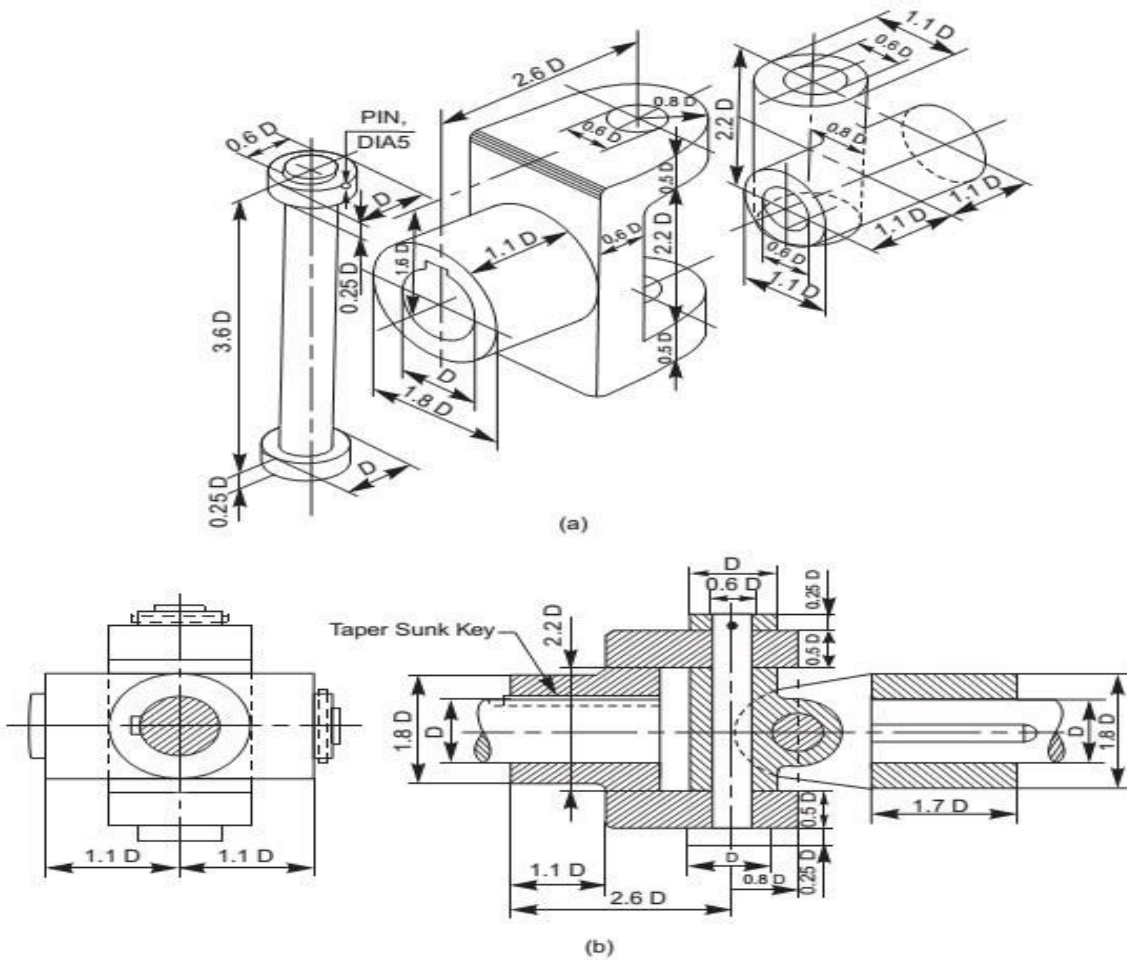


CHAPTER-2

UNIVERSAL COUPLING AND OLDHAM COUPLING (ASSEMBLY)

➤ UNIVERSAL COUPLING

Universal coupling is also known as Hooke's joint. It is used to couple two shafts whose axes are not in line with each other, but intersecting at small angle 30 degree.



DIGITAL LINK FOR ASSEMBLY OF UNIVERSAL COUPLING

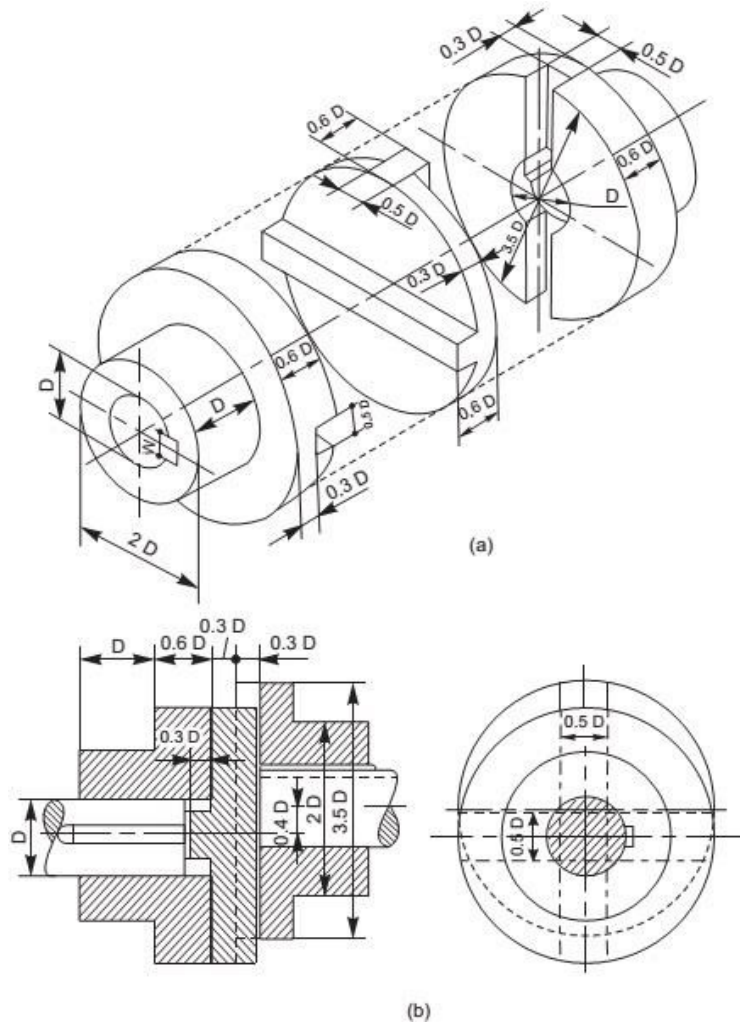
- 1 <https://youtu.be/mYsCd6xduJw>
2 <https://youtu.be/yT8DqQHZo2U>
3 <https://youtu.be/hLFg9G9Q-oE>

DIGITAL LINK FOR ASSEMBLY OF OLDHAM COUPLING

- 1 <https://youtu.be/ffBIXGXaz2s>
- 2 <https://youtu.be/eQlwU97rRYI>

➤ OLDHAM COUPLING

This Coupling is used to connect two shafts where axes are parallel, but not in alignment. This type of coupling is suitable for transmitting heavy running at constant speed even when axial alignment varies.

