



Course Overview

Subject: Computer Aided Machine Drawing

Subject Code: 18ME36A/46A

Drawing is a language of engineers. The development of sketching ability also strengthens effective engineering communication & presentation. Now a days the market driven economy demands frequent changes in product design to suit the customer needs. With the introduction of computers, it is flexible to change drawing as per requirement. Machine drawing deals with the information regarding a part or component of a machinery which gives all external and internal details of the machine component from which it is manufactured. This course develops the skills in students to interpret drawings of machine components in different visible and hidden conventions for a three-dimensional object, drawings of different temporary and permanent joints, couplings, 3D modeling of assembly drawings of machines are drafted manually and using CAD packages.

Course Objectives

The objectives of this course are to make students to learn-

1. To acquire the knowledge of CAD software and its features.
2. To inculcate understanding of the theory of projection and make drawings using orthographic projections and sectional views
3. To familiarize the students with Indian Standards on drawing practices.
4. To impart knowledge of thread forms, fasteners, keys, joints and couplings.
5. To make the students understand and interpret drawings of machine components so as to prepare assembly drawings either manually and using CAD packages.
6. To acquire the knowledge of limits fits and tolerance pertaining to machine drawings.

Course Outcomes

COs	Description
18ME36A.1/46A.1	Sketch orthographic views of simple machine parts and also the sections of solids of various polyhedrons.
18ME36A.2/46A.2	Produce the drawing of various Thread forms and Fasteners
18ME36A.3/46A.3	Draw different types of Joints, Keys and Couplings used in mechanical system.
18ME36A.4/46A.4	Construct an assembly drawing using part drawings of machine components.
18ME36A.5/46A.5	Create 2D drawing and 3D models of machine components and assemble them using CAD packages.

Faculty	Faculty	Faculty	Course Coordinator

Facilitator	NBA Coordinator	HOD



Syllabus

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Part A

Introduction

Review of graphic interface of the software. Review of basic sketching commands and navigational commands. Starting a new drawing sheet. Sheet sizes. Naming a drawing, Drawing units, grid and snap. Conversion of pictorial views into orthographic projections of simple machine parts (with and without section). Hidden line conventions. Precedence of lines.

Sections of Solids:

Sections of Pyramids, Prisms, Cubes, Tetrahedrons, Cones and Cylinders resting only on their bases (No problems on axis inclinations, spheres and hollow solids). True shape of sections. Conversion of pictorial views into orthographic projections of simple machine parts. Hidden line conventions. Precedence of lines. Conversion of pictorial views into orthographic projections of simple machine parts (with section planes indicated on the part).

Thread Forms:

Thread terminology, sectional views of threads. ISO Metric (Internal & External), BSW (Internal & External) square and Acme. Sellers thread, American Standard thread. Fasteners: Hexagonal headed bolt and nut with washer (assembly), square headed bolt and nut with washer (assembly) simple assembly using stud bolts with nut and lock nut. Flanged nut, slotted nut, taper and split pin for locking, counter sunk head screw, grub screw, Allen screw.

Part B

Keys:

Parallel key, Taper key, Feather key, Gib-head key and Woodruff key.

Joints:

Cotter joint (socket and spigot), knuckle joint (pin joint) for two rods.

Couplings:

Split Muff coupling, Protected type flanged coupling, pin (bush) type flexible coupling, and universal coupling (Hooks' Joint)



Maharaja Institute of Technology Mysore

Department of Mechanical Engineering



Syllabus

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Part C

Limits, Fits and Tolerances:

Introduction, Fundamental tolerances, Deviations, Methods of placing limit dimensions, machining symbols, types of fits with symbols and applications, geometrical tolerances on drawings. Standards followed in industry.

Assembly Drawings: (Part drawings shall be given)

1. Plummer block (Pedestal Bearing)
2. Lever Safety Valve
3. I.C. Engine connecting rod
4. Screw jack (Bottle type)
5. Tailstock of lathe
6. Machine vice
7. Tool head of shaper

TEXTBOOKS

- 1 Machine Drawing, K. R. Gopala Krishna Subhash Publication 2005
- 2 Machine Drawing, N. D. Bhat & V.M. Panchal Charoratar publishing house 2005

REFERENCE BOOKS

- 3 A Text Book of Computer Aided Machine Drawing, S. Trymbaka Murthy CBS Publishers, New Delhi 2007
- 4 Engineering drawing, P. S. Gill S K Kataria and Sons 2013
- 5 Machine Drawing, N. Siddeshwar, P. Kanniah, V. V. S. Sastri Tata McGraw Hill 2006



Maharaja Institute of Technology Mysore
Department of Mechanical Engineering



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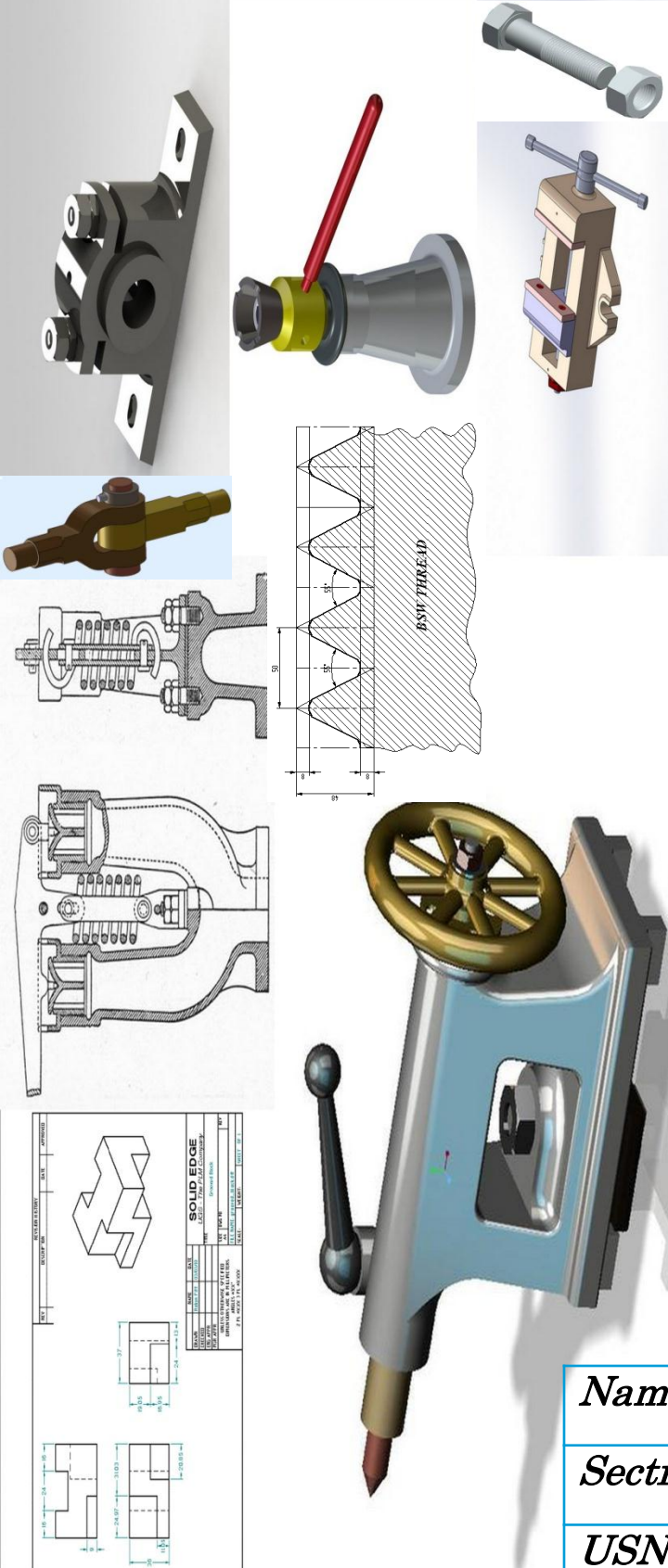
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SOLID EDGE

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DEPARTMENT OF MECHANICAL ENGINEERING

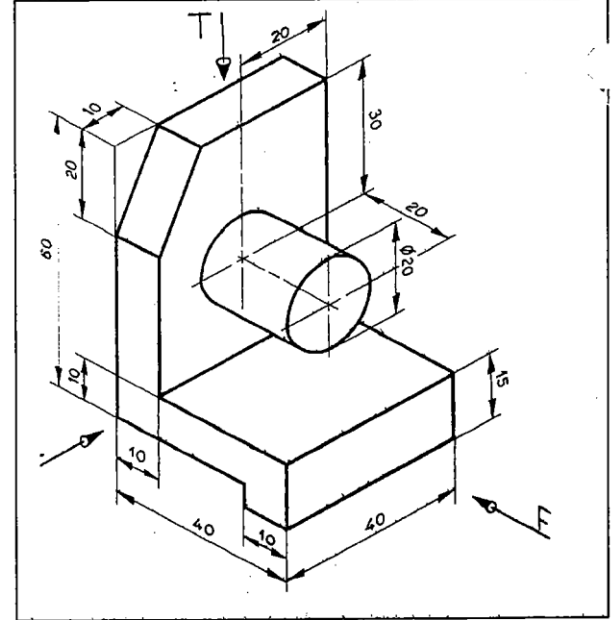
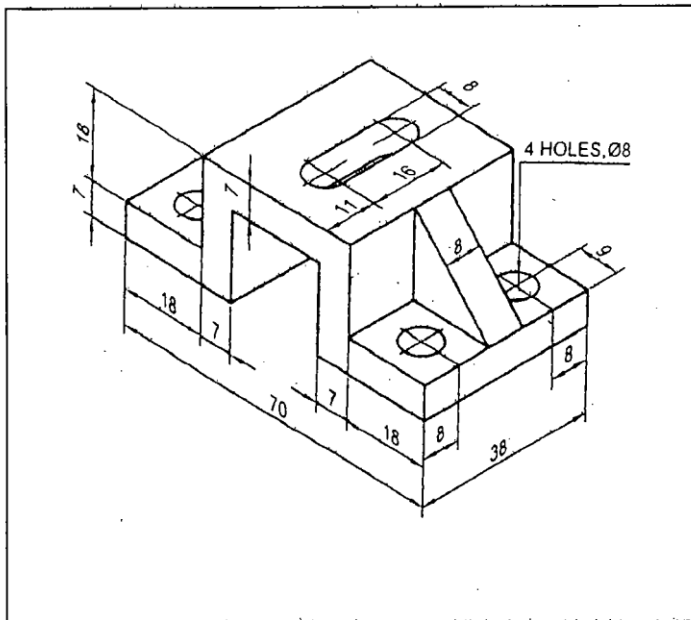
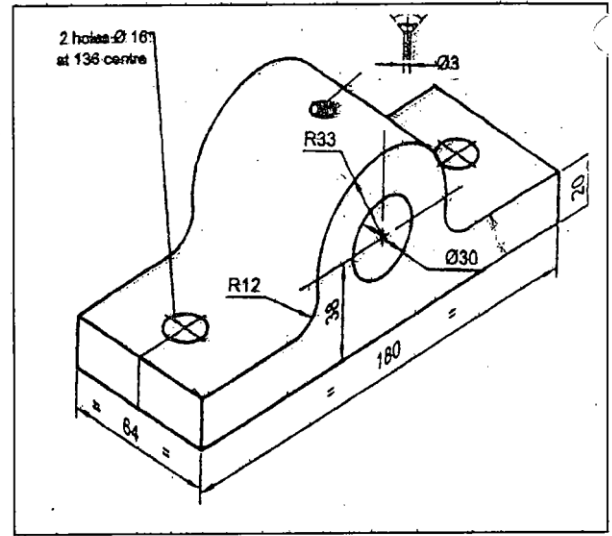
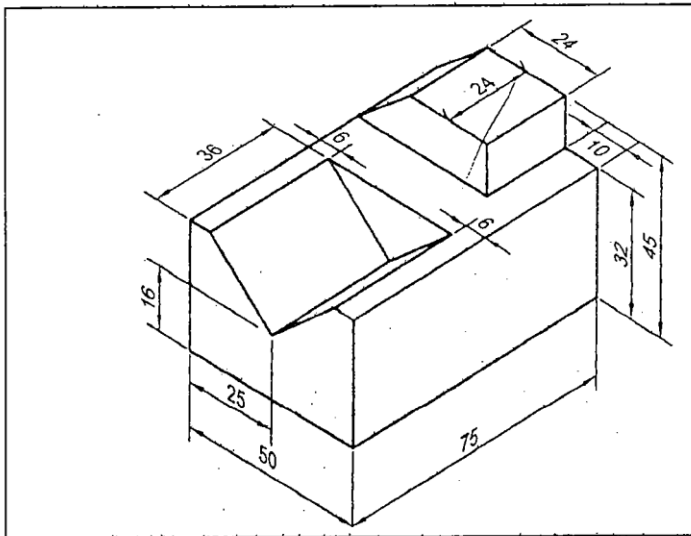
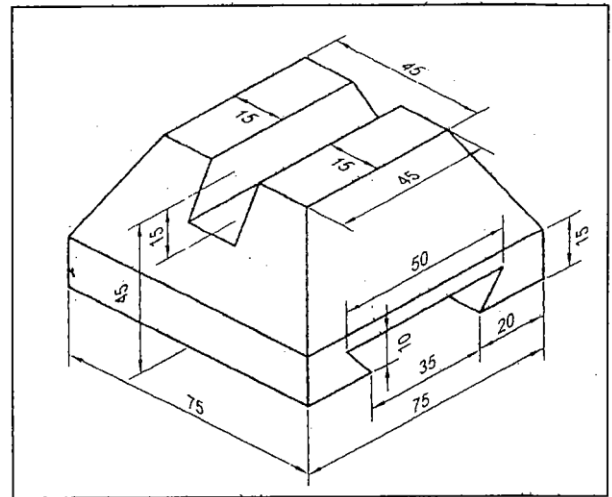
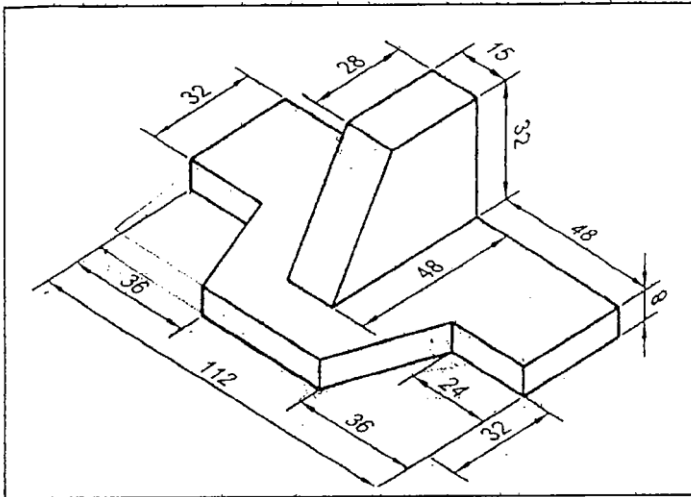


