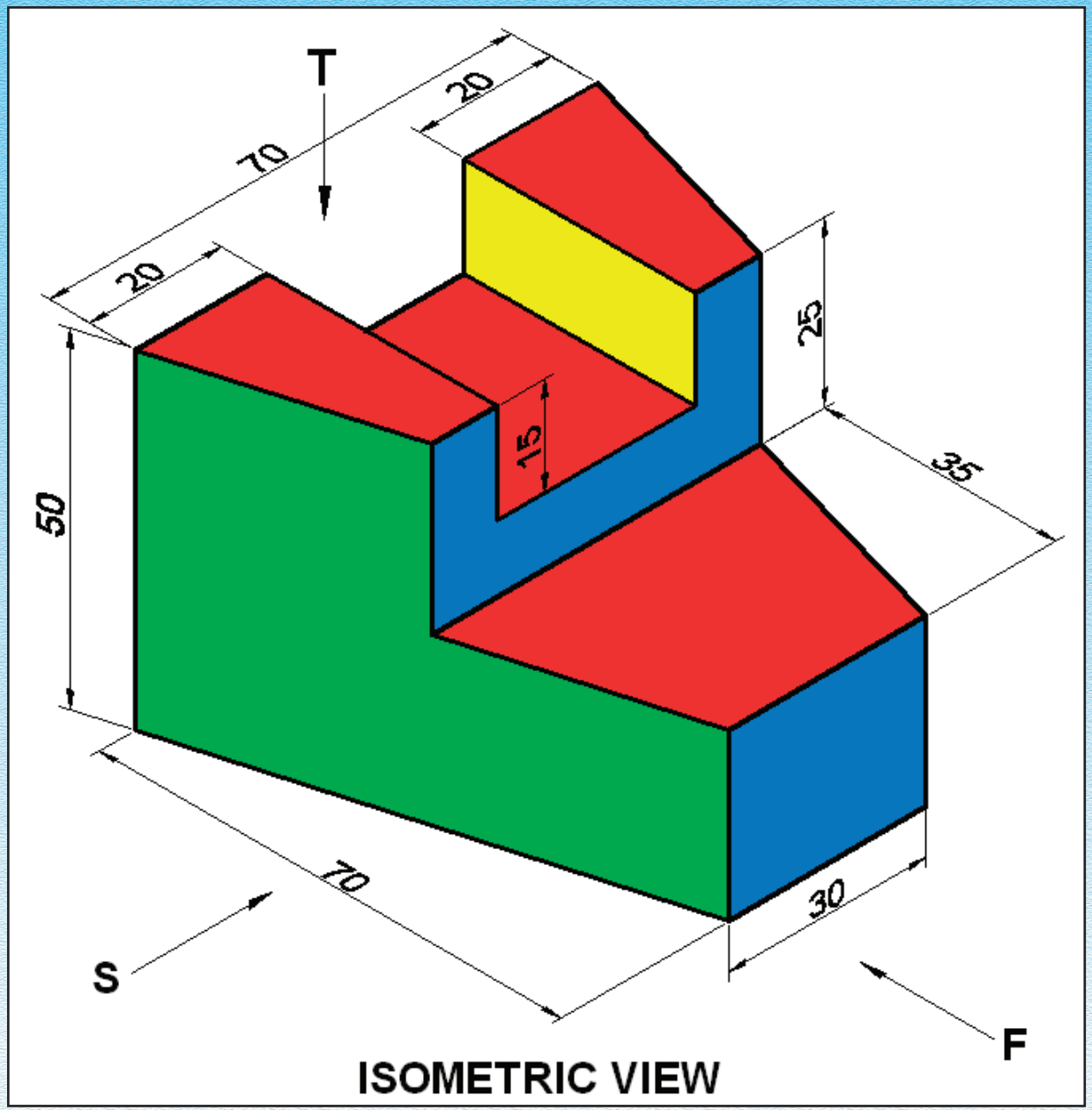


Fig. 6.26

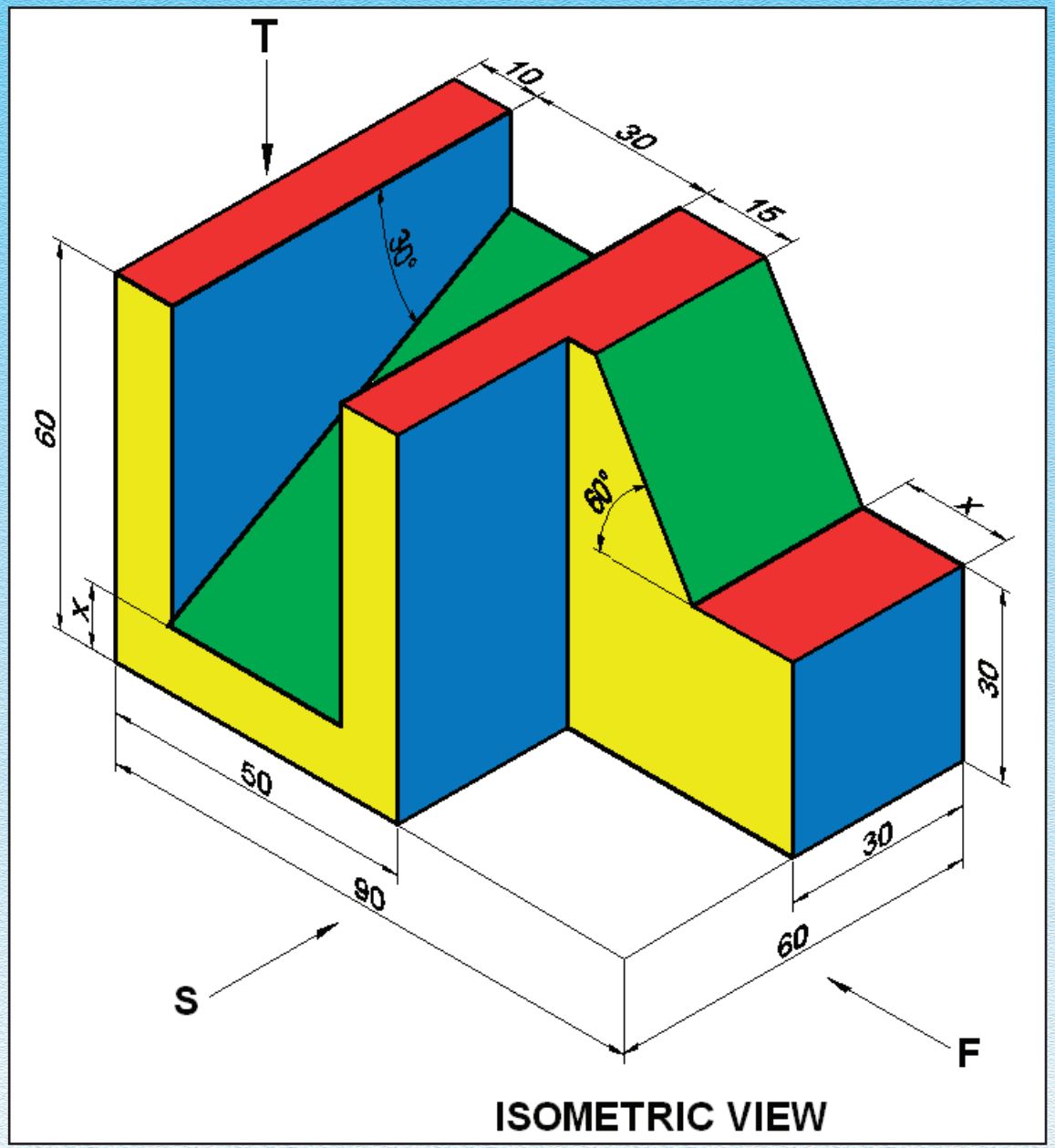