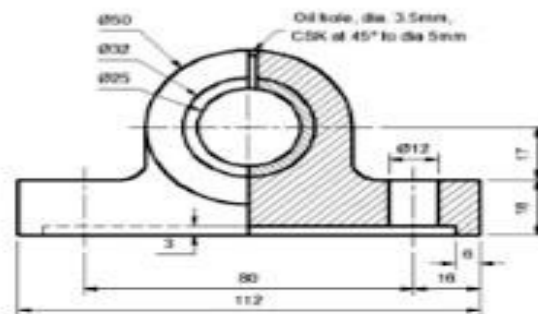
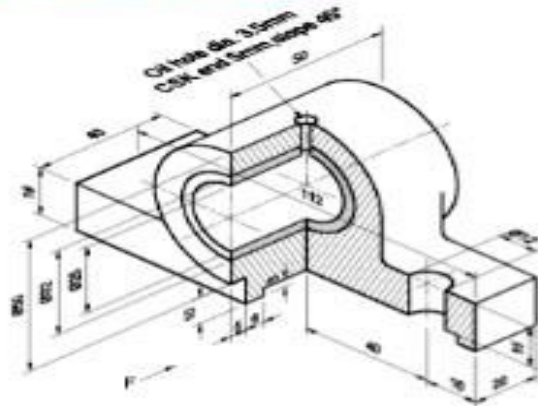


BEARINGS

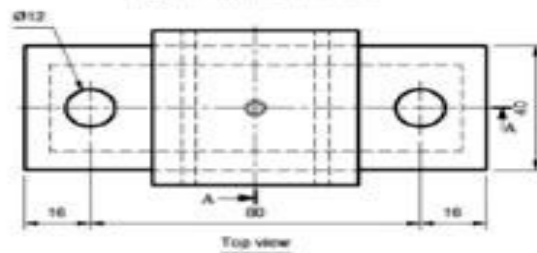
BUSHED BEARING (ASSEMBLY)

It is the modification of solid bearing. There is hole which support the rotating shaft. The bush should not rotate with shaft.

10) Pictorial view of a bushed bearing is shown below. Draw the right half sectional front view and top view.



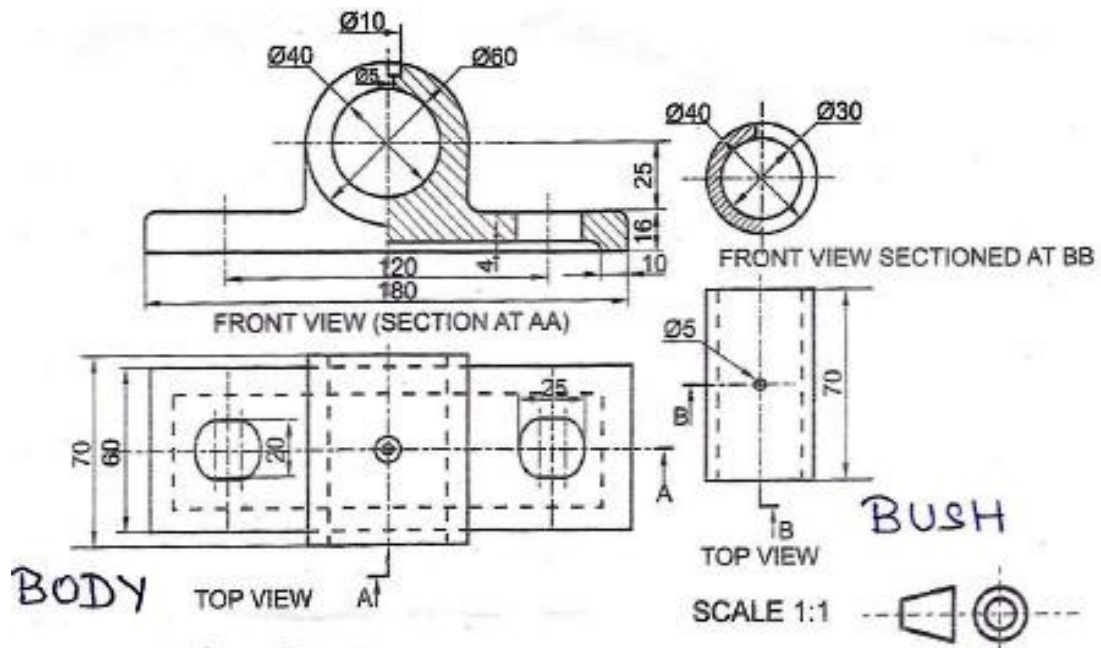
Right Half Sectional Front view



Top view

DIGITAL LINK OF ASSEMBLY OF BUSH BEARING

1 <https://youtu.be/0hLe342TIOw>

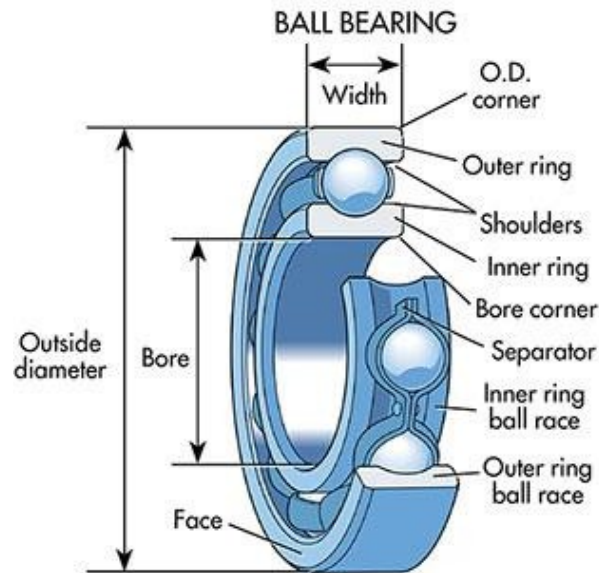


Either there should be force fit between the body and the bush. The material used for the bush is brass, gun metal and phosphor-bronze.

BALL BEARING AND ROLLER BEARING (ASSEMBLY)

➤ Ball Bearing

Ball bearing is used to minimize the friction. These are used on large and fast moving machine. Wear and tear is practically negligible. These bearing require small space and much small quantity of lubricant. The balls are made of high carbon chrome steel hardened and polished whereas the cage is made of steel or brass.



Side View

➤ Roller Bearing

Roller bearing is used to change the sliding friction into pure rolling friction. Roller bearing are used on large and fast running machines such that electric motor, automobile etc. The roller are made of high carbon steel hardened and polished whereas cage is of steel or brass.