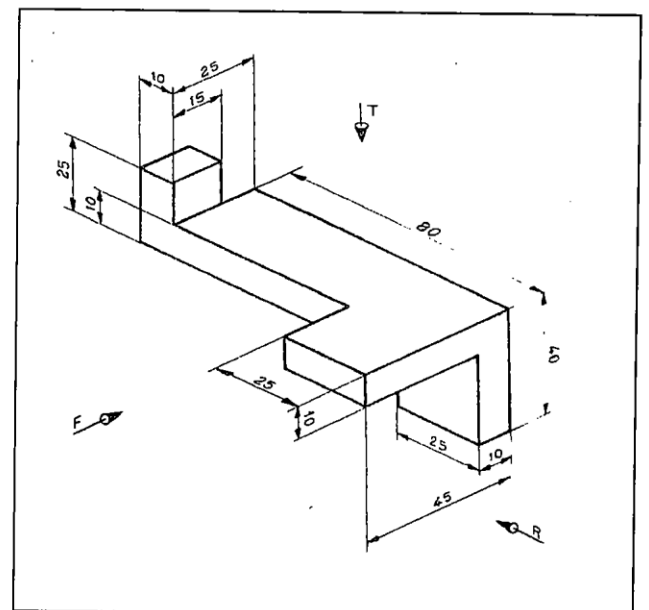
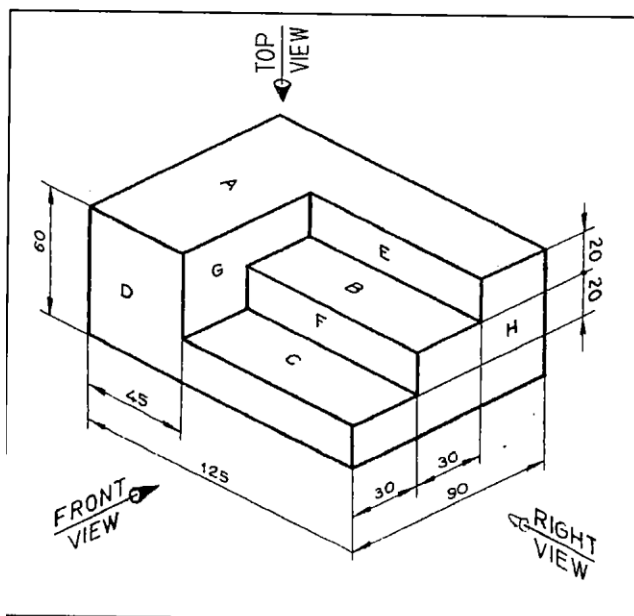
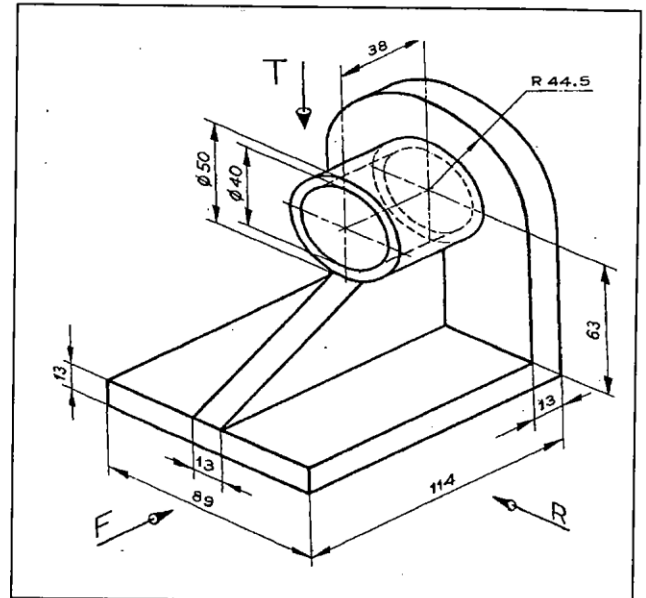
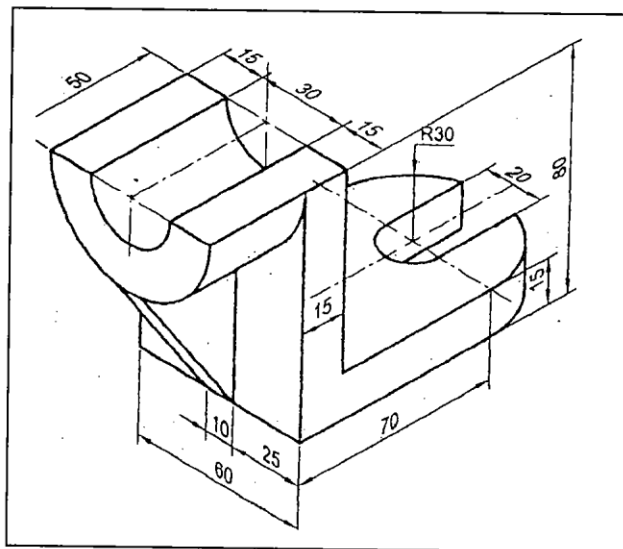
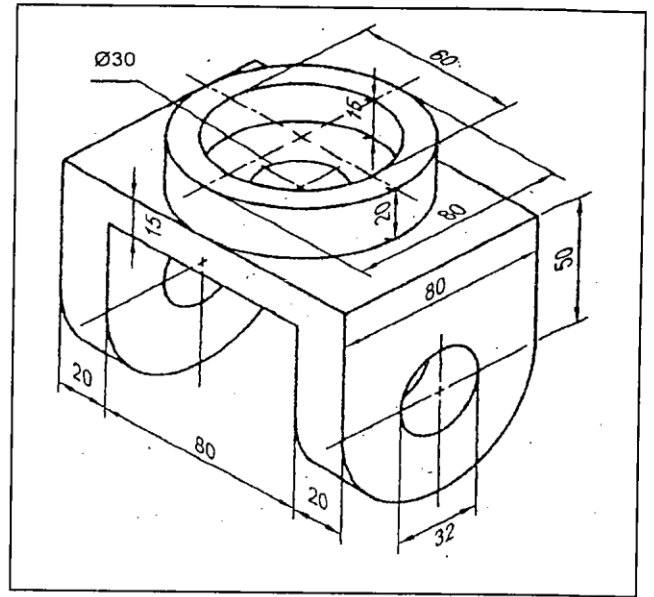
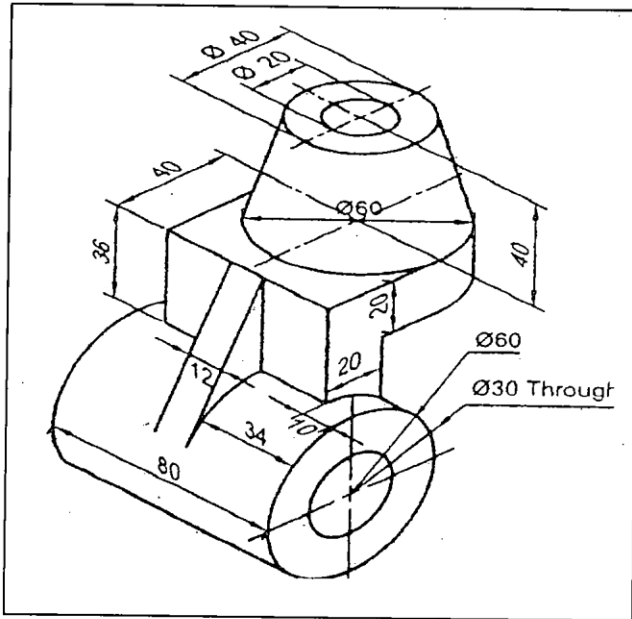
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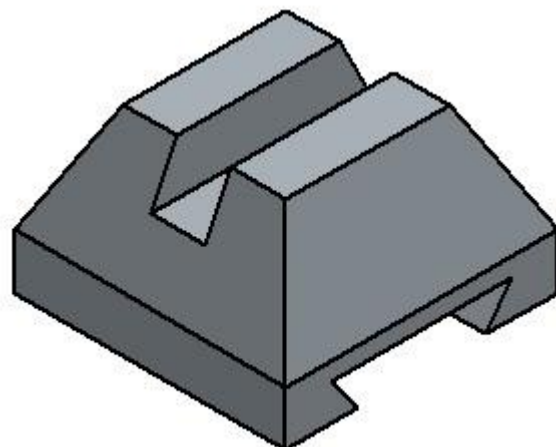
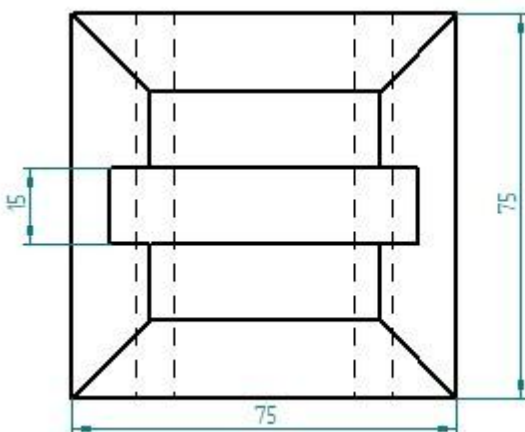
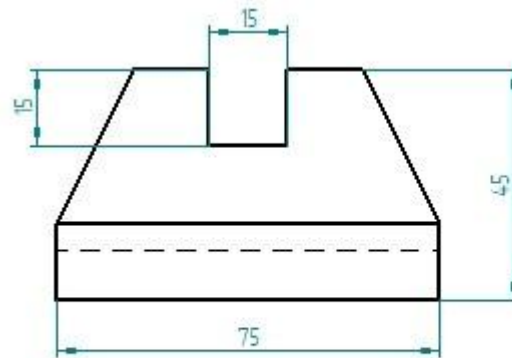
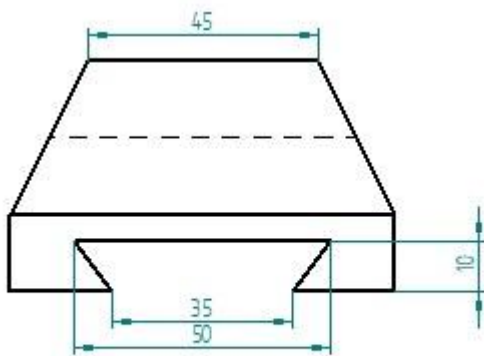
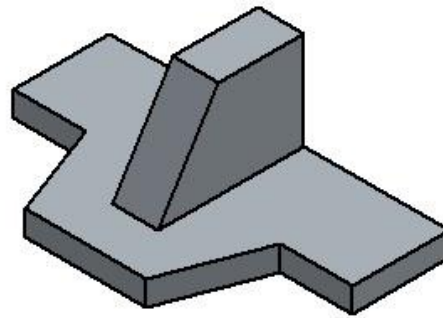
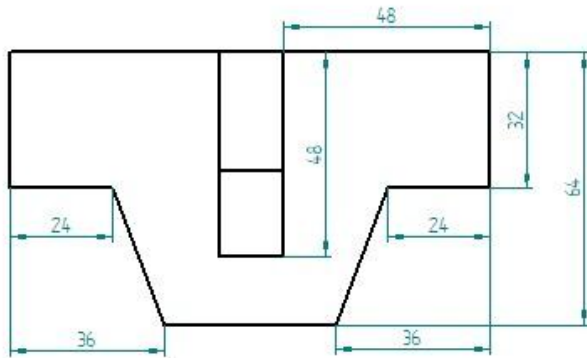
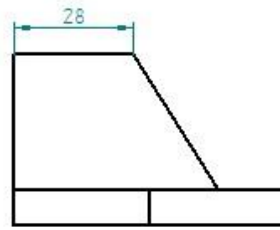
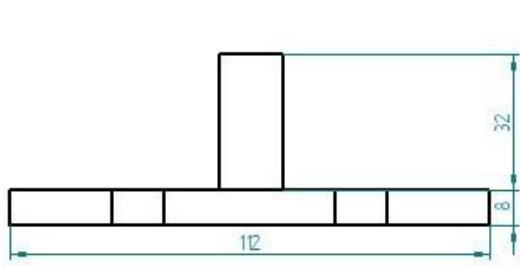
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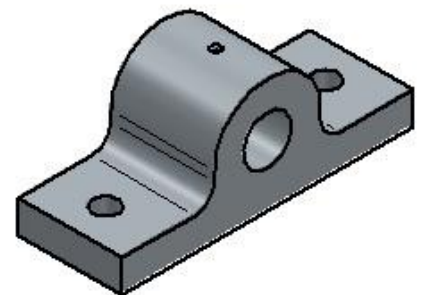
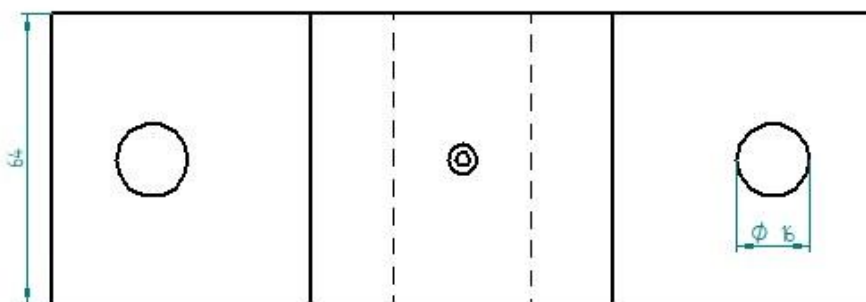
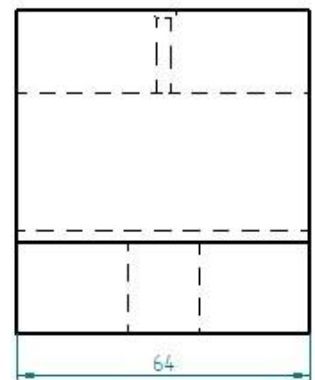
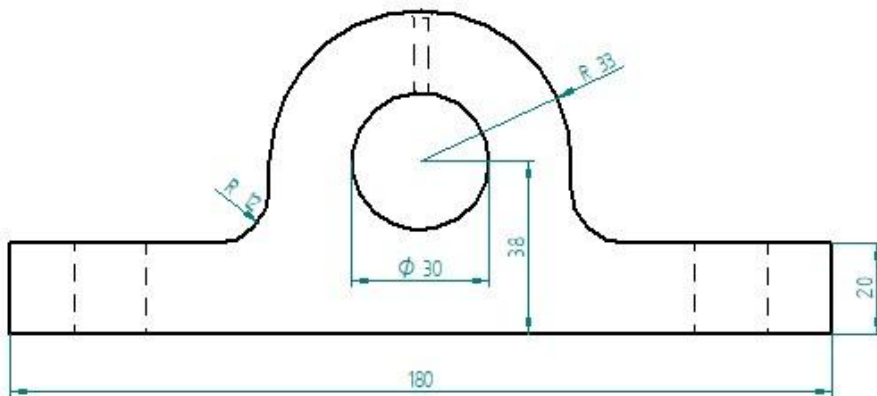
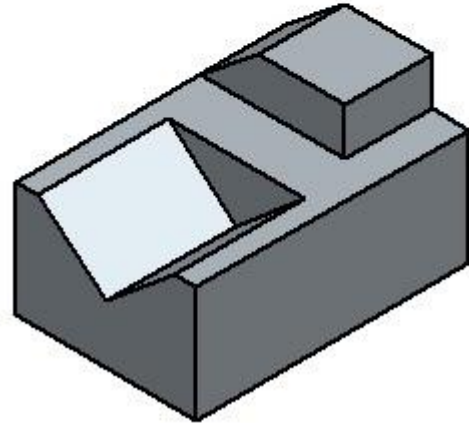
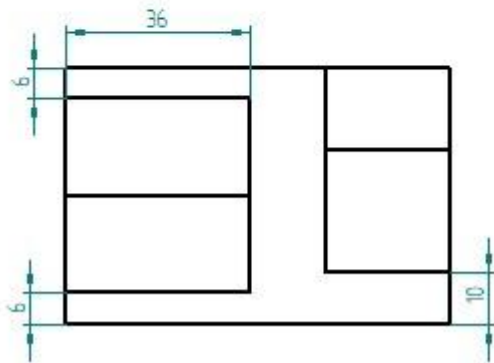
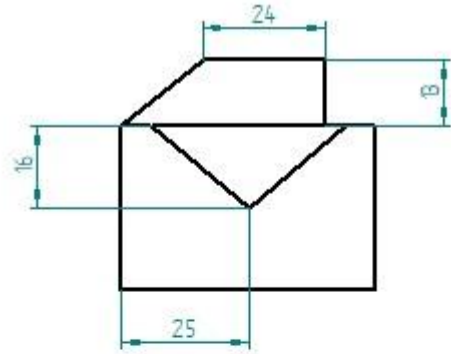
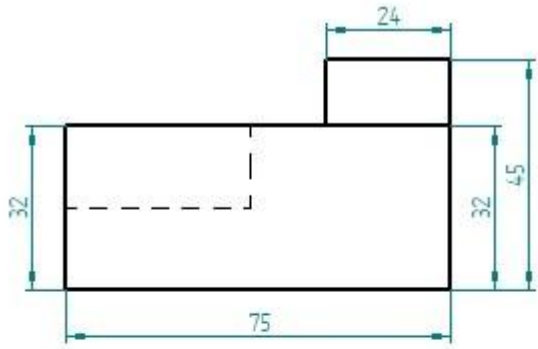
PART - A

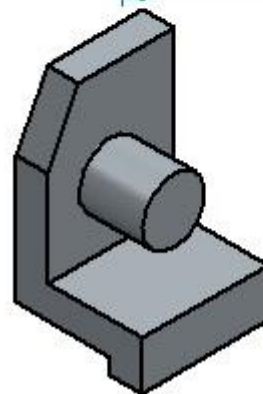
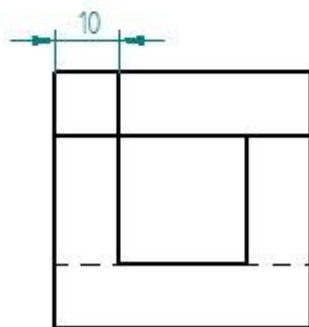
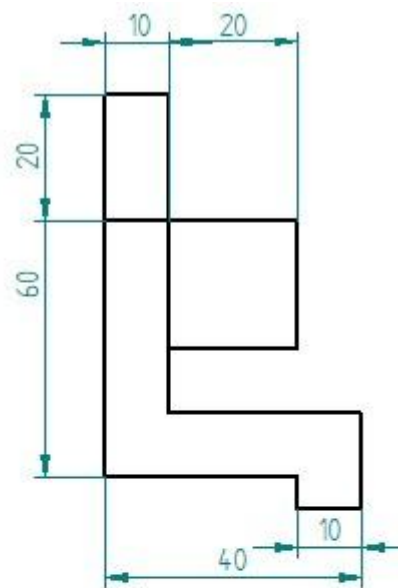
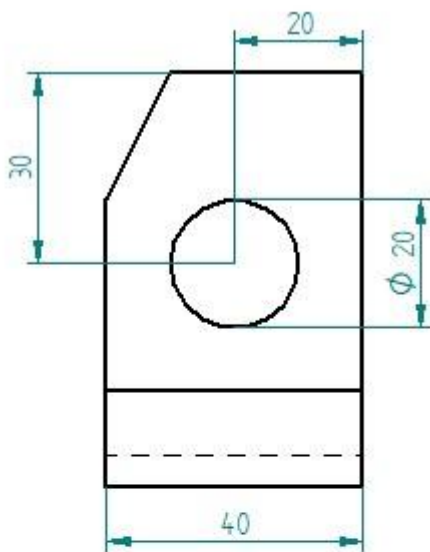
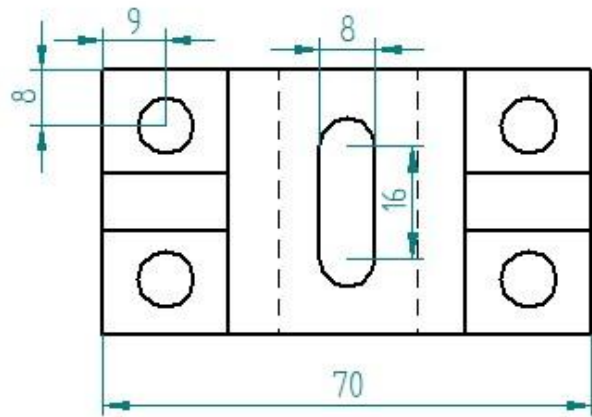
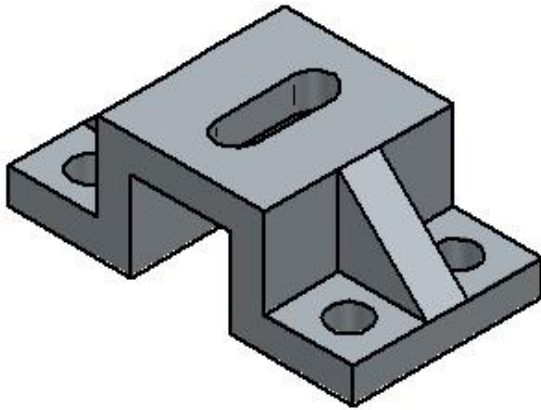
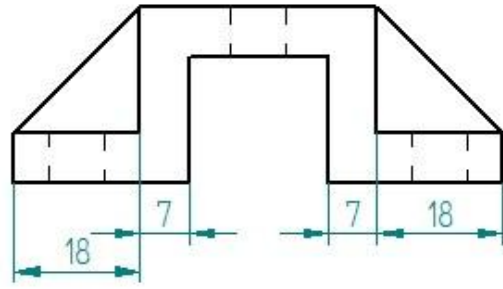
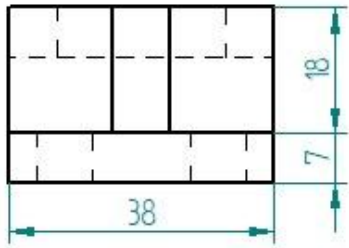
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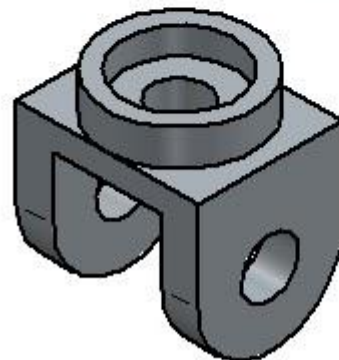
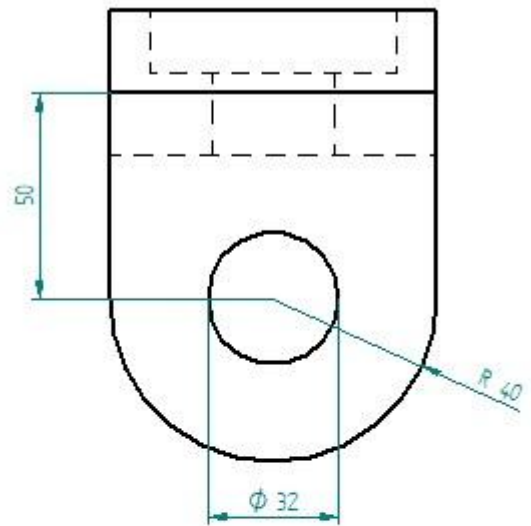
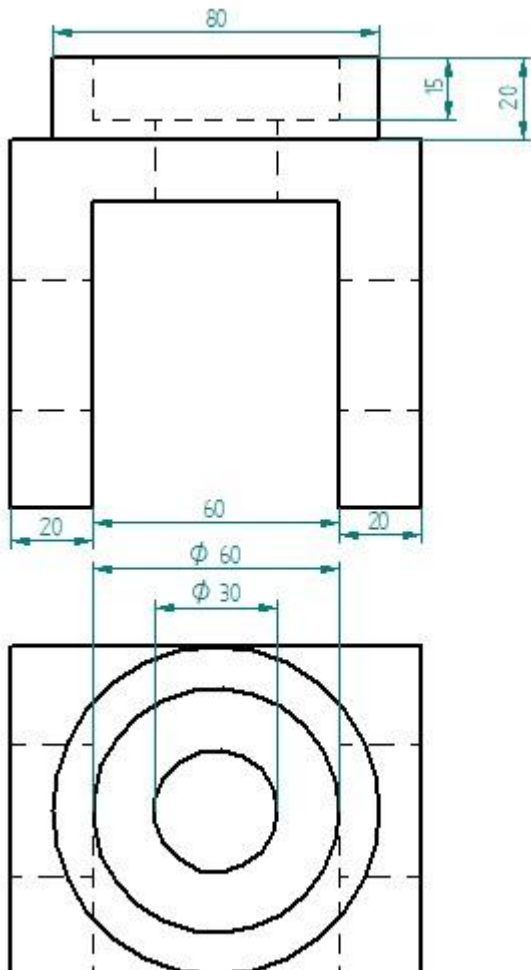
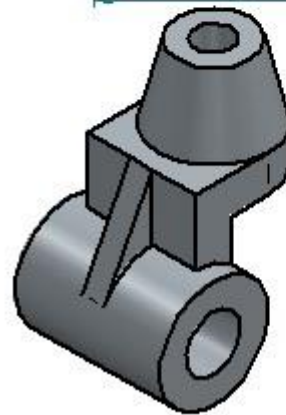
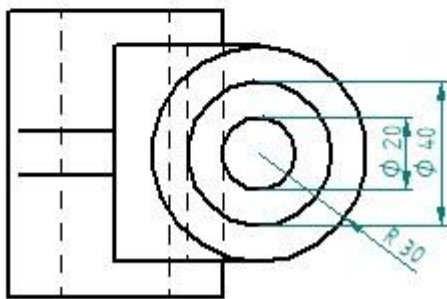
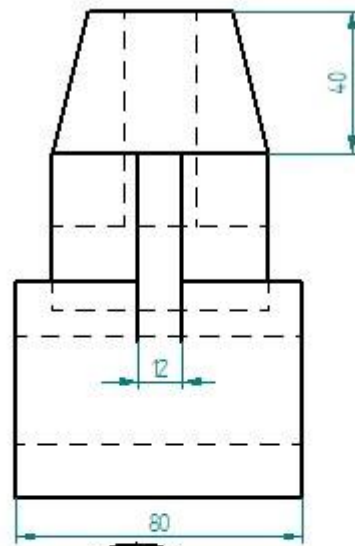
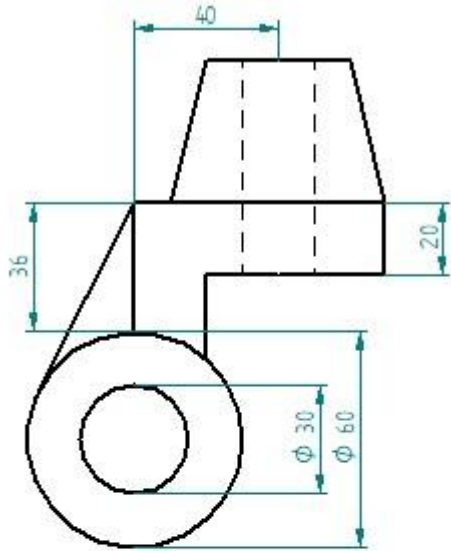