Fig. 6.27

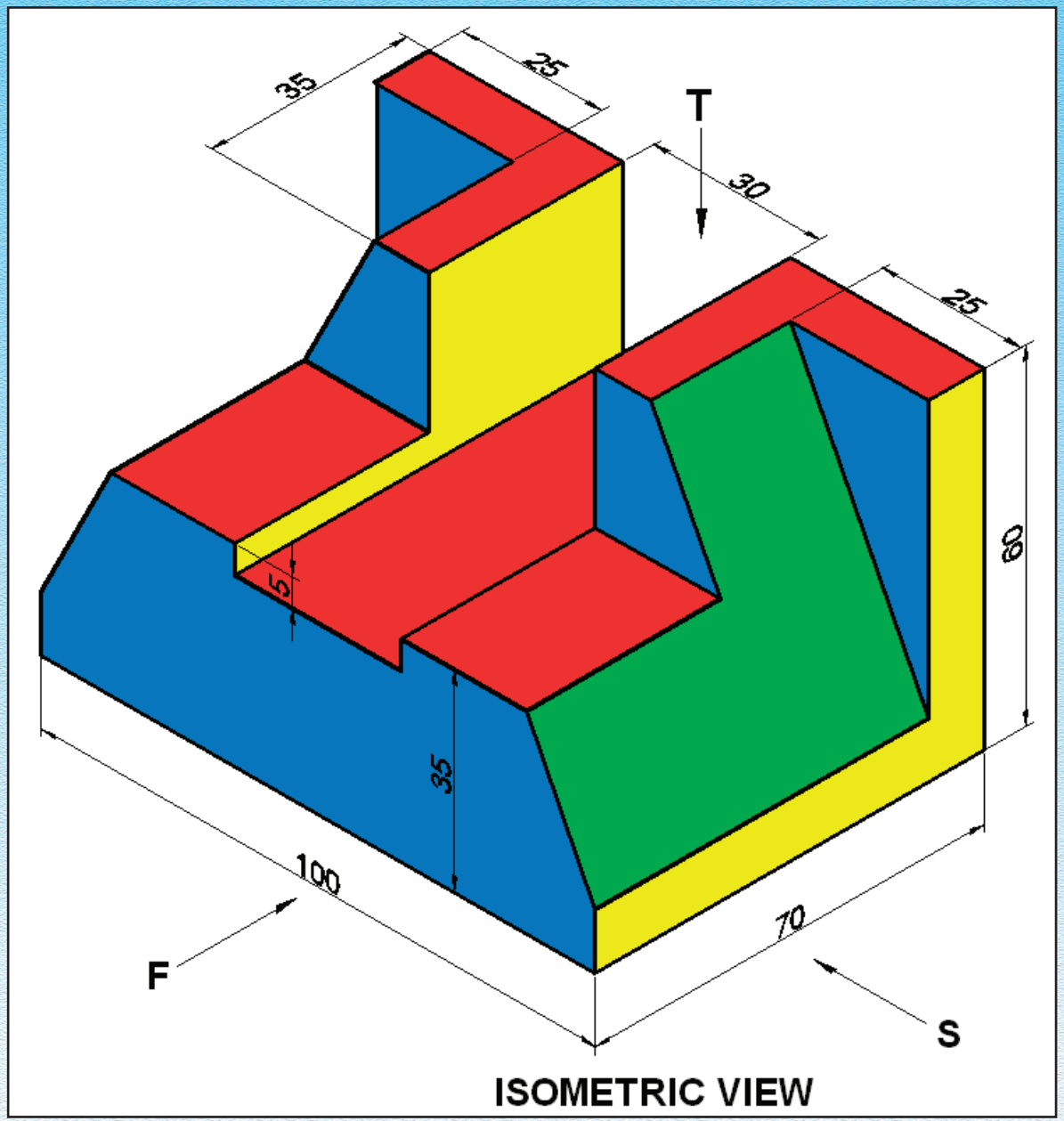