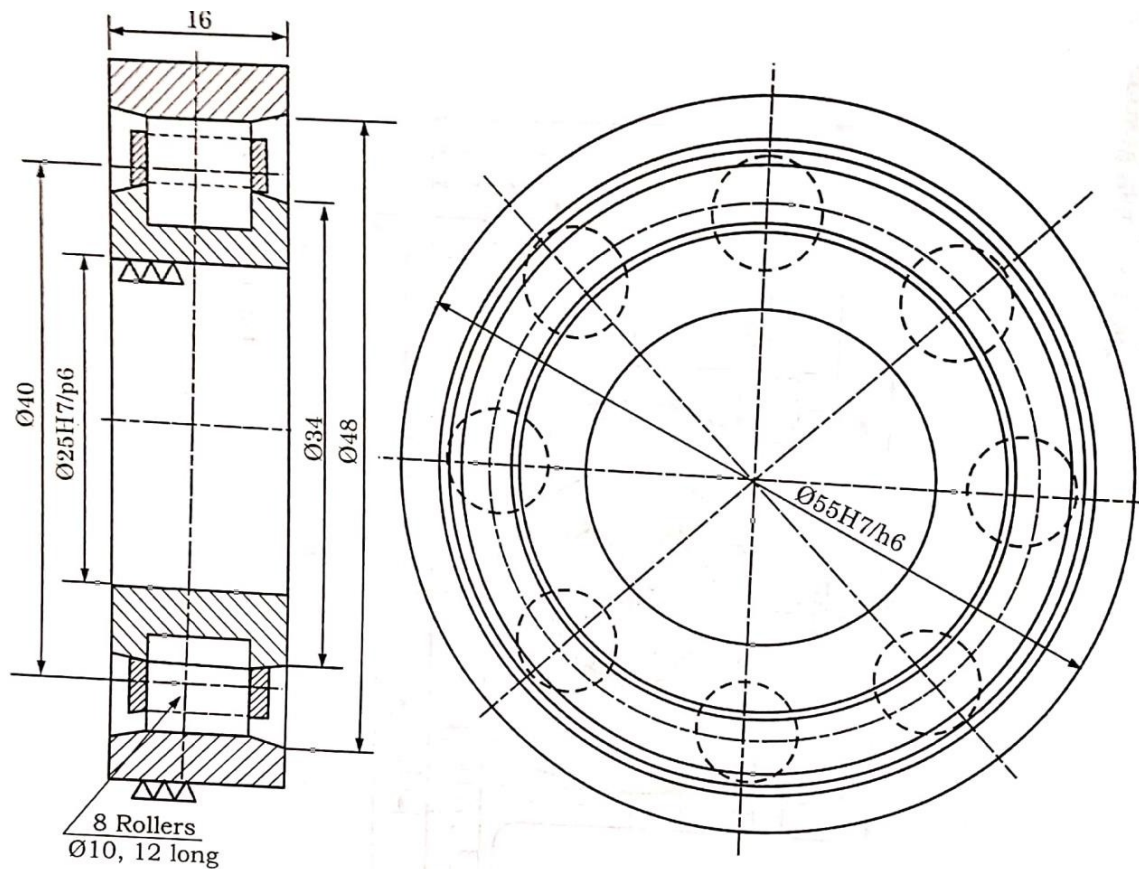
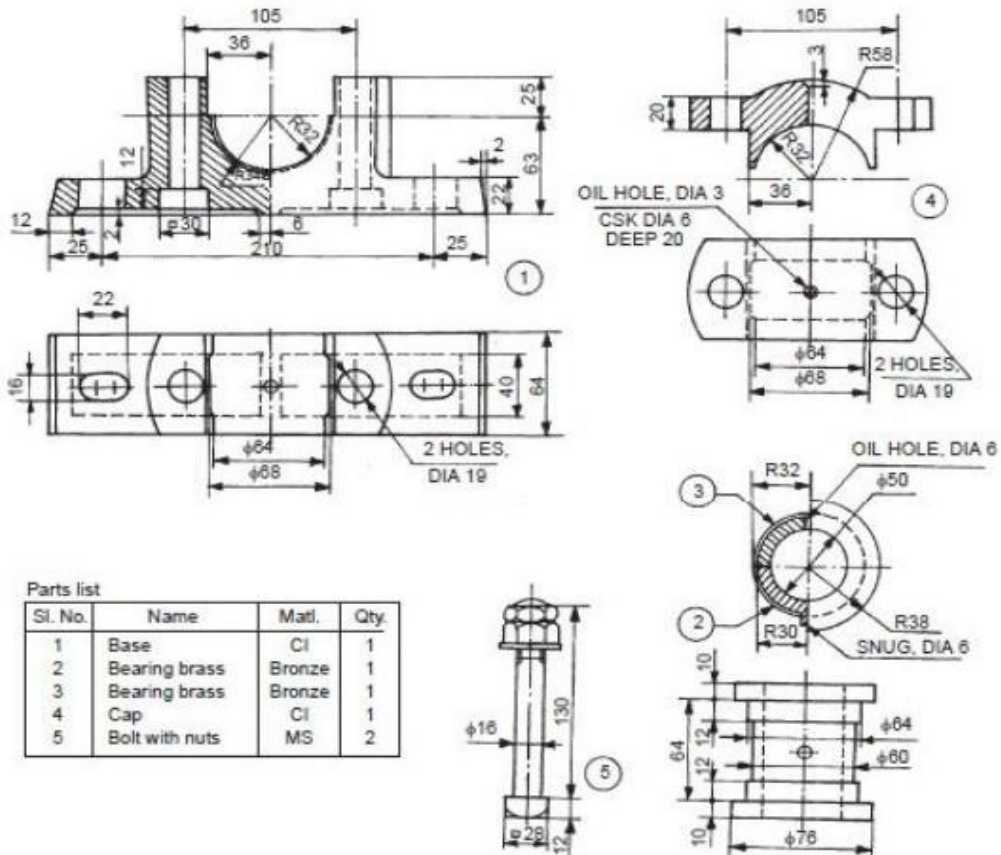


Fig. 4.13 : Roller Bearing

PLUMMER BLOCK (ASSEMBLY)

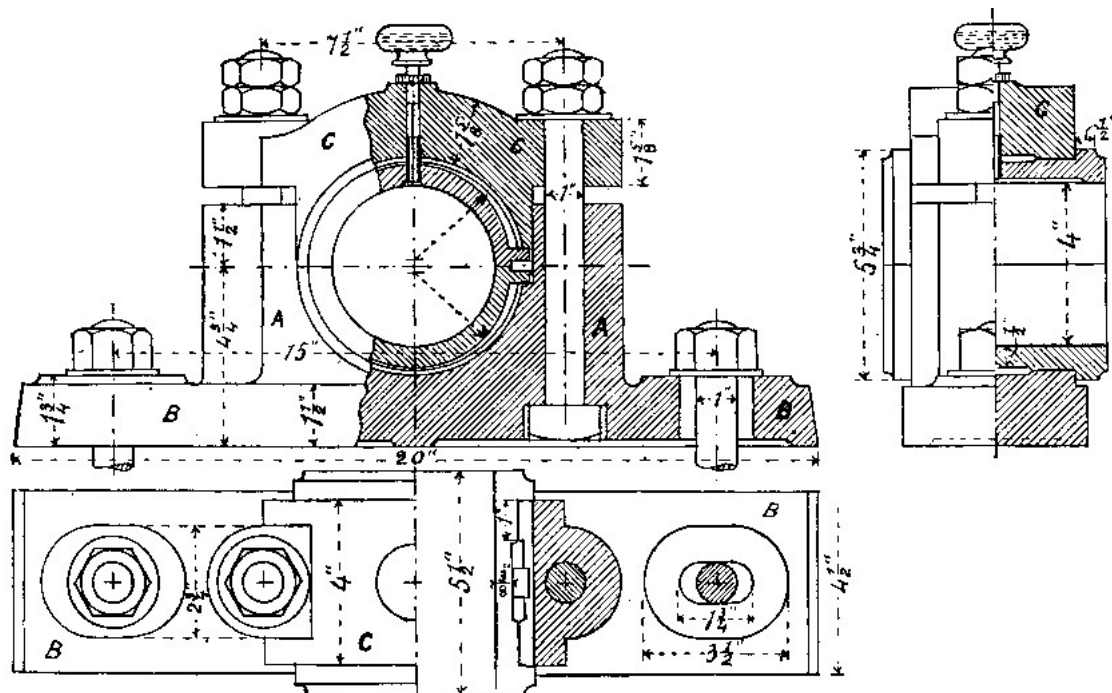
Plumber block is like a journal bearing. When load varies and speed of rotating shaft is too high, plumber block is used.