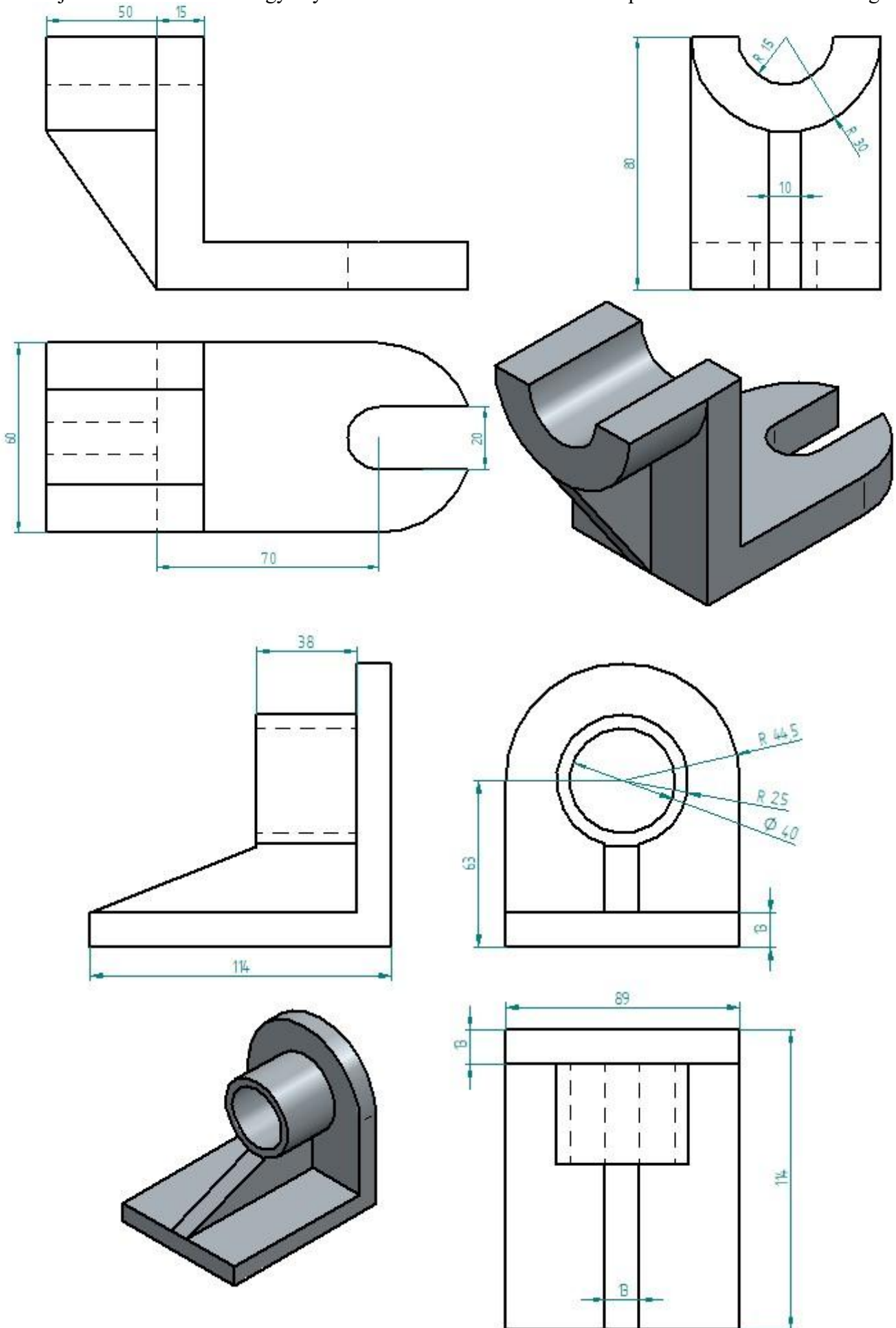


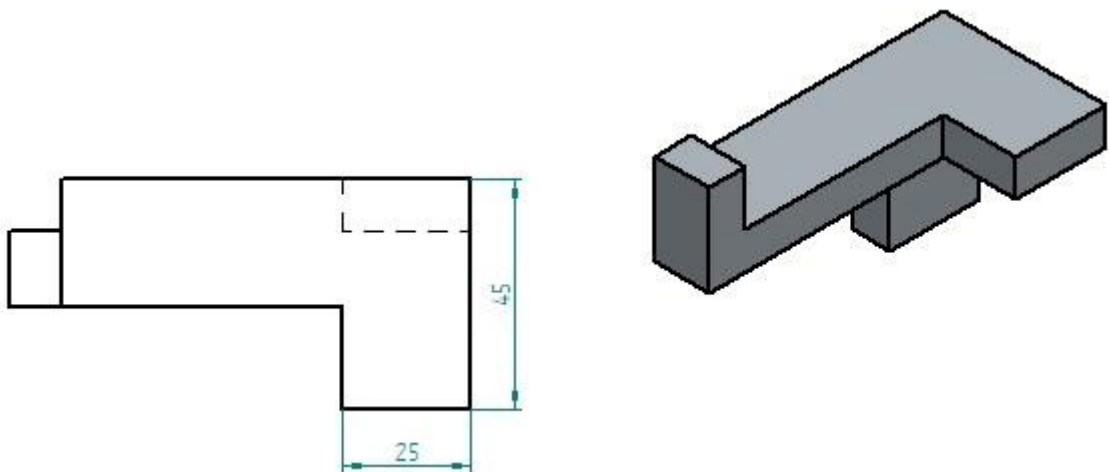
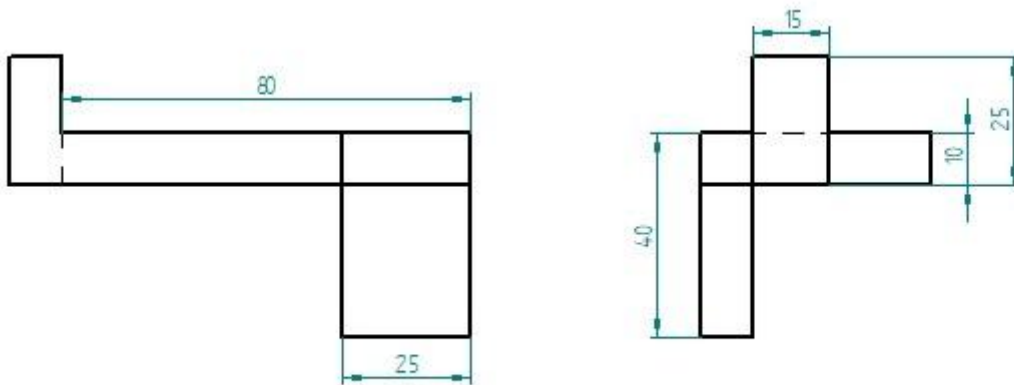
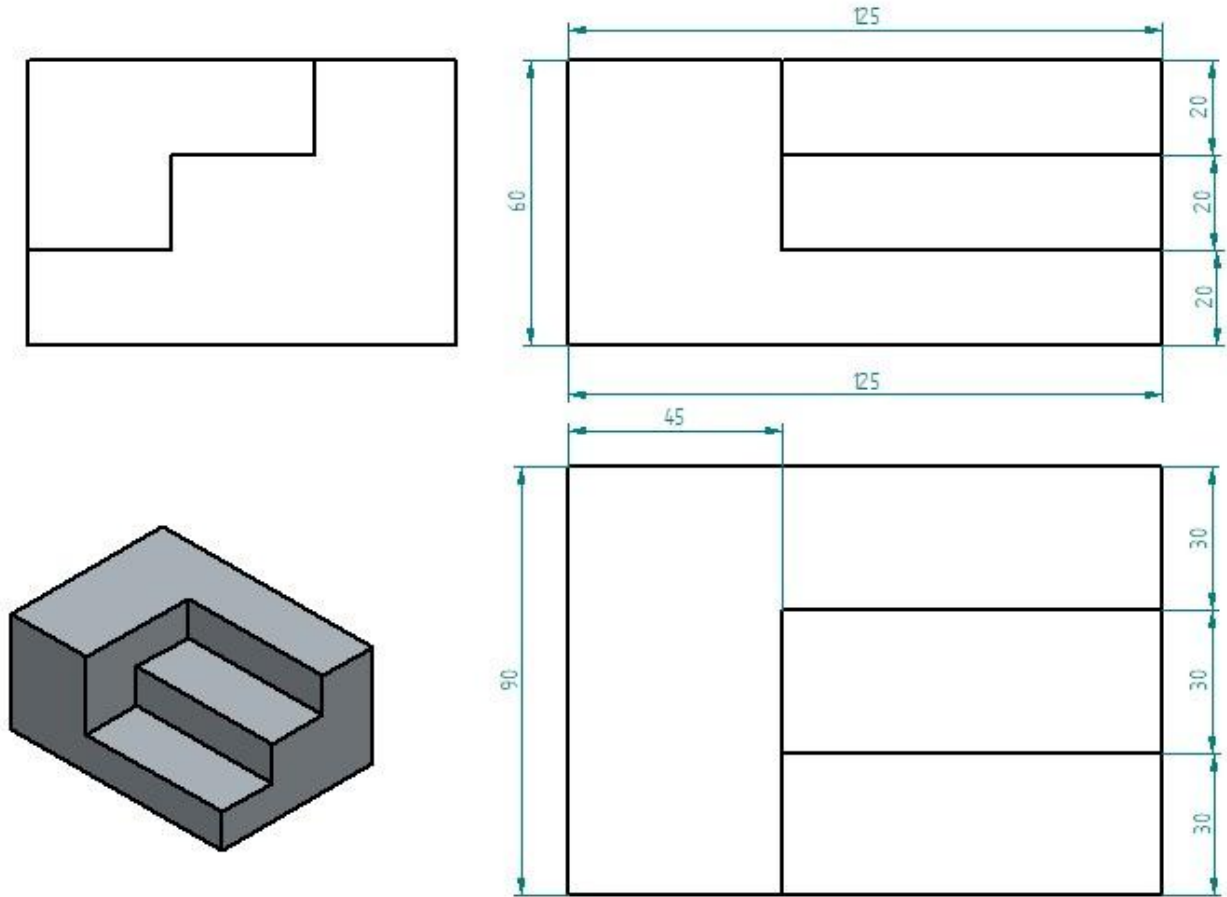




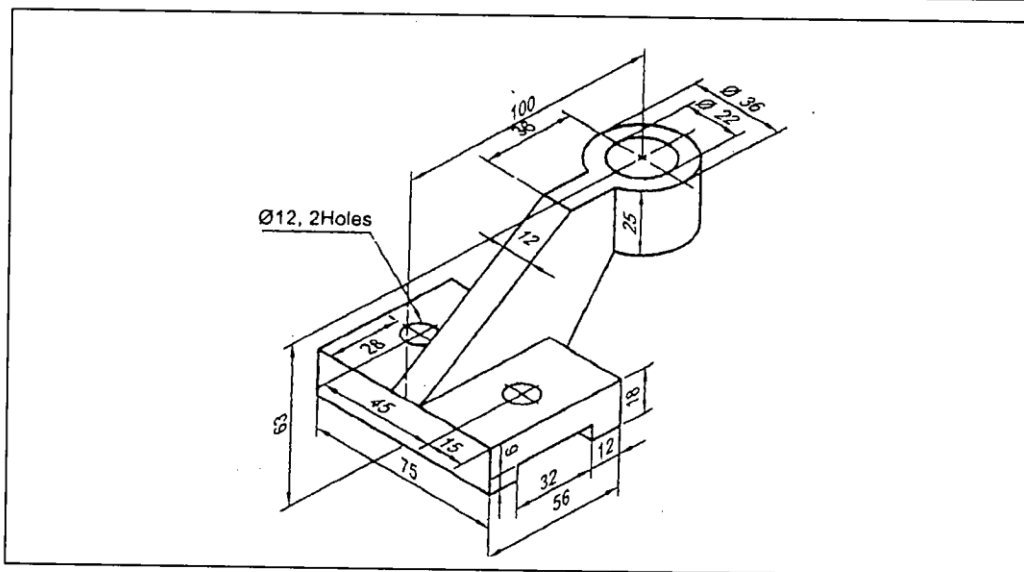
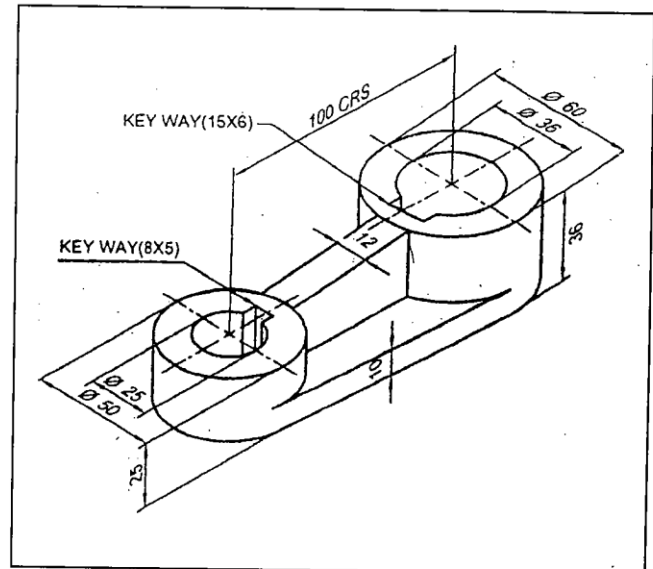
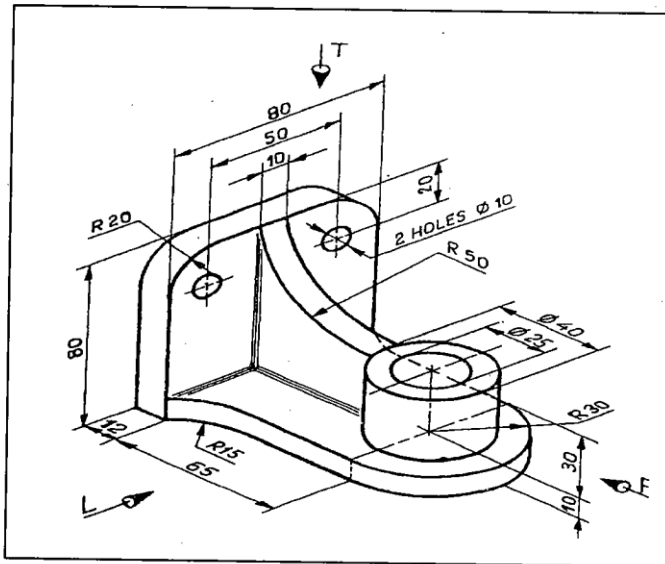
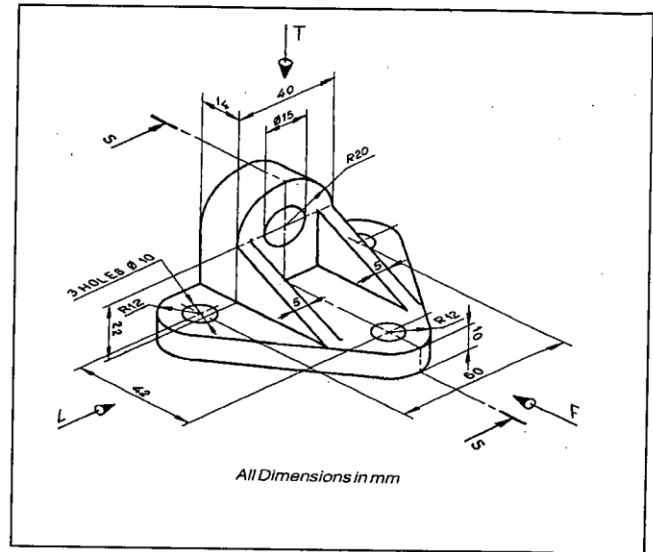
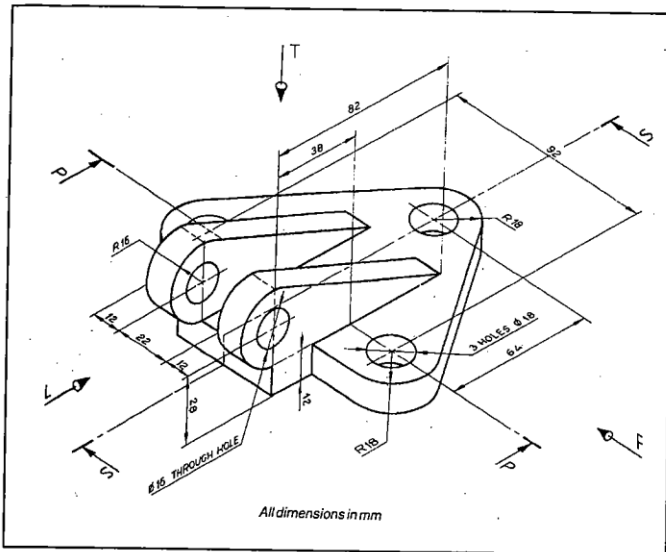