Fig. 6.28

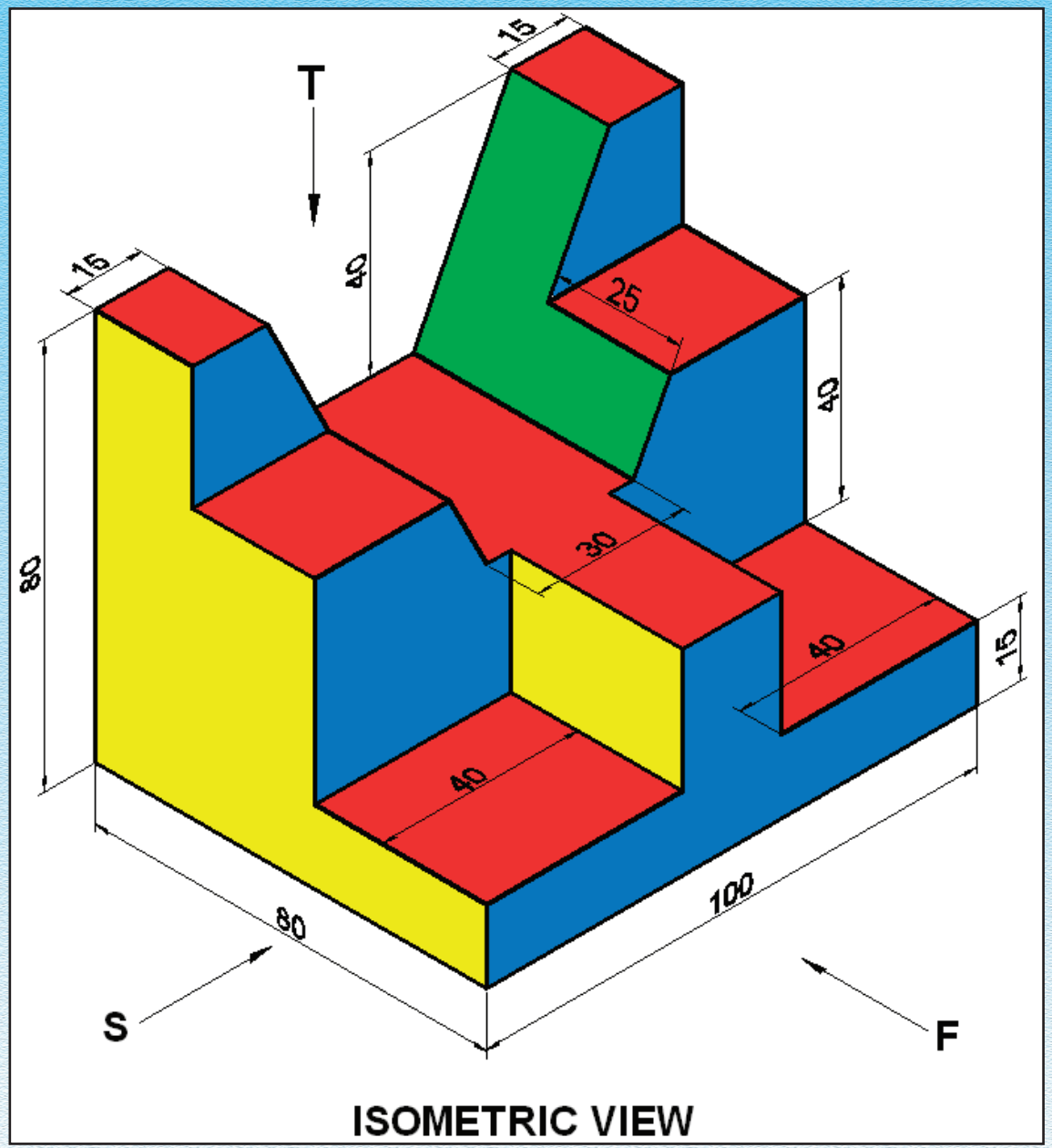


Fig. 6.29