DIGITAL LINK OF ASSEMBLY OF PLUMBER BLOCK

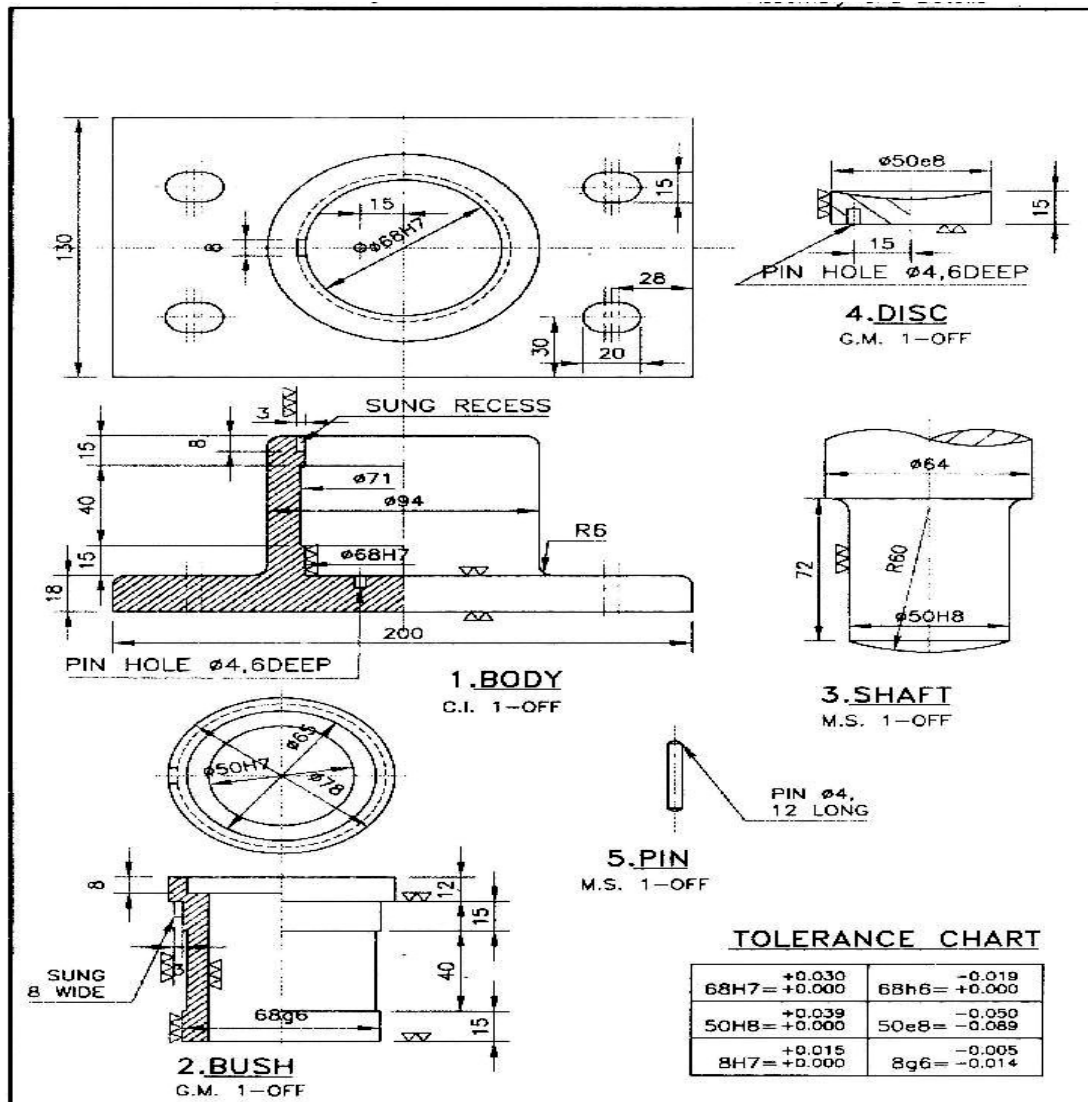
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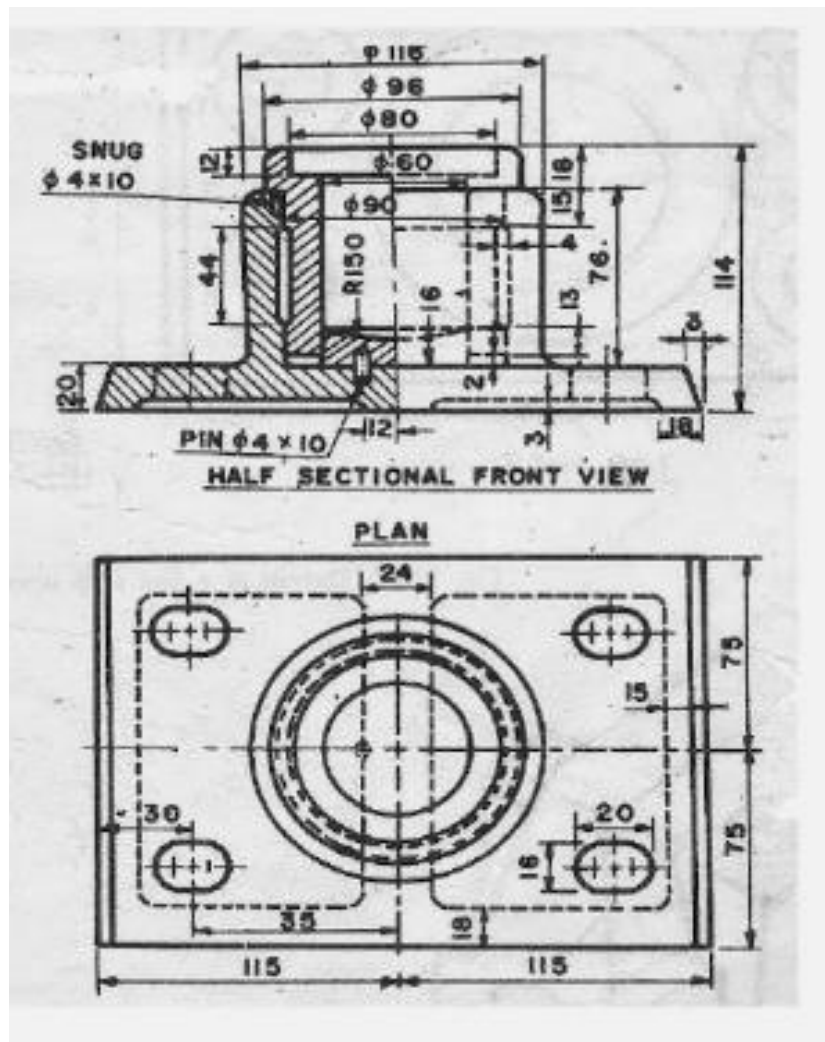
FOOT STEP BEARING (ASSEMBLY)

It is used to support the lower end of a rotating shaft. It consist of cast iron circular block with a base.