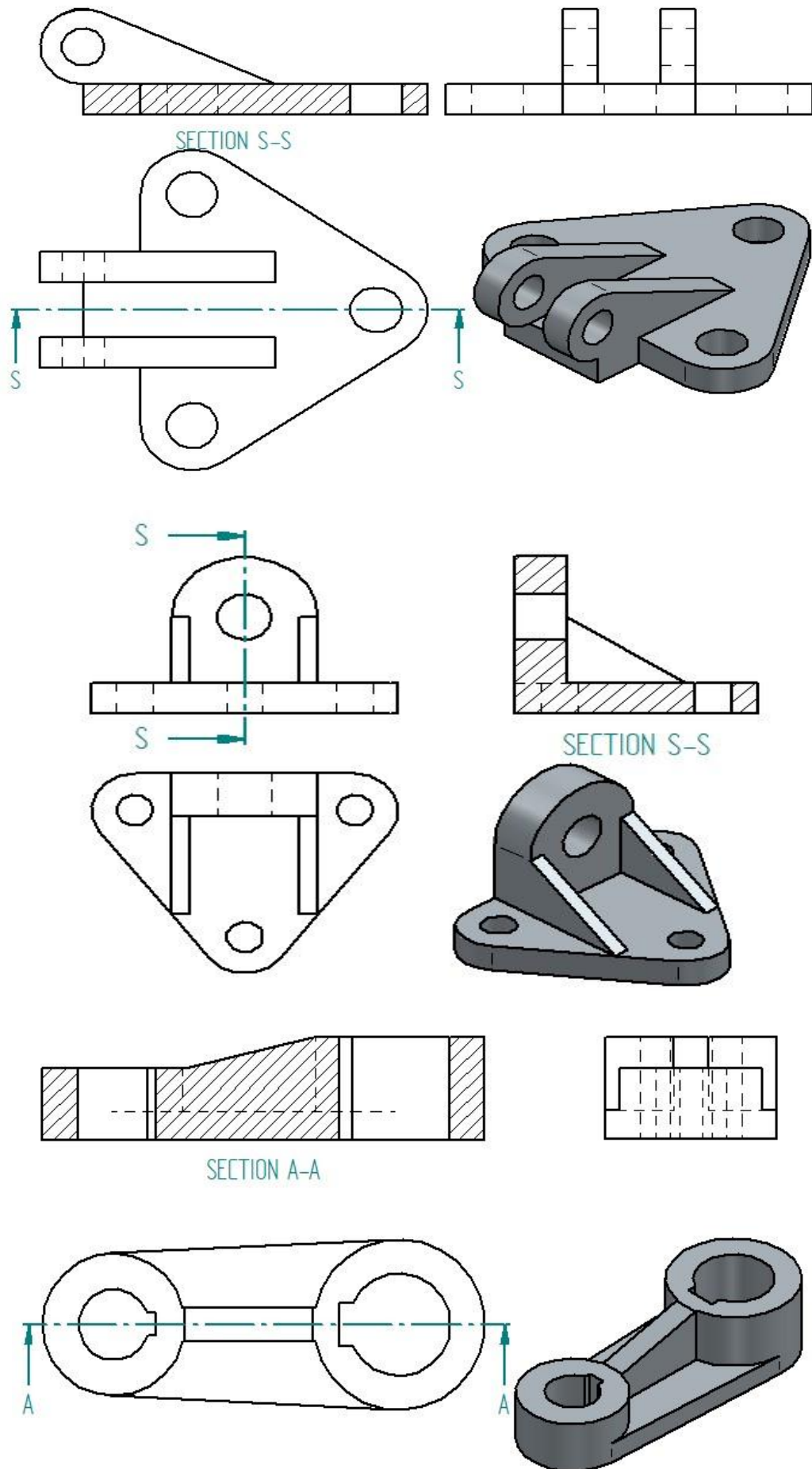


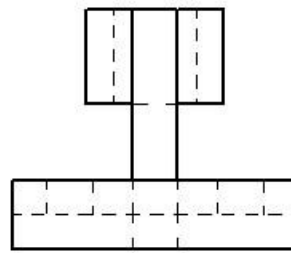
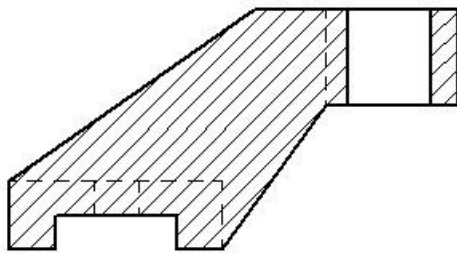
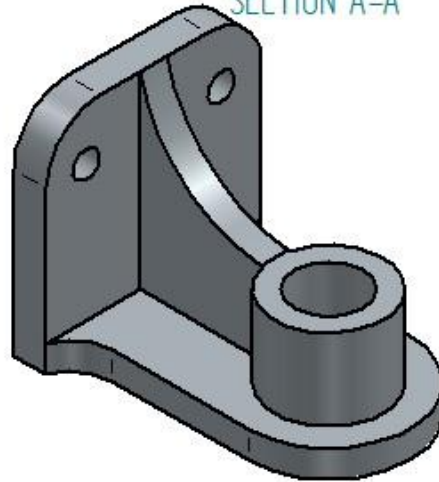
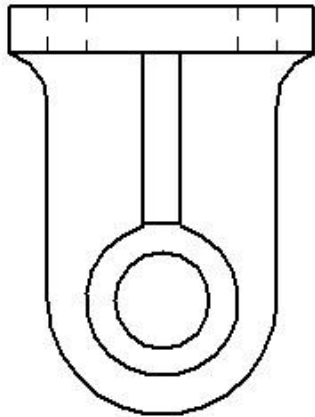
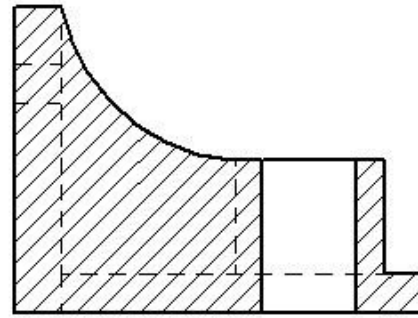
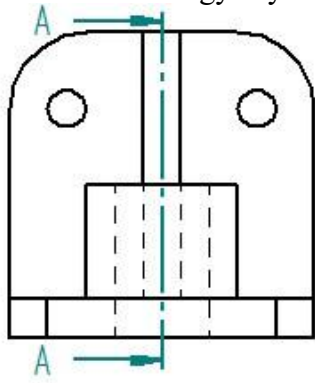




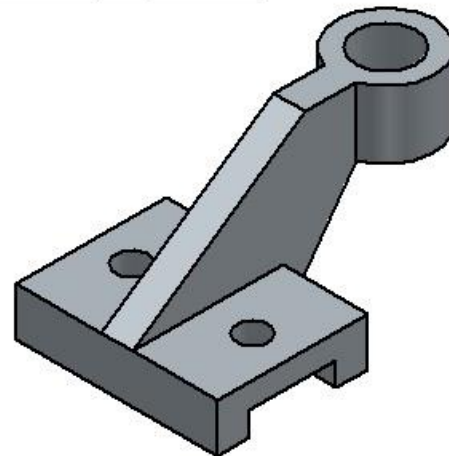
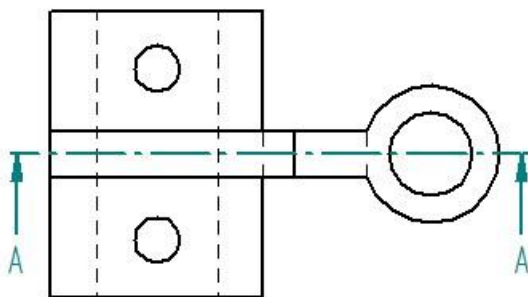
ORTHOGRAPHIC PROJECTIONS WITH SECTIONAL VIEWS OF MACHINE PARTS







SECTION A-A



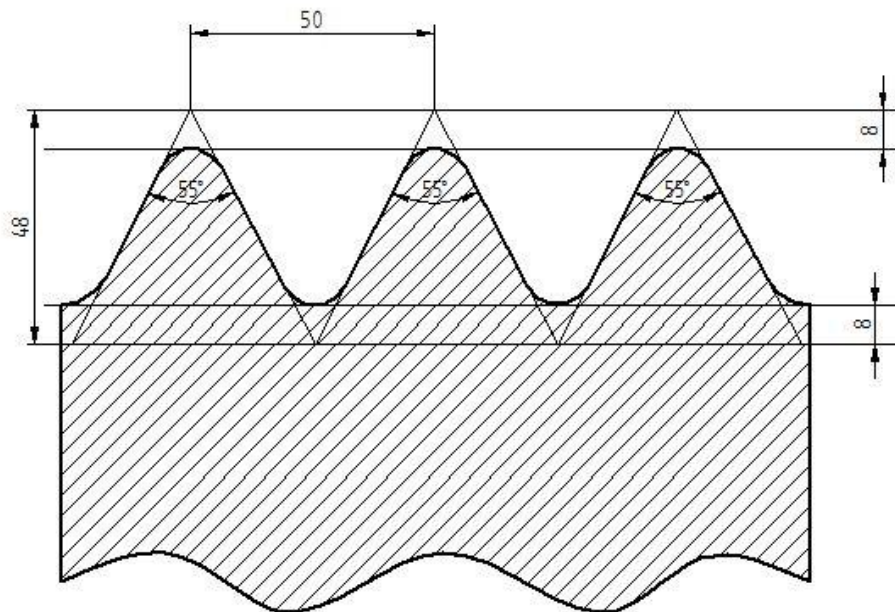
THREAD FORMS

STANDARDS OF THREAD FORMS

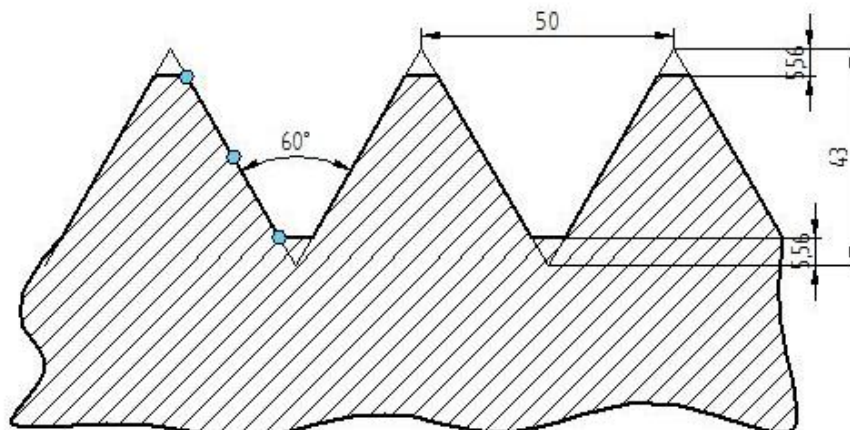
SI NO	TYPE OF THREAD	DEPTH	ANGLE (deg)	UPPER	LOWER
V-THREADS					
1	Whithworth(Bsw)	$0.96 * P$	55	H/6	H/6
2	Sellers	$0.86 * P$	60	H/8	H/6
3	Iso-Metric				
	Internal	$0.86 * P$	60	H/8	H/4
	External	$0.86 * P$	60	H/8	H/6
SQUARE THREADS					
4	Square	$0.5 * P$	90	$0.5 * P$	
5	Acme	$0.5 * P + 0.25$	29	$0.37P$ (FLAT)	
6	Buttress	P	45	$0.125P$	$0.125P$

All thread forms are drawn to pitch of 50 mm

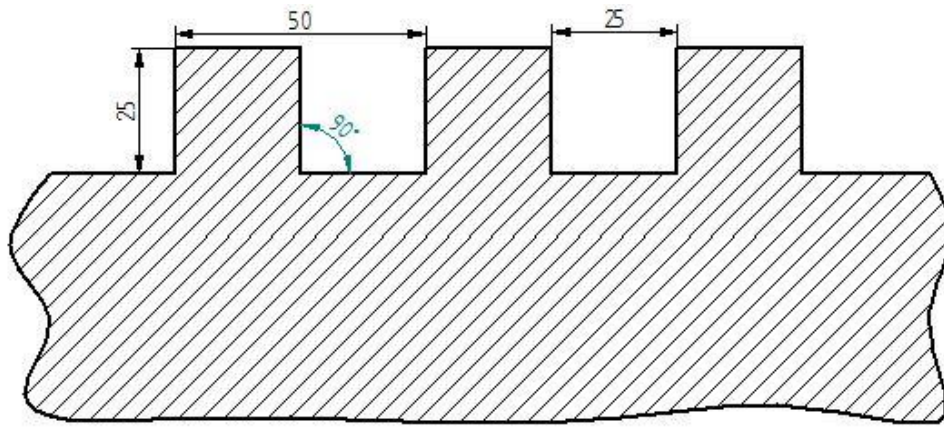
1. BSW Thread (Whithworth Thread)



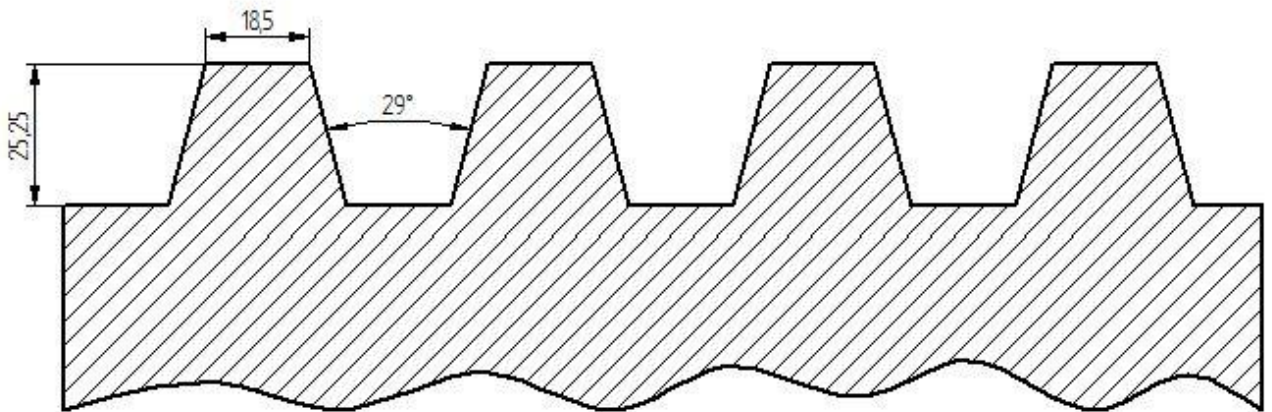
2. Sellers Thread (American Standard Thread)