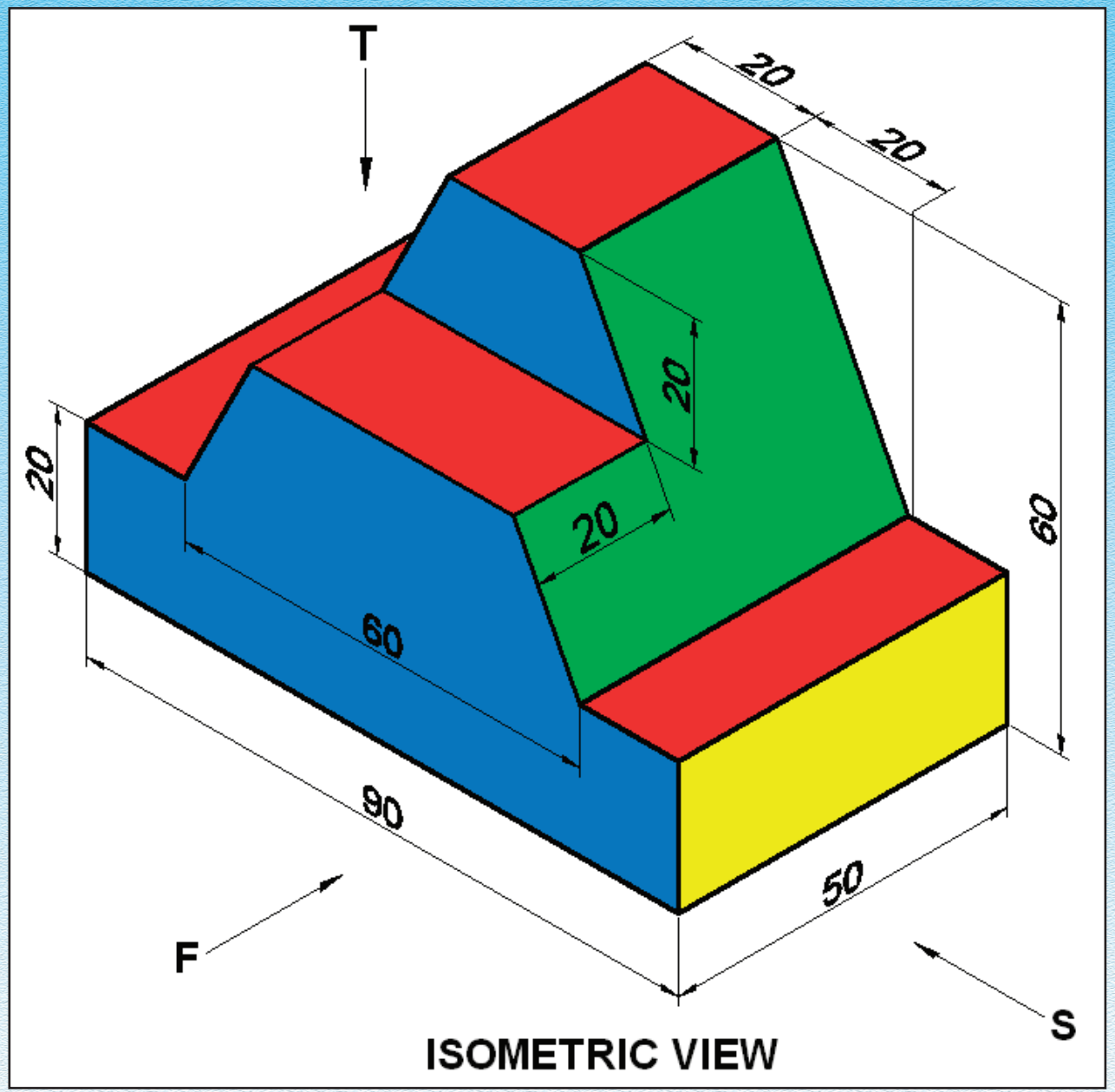
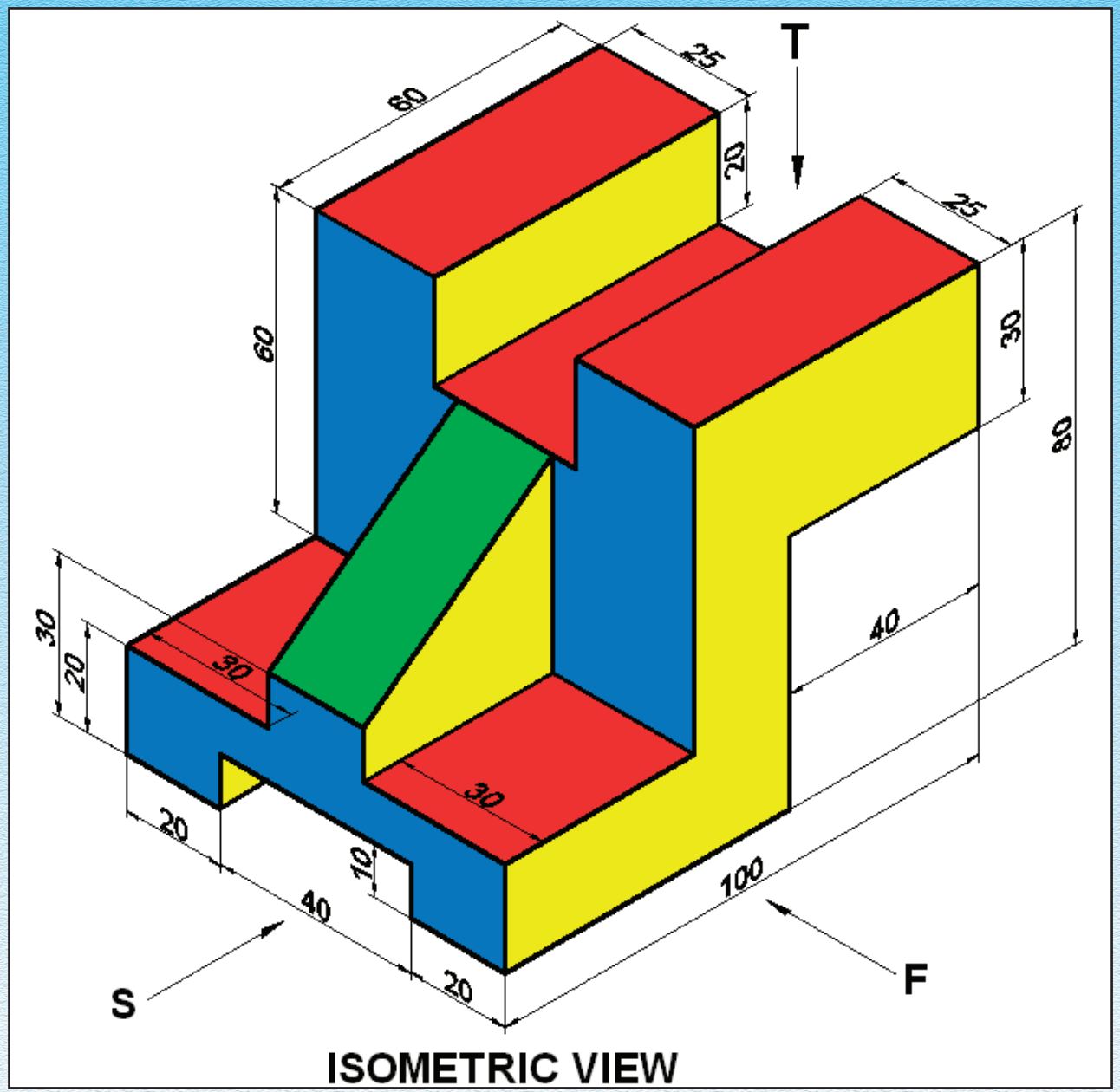


