PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

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PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

Exercise Sheets

Mahesh Chandra Luintel

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PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 1

ISOMETRIC DRAWING

1. Draw the isometric drawings from the given orthographic views in *Figure T1.1a* to *T1.1f*.

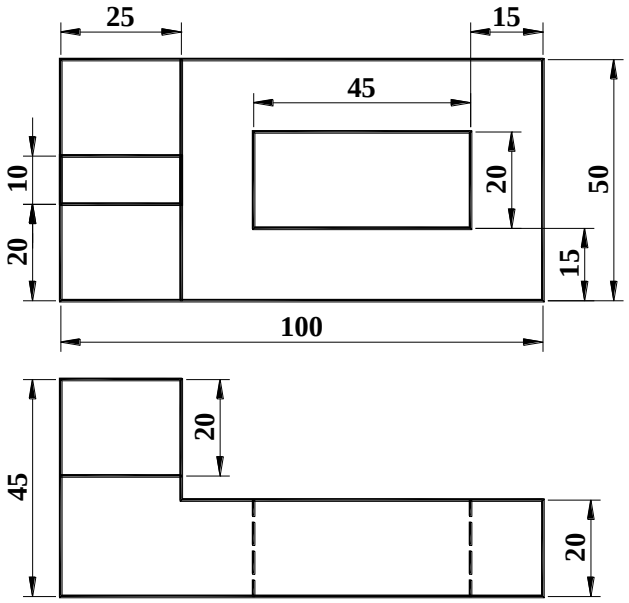


Figure T1.1a

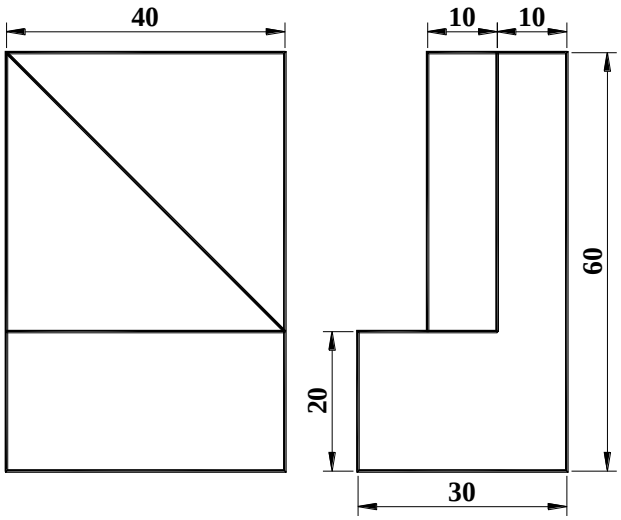


Figure T1.1b

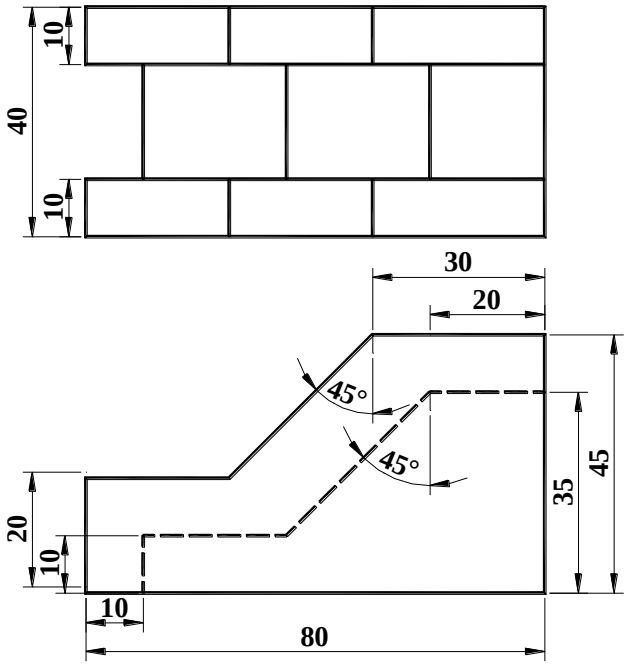


Figure T1.1c

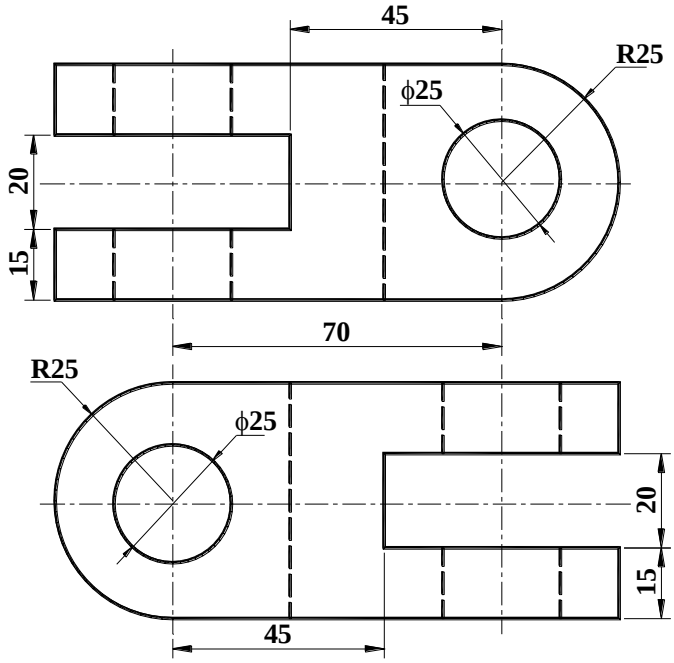
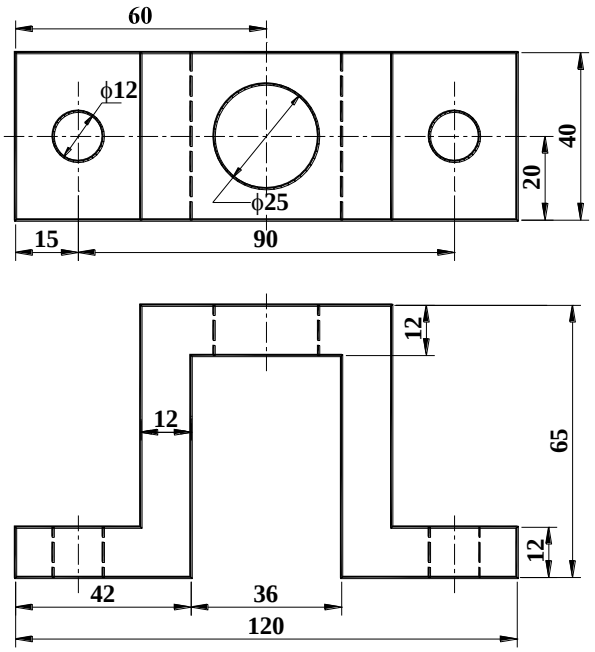


Figure T1.1d



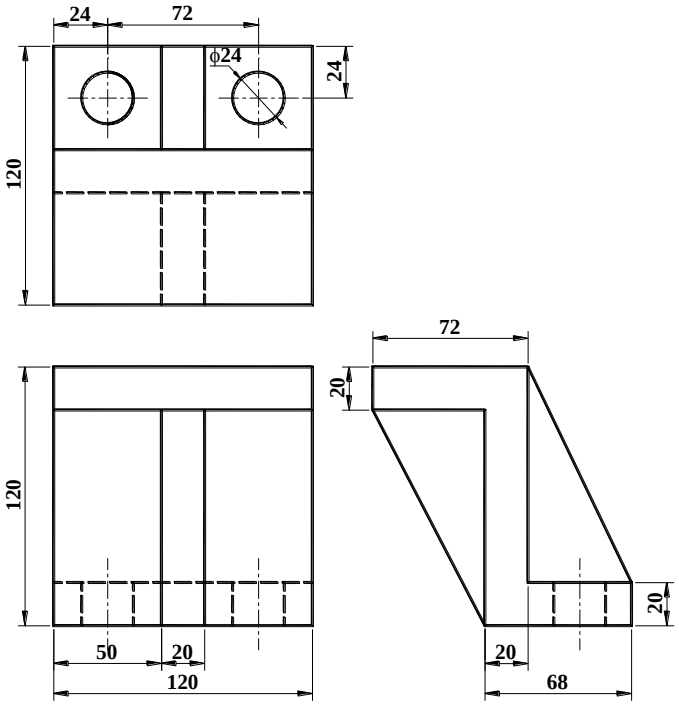
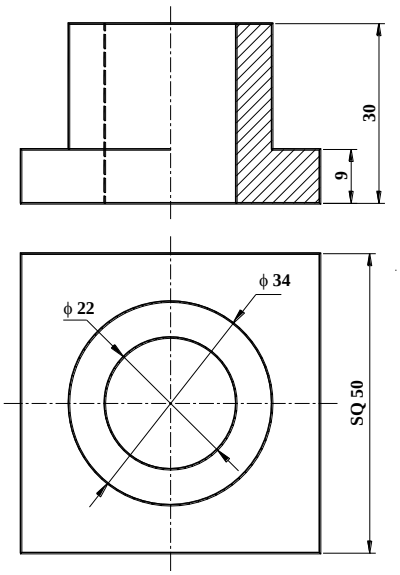


