Techno India NJR Institute of Technology

Lab Manual

Computer Aided Machine Drawing

(1FY3-29/2FY3-29)

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Lab Overview: A Mechanical Engineer must use the graphic language as powerful means of communication with others for conveying ideas on technical matters. However, for effective exchange of ideas with others, the engineer must have proficiency in (i) language, both written and oral, (ii) symbols associated with basic sciences and (iii) the graphic language. This efficacy is further enhanced when computer is involved. Computer Aided Machine Drawing pertains to machine parts or components. It is presented through a number of orthographic views, so that the size and shape of the component is fully understood. Part drawings and Assembly drawings belong to this classification.

Lab Outcomes:

CO No	Cognitive Level	Course outcomes
CO1	Application	Students will be able to understand knowledge of engineering drawing ethics in simple machine components
CO2	Application	Students will be able to understand and apply orthographic projection for simple machine elements.
CO3	Application	Students will be able to understand various types of fasteners used for permanent and temporary joints like Screw, Bolt and rivet etc.
CO4	Application	Students will be able to understand knowledge of free hand sketching for machine components
CO5	Application	Students will be able to understand and apply CAD software for drafting machine components

Computer Aided Machine Drawing (1FY3-29/2FY3-29) Year of study: 2020-21												
Course Outcome	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3											
CO2	3	3										
CO3		3	3							2		3
C04			2	3						2		
C05				3					2			2

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (high)

RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester

Common to all branches of UG Engineering & Technology

1FY3-29/ 2FY3-29: Computer Aided Machine Drawing

Introduction: Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules of dimensioning.

Conversion of pictorial views into orthographic views: (1 drawing sheet) Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems covering Principles of Orthographic Projections.

Sectional views of mechanical components: (1 drawing sheet) Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions-spokes, web rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials.

Fasteners and other mechanical components: (Free hand sketch) Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc. Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, and pin type flexible coupling. Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves etc.

Overview of Computer Graphics: (2 drawing sheets) Covering theory of CAD software such as: The menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (Where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple and compound Solids.

Text & Reference Books:

1. N.D. BHATT AND V.M. PANCHAL, ENGINEERING GRAPHICS, CHAROTAR PUBLISHERS 2013
2. E. FINKELSTEIN, “AUTOCAD 2007 BIBLE”, WILEY PUBLISHING INC., 2007
3. MACHINE DRAWING, LAKSHMINARAYAN, JAIN BROTHERS.

List of Experiments

Sheet Number	As per RTU	Performed/Not Performed
1	**Introduction (1 drawing sheets)** Introduction, classification of machine drawings, principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, lines and rules of dimensioning	
2	**Conversion of pictorial views into orthographic views: (1 drawing sheet)** Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems covering Principles of Orthographic Projections.	
3	**Sectional views of mechanical components: (1 drawing sheet)** Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions-spokes, web rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials.	
4	**Fasteners and other mechanical components: (Free hand sketch)** Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc. Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, and pin type flexible coupling. Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves etc.	
5	**Overview of Computer Graphics: (2 drawing sheets)** Covering theory of CAD software such as: The menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (Where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple and compound Solids	

Introduction: Engineering drawing is a two-dimensional representation of three-dimensional objects. In general, it provides necessary information about the shape, size, surface quality, material, manufacturing process, etc., of the object. It is the graphic language from which a trained person can visualize objects. Drawing Instruments and aids: The Instruments and other aids used in drafting work are listed below:

- Drawing board
- Set squares
- French curves
- Templates
- Mini drafter
- Instrument box
- Protractor
- Set of scales
- Drawing sheets
- Pencils

Drawing Board: Until recently drawing boards used are made of well-seasoned softwood of about 25 mm thick with a working edge for T-square. Nowadays mini-drafters are used instead of T-squares which can be fixed on any board. The standard size of board depends on the size of drawing sheet size required.

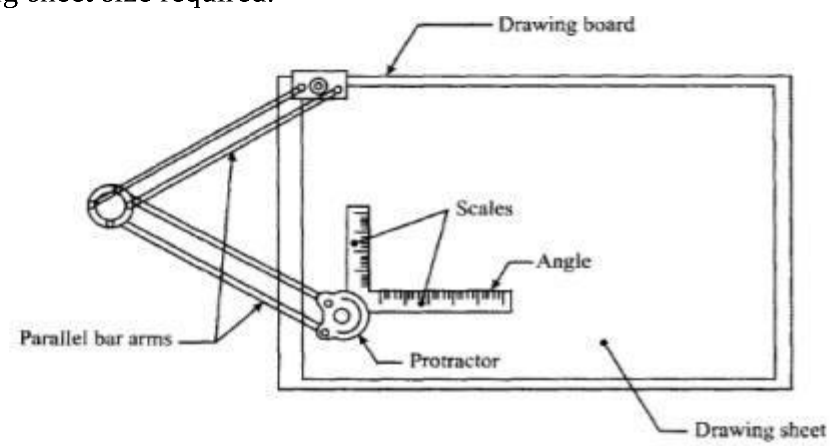


Fig. 1.1 Mini-draughter

Mini-Drafter: Mini-drafter consists of an angle formed by two arms with scales marked and rigidly hinged to each other. It combines the functions of T-square, set-squares, scales and protractor. It is used for drawing horizontal, vertical and inclined lines, parallel and perpendicular lines and for measuring lines and angles.