DIGITAL LINK FOR ASSEMBLY OF FOOT STEP BEARING

<https://youtu.be/rtdoggy5YMs>



A footstep bearing consists of a cast iron block into which a bush consisting of a collar at the top is fitted. The shaft rests on a pad. The pad is prevented from rotating by a pin, inserted half inside the block and half in the pad and away from the center. The collar of the bush is made hollow to serve as an oil sump for lubrication of the bearing. Since, it is subjected to heavy thrust loads along the axis of the shaft and operates without clearance between the conjugate parts, an adequate supply of oil to the rubbing surfaces is extremely important for footstep bearings.

PULLEYS

PULLEYS, FUNCTION OF PULLEY, TYPES AND MATERIALS OF PULLEY

- **Pulley:** Pulleys are used to transmit power from one shaft to another shaft with the help of belts and ropes at a distance. Pulleys are generally consist of three parts:
 - (i) Hub or boss
 - (ii) Rim
 - (iii) Web or arms
- **Types of Pulley:**
 - (1) Stepped Pulley
 - (2) Fast and Loose pulley
 - (3) V- Belt Pulley
- **Material of Pulley:**

Pulleys are Generally made of Cast iron, wrought iron, steel and wood.

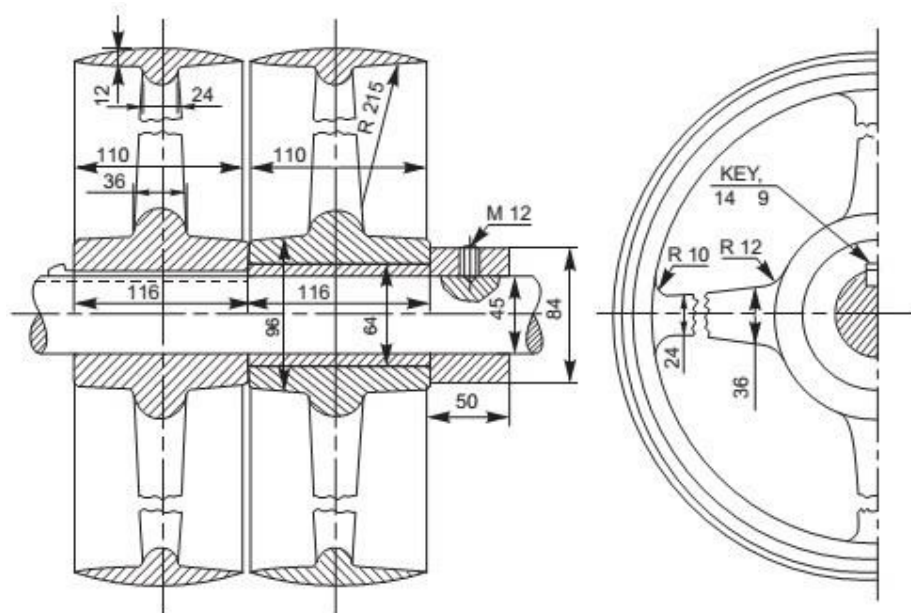
FREE HAND SKETCH OF VARIOUS TYPES OF PULLEYS

- **To be drawn the Students at their own by taking proportionate dimentions**

FAST AND LOOSE PULLEY

A fast pulley is keyed to the machine shaft while the loose pulley runs freely. The belt runs over the fast pulley to transmit power by the machine and it is shifted to the loose pulley when the machine is not required to transmit power. By this way, stopping of one machine does not interfere with the other machines which run by the same line shaft. Paper Pulleys, Fast and Loose Pulleys. The loose pulley is provided with a cast iron or gun-metal bush with a collar at one end to prevent axial movement. The rim of the fast pulley is made larger than the loose pulley so that the belt may run slackly on the loose pulley. The loose pulley usually have longer hub in order to reduce wear and friction and it requires

proper lubrication. Fast and loose pulley drive, is used when the driven or machine shaft is to be started or stopped when ever desired without interfering with the driving shaft. A pulley which is keyed to the machine shaft is called fast pulley and runs at the same speed as that of machine shaft. A loose pulley runs freely over the machine shaft and is incapable of transmitting any power.



PIPE JOINTS

TYPES OF PIPE JOINTS, SYMBOL & LINE LAYOUT OF PIPE LINES

➤ Pipe Joint :

Pipe joints can be connected together to increase the length of pipe or pipes can be connected to different fittings to obtain the required layout. Types of pipe Joints:

- (iv) Cast Iron Flanged Joint
- (v) Socket and Spigot Joint
- (vi) Hydraulic Joint
- (vii) Union Joint
- (viii) Expansion Joint

➤ Symbol:

Piping symbols					
	General joint		End caps		Tundish
	Butt weld		End caps		
	Soldered / Solvent		End caps		
	Screwed joint		Strainer		Bell mouth
	Socket and spigot		Separator		
	Sleeve joint		Exhaust silencer		Exhaust head
	Socket weld		Drain silencer		
	Flanged / bolted		Syphon drain		
	Swivel joint		Hydrant		Bursting disc
	Electrically bonded		Y strainer		
	Electrically insulated				
	Open vent		Liquid seal open/closed		Flame arrester

EXPANSION JOINT

The pipe which carry steam at very high pressure have the provision of longitudinal expansion due to change in temperature. The expansion pipe joint is provided with gland and stuffing box to make it steam tight perfectly. The pipe which is inserted in the stuffing box is free to move in the box. To prevent the leakage of steam asbestos packing is used. A brass liner is also attached to prevent corrosion.