Fig. 6.30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ISOMETRIC VIEW

Fig. 6.31

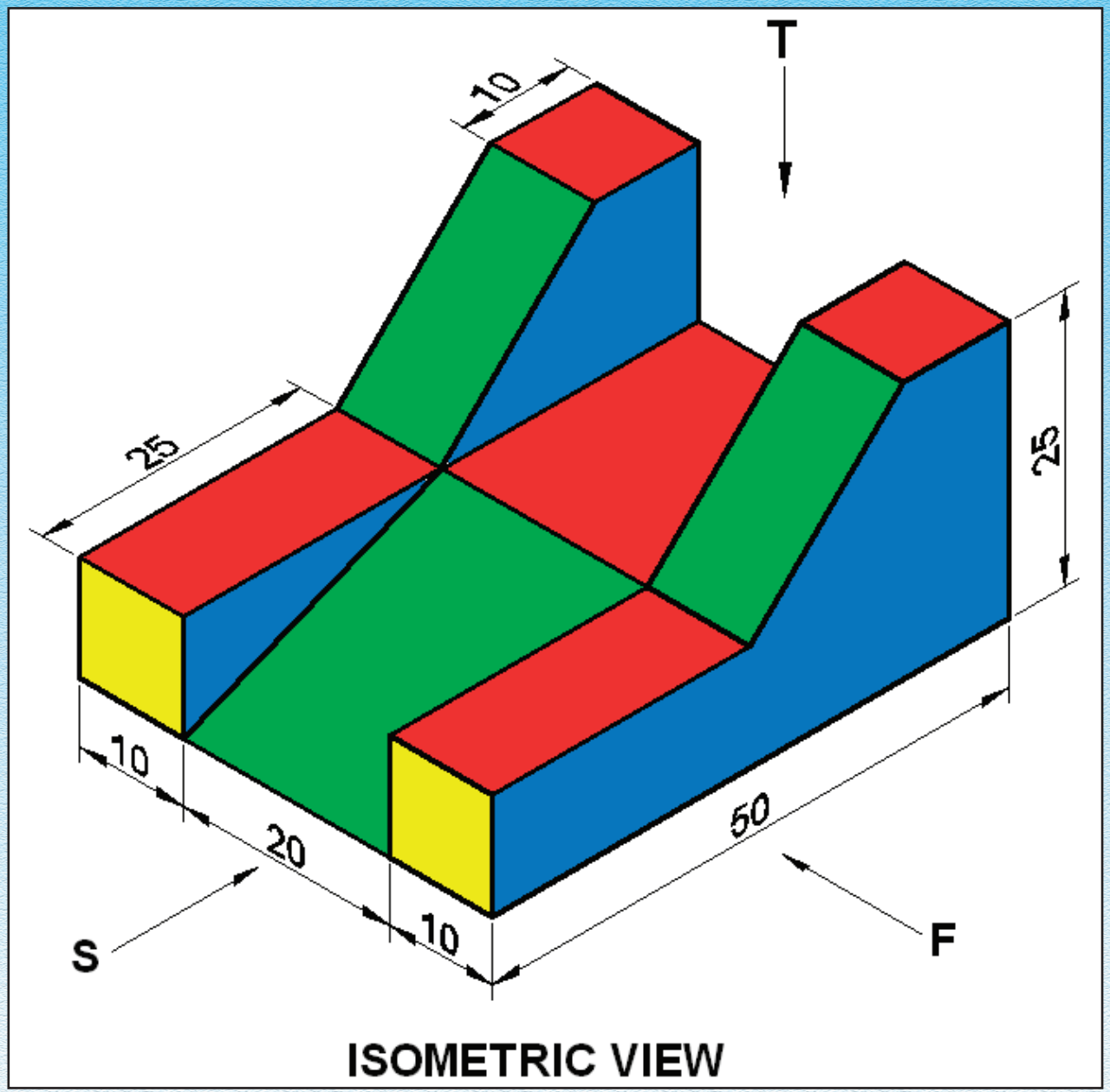


Fig. 6.32

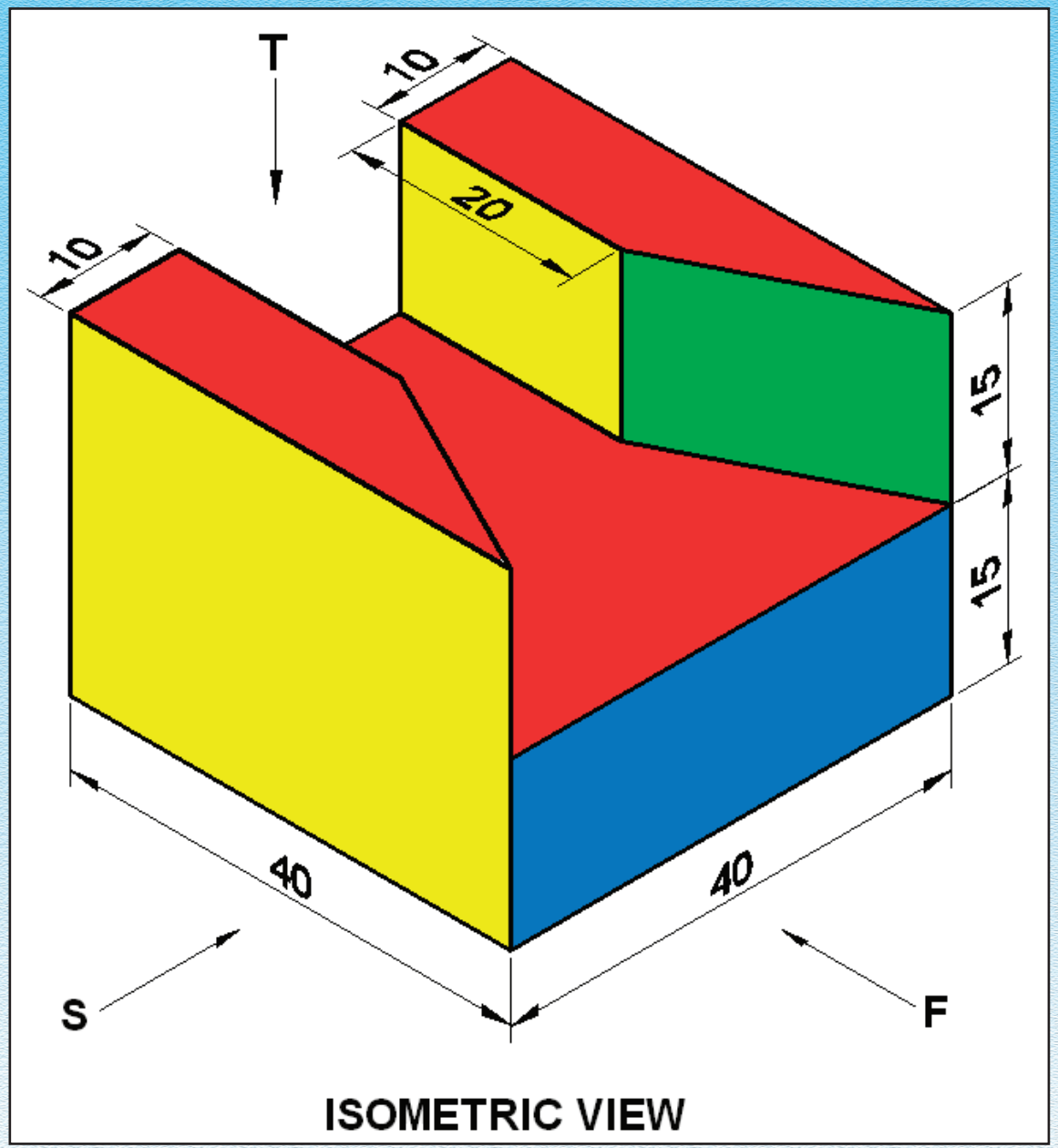