Figure T1.1e **Figure T1.1f**

2. Draw the isometric drawings in section from the given sectional views in *Figure T1.2a* and *T1.2b*.



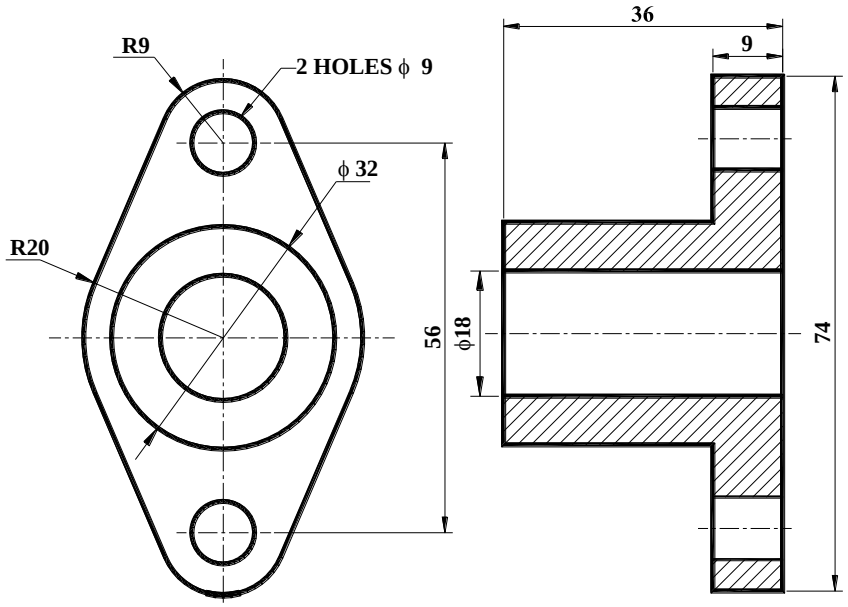


Figure T1.2a **Figure T1.2b**

3. A cylindrical slab having 75 mm as diameter and 45 mm thickness, is surmounted by a cube of edge 38 mm. On the top of the cube rests a square pyramid of altitude 38 mm and side of

base 25 mm. The axes of the solids are in the same straight line. Draw the isomeric view of the combination of these solids.

4. A sphere of diameter 45 mm rests centrally over a frustum of cone of base diameter 60 mm, top diameter 40 mm and height 60 mm. Draw isometric projections of the combination of solids.

5. A cylindrical slab of 70 mm as diameter and 40 mm thickness is surmounted by a frustum of a square pyramid of base side 45 mm, top base side 25 mm and height 50 mm. The axes of the two solids are on a common straight line. A sphere of diameter 40mm is centrally placed on top of the frustum. Draw the isometric view of the solids.

6. A cube of sides 60mm is resting on the ground. A cylinder of base diameter 50 mm and height 60mm is kept over that. On top of the cylinder, a hexagonal pyramid of side of base 20 mm and altitude 40 mm is kept. The axis of the three solids lies in the same vertical line. Draw the isometric view.

PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 2

OBLIQUE DRAWING

Draw oblique drawings from given orthographic projections.