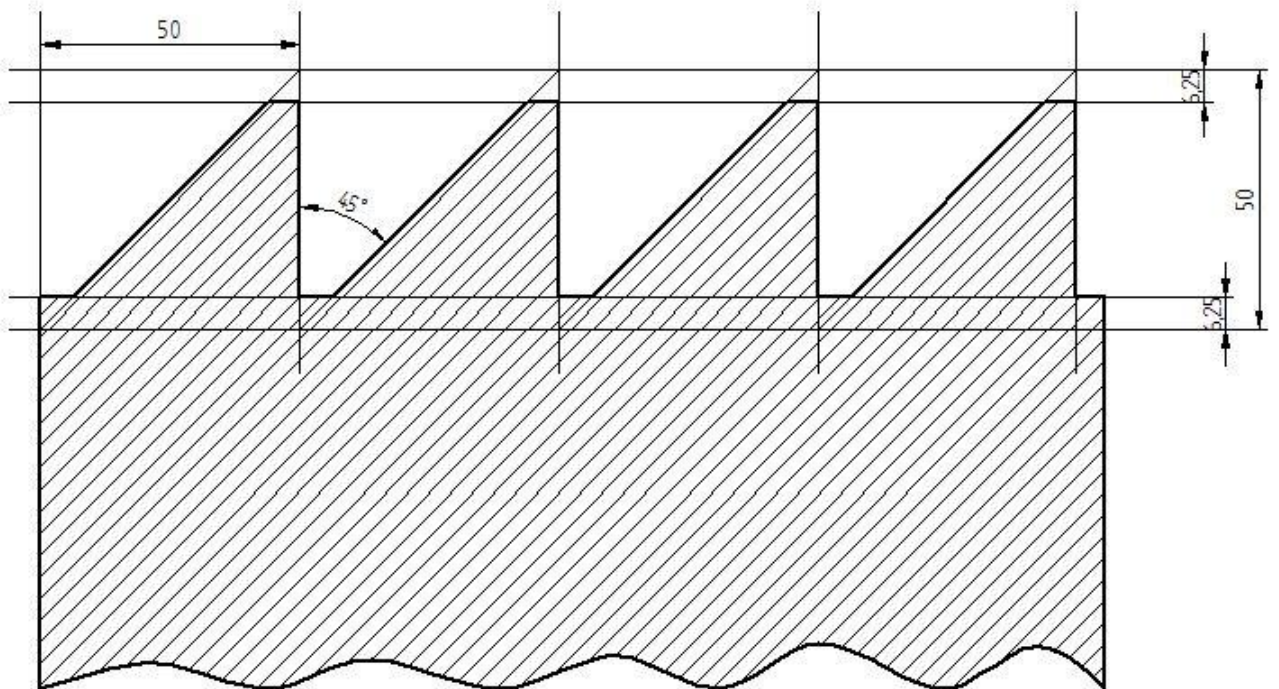
3. Square Thread



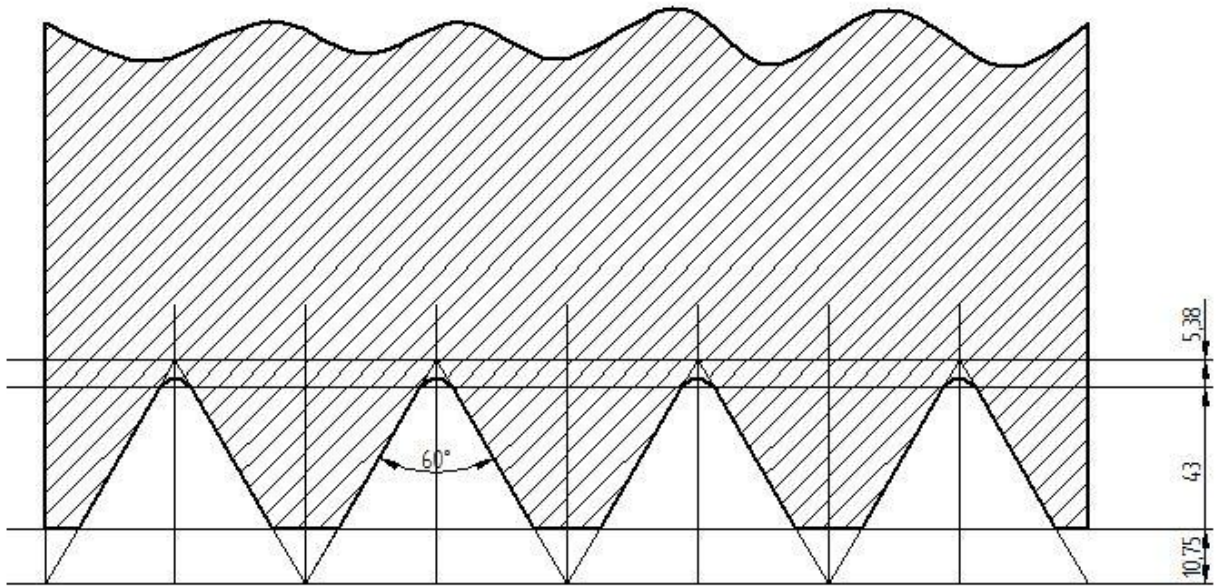
4. ACME Thread



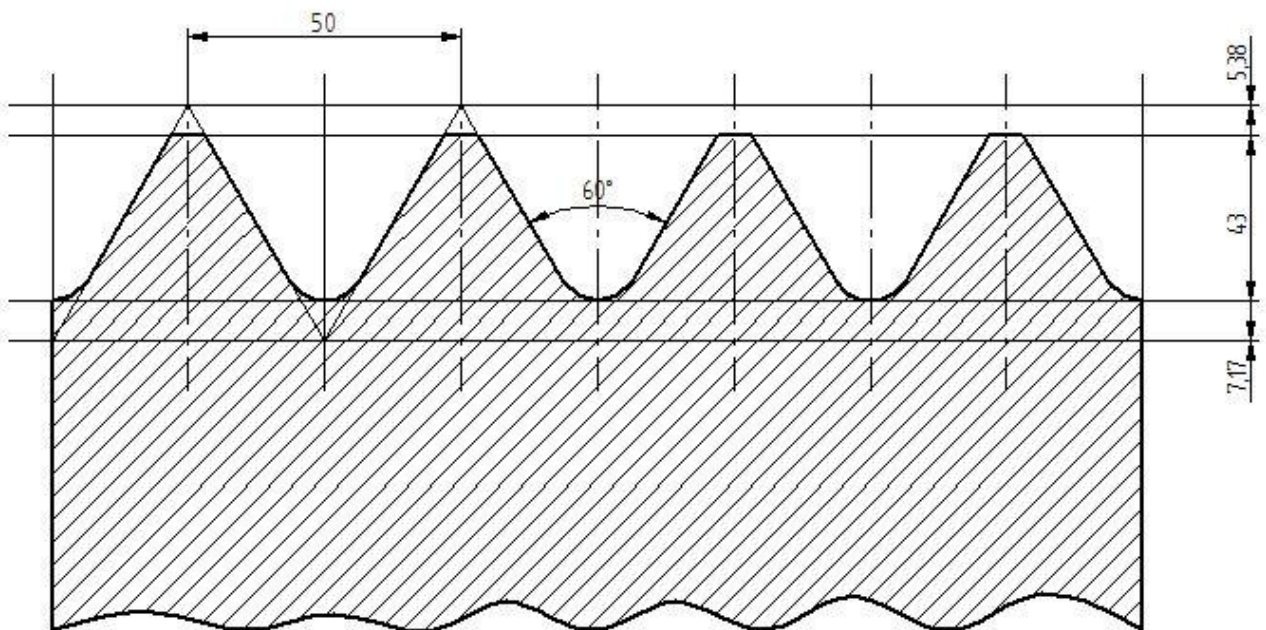
5. Buttress Thread



6. ISO Metric (Internal and External) Thread



ISO METRIC INTERNAL THREAD

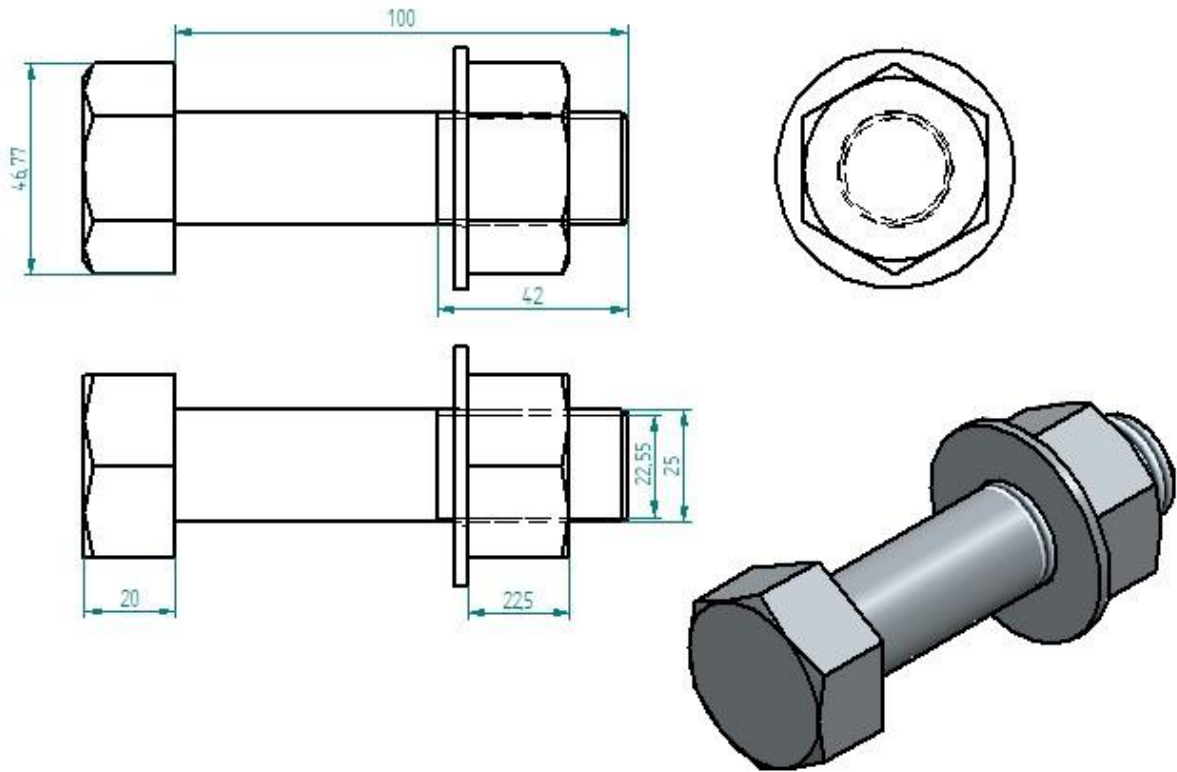


ISO METRIC EXTERNAL THREAD

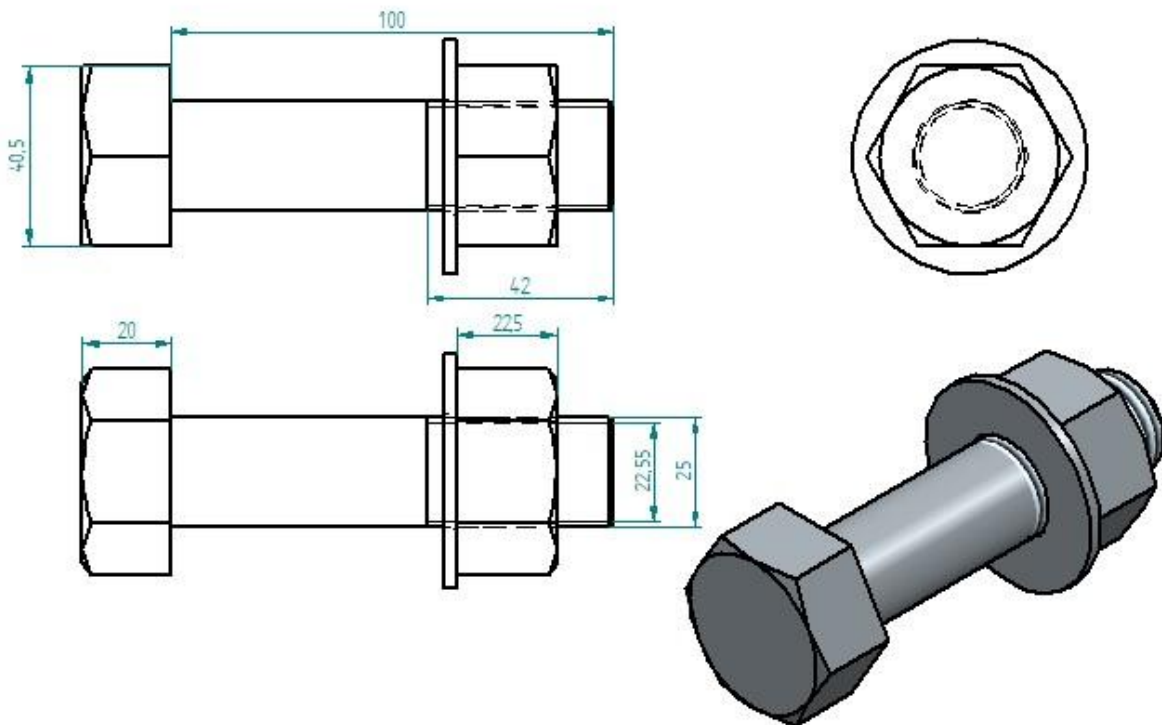
FASTENERS

1. Hexagonal headed bolt:

a. Hexagonal headed bolt and nut assembly with washer resting on edge

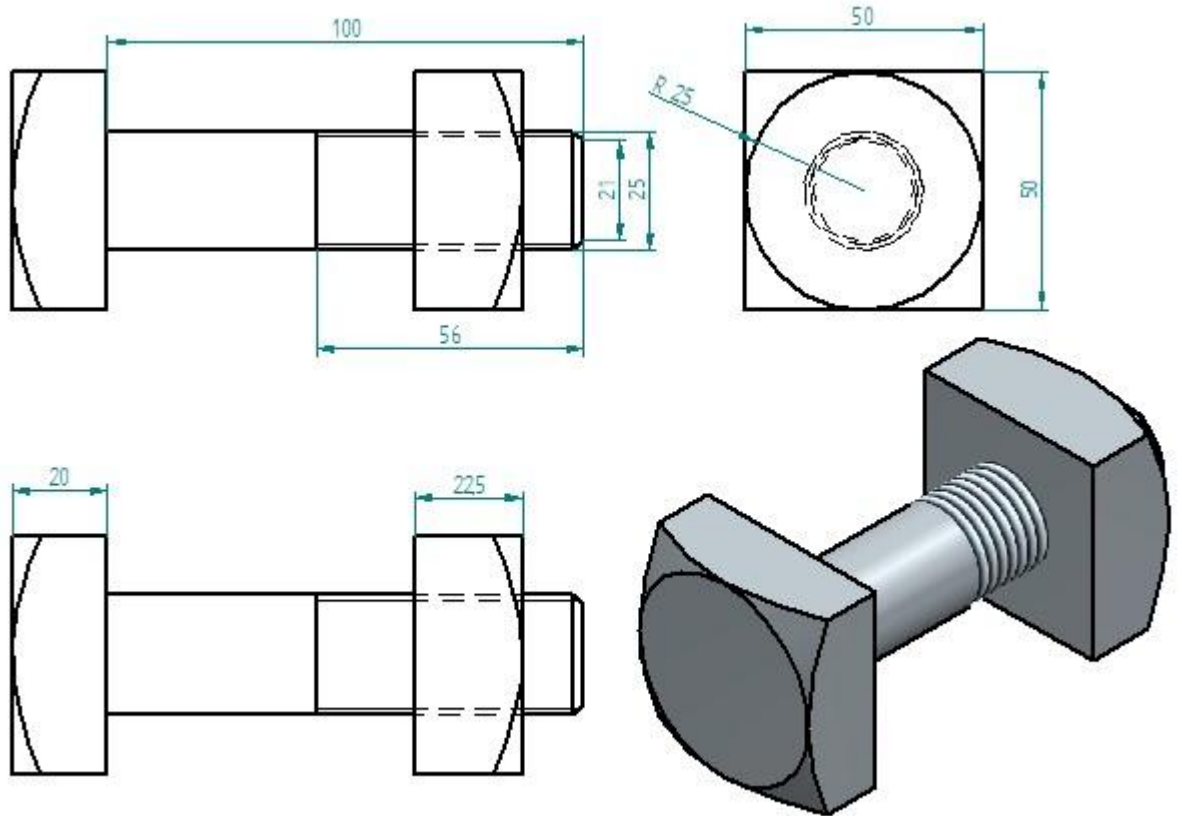


b. Hexagonal headed and nut assembly with washer resting on corner

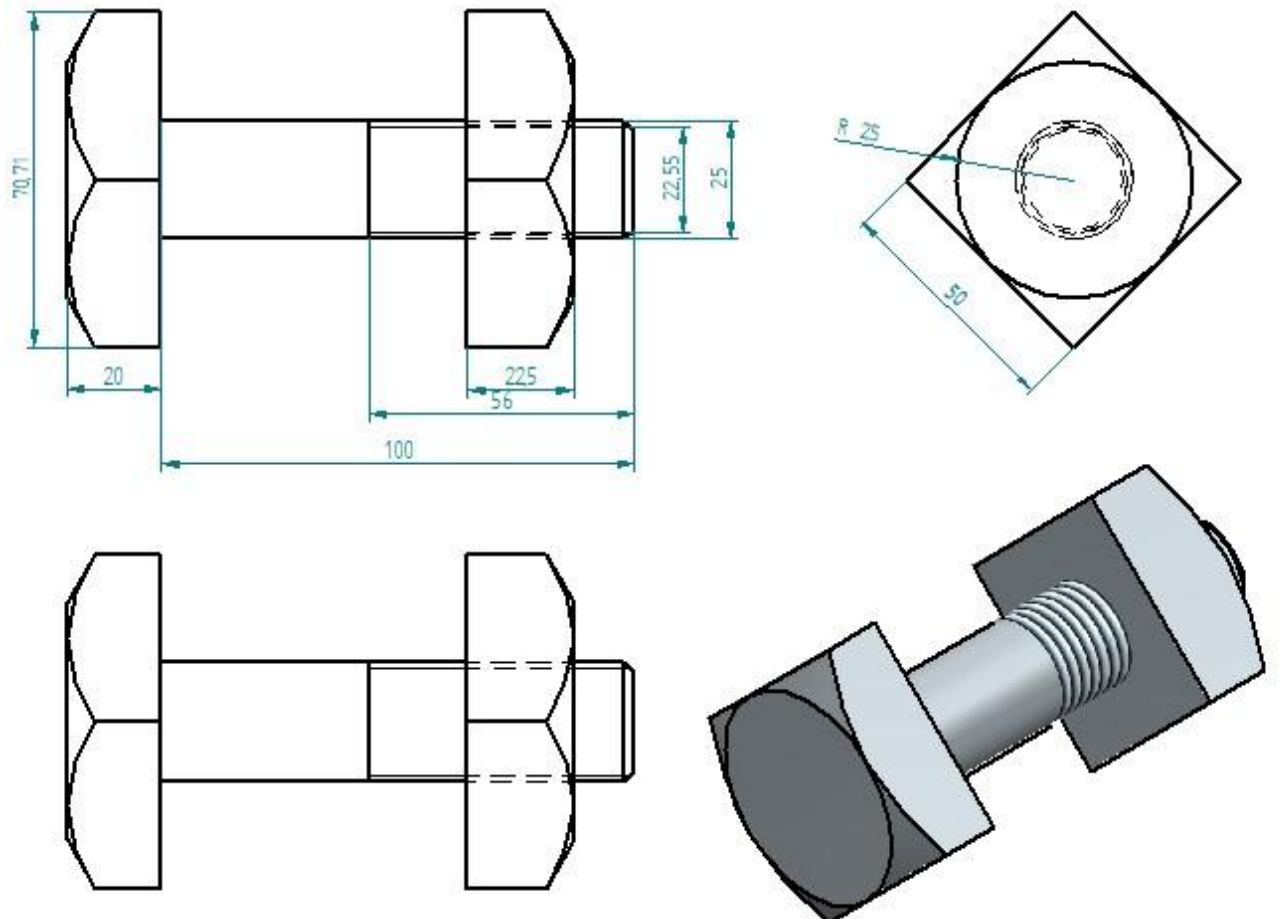


2. Square headed bolt:

a. Square headed bolt resting on edge

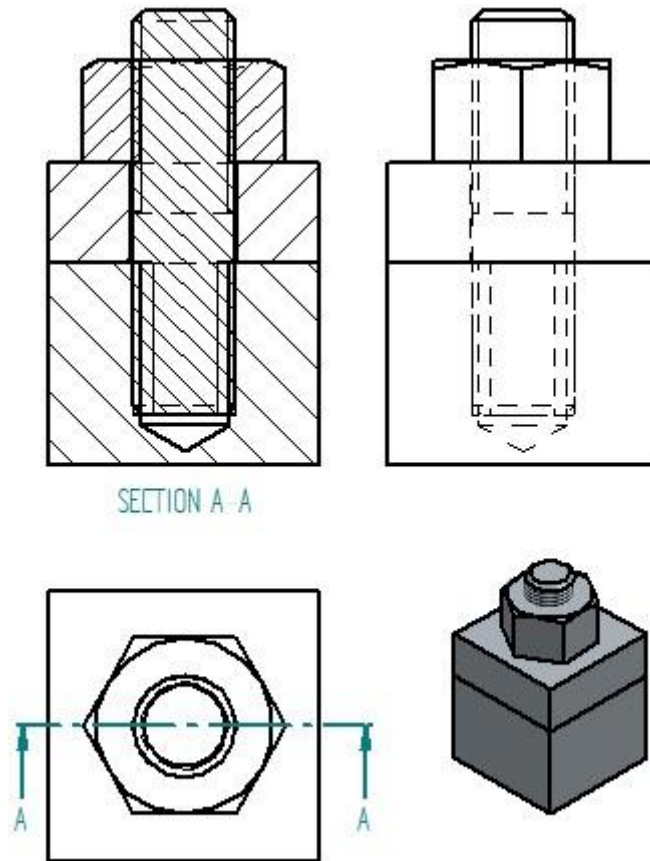


b. Square headed bolt resting on corner

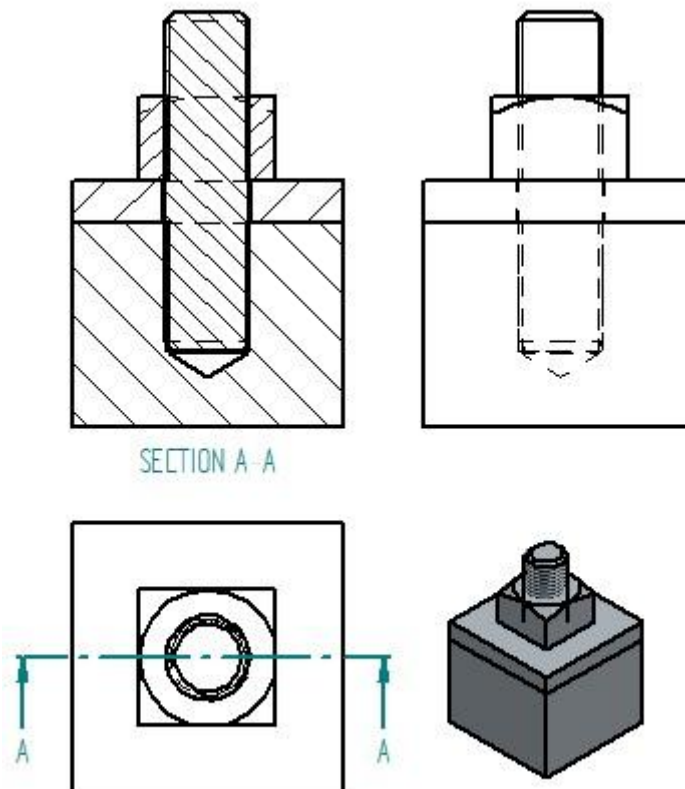


3. Stud:

a. Stud with Hexagonal Nut:



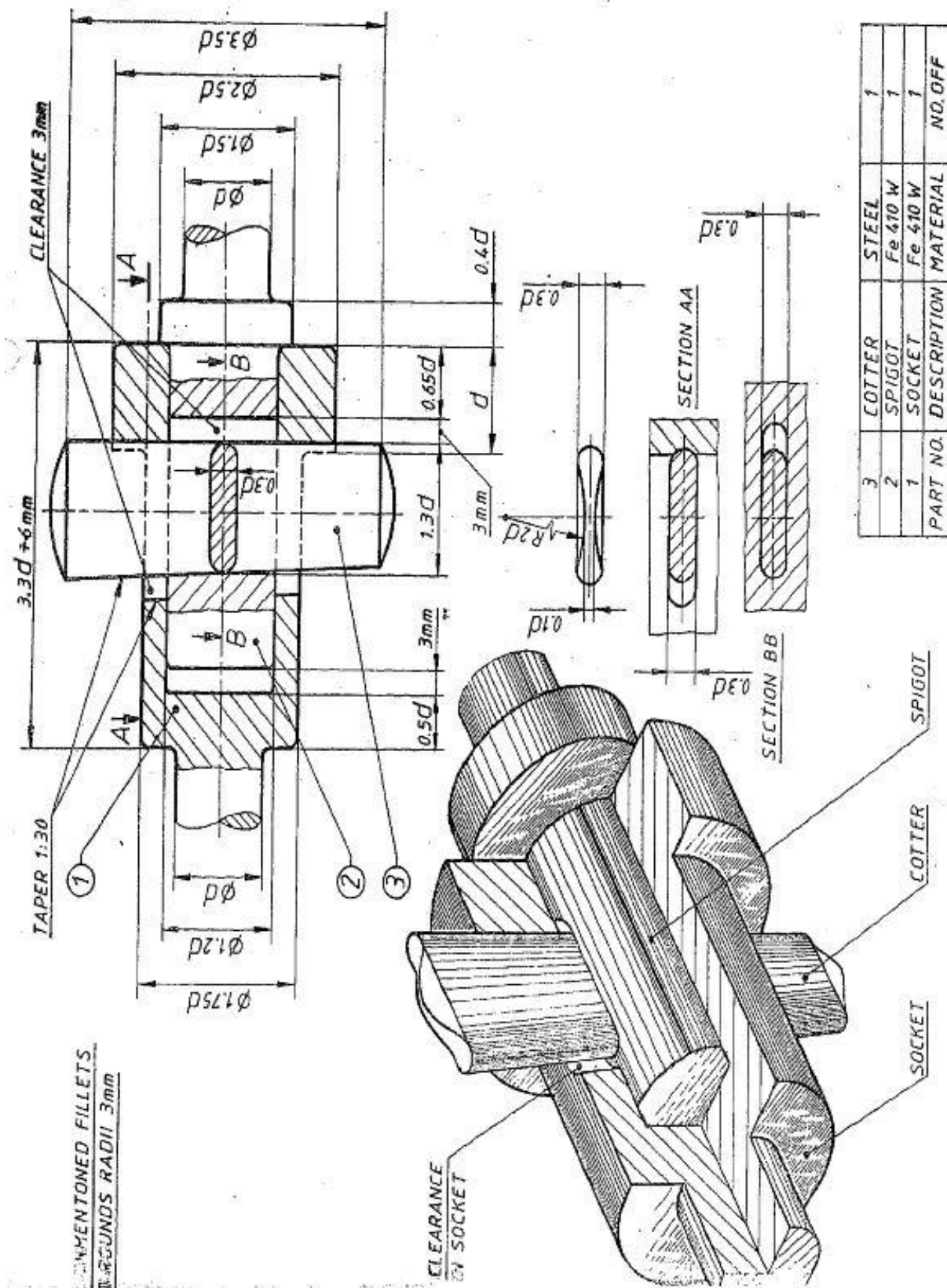
b. Stud with Square Nut:



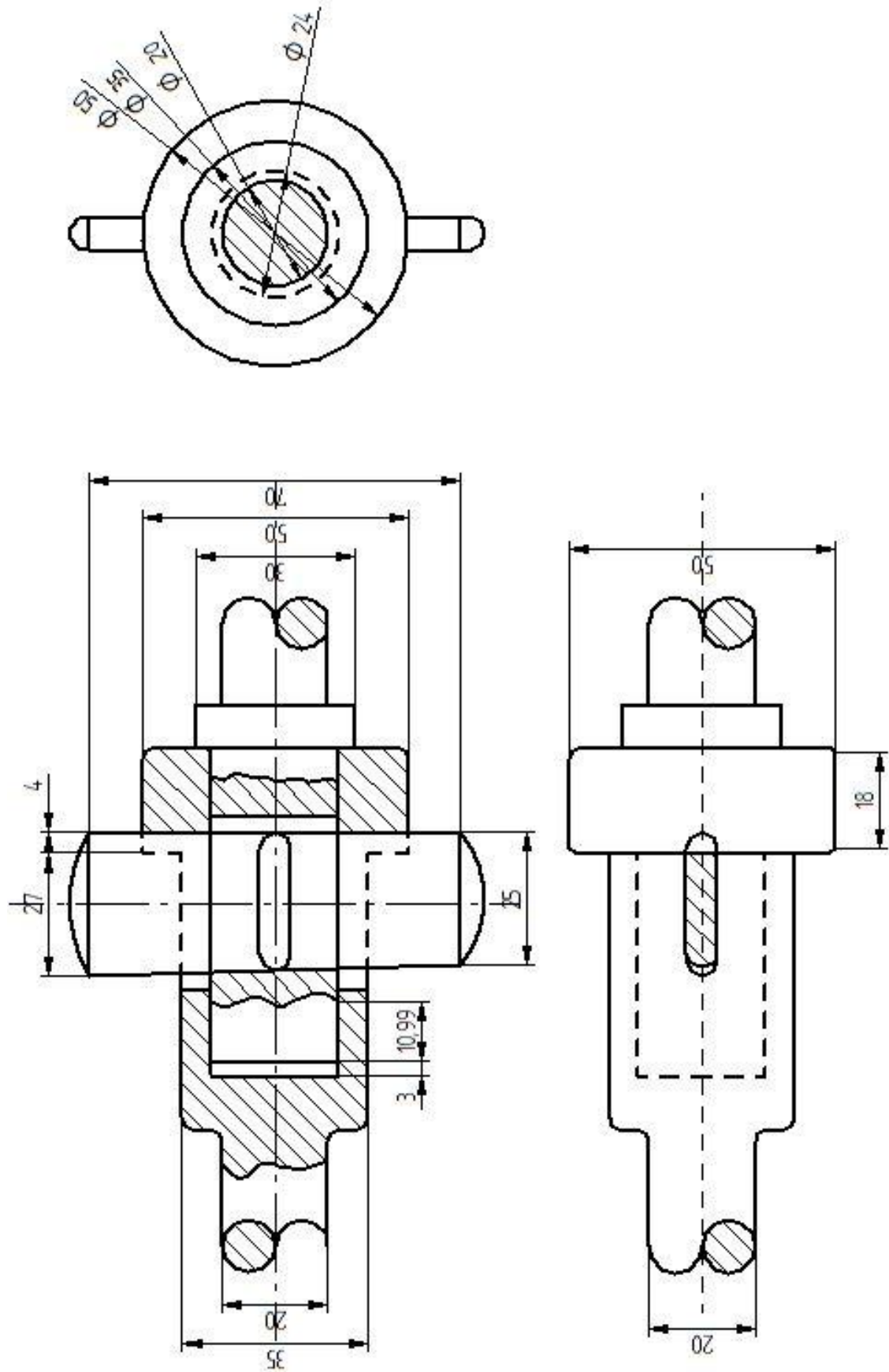
PART – B

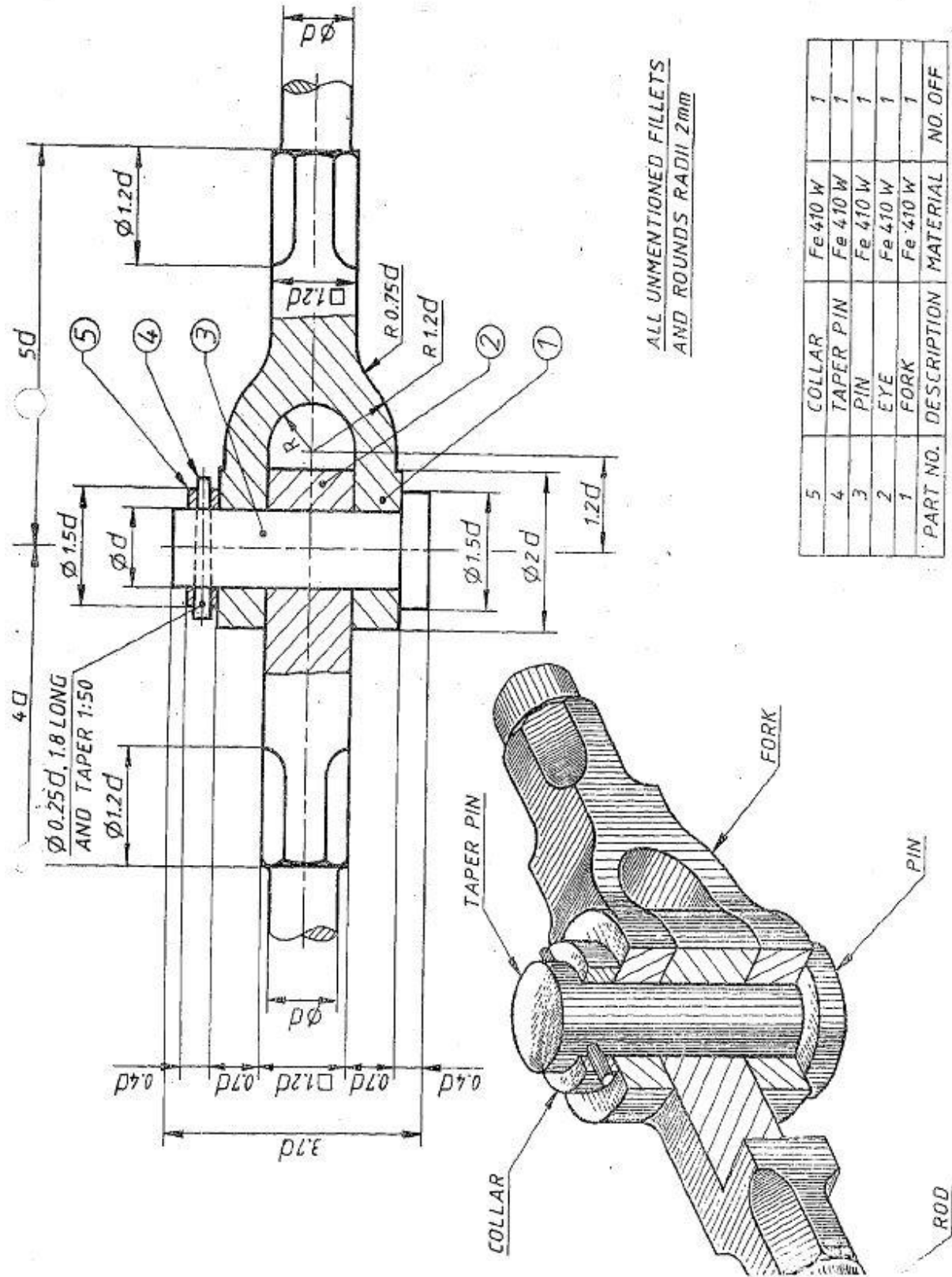
JOINTS

COTTER JOINT:

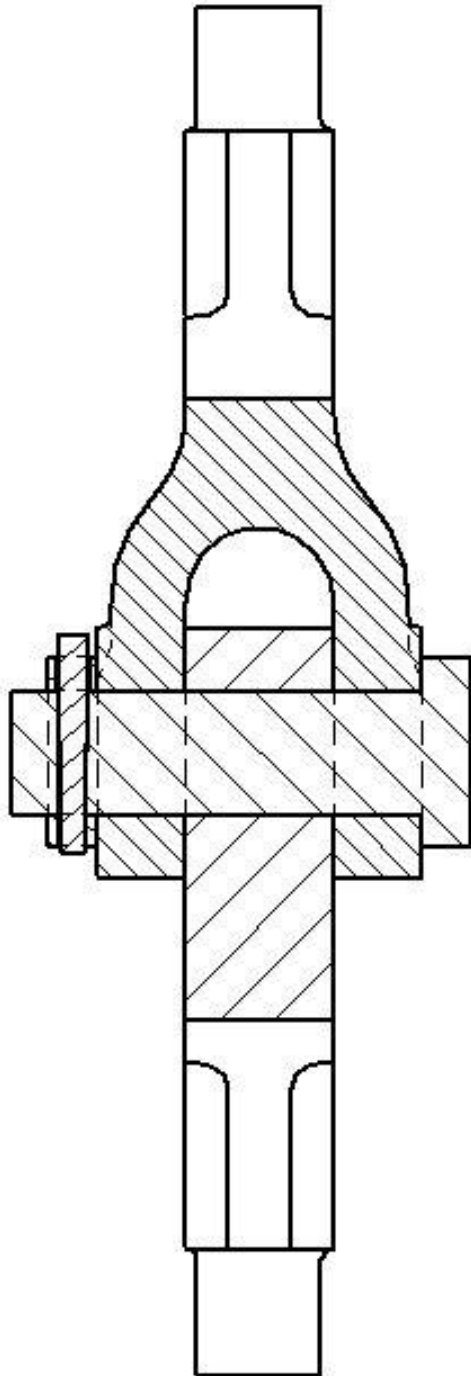
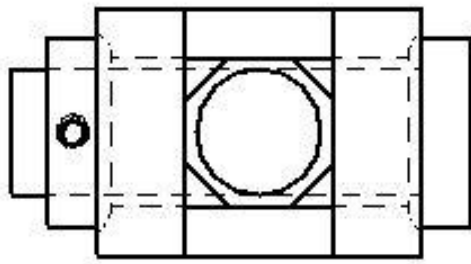


