CHAPTER 3

BEARINGS

3.1 INTRODUCTION

All of you have seen a bicycle and most of you may know how to ride it. Do you know how a bicycle runs so smoothly and easily? The reason is that friction is greatly reduced by using bearings in the moving parts and you must have oiled/ greased these bearings from time to time.

In the industry also, the bearings are used to help in smooth running of the shafts. There shaft is a rotating circular rod and which is used to transmit power from one machine to another.

So a shaft bearing is a mechanical component used to support or guide a shaft and allow rotational or sliding motion between two or more machine parts. They are widely used in mechanical and industrial applications including automotive, aerospace, industrial machinery etc.

These are broadly classified according to the type of motion as:

1. Plain/sliding contact bearings.
2. Anti-Friction bearings/Rolling Bearings.

We will learn about some of the plain/sliding contact bearings. They have a rotating shaft which has a sliding contact with the bearing which is held stationary. They do best when materials in contact are dissimilar.

Plain/sliding contact bearings are further classified according to leading conditions as:

1. Journal bearings
2. Thrust bearing
3. Pivot bearing

3.2 JOURNAL BEARINGS

In this chapter, we shall learn about Journal bearings, where load on the bearing is normal to the shaft axis. The term 'journal' refers to that part of the shaft which is in contact in the bearing.

Some examples of Journal bearings are:

1. Open bearing
2. Bush bearing

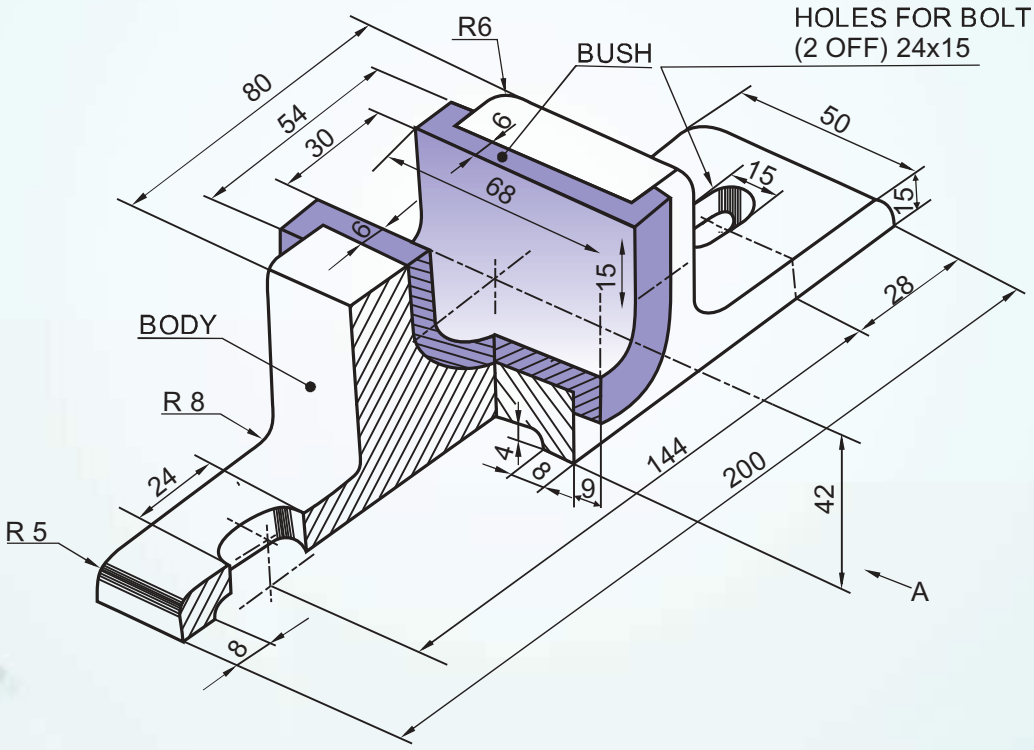
In our syllabus, the assembly and Dis-assembly of such machines are prescribed.

As machines have more than one or numerous components, these components need to be fit in proper position or assembled.

Similarly, to understand & manufacture each individual machine part, the machine has to be disassembled. So let us learn about assembly & dis-assembly with respect to the machines we study.

3.2.1 OPEN BEARING

This type of journal bearing consists of a 'U' shaped cast iron body with a similar shaped collared brass, bronze or gun-metal bush. The bush can be replaced with a new one when worn out. The base plate or sole in the body is recessed leaving a standing material all around, known as padding which helps in the stability of the sole on the resting surface and also reduces the machining area. Usually elongated drilled holes are provided in the sole plate to facilitate any misalignment or lateral adjustments of bolts while fitting the bearing in position on base/floor. This bearing is used for linear and zigzag shafts, which rotate at slow speeds. Now let us understand the different parts shown in Fig. 3.1



OPEN BEARING

Fig. 3.1

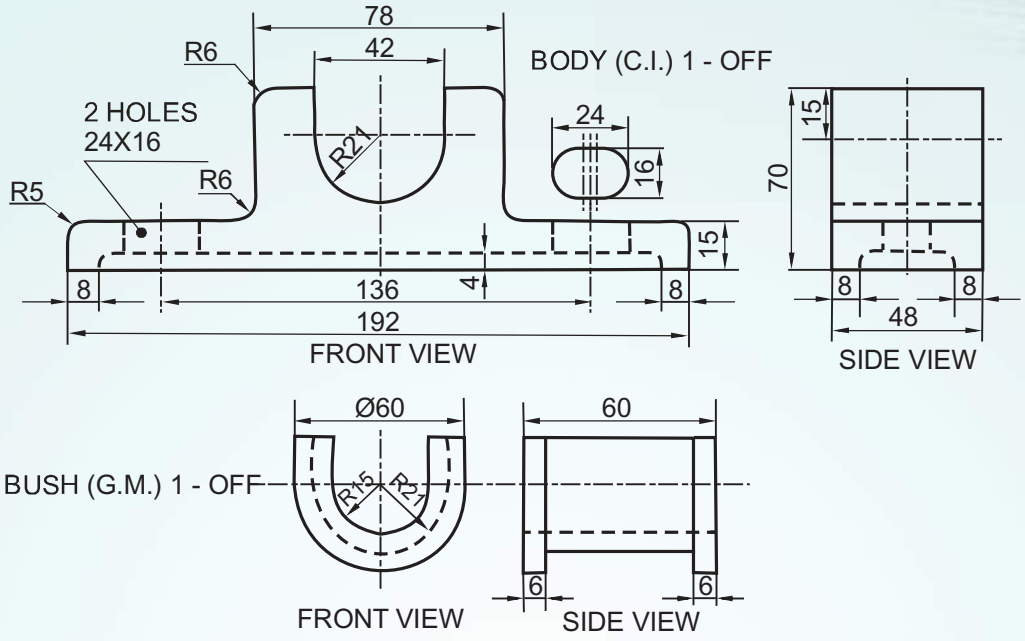
Example:

The figure given below (Fig:3.2) shows the details of an 'Open bearing'. Assemble these parts correctly and then draw its following views to scale1 :1

a. Front view, right half in section.

b. Top view.

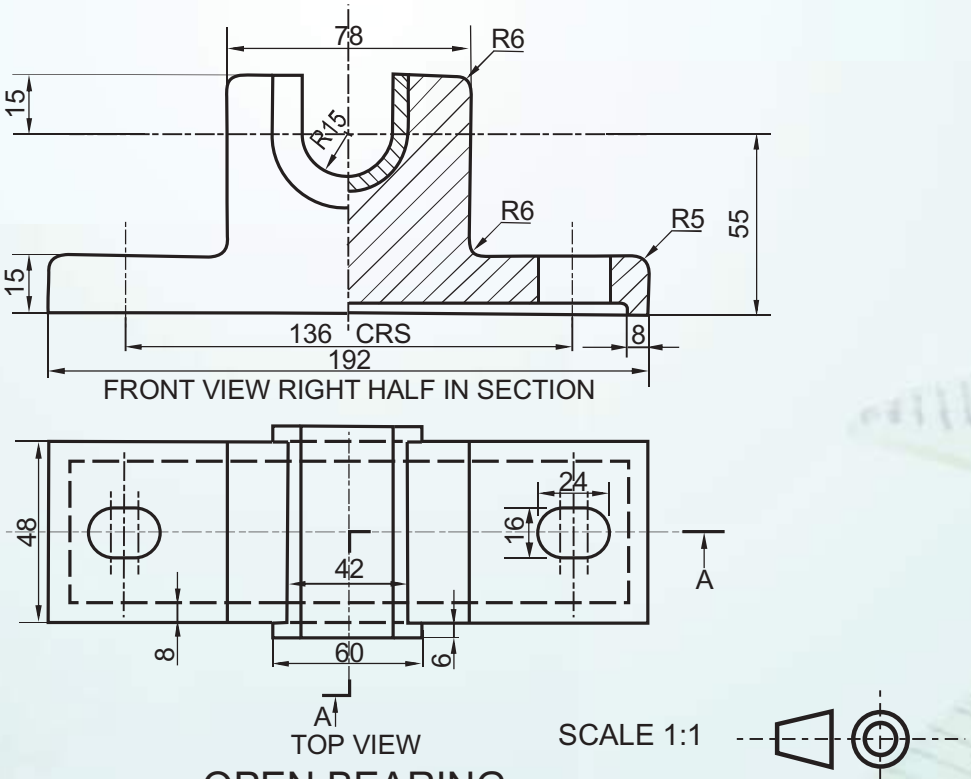
Write heading and scale used. Draw projection symbol. Give '6' important dimensions.



DETAILS OF OPEN BEARING

Fig: 3.2

Solution:



OPEN BEARING

Fig: 3.3

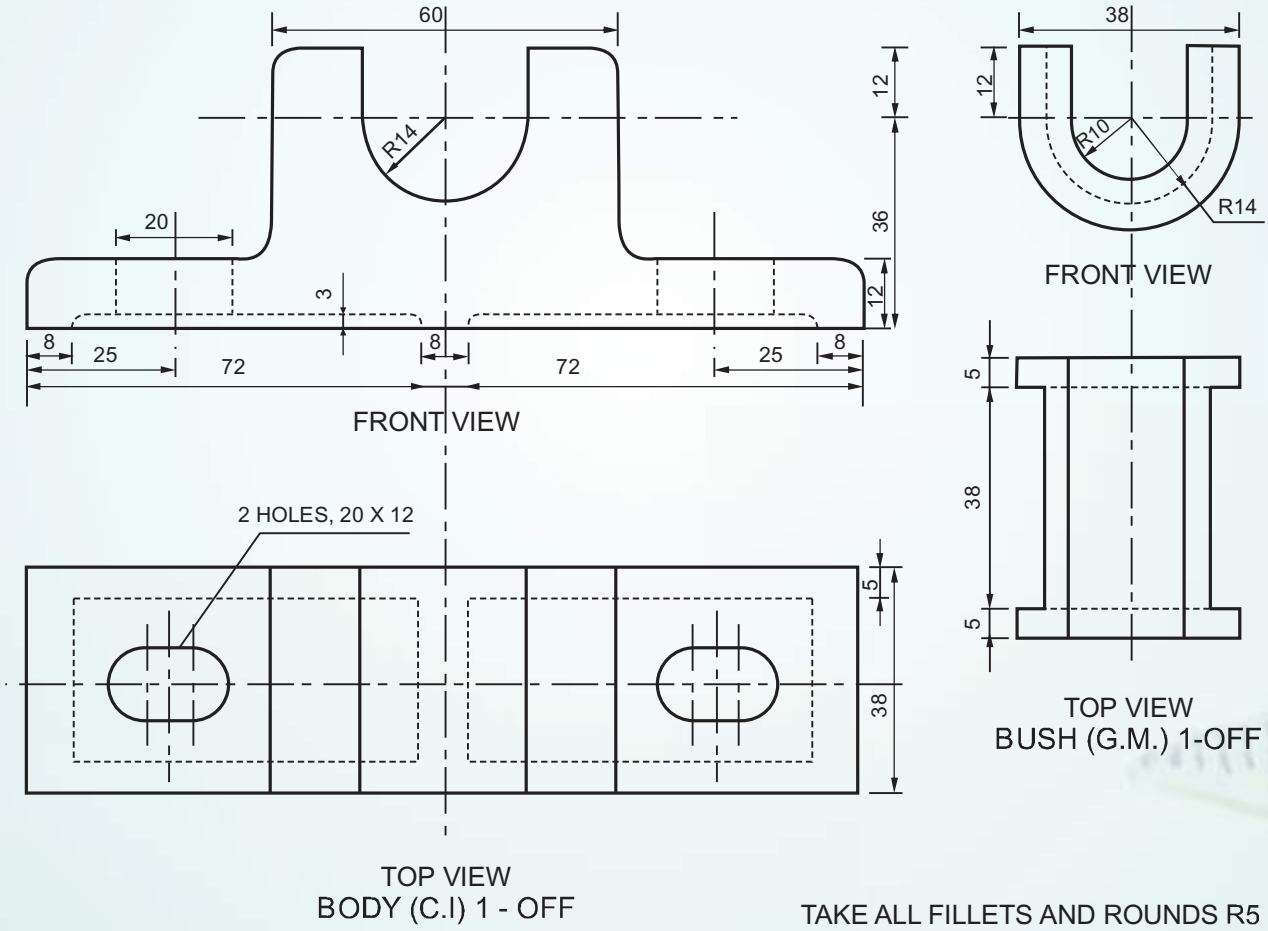
Exercise:

The given figure shows the details of the parts of an OPEN BEARING. Assemble these parts correctly, and then draw the following views to scale 1:1

(a) Front view, left half in section

(b) Left Side view

Print the titles and scale used. Draw the symbol of projection. Give six important dimension.



OPEN BEARING

Fig: 3.4

Example :

The figure given below shows the assembly of an 'Open Bearing'. Dis assemble the parts correctly and then draw the following views of the following parts to scale 1:1, keeping the same position of Body and Bush, with respect to V.P. and H.P.

(a) Body

(i) Front view left half in section

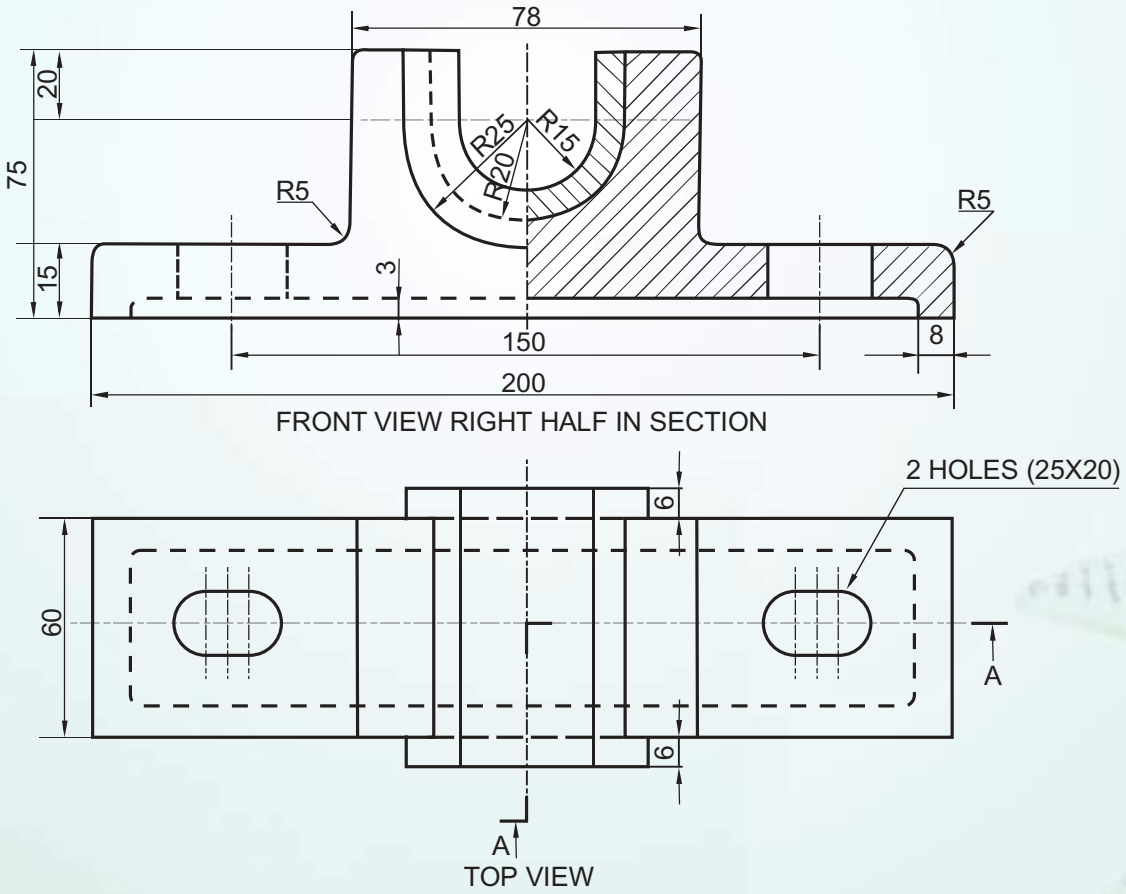
(ii) Top view

(b) Bush

(i) Front view left half in section

(ii) Left side view

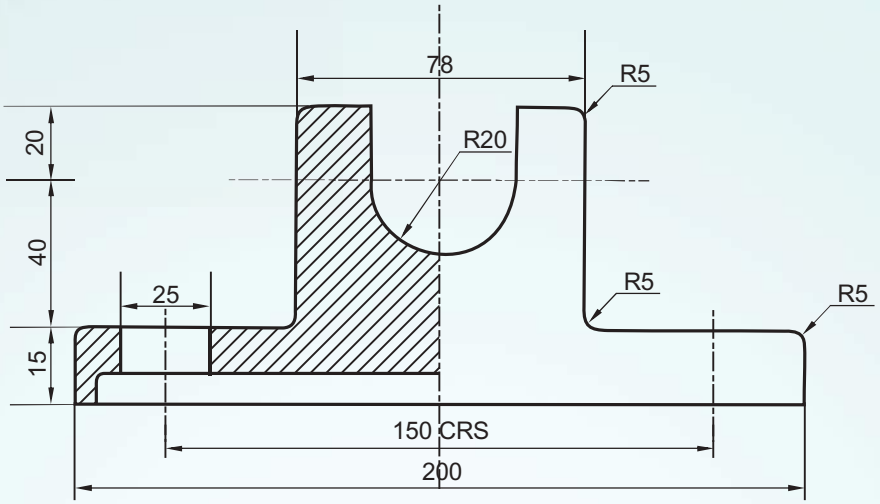
Print titles and the scale used. Draw the projection symbol. Give six important dimensions.