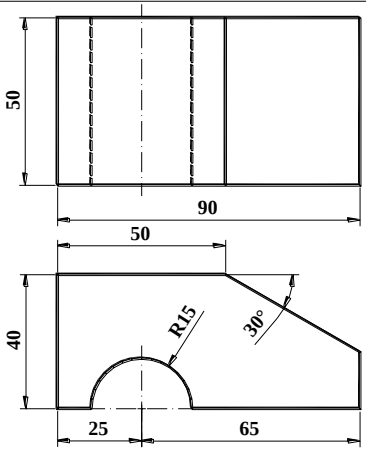


Figure T2.1

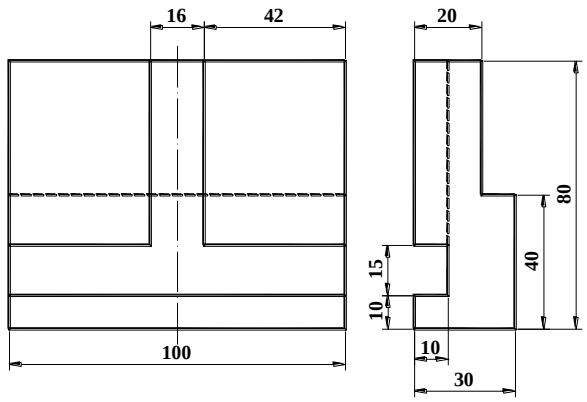


Figure T2.2

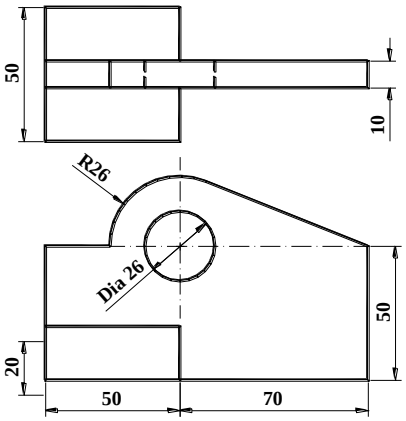


Figure T2.3

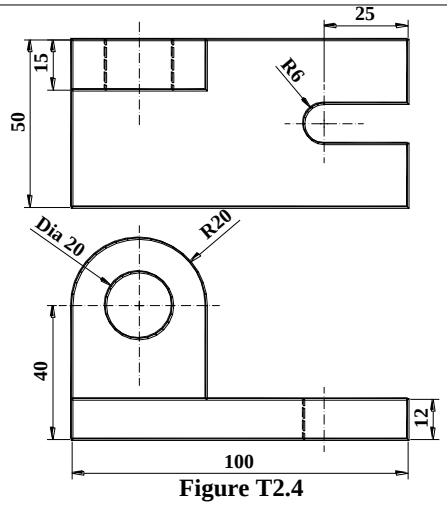


Figure T2.4

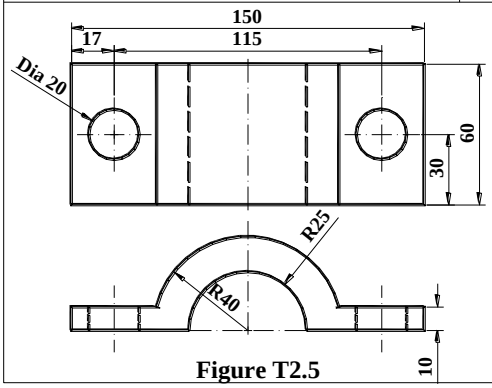


Figure T2.5

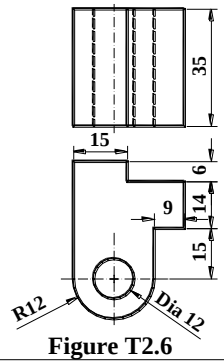


Figure T2.6

PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 3

PERSPECTIVE PROJECTION

1. Draw the perspective projection from the given orthographic views in *Figure T3.1a* to *T3.1d*.

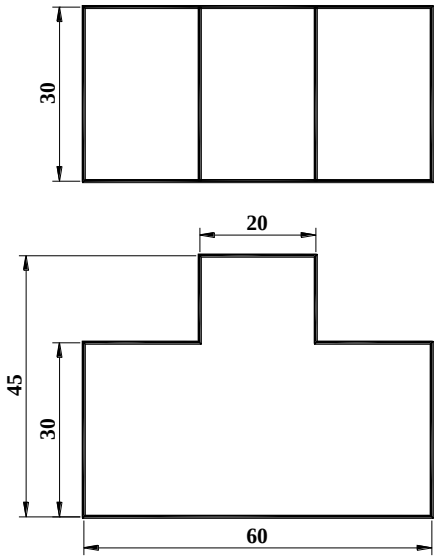


Figure T3.1a

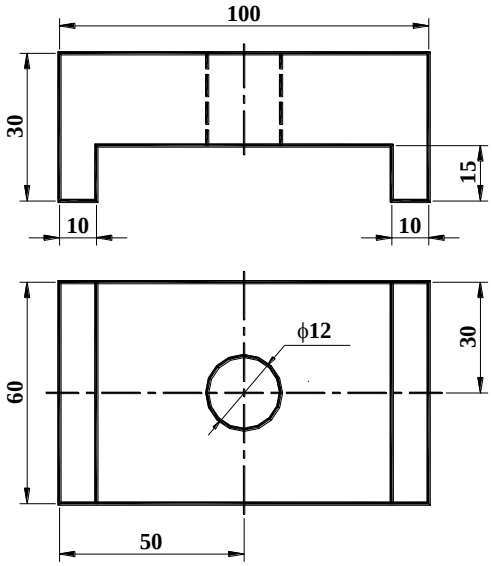


Figure T3.1b

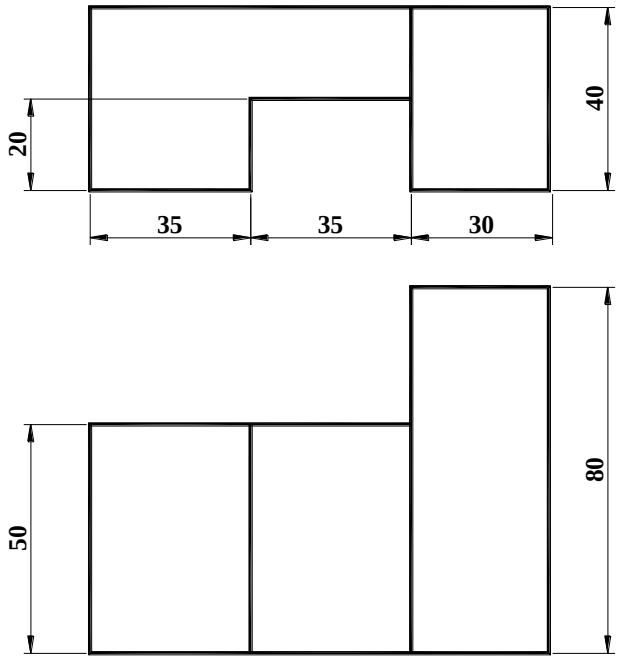


Figure T3.1c

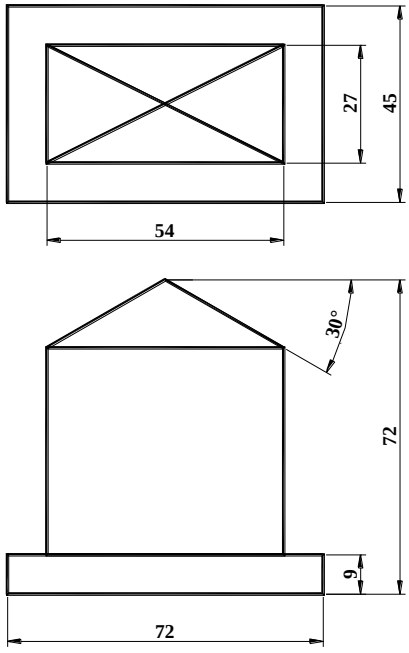


Figure T3.1d

2. A square prism of side base 30 mm and height 50 mm rests with it base on the ground and one of the rectangular faces inclined at 30^0 to the picture plane. The nearest vertical edge touches the PP. The station point is 45 mm in front of the PP, 60 mm above the ground an opposite to the nearest vertical edge that touches the PP. Draw the perspective view of the prism.

3. A hexagonal prism, side of base 25 mm and height 50 mm with its base on the ground plane such that one of its rectangular faces is inclined at 30^0 to the picture plane and the vertical edge nearer to PP is 15 mm behind it. The station point is 45 mm in front of the picture plane. 70 mm above the ground plane and lies in a central plane, which is 15 mm left to the vertical edge nearer to the picture plane. Draw the perspective projection of the prism.

4. Draw the perspective view of a cube of 25 mm edge, resting on ground with one of its faces. It has one of its vertical edges in the picture plane and all its vertical faces are equally inclined the picture plane. The station point is 55 mm in front of the picture plane, 40 mm above the ground and lies in the central plane, which is 10 mm left of the center of the cube.

5. A model of steps has 3 steps of 15 mm tread and rise 10 mm. The steps measure 60 mm wide. The vertical edge of bottom steps, which is nearer to the picture plane, is 25 mm behind PP and the width of steps recede to the left at an angle of 30^0 to PP. The station point is 100 mm in front of PP and 60 mm above the ground plane and 30 mm to the right of the vertical edge, which is nearest to PP. Draw the perspective view of the model.

PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 4

LIMIT, FIT AND TOLERANCES

1. Find (*i*) type of fit and (*ii*) tolerances of a 45 mm diameter shaft rotating at a normal speed.

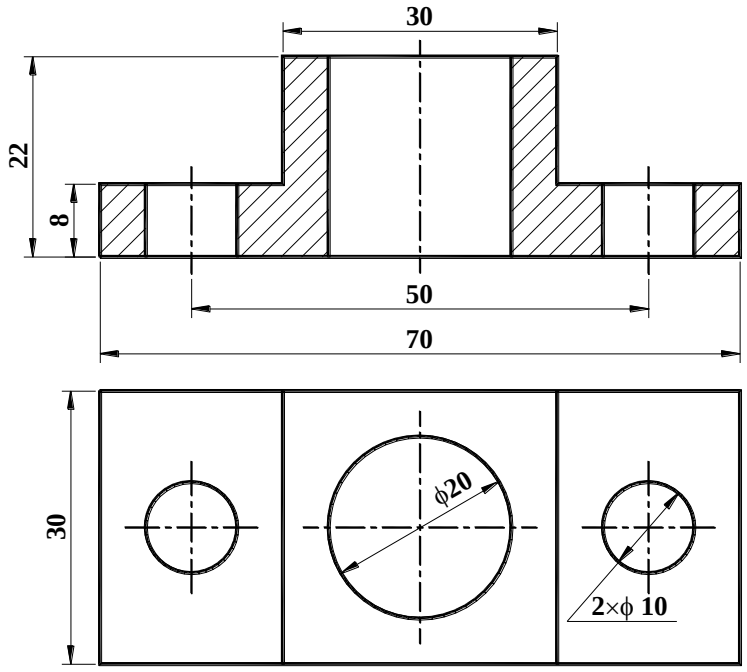
2. Fix the limits of tolerance and allowance for a 25 mm diameter shaft and hole pair designated by T6/h5. Find the type of fit and comment on the application of this type of fit.

3. Fix the limits of tolerance for a 50 mm diameter shaft and hole pair designated by H8/p7. Find the type of fit and comment on the application of this type of fit.

4. Draw the standard symbol for the machining processes:

- Surface to be obtained without removal of material.
- Surface to be coated.
- Surface to be precision grinding.
- Surface to be obtained by fine turning.

5. Draw the roughness grade symbols for the surfaces of an object shown in *Figure T4.5*.



The plane surfaces of the object are produced from shaping machine. Holes are produced by normal drilling process. Top surfaces are also super finished and central hole is super finished by lapping.