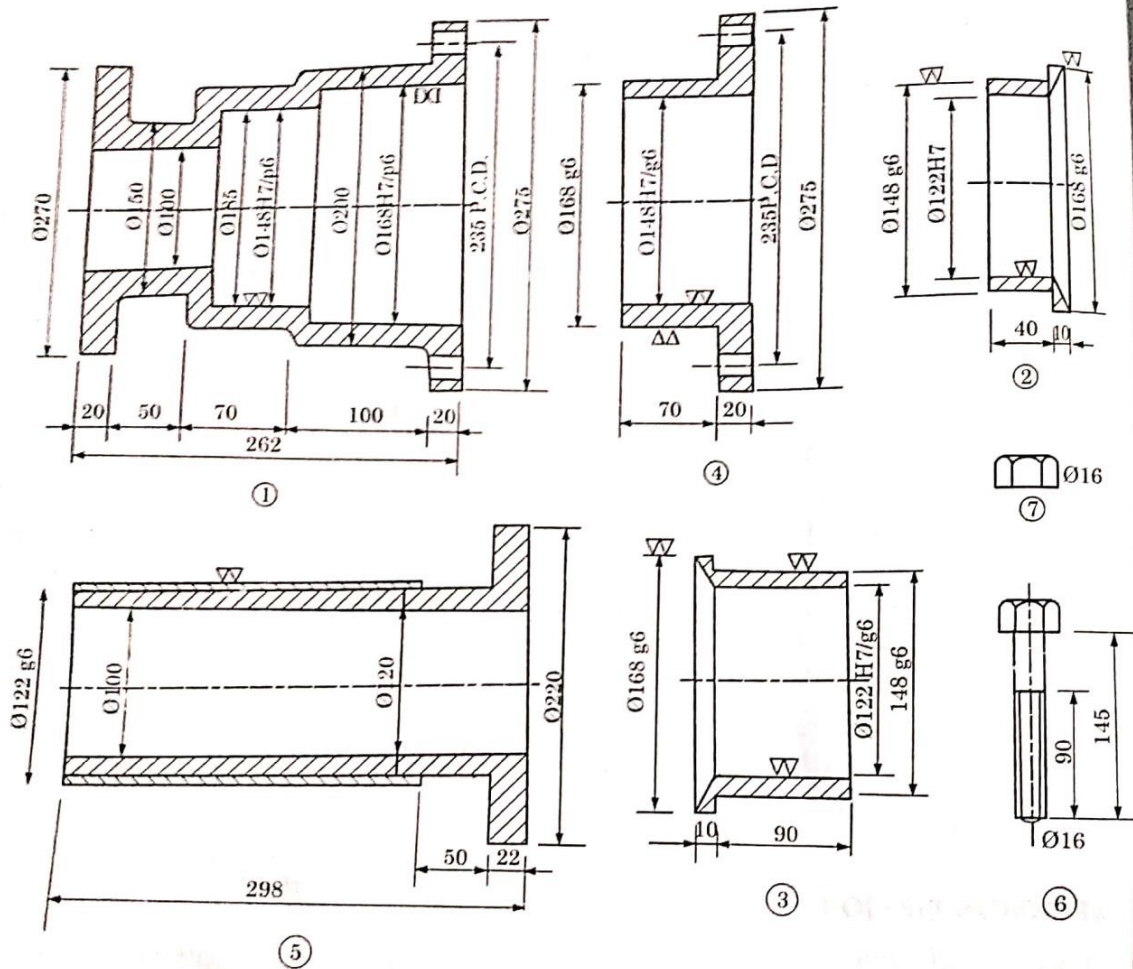


Fig. 6.5 (a) : Detail Drawing of Expansion Pipe Joint

Bill of Materials- Expansion Pipe Joint - Fig. 6.5(a)

Part No.	Name of Part	Material	No. Off.
1.	Body	C.I.	1
2.	Neck bush	Brass	1
3.	Gland bush	Brass	1
4.	Gland	Brass	1
5.	Pipe	C.I.	1
6.	Bolt	M.S.	4
7.	Nut	M.S.	4

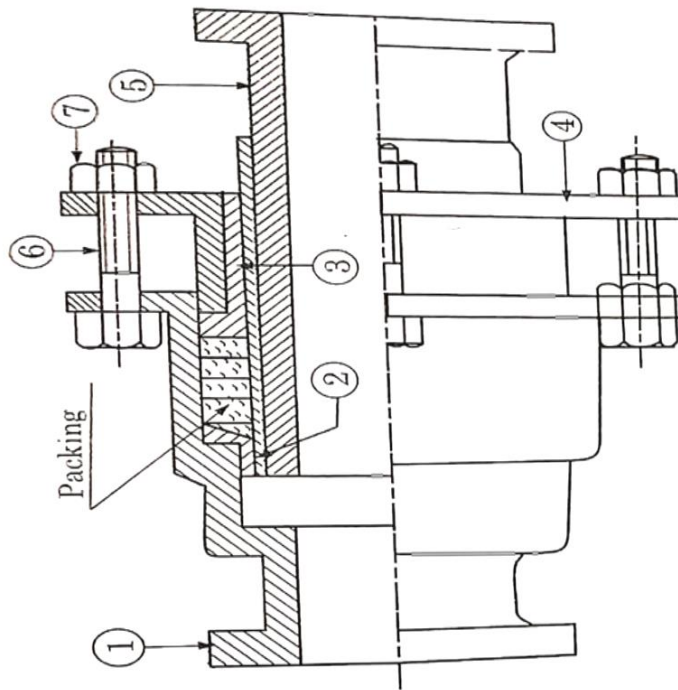
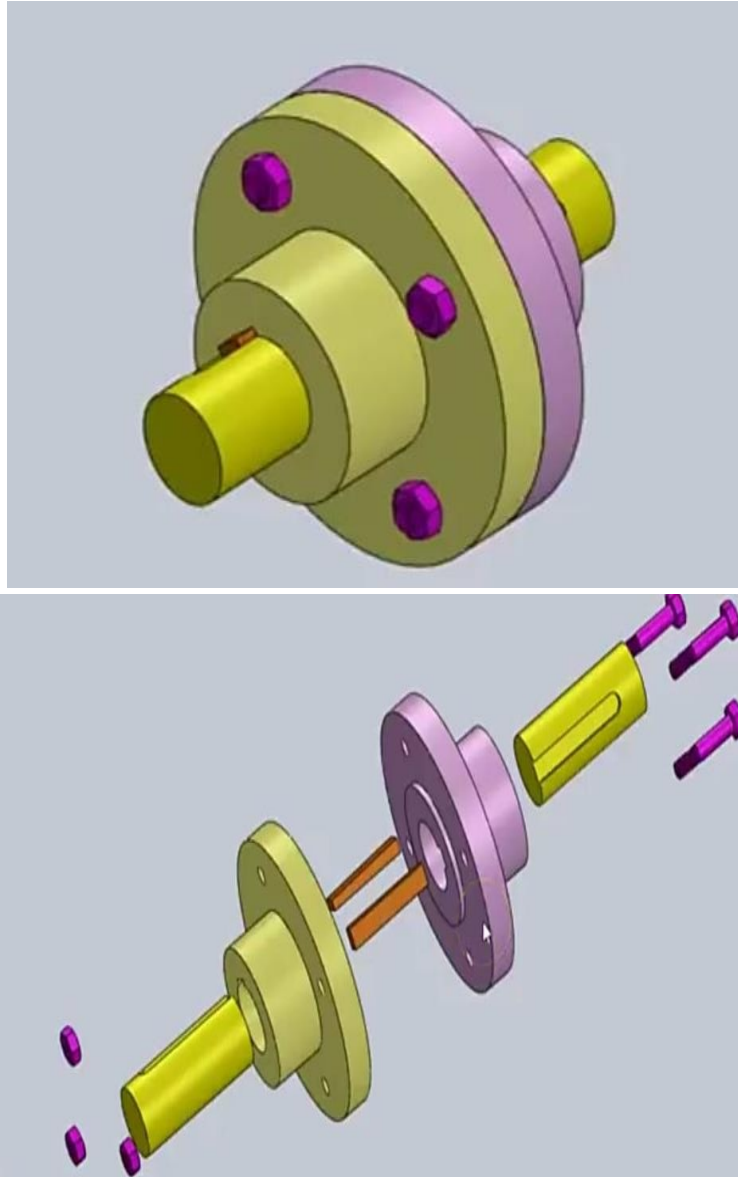
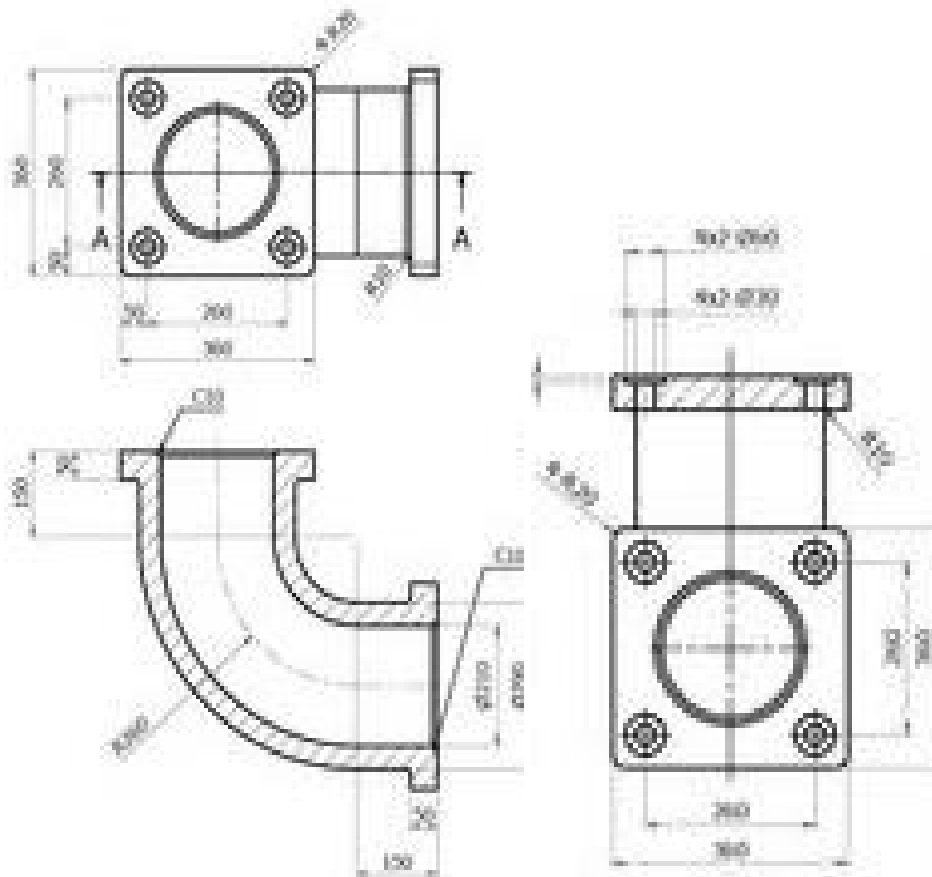