Assembly of Socket and Spigot Cotter Joint

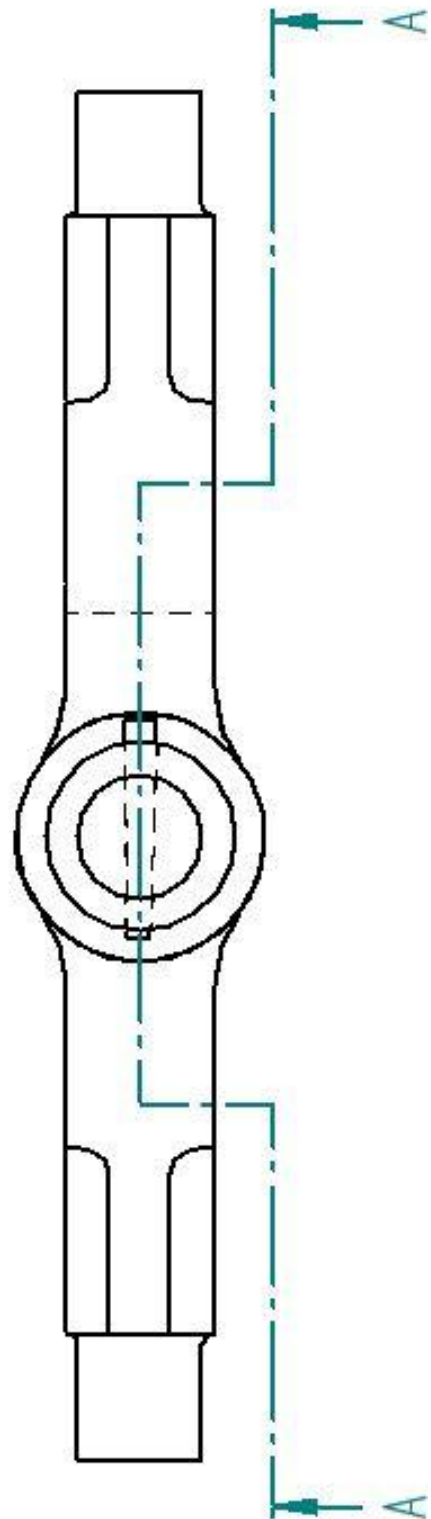




Assembly of Knuckle Joint

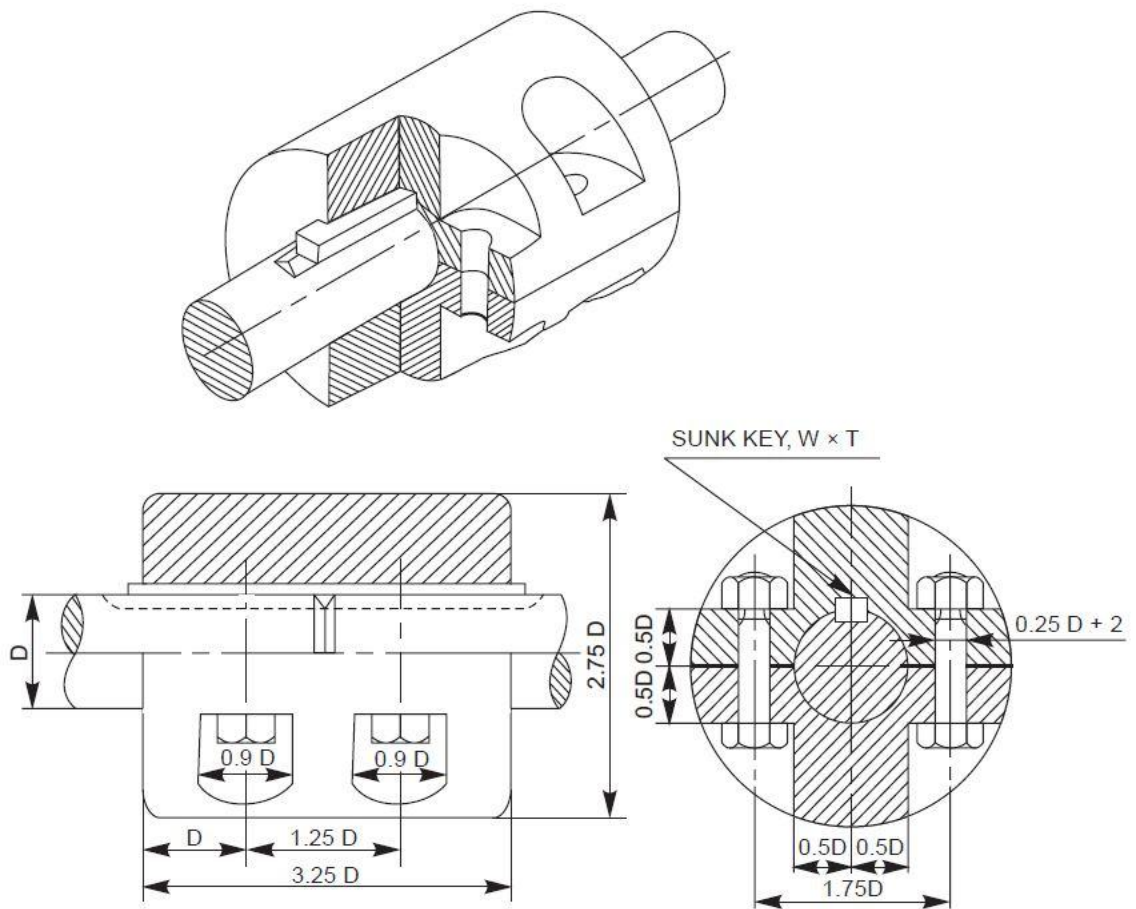


SECTION A-A

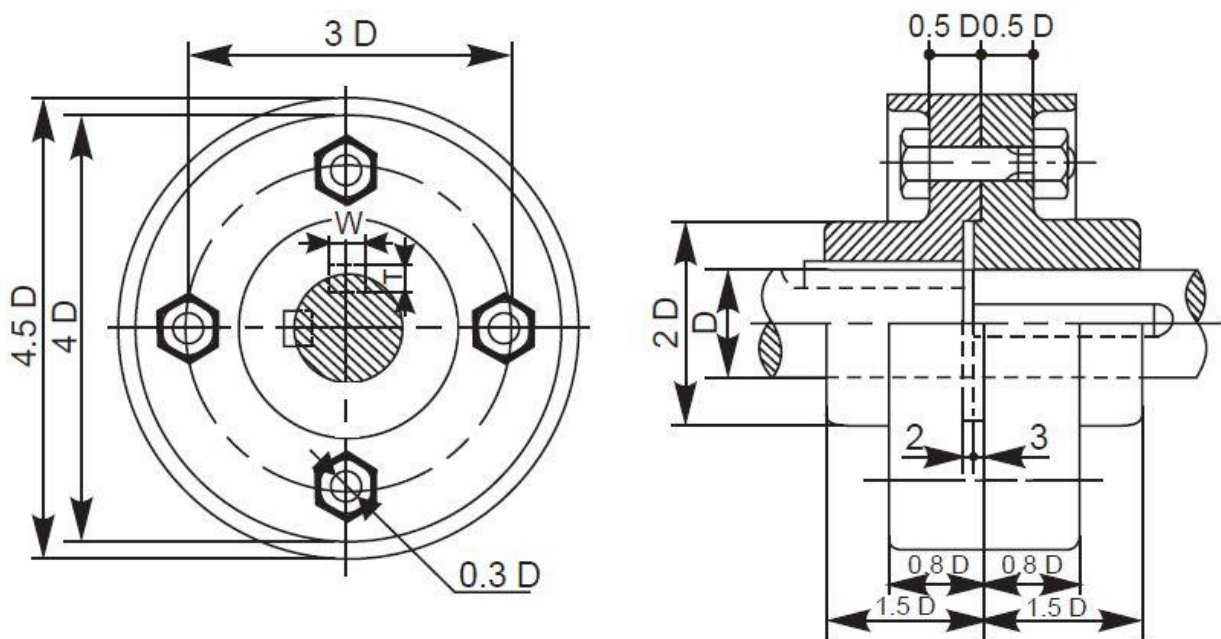


COUPLINGS

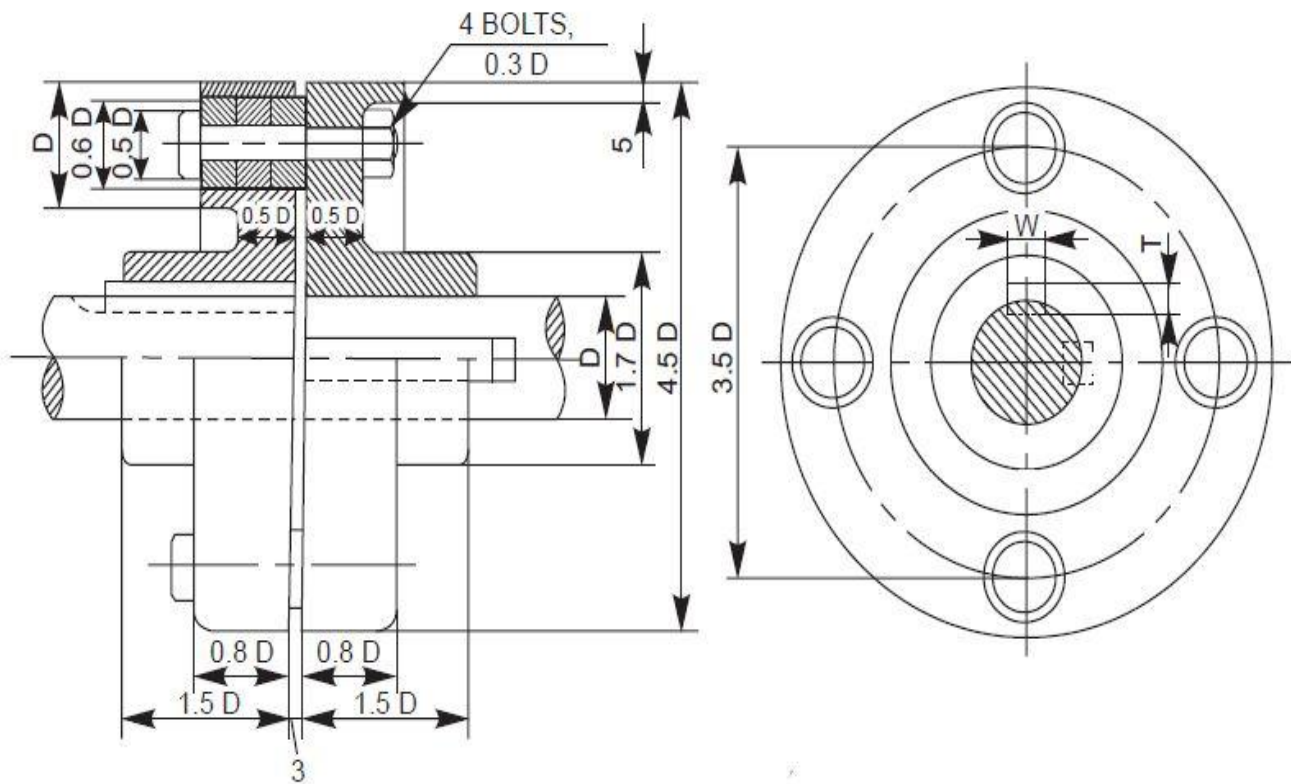
1. SPLIT MUFF COUPLING



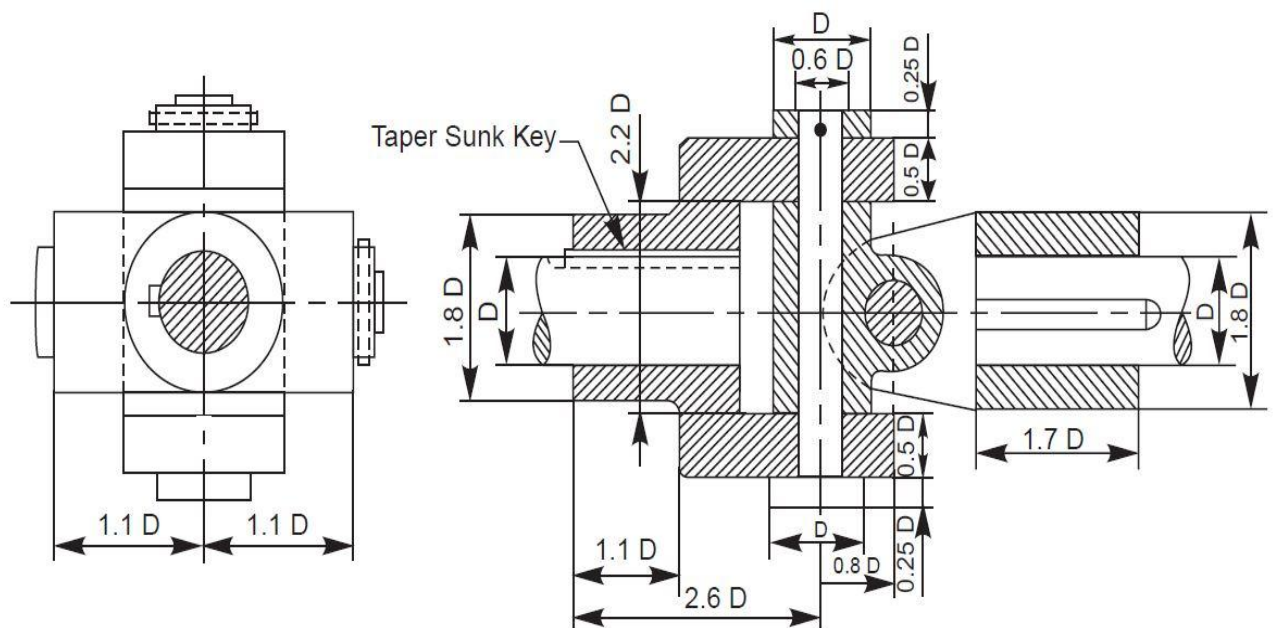
2. PROTECTED TYPE FLANGED COUPLING



3. PIN (BUSH) TYPE FLEXIBLE OR BUSHED PIN TYPE FLANGED COUPLING



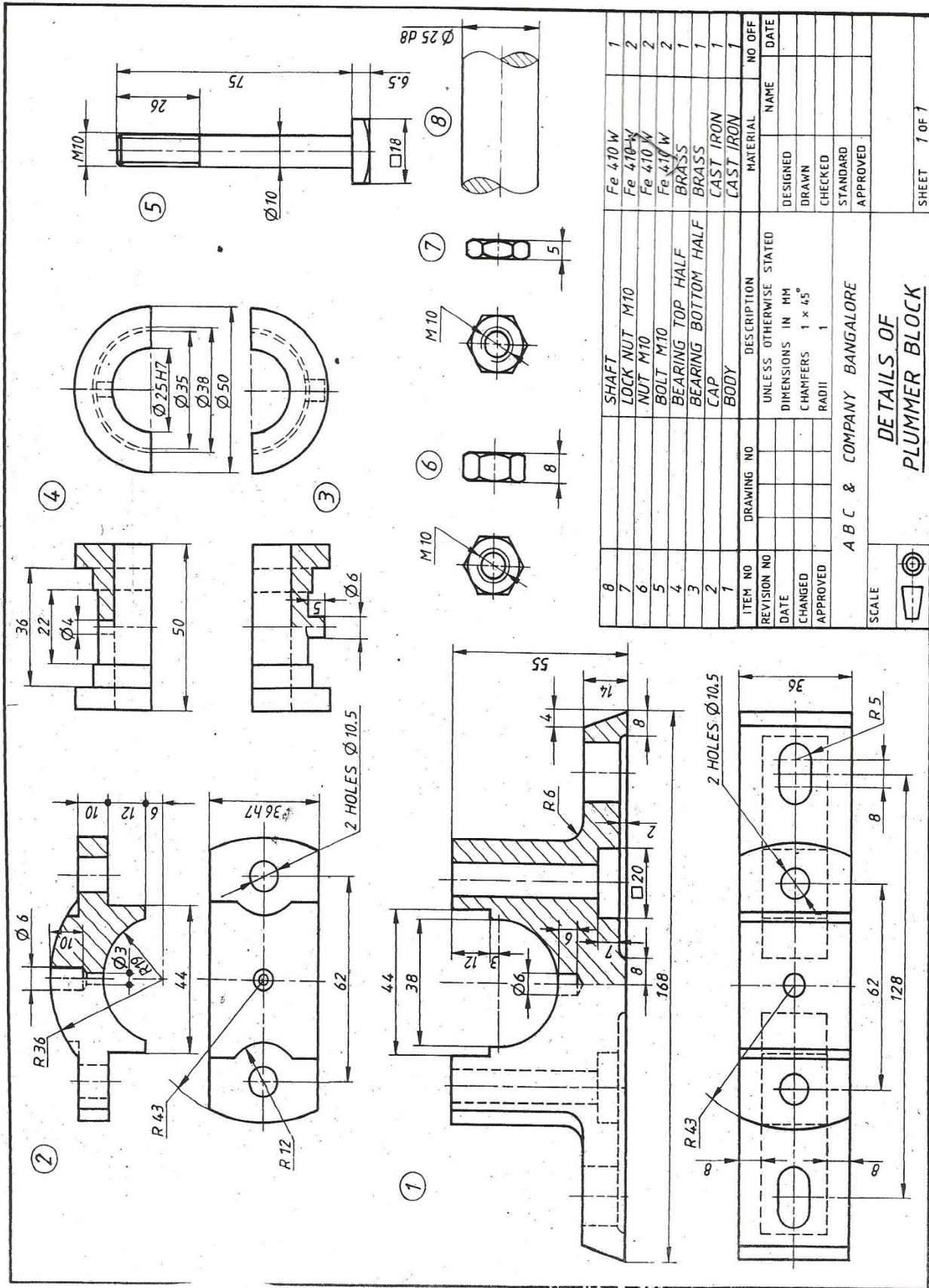
4. UNIVERSAL COUPLING (HOOKS' JOINT)



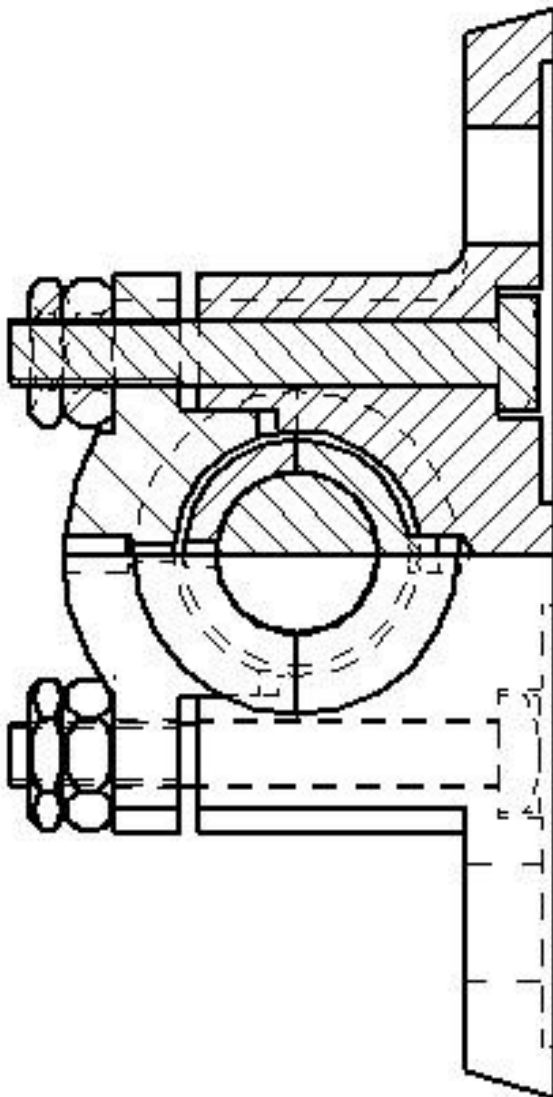
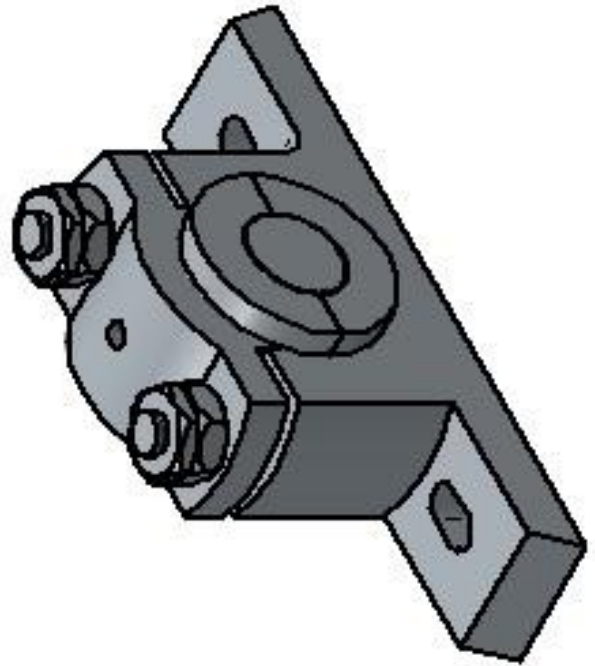
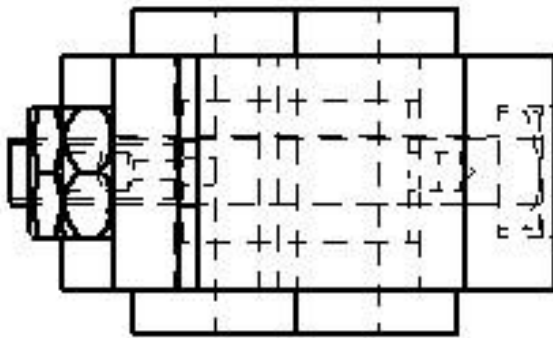
PART – C

ASSEMBLY DRAWINGS: (PART DRAWINGS SHALL BE GIVEN)

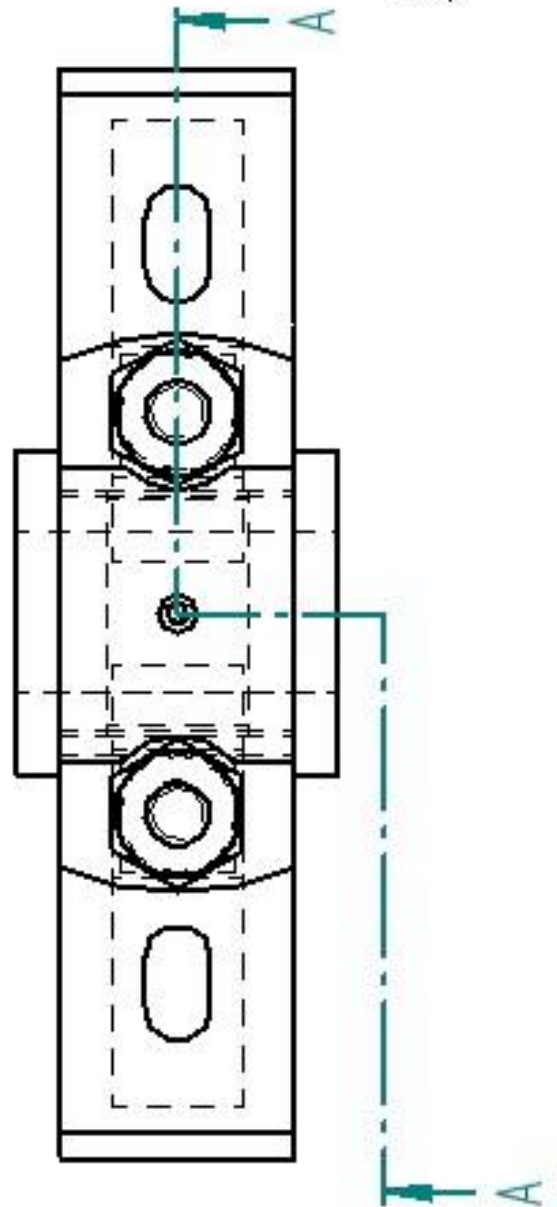
1. Plummer block (Pedestal Bearing)