Figure T4.5

EXERCISE 5

SCREW/BOLT/THREAD/STUD/NUT

1. Draw the metric thread, as shown in *Figure T5.*1, taking suitable value of pitch.

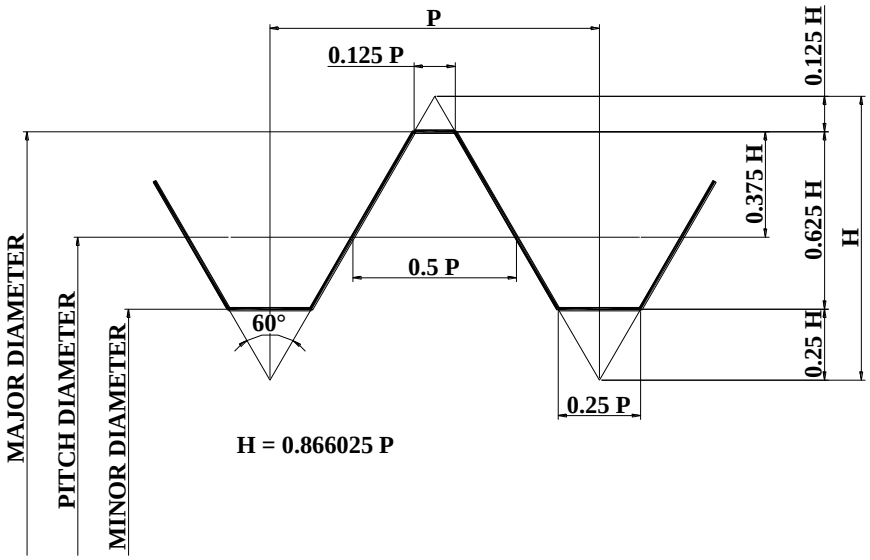


Figure T5.1: Metric Thread

2. Draw a screw fastening shown in *Figure T5.2* with suitable value of dimensions.

3. Draw a stud joint to conventional ratios for the pieces shown in *Figure T5.3*.

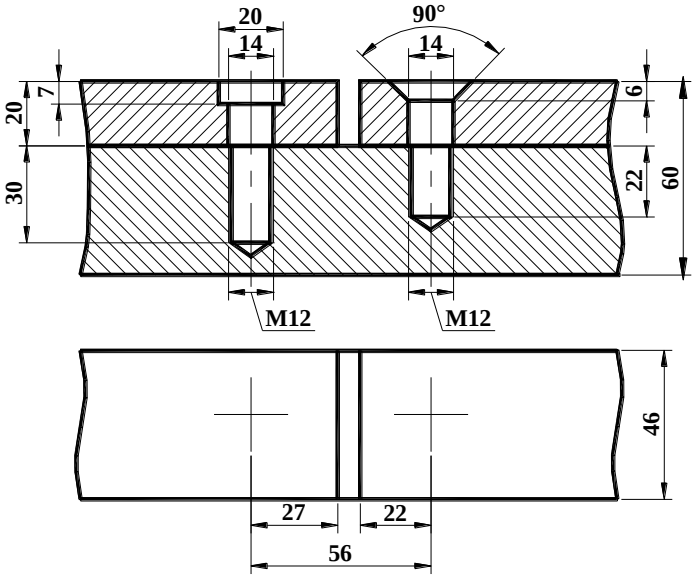


Figure T5.2

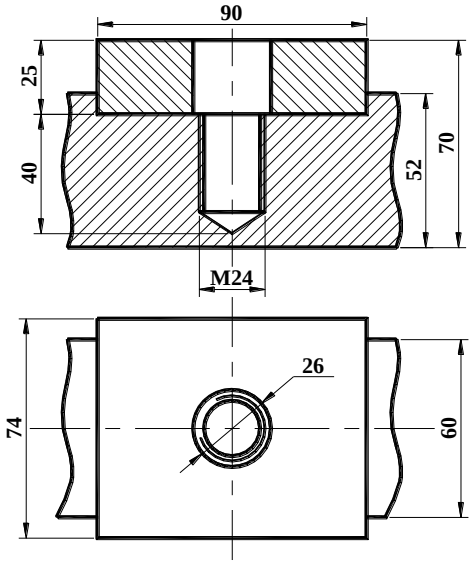
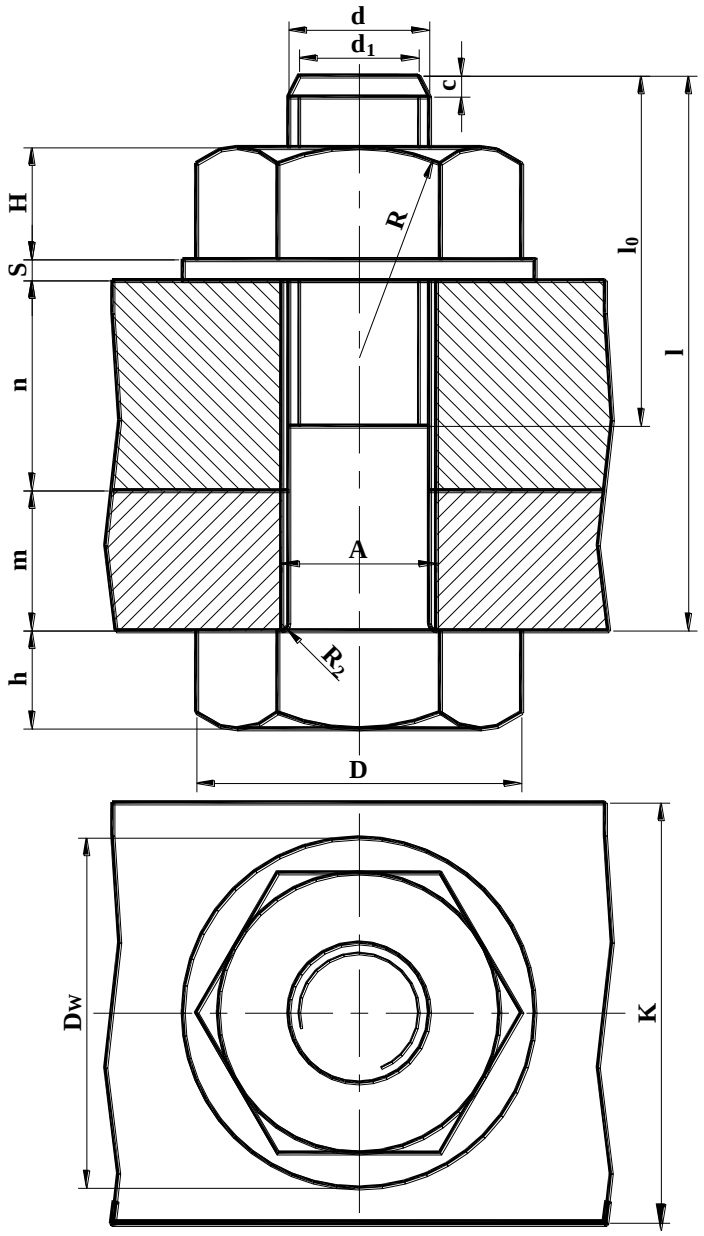


Figure T5.3

4. Draw a bolted joint to conventional ratios as shown in *Figure T5.4*. Take d = 20 mm, m = 20 mm and n = 30 mm.



d_1	=	0.85 d	R_1	=	d
D	=	2 d	R_2	=	0.5 c
H	=	0.8 d	c	=	S to 2 S
h	=	0.7 d	K	=	3 d
Dw	=	2.5 d			
S	=	0.15 d			
A	=	1.1 d			
l_0	=	2 d to 2.5 d			
R	=	1.5 d			

Figure T5.4: Hexagonal Bolt

5. Draw front view and top view of pieces fasten together with 18 mm square bolt and nut as shown in *Figure T5.6.*

6. Taking suitable value of 'D' draw the eyebolt as shown in the *Figure T5.6.*

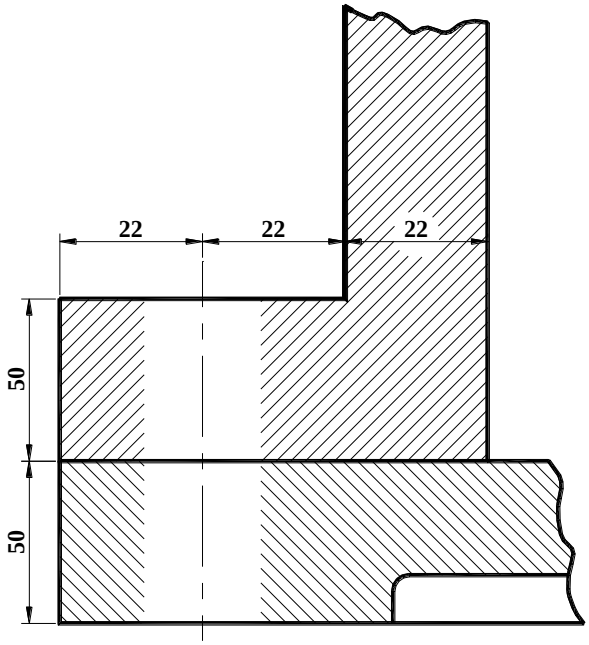


Figure T5.5: Square Head Bolt

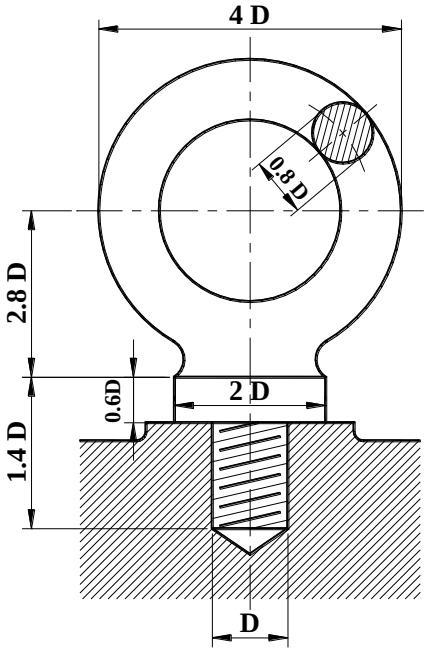


Figure T5.6: Eye Bolt

PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 6

(RIVETING, WELDING & PIPING

1. Draw the plan and sectional elevation of the following riveted joints. Take the diameter of the rivet 24 mm.

- Single riveted lap joint
- Double riveted chain lap joint
- Double riveted zig-zag lap joint
- Single riveted, single strap butt joint
- Single riveted, double strap butt joint
- Double riveted, double strap chain butt joint
- Double riveted, double strap zig-zag butt joint

2. *Figure T6.2(a)* and *T6.2(b)* show the isometric of a machine part to be fabricated by the welding process. Draw its orthographic view. Choose suitable types of weld and represent it on the drawings through respective symbols.