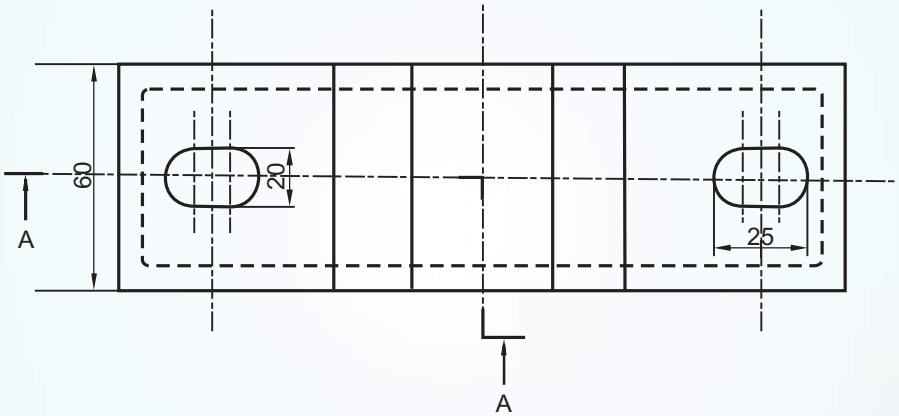
OPEN BUSH BEARING

Fig. 3.5

Solution:

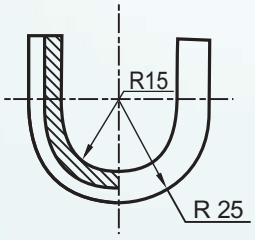


FRONT VIEW LEFT HALF IN SECTION AT AA

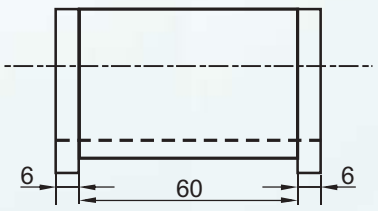


TOP VIEW

BODY



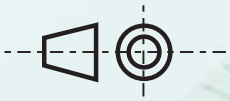
FRONT VIEW
LEFT HALF IN SECTION



LEFT SIDE VIEW

BUSH

SCALE 1:1



OPEN BEARING

Fig. 3.6

Exercise:

The figure given below shows the assembly of an OPEN BEARING. Disassemble the parts and then draw the following views of the following parts to scale 1:1, keeping the same position of both the Base and the Bush, with respect to H.P. and V.P.

(a) BASE

(i) Front view, showing left half in section

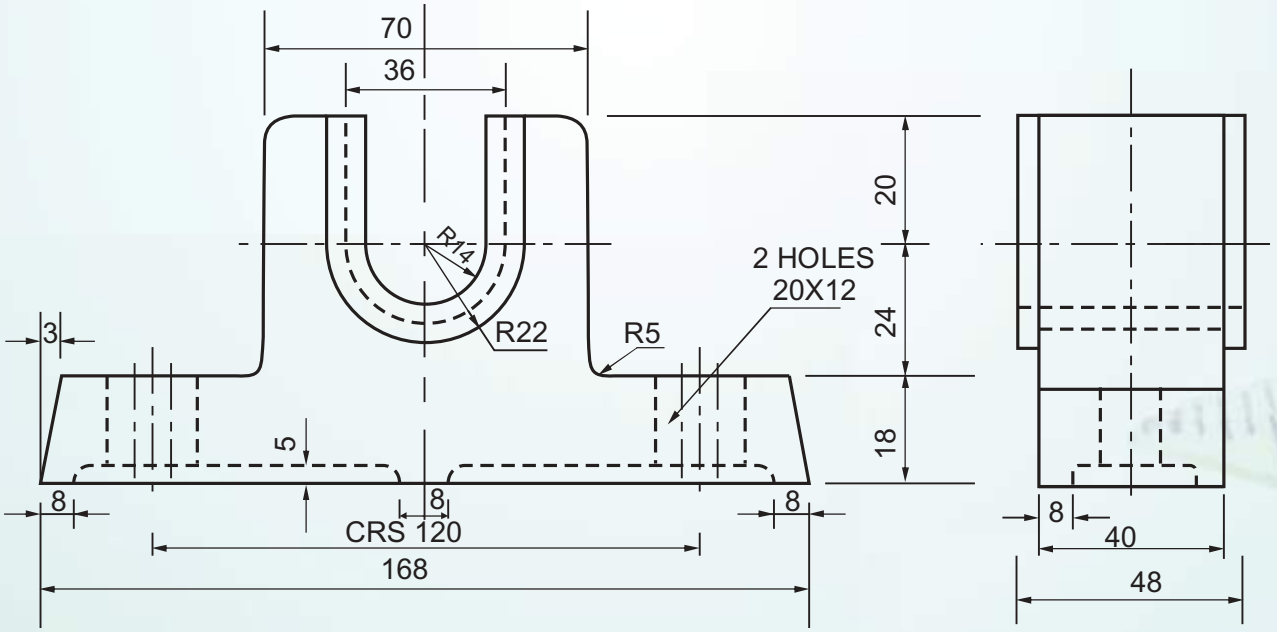
(ii) Top view

(b) BUSH

(i) Front view, showing right half in section

(ii) Top view

Print titles and the scale used. Draw the projection symbol. Give six important dimensions.