Instrument Box: Instrument box contains 1. Compasses, 2. Dividers and 3. Inking pens. What is important is the position of the pencil lead with respect to the tip of the compass. It should be at least 1 mm above as shown in the fig. because the tip goes into the board for grip by 1 mm.

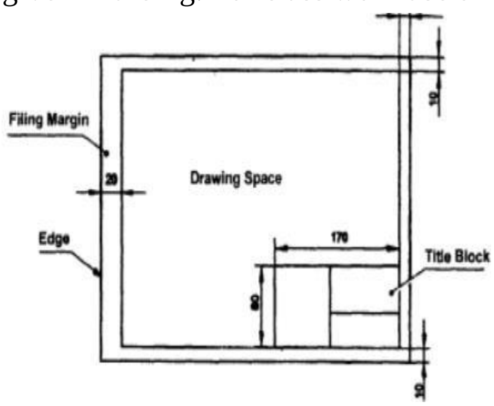
(a) Sharpening and position of compass lead (b) Position of the lead leg to draw larger circles

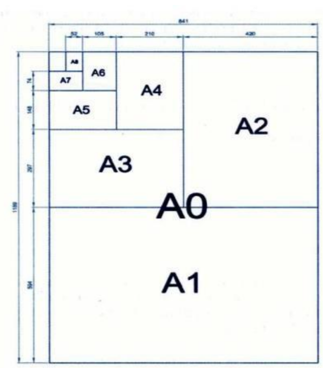
Pencils: Pencils with leads of different degrees of hardness or grades are available in the market. The hardness or softness of the lead is indicated by 3H, 2H, H, HB, B, 2B, 3B, etc. The grade HB denotes medium hardness of lead used for general purpose. The hardness increases as the value of the numeral before the letter H increases. The lead becomes softer, as the value of the numeral before B increases.

- HB Soft grade for Border lines, lettering and free sketching
- H Medium grade for Visible outlines, visible edges and boundary lines
- 2H Hard grade for construction lines, Dimension lines, Leader lines, Extension lines, Centre lines, Hatching lines and Hidden lines.

Drawing Sheet: The standard drawing sheet sizes are arrived at on the basic Principal of x: y = 1: 2^ (1/2) and xy = 1 where x and y are the sides of the sheet. For example, AO, having a surface area of 1 Sq.m; x = 841 mm and y = 1189 mm. The successive sizes are obtained by either by halving along the length or doubling the width, the area being in the ratio 1: 2. Designation of sizes is given in the fig. For class work use of A2 size drawing sheet is preferred.

Designation	Dimension, mm Trimmed size
A0	841 × 1189
A1	594 × 841
A2	420 × 594
A3	297 × 420
A4	210 × 297





Title Block: The title block should lie within the drawing space at the bottom right-hand comer of the sheet. The title block can have a maximum length of 170 mm and width of 65mm providing the following information.

- Title of the drawing.
- Drawing number.
- Scale.

• Symbol denoting the method of projection.
• Name of the firm, and
• Initials of staff, who have designed, checked and approved.

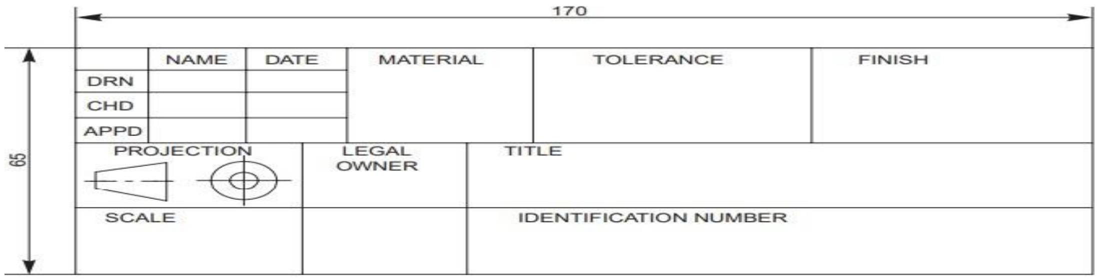
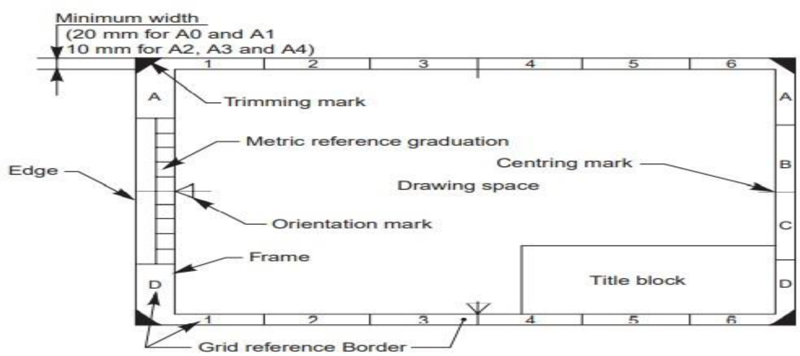