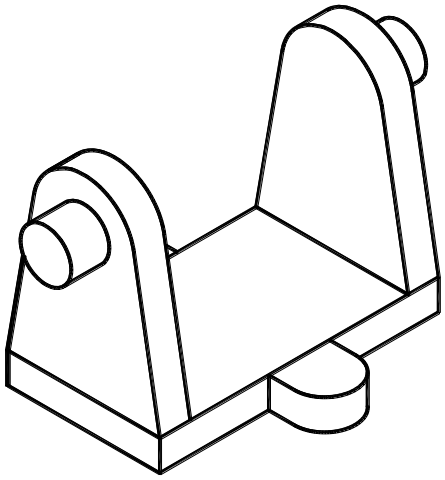


Figure T6.2(a)

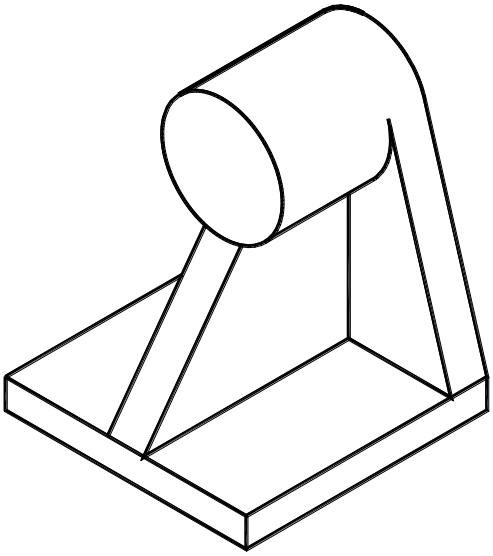


Figure T6.2(b)

3. Sketch the symbol of the following joints and parts of piping:

- 90^0 elbow
- 45^0 bend
- Reducer
- Tee
- Cross
- Plug
- Union
- Nipple
- Cap
- Check Valve

4. Redraw a single line and a double line drawing of the portion of a piping system as shown in *Figure T6.4*.

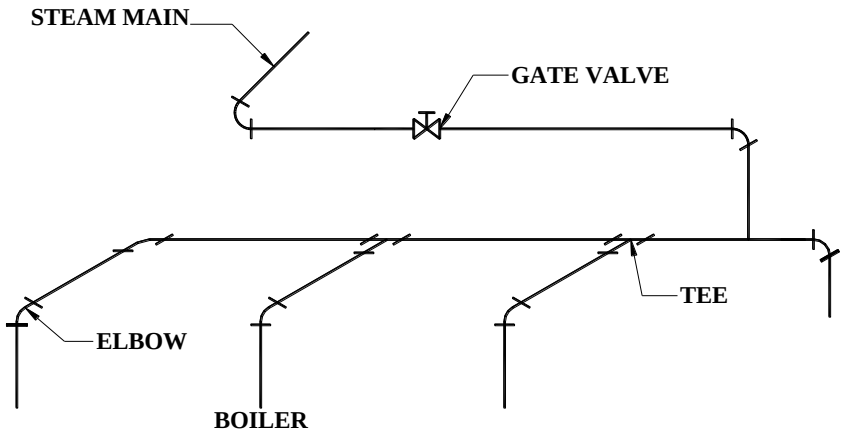


Figure T6.4

PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 7

DETAIL DRAWING

1. Make a complete set of working drawings for a V-block Clamp shown in *Figure T7.1*.

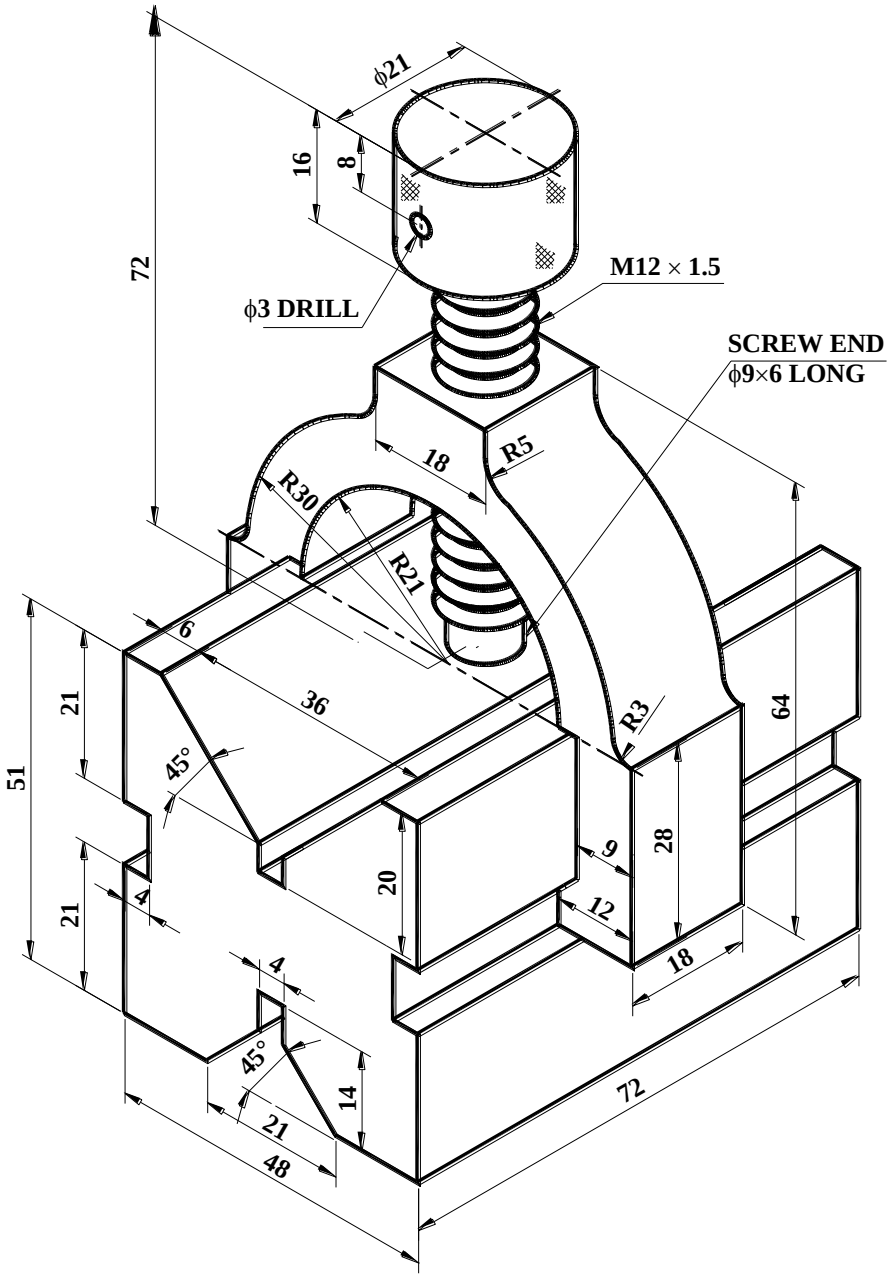
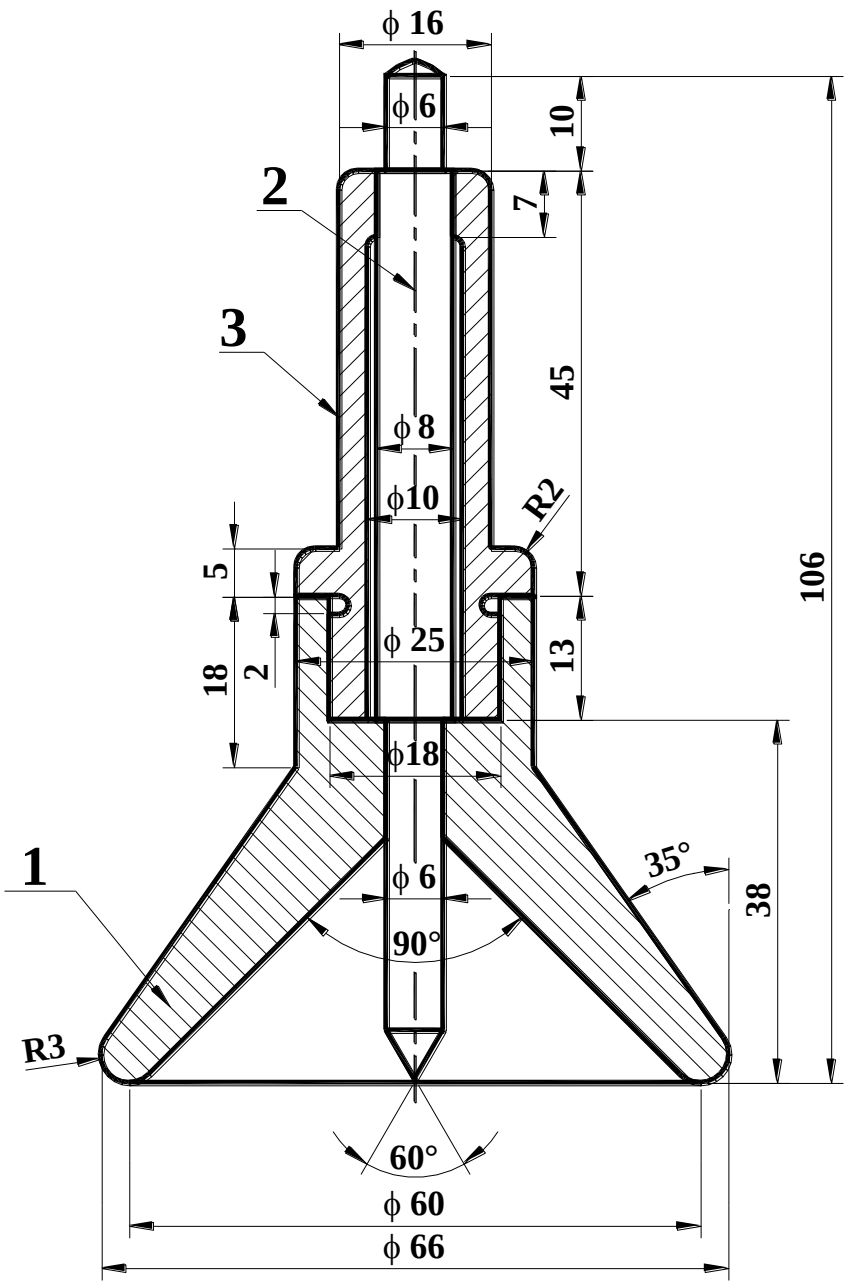