Fig. 6.5 (b) : Assembly Drawing of Expansion Pipe Joint

FLANGED PIPE AND RIGHT ANGLED BEND JOINT (ASSEMBLY DRAWING)

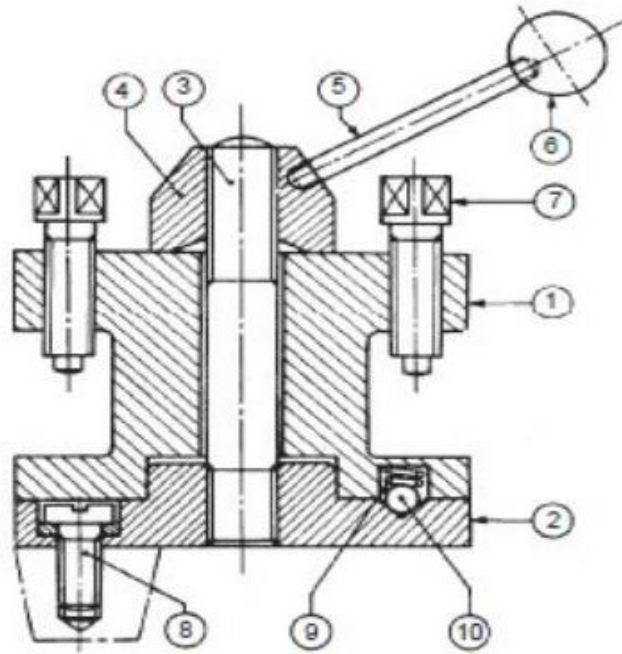


FLANGED PIPE JOINT

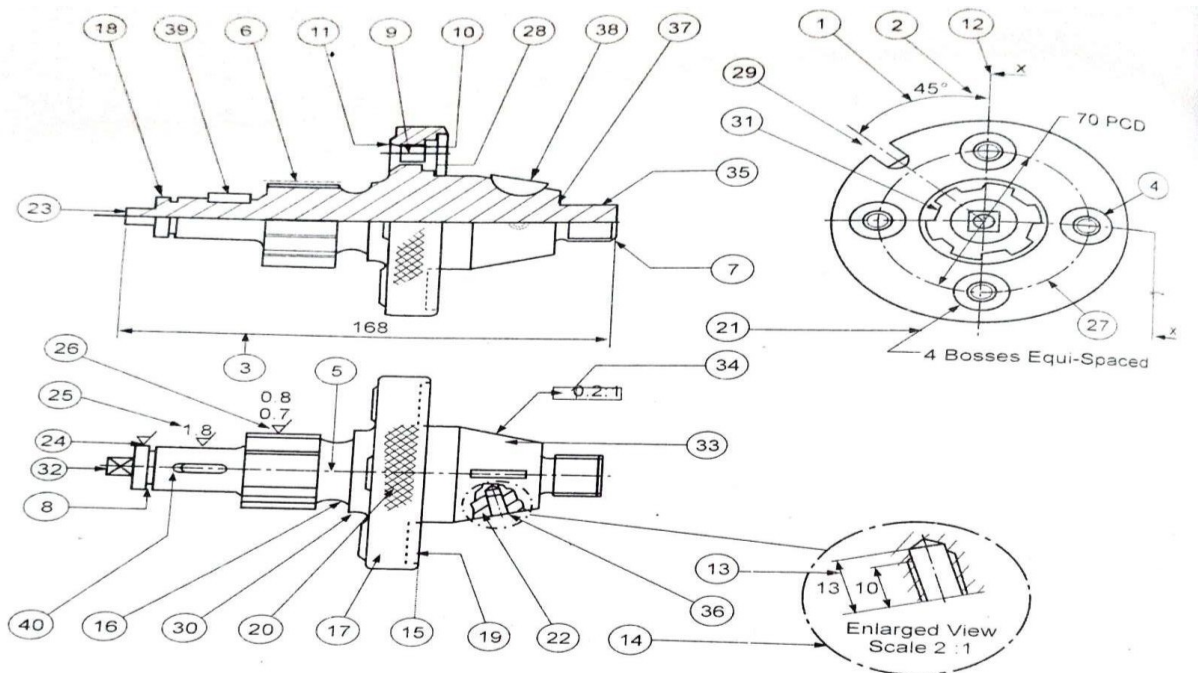


RIGHT ANGLED BEND JOINT

LATHE TOOL HOLDER (ASSEMBLY DRAWING)