Fig. 2.3 Details in title block



Lines: Just as in English textbook the correct words are used for making correct sentences; in Engineering Graphics, the details of various objects are drawn by different types of lines. Each line has a definite meaning and sense to convey.

• Visible Outlines, Visible Edges: (Continuous wide lines) the lines drawn to represent the visible outlines/ visible edges / surface boundary lines of objects should be outstanding in appearance.

• Dimension Lines (Continuous narrow Lines): Dimension Lines are drawn to mark dimension.

• Extension Lines (Continuous narrow Lines): There are extended slightly beyond the respective dimension lines.

• Construction Lines (Continuous narrow Lines): These are drawn for constructing drawings and should not be erased after completion of the drawing.

• Hatching / Section Lines (Continuous Narrow Lines): These are drawn for the sectioned portion of an object. These are drawn inclined at an angle of 45° to the axis or to the main outline of the section.

• Guide Lines (Continuous Narrow Lines): These are drawn for lettering and should not be erased after lettering.

• Break Lines (Continuous Narrow Freehand Lines): Wavy continuous narrow line drawn freehand is used to represent break of an object.

• Break Lines (Continuous Narrow Lines With Zigzags): Straight continuous narrow line with zigzags is used to represent break of an object.

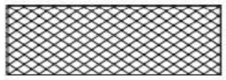
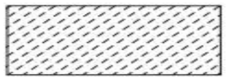
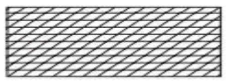
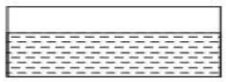
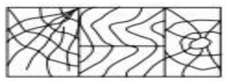
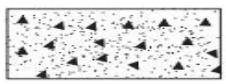
• Dashed Narrow Lines (Dashed Narrow Lines):Hidden edges / Hidden outlines of objects are shown by dashed lines of short dashes of equal lengths of about 3 mm, spaced at equal distances of about 1 mm. the points of intersection of these lines with the outlines / another hidden line should be clearly shown. • Center Lines (Long-Dashed Dotted Narrow Lines): These are drawn at the center of the drawings symmetrical about an axis or both the axes. These are extended by a short distance beyond the outline of the drawing.

• Cutting Plane Lines: Cutting Plane Line is drawn to show the location of a cutting plane. It is long-dashed dotted narrow line, made wide at the ends, bends and change of direction. The direction of viewing is shown by means of arrows resting on the cutting plane line.

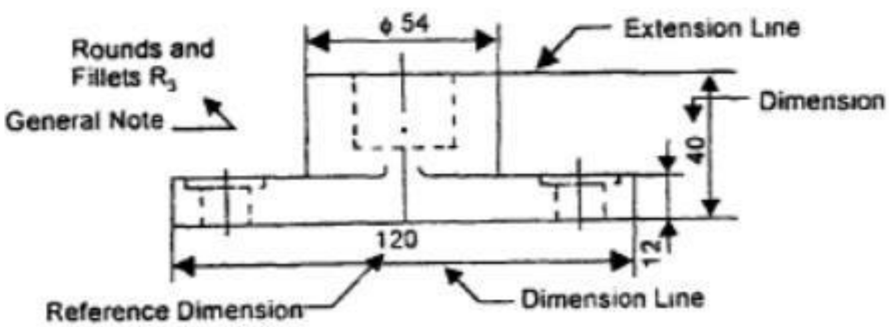
• Border Lines: Border Lines are continuous wide lines of minimum thickness 0.7 mm.

Line	*Description*	*General Applications*
A	Continuous thick	A1 Visible outlines
B	Continuous thin (straight or curved)	B1 Imaginary lines of intersection B2 Dimension lines B3 Projection lines B4 Leader lines B5 Hatching lines B6 Outlines of revolved sections in place B7 Short centre lines
C	Continuous thin, free-hand	C1 Limits of partial or interrupted views and sections, if the limit is not a chain thin
D	Continuous thin (straight) with zigzags	D1 Line (see Fig. 2.5)
E	Dashed thick	E1 Hidden outlines
G	Chain thin	G1 Centre lines G2 Lines of symmetry G3 Trajectories
H	Chain thin, thick at ends and changes of direction	H1 Cutting