Figure T7.1: V-block Clamp

2. *Figure T7.2* shows the assembly drawing of a centering cone. Make a detail drawing of all parts.



1	Guide	St 42	3		
1	Centering Pin	C60	2		
1	Centering Cone	St 42	1		
Nos. Reqd.	**Name**	**Material**	**St. No.**	**Weight**	**Notes**

Figure T7.2: Centering Cone

PRACTICE PROBLEMS FOR ENGINEERING DRAWING II

EXERCISE 8

ASSEMBLY DRAWING I

1. *Figure T8.1* the details of a split bearing. Draw the assembled front view with section. *Take any length for the shaft*.

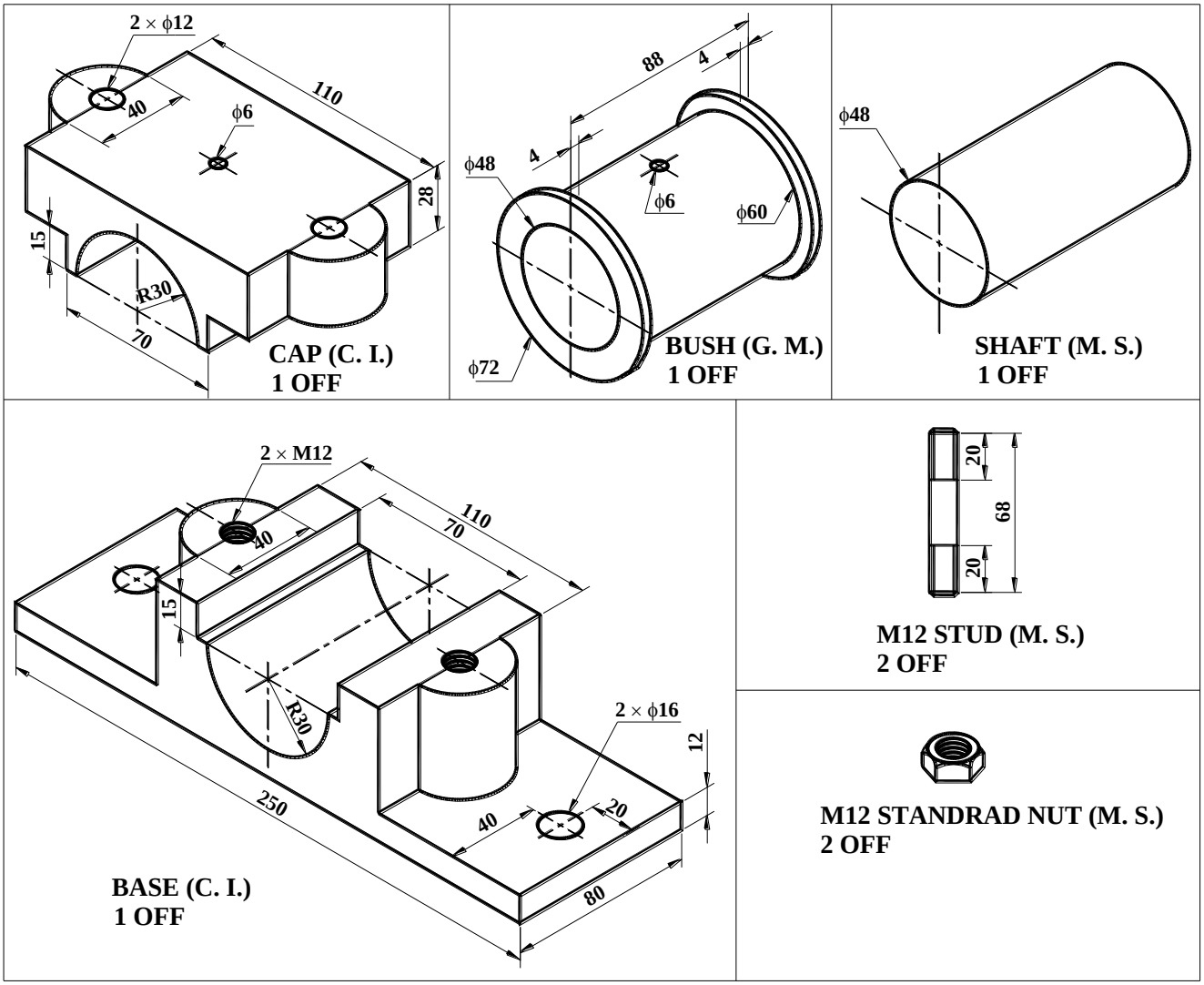
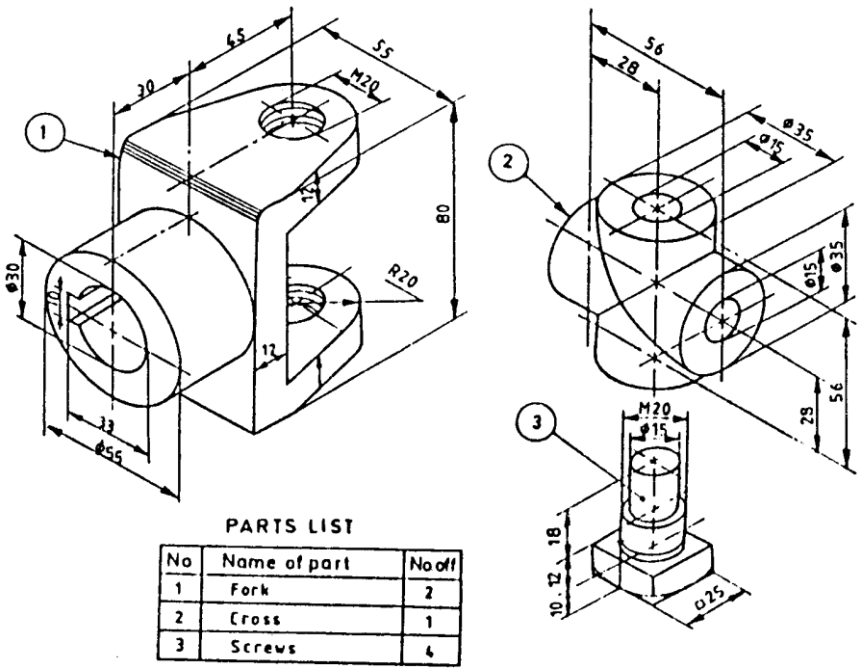


Figure T8.1: Split Bearing

2. *Figure T8.2* shows the detail drawing of a Universal Coupling for connecting two shafts. Assemble the parts and draw the sectional front view and the top view.