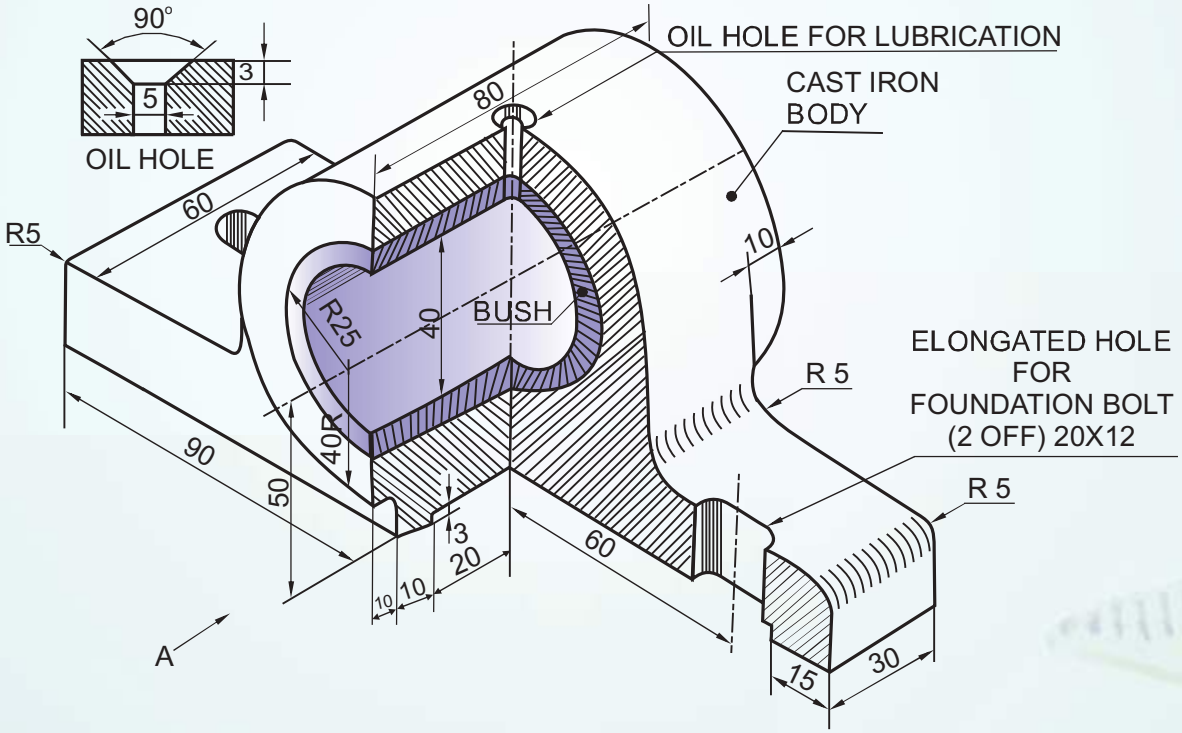
OPEN BEARING

Fig. 3.7

3.2.2 BUSH BEARING

It is a journal bearing in which the bush is made of some soft material such as brass, bronze or gun metal. This bearing is useful for higher loads at medium speed. The bush is tightly fitted into a bored hole in the body of the bearing. The inside of the bushes is bored as a fit for the shaft. The sole is recessed for better stability on the surface.

A counter sunk hole is drilled at the top of the body to pour the lubricant which helps to reduce friction between the shaft and bush. The holes for the bolts in the sole plate are elongated towards the width. This bearing is generally placed only at or near the ends of the shaft, as the shaft can be inserted end wise only.