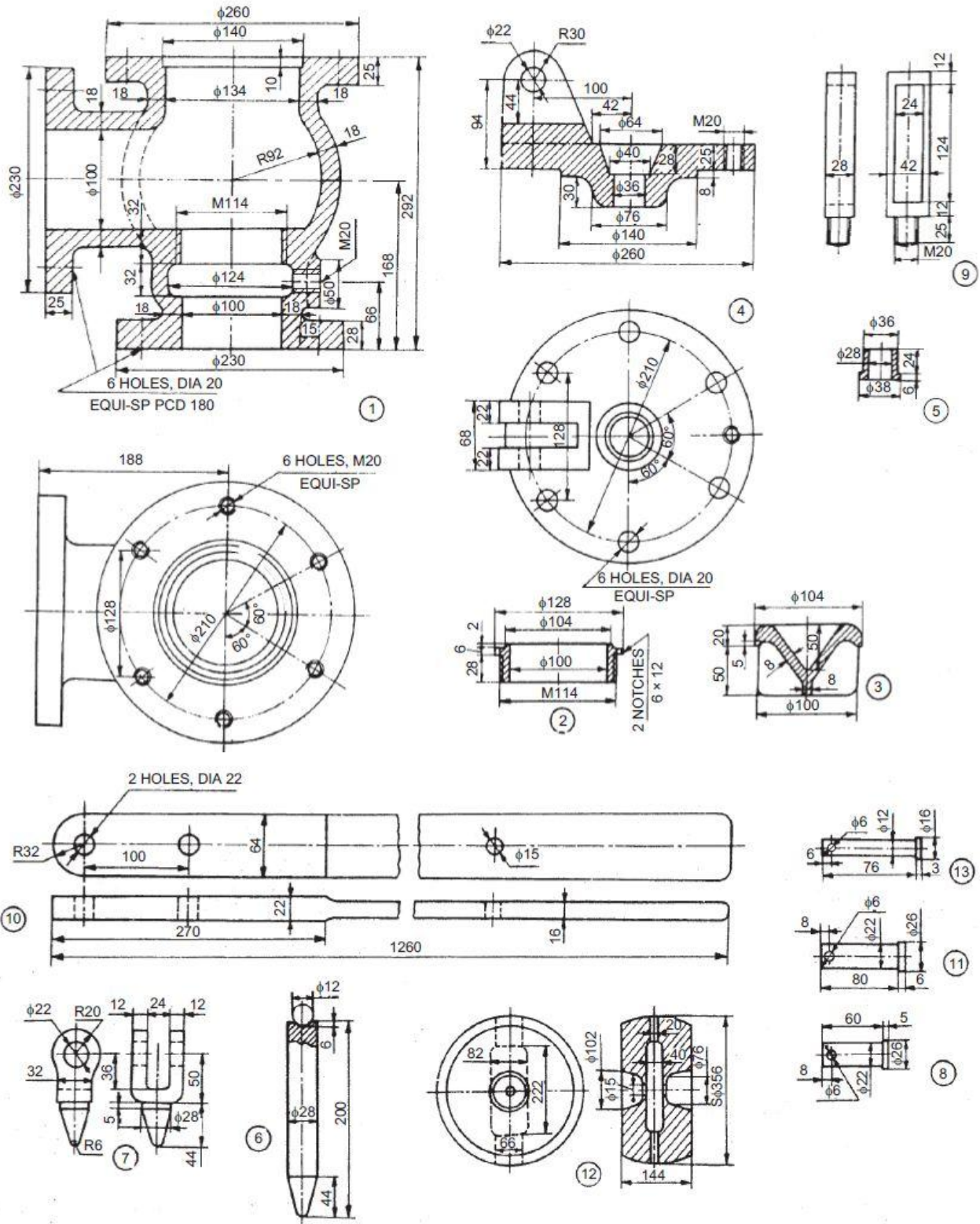


Details of a Plummer Block



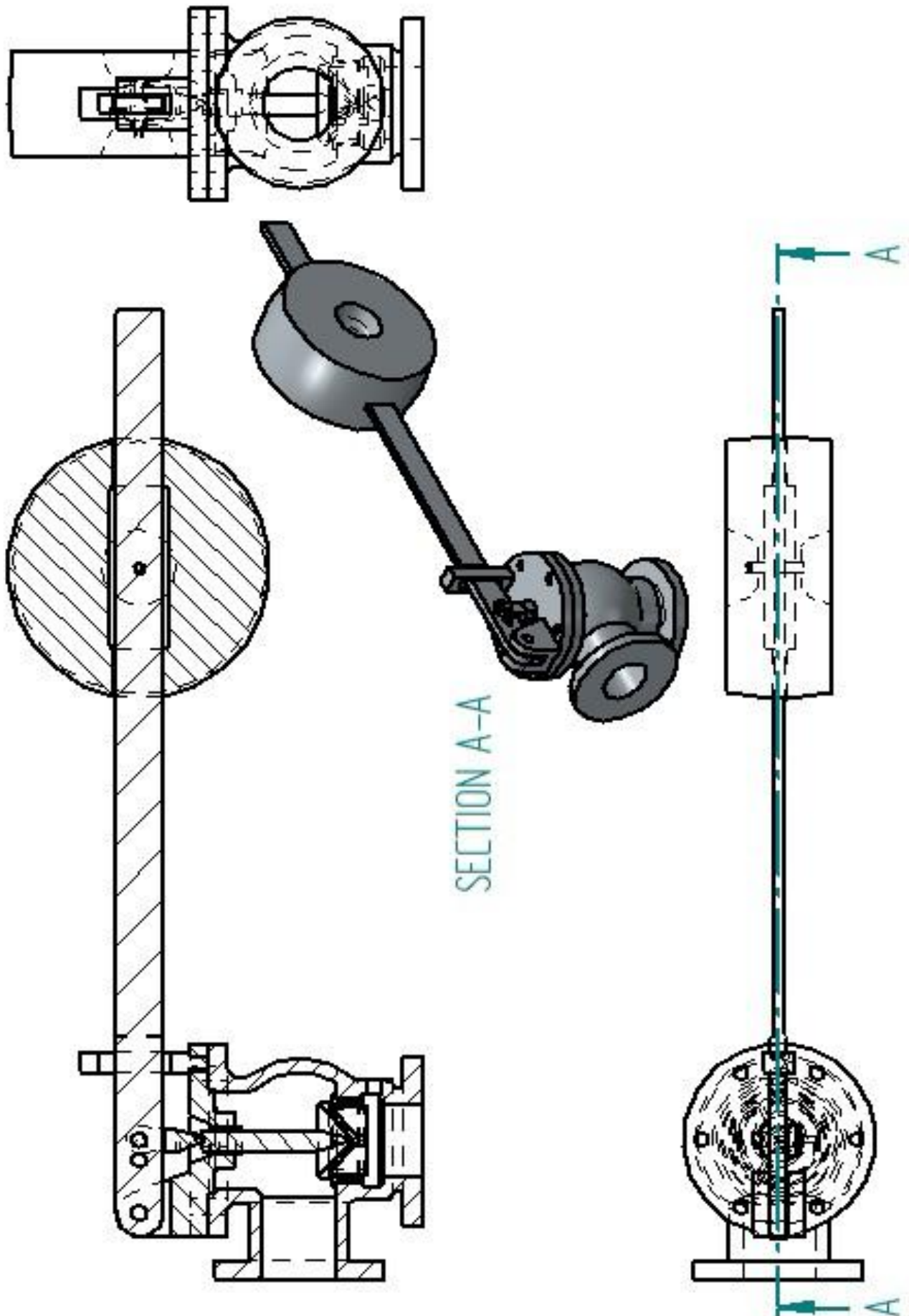
SECTION A-A

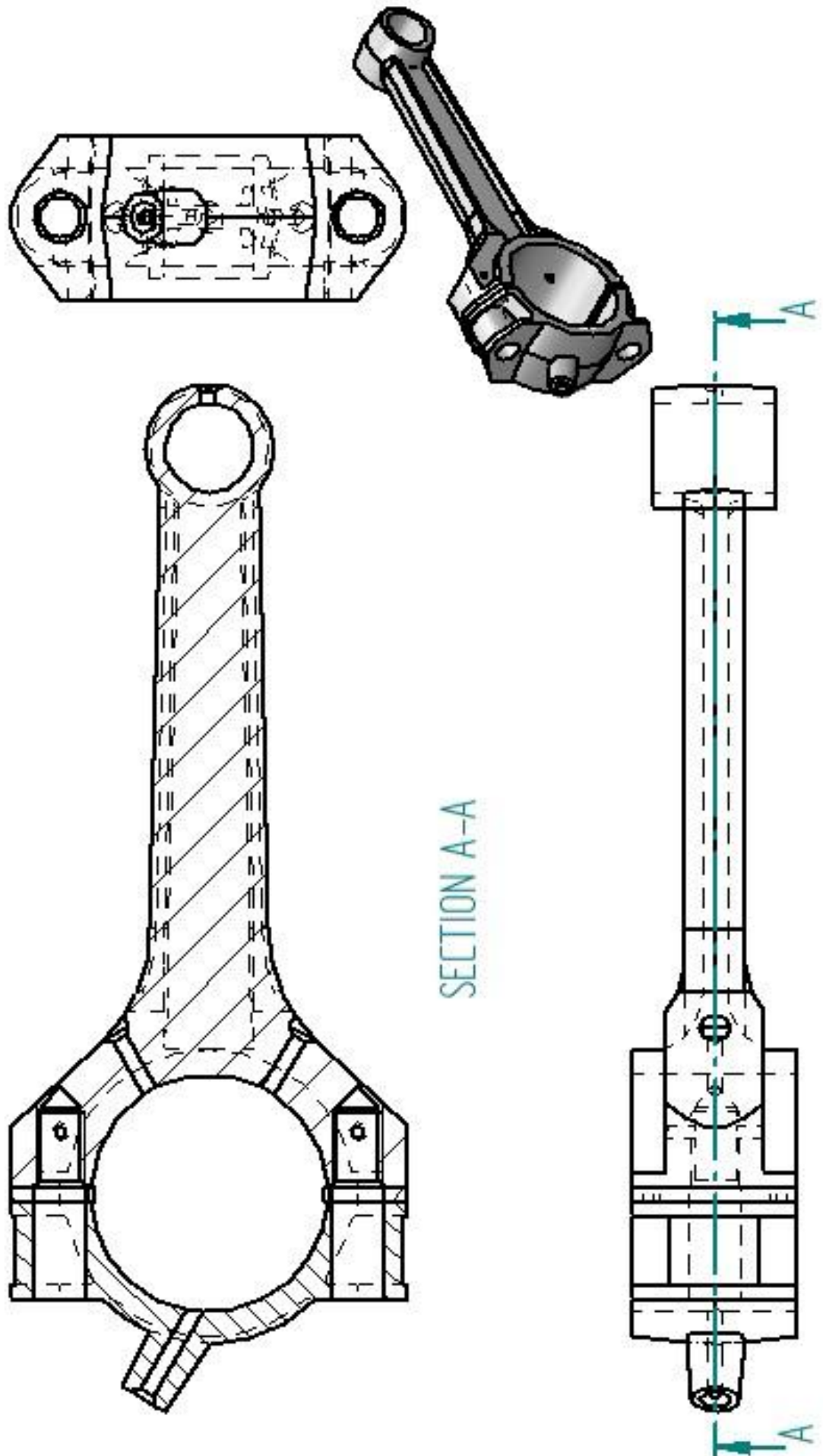


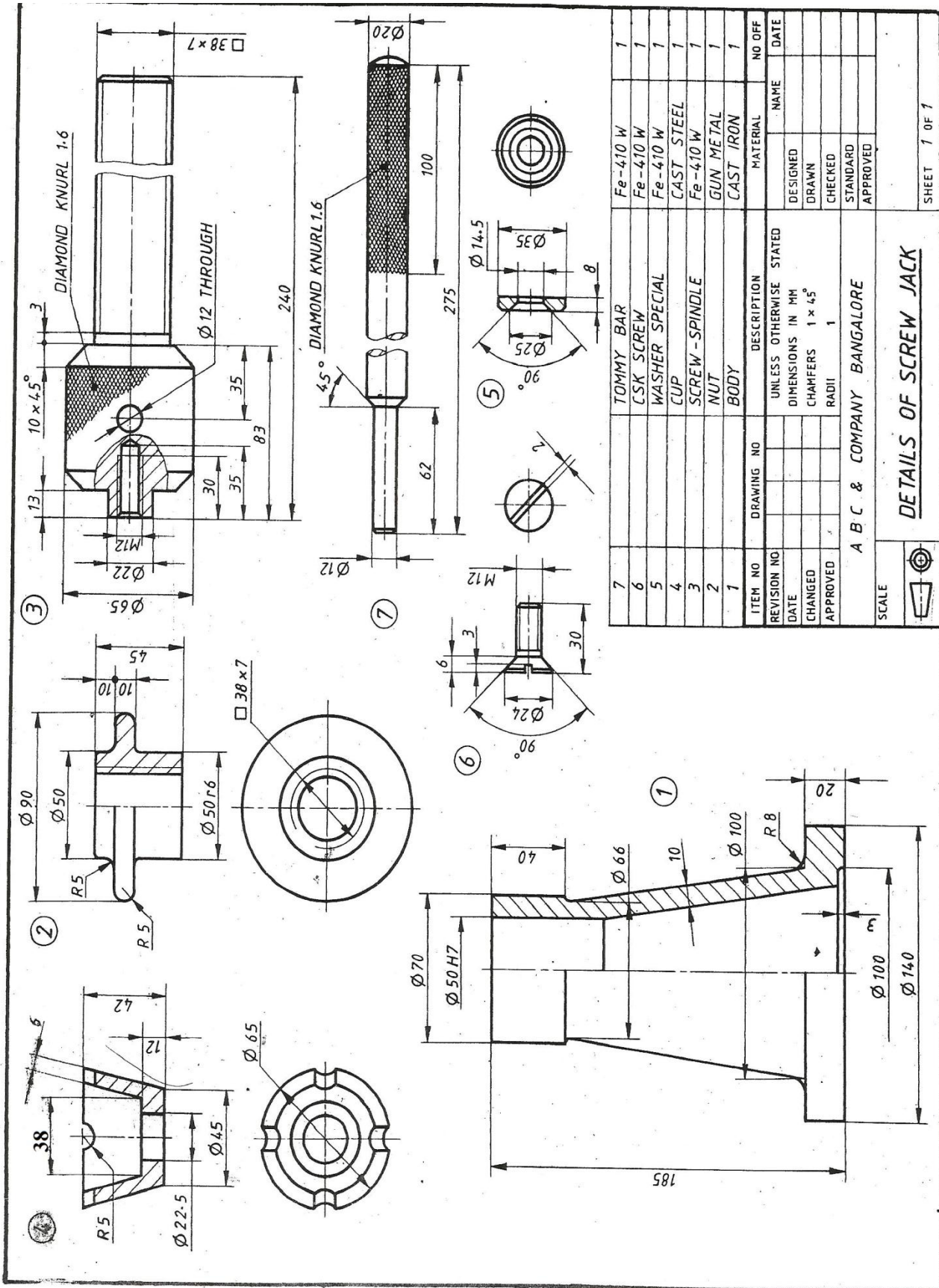


Parts list

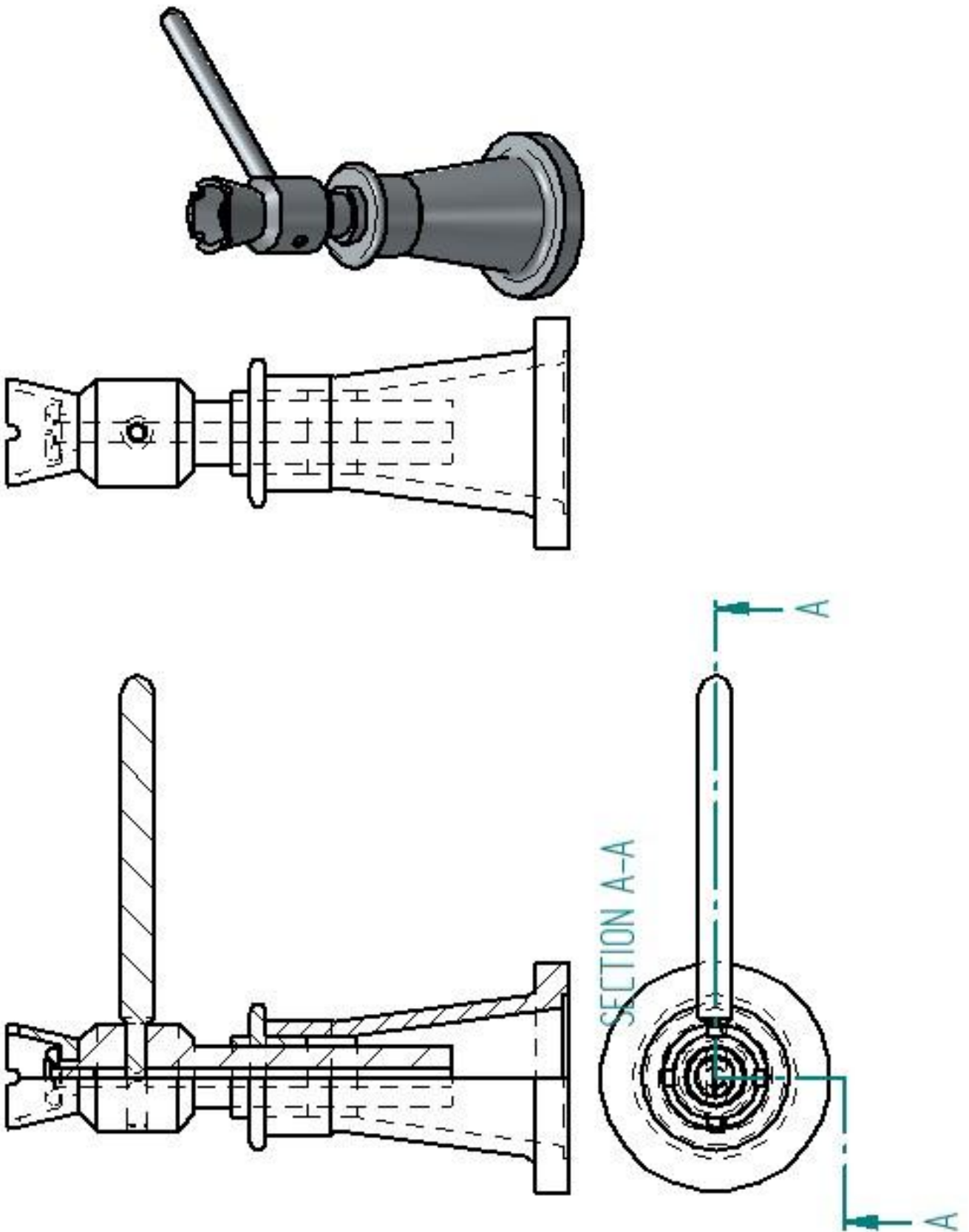
Part No.	Name	Matl	Qty	Part No.	Name	Matl	Qty
1	Body	CI	1	8	Toggle-pin	MS	1
2	Valve seat	GM	1	9	Lever guide	MS	1
3	Valve	GM	1	10	Lever	FS	1
4	Cover	CI	1	11	Fulcrum pin	MS	1
5	Cover bush	Brass	1	12	Weight	CI	1
6	Spindle	MS	1	13	Lever pin	MS	1
7	Toggle	MS	1	14	Stud with nut M20	—	6

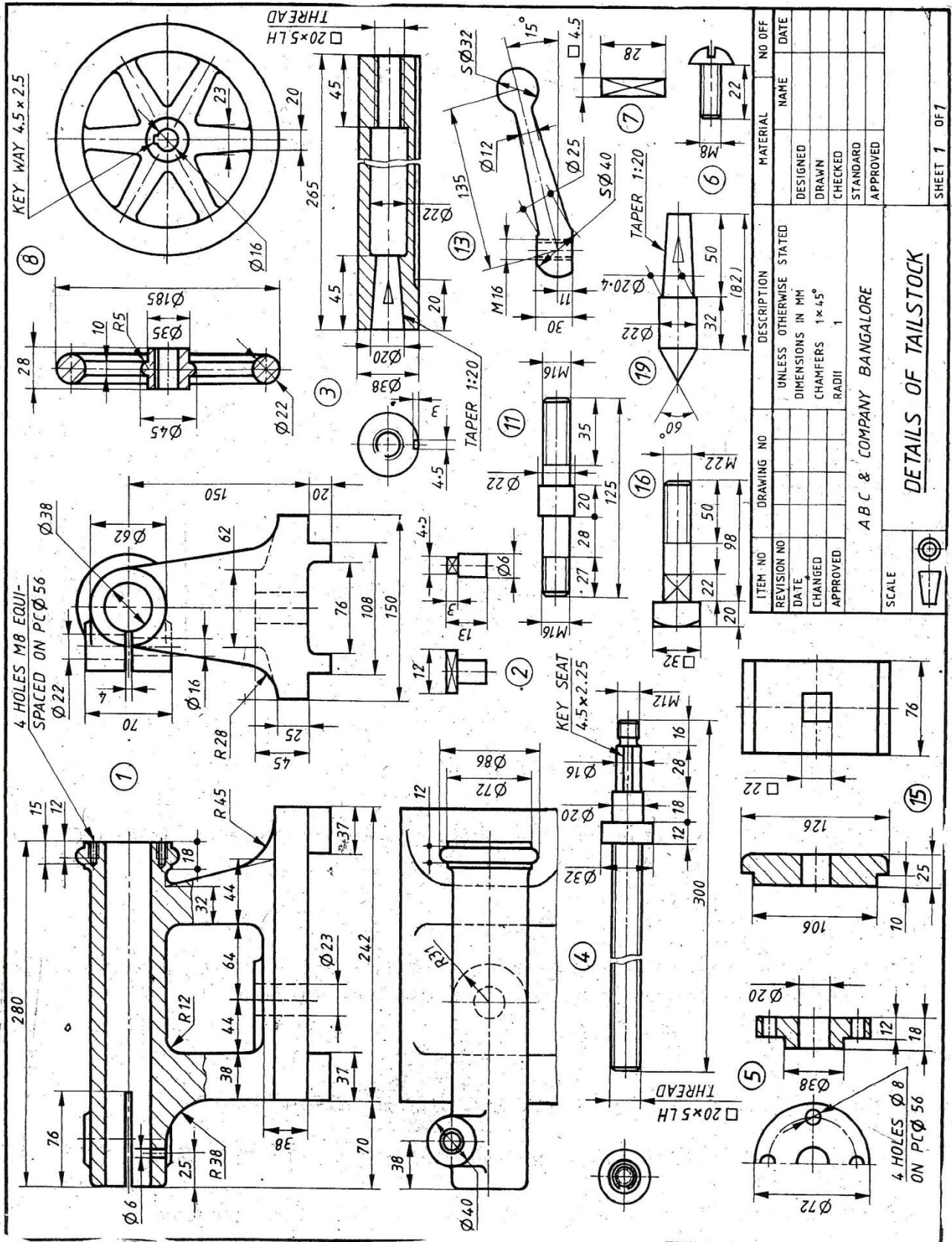






Details of a Screw Jack





Details of a Tailstock