PARTS LIST

No	Name of part	No off
1	Fork	2
2	Cross	1
3	Screws	4

Figure T8.2: Universal Coupling

3. *Figure T8.3* shows the detail drawing of an antivibration mount. Assemble the parts and draw the sectional front view and the side view.

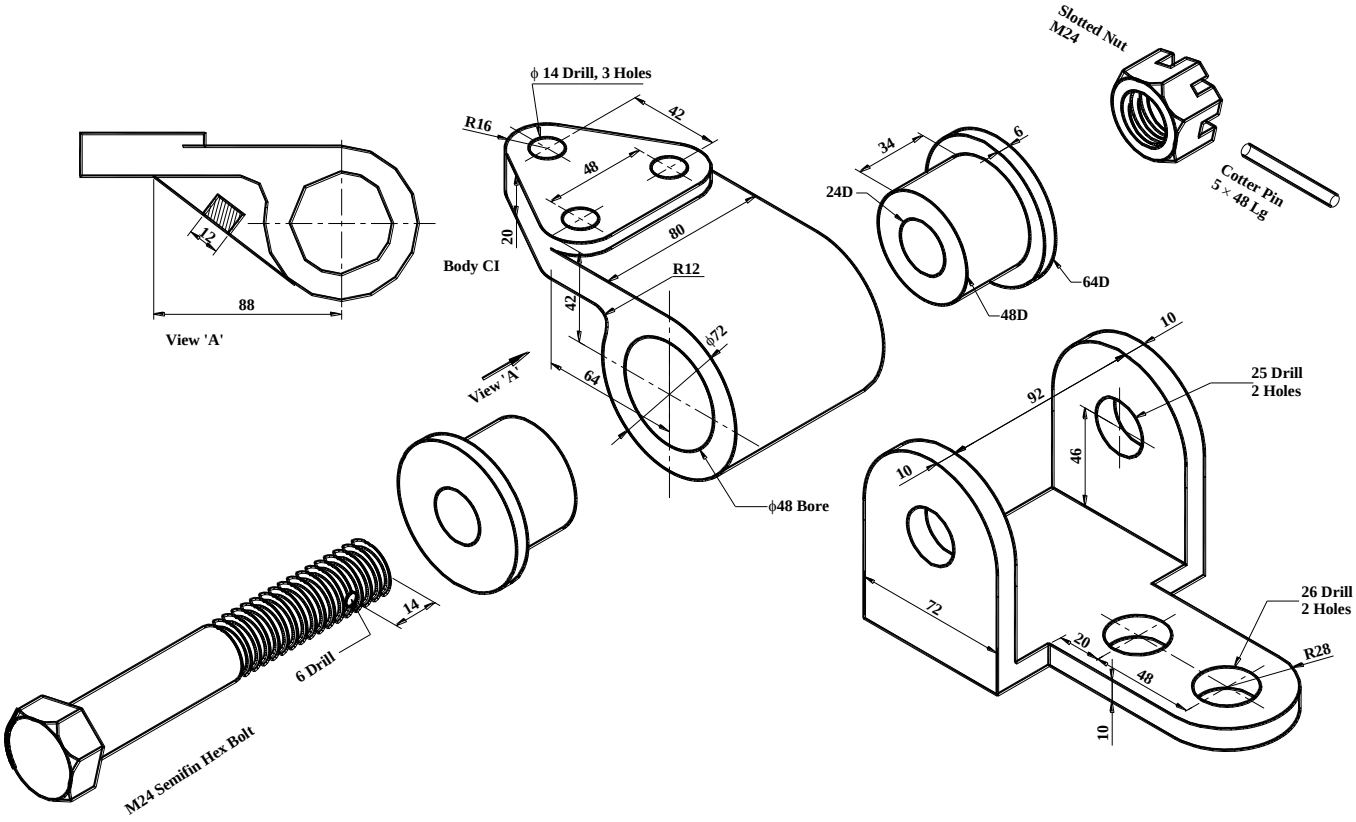


Figure T8.3: Antivibration Mount

EXERCISE 9

ASSEMBLY DRAWING II

1. *Figure T9.1* shows the detail drawing of a Screw jack. Assemble the parts and draw the half sectional front view (right half) and the top view.

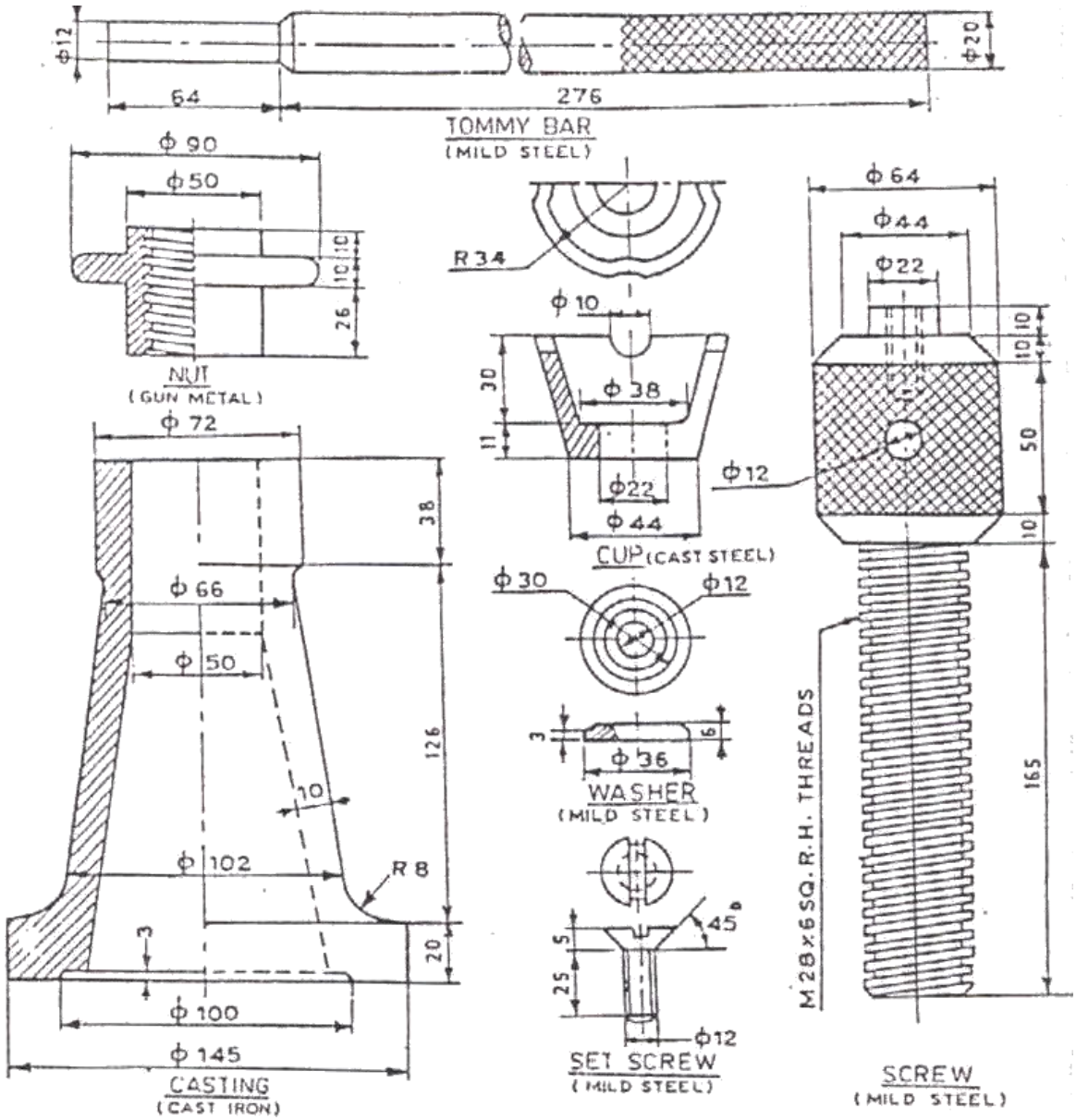
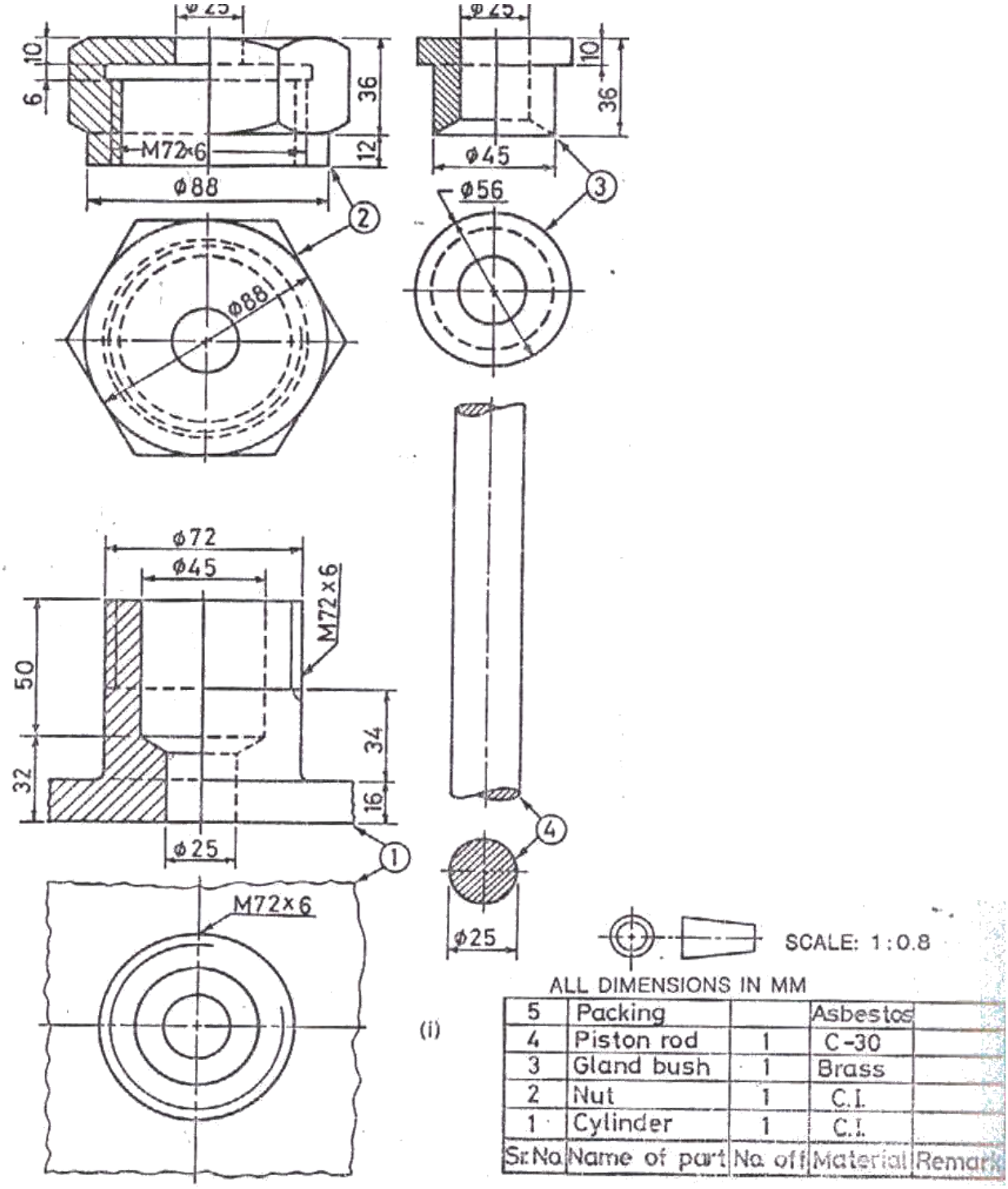