BUSH BEARING

Fig. 3.8

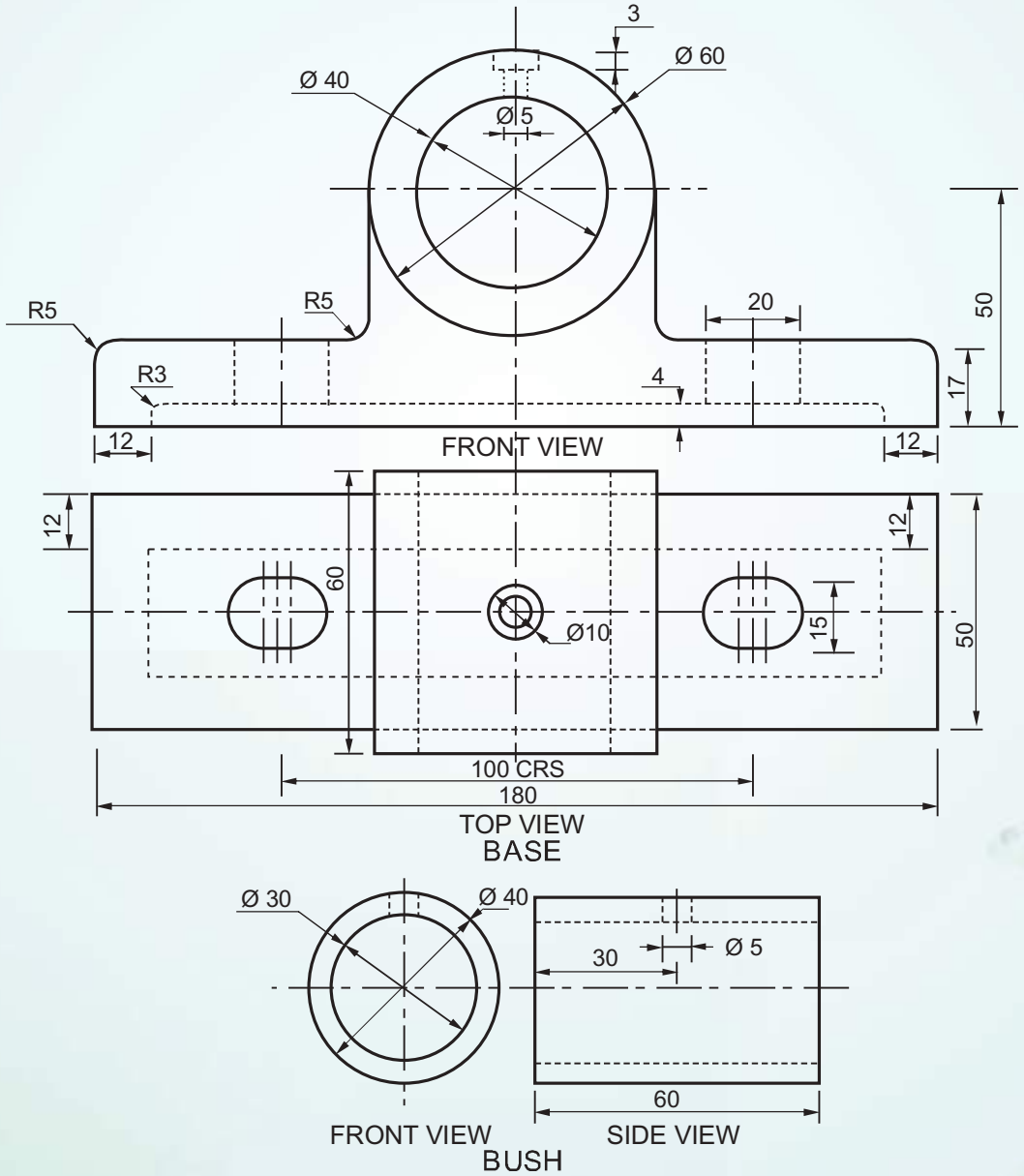
Example :

The figure given below shows the details of the parts of a Bush Bearing. Assemble these parts correctly and then draw its following views to a scale 1:1

a. Front view, right half in section

b. Top view

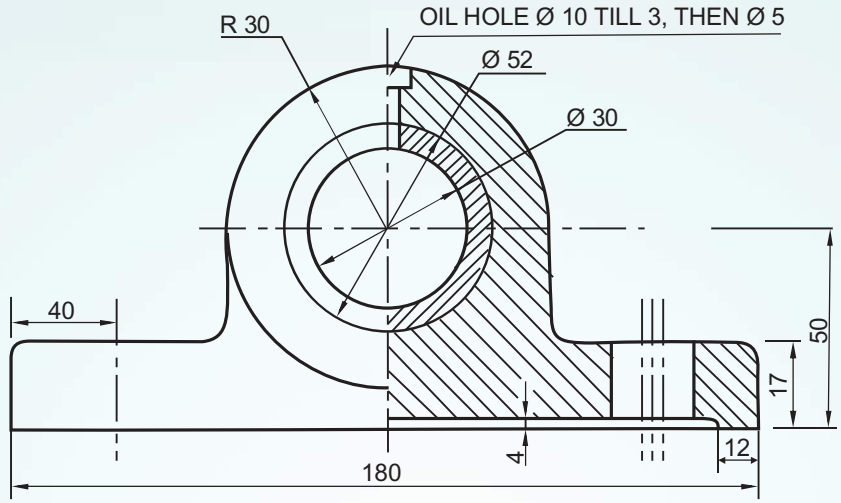
Print titles and the scale used. Draw the projection symbol. Give six important dimensions.



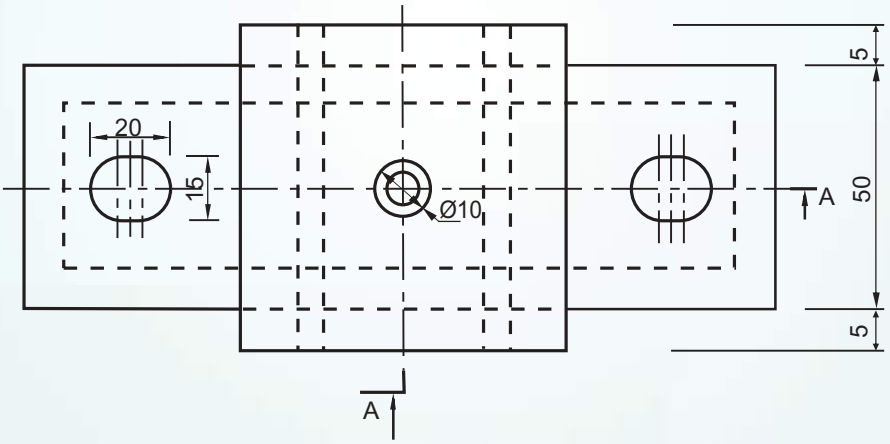
BUSH BEARING

Fig. 3.9

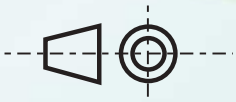
Solution :