Fig. 6.33

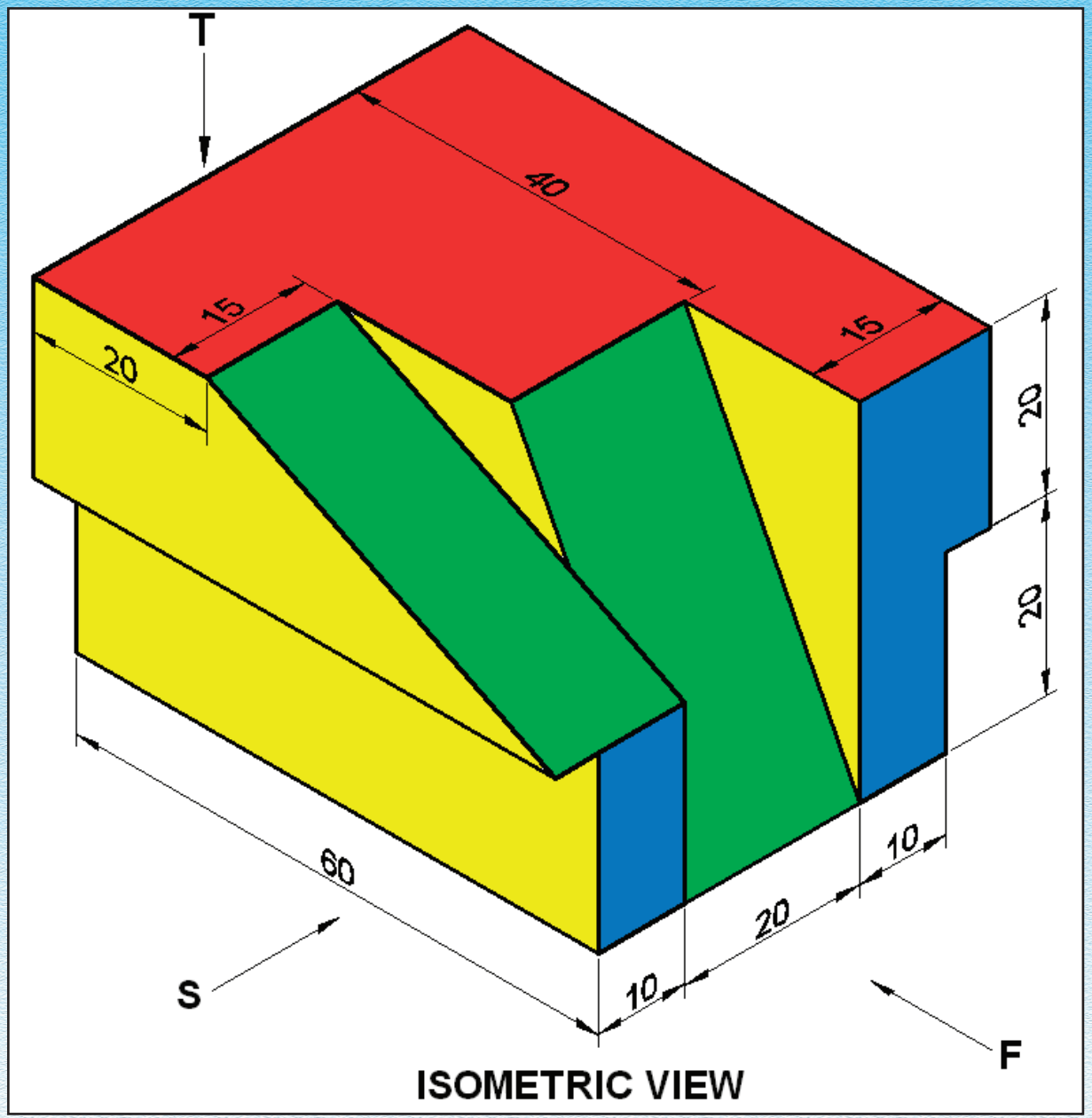
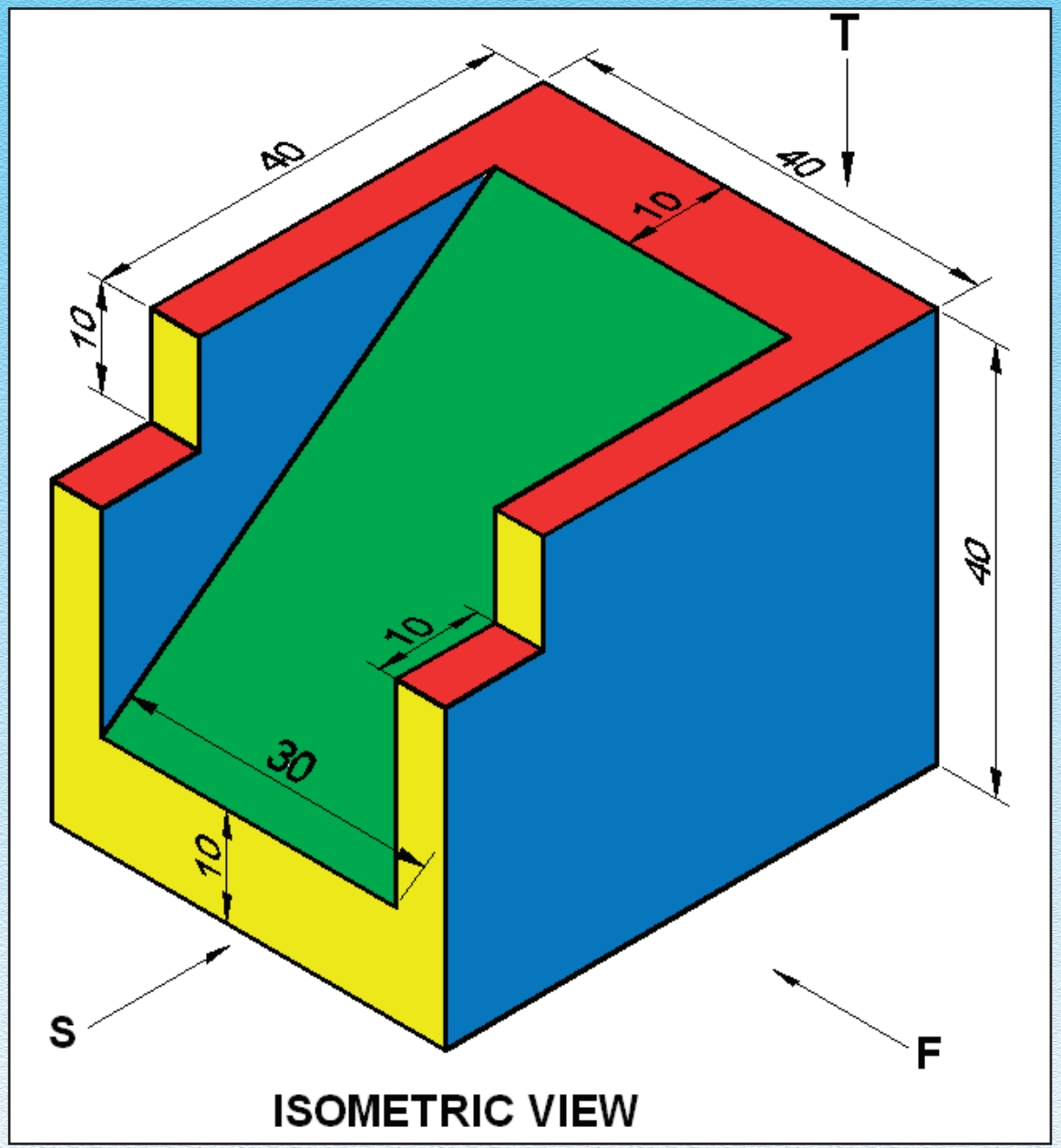