Figure T9.1: Screw Jack

2. *Figure T9.2* shows the detail drawing of a Stuffing Box for a small steam engine. Assemble the parts and draw the half sectional front view and the top view.



Sr.No.	Name of part	No. off	Material	Remark
5	Packing		Asbestos	
4	Piston rod	1	C-30	
3	Gland bush	1	Brass	
2	Nut	1	C.I.	
1	Cylinder	1	C.I.	

Figure T9.2: Stuffing Box

3. *Figure 10.3* shows the detail drawing of an antivibration mount. Draw front view of the assembly.

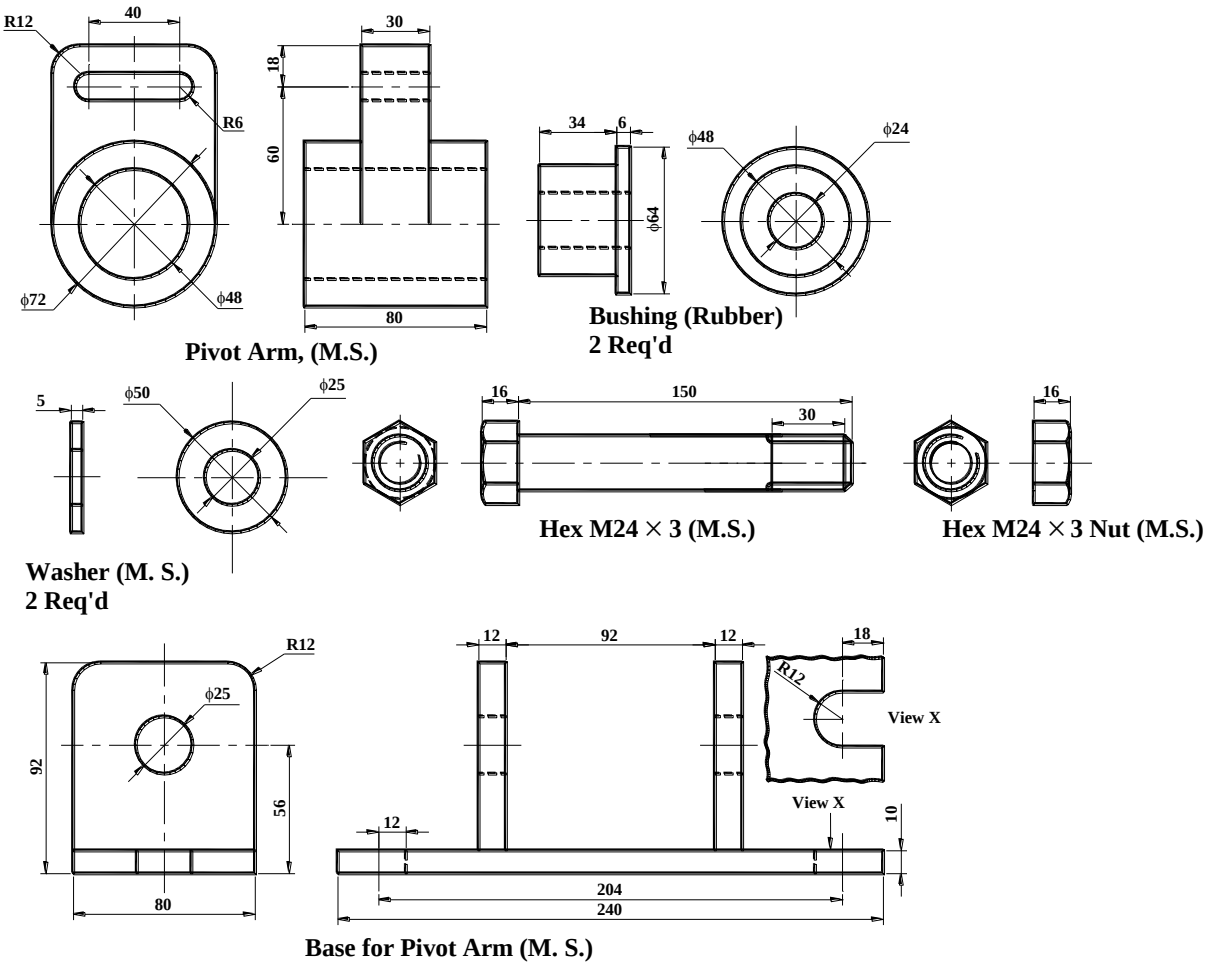


Figure T9.3: Antivibration Mount

EXERCISE 10

SYMBOLS

1. Draw the symbols for the following:

- Amplifier
- Capacitor
- Fuse
- Inductor
- Resistor
- Thermocouple
- Transformer
- Generator
- Motor
- 3-Phase Wye
- 3-Phase Delta

2. Draw symbols of six common natural surfaces features (streams, lakes, etc) and six common development features (roads, buildings, etc.)