FRONT VIEW RIGHT HALF IN SECTION



TOP VIEW

SCALE 1:1 

BUSH BEARING

Fig. 3.10

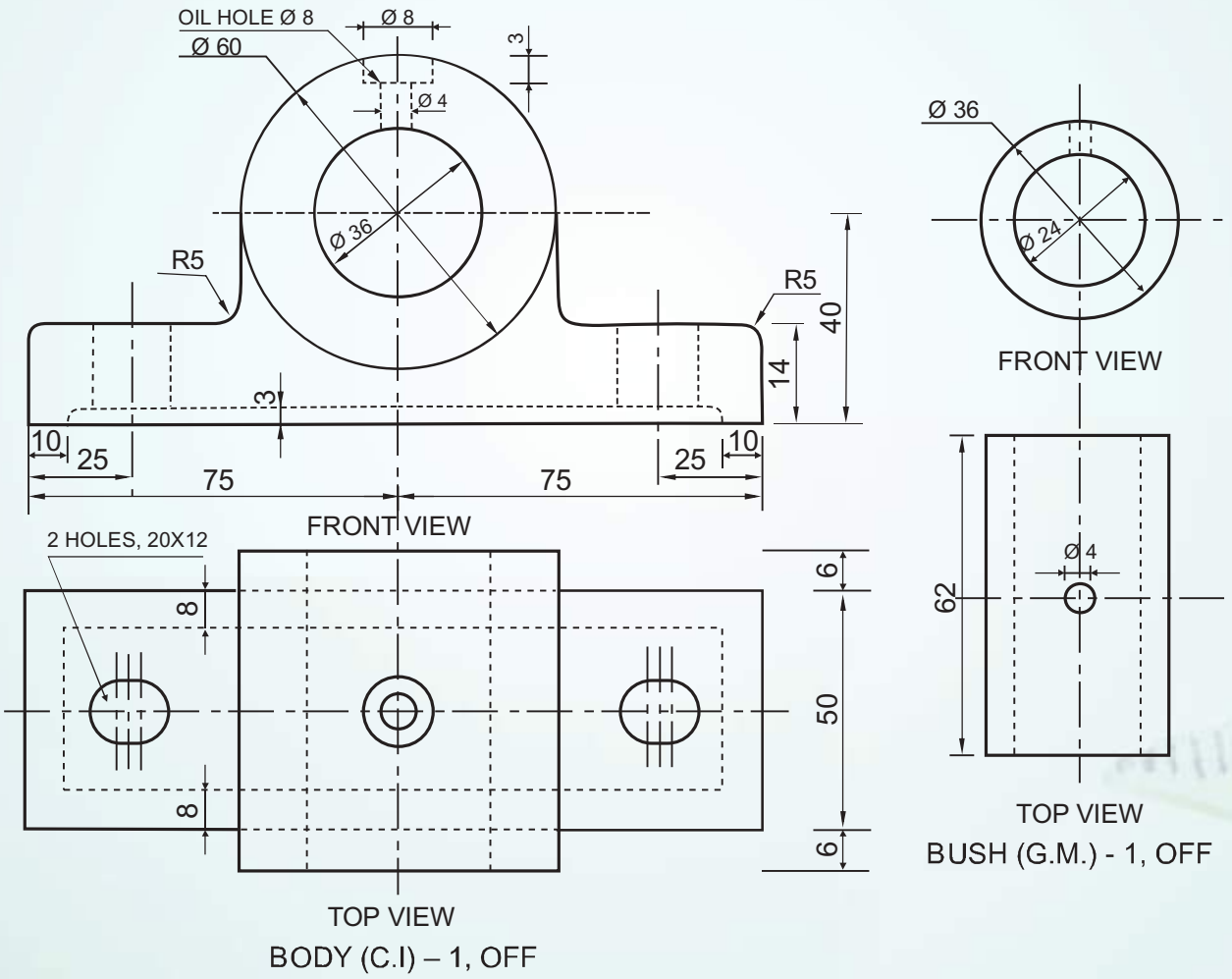
Exercise :

The given figure shows the details of the parts of a BUSH BEARING. Assemble these parts correctly, and then draw to scale 1:1, the following views.

(a) Front view, left half in section

(b) Right side view

Print titles and the scale used. Draw the projection symbol. Give six important dimensions.



BUSH BEARING

Fig. 3.11

Example :

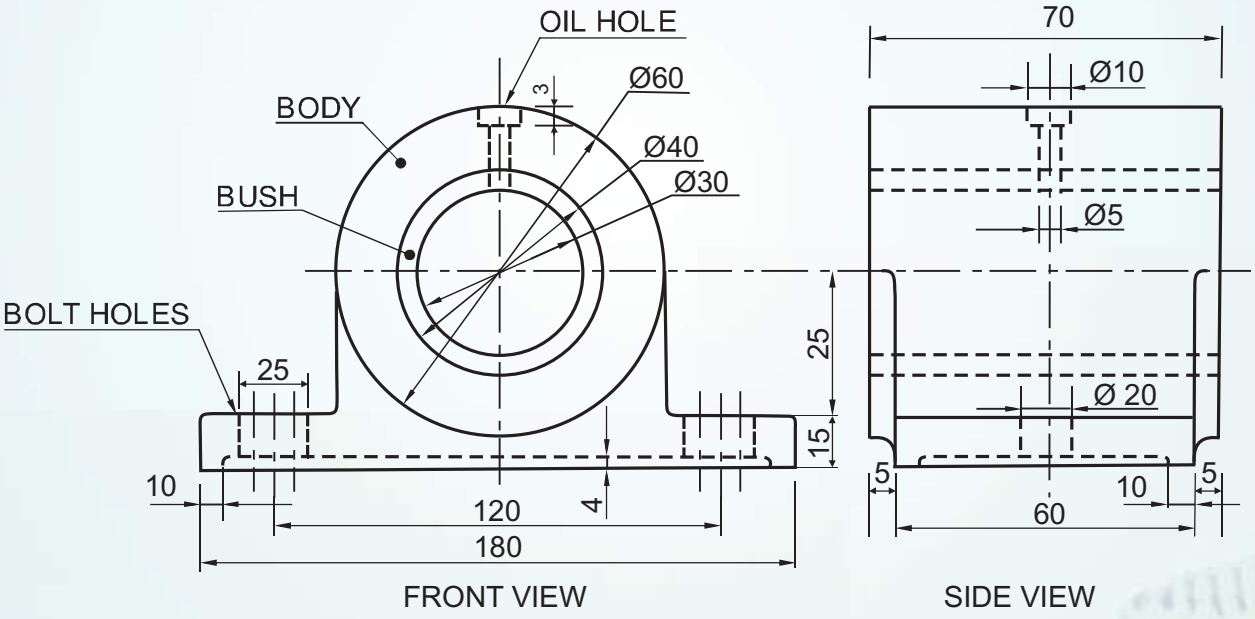
The figure given below shows the assembled front view and the side view of a Bush Bearing. Disassemble the body and the bush and draw the following views to a scale 1:1, keeping the same position of both the body and the bush, with respect to H.P. and V.P.

a. BODY - Front view, showing right half in section and its Top view.

b. BUSH - Front view, showing left half in section and its Top view.

c. Print titles of both and scale used. Draw the projection symbol. Give 8 important dimensions.