READING AND INTERPRETATION OF MECHANICAL COMPONENTS AND ASSEMBLY

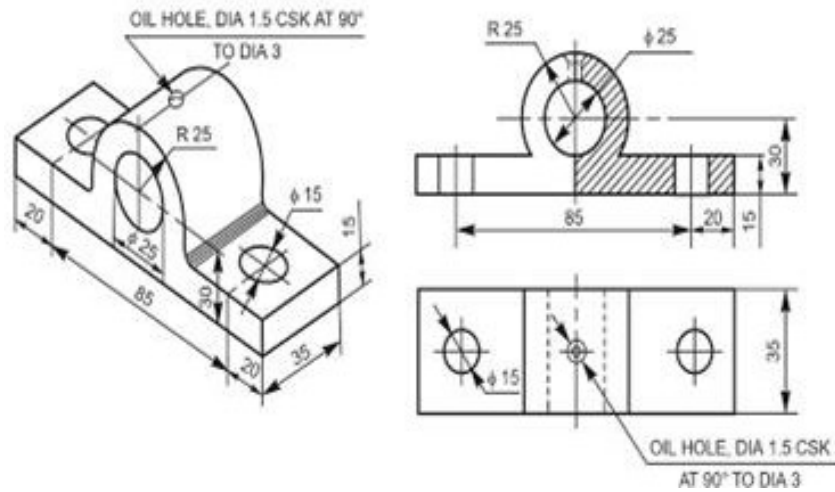


- | | |
|---------------------------|-------------------------|
| 1. Angular Dimension | 21. Leader Line |
| 2. Arrow Head | 22. Local Section |
| 3. Auxiliary Dimensions | 23. Machining Centre |
| 4. Boss | 24. Machining Symbol |
| 5. Centre Line | 25. Surface Finish |
| 6. Chain line | 26. Surface Finish |
| 7. Chamfer | 27. Pitch Circle |
| 8. <u>Circlip</u> Grooves | 28. Recess |
| 9. Clearance Hole | 29. Slot |
| 10. Counter Bore | 30. Spigot |
| 11. Countersunk | 31. <u>Spline</u> Shaft |
| 12. Cutting Plane | 32. Square |
| 13. Dimension Line | 33. Taper |
| 14. Enlarged view | 34. Taper Symbol |
| 15. Round | 35. External Thread |
| 16. Fillet | 36. Internal Thread |
| 17. Flange | 37. Undercut |
| 18. Hatching | 38. Woodruff key |
| 19. Hidden Detail | 39. Key |
| 20. Knurl | 40. Keyway |

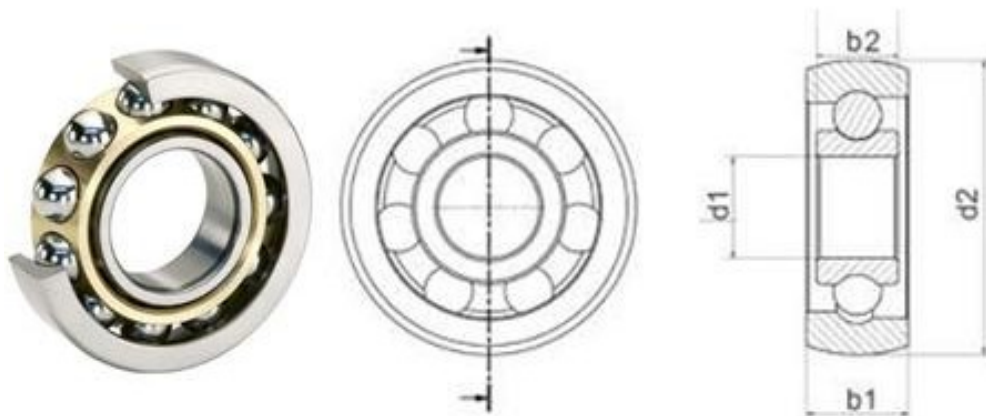
Bushed Bearing



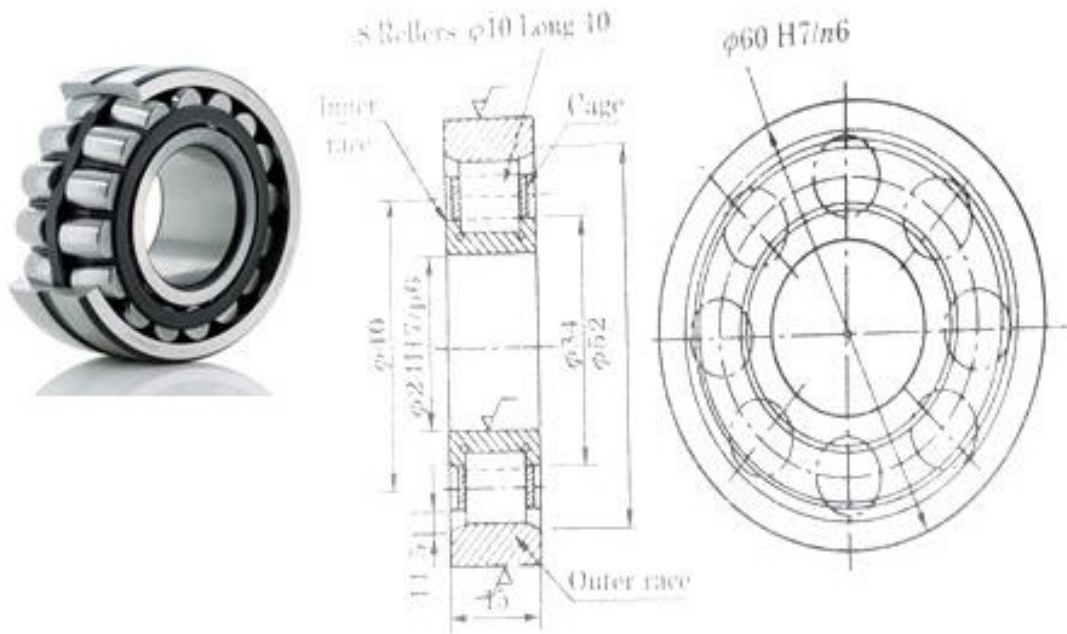
Simple Journal Bearing



Ball Bearing



Roller Bearing



Wall Bracket