Fig. 6.34



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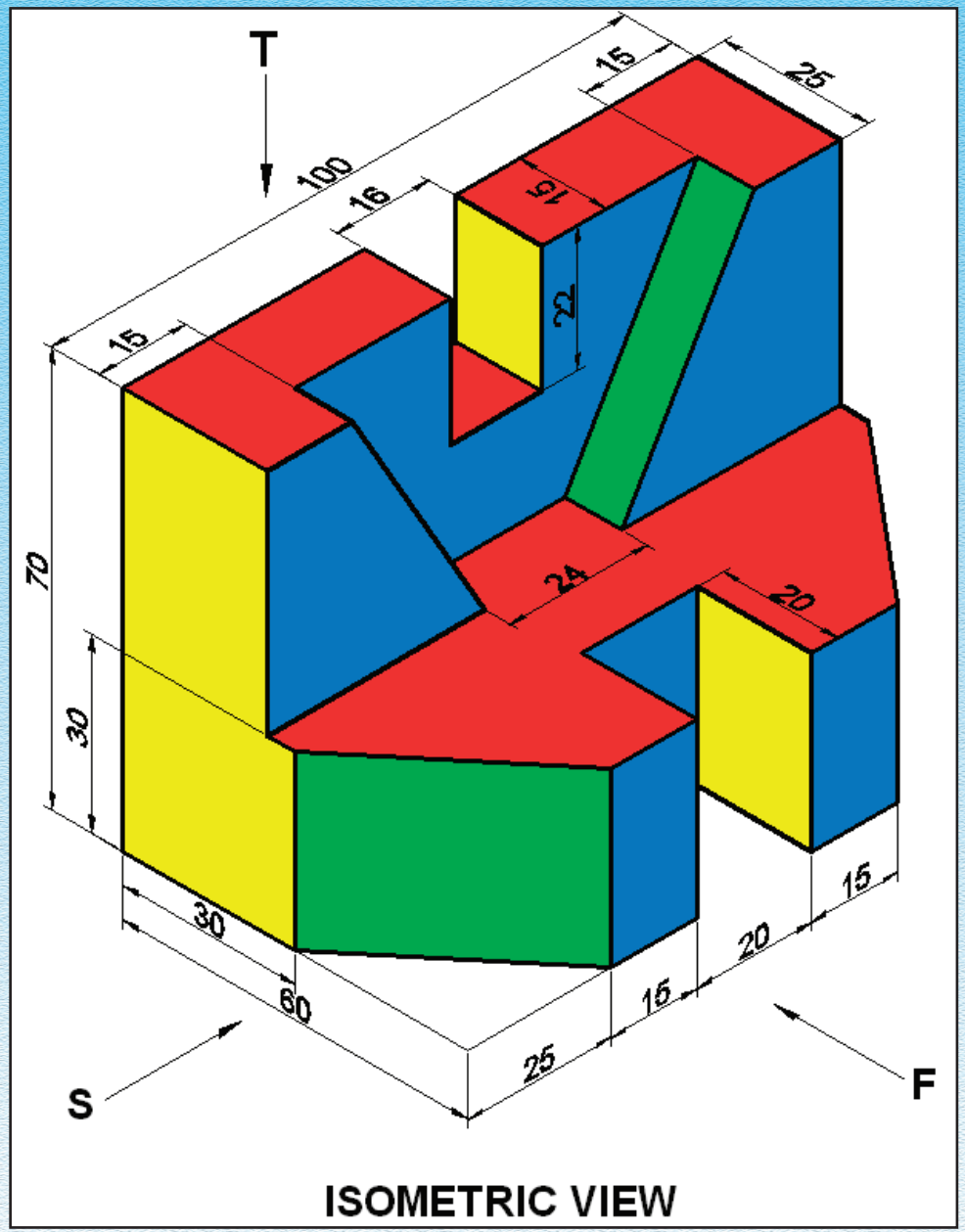
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ISOMETRIC VIEW

Fig. 6.36