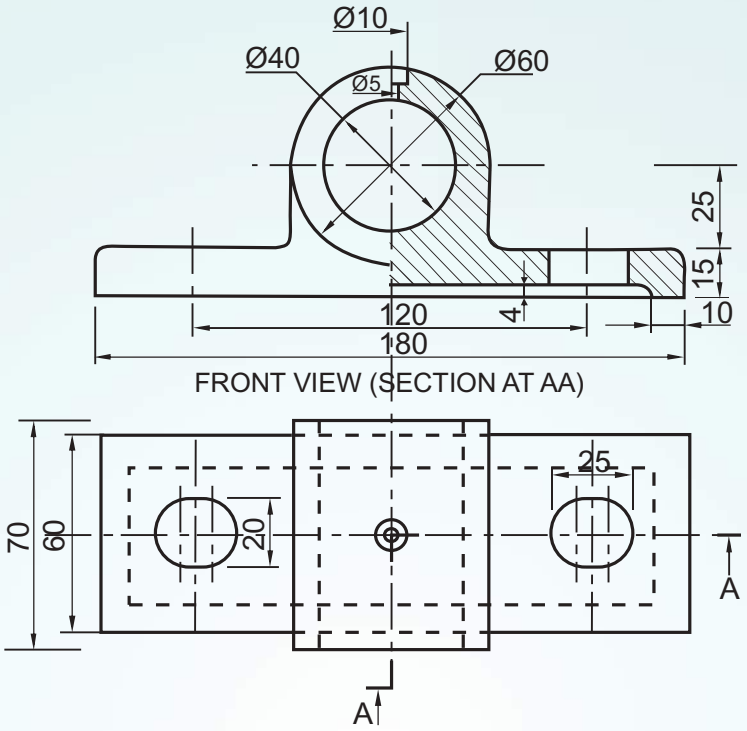
Note : Take R4 Radius for All Fillets And Rounds.



BUSH BEARING

Fig. 3.12

Solution :



BUSH BEARING

Fig. 3.13

Exercise :

The figure given below shows the front view and side view of the assembly of Bush Bearing. Disassemble the parts and draw the views of the following parts to scale 1:1. Keep the same position of the parts with respect to H.P. and V.P.

(a) BODY

(i) Front view, left half in section

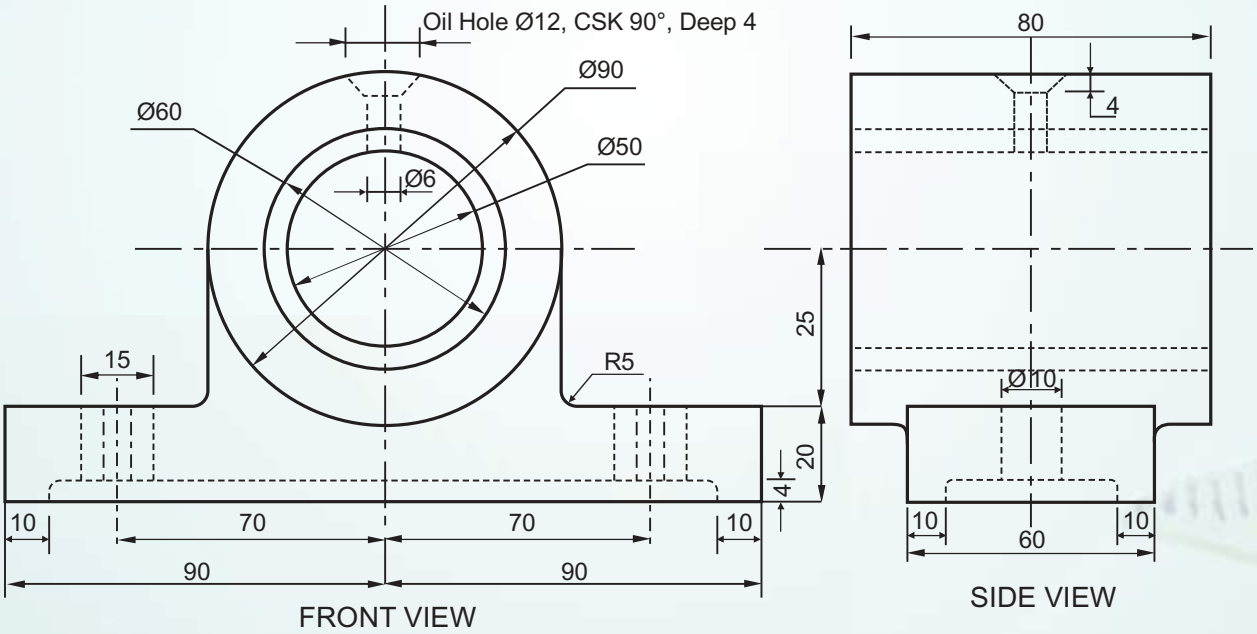
(i) Side view

(b) BUSH

(i) Front view, right half in section

(ii) Top view

Print titles and the scale used. Draw the projection symbol. Give six important dimensions.



BUSHED BEARING

Fig. 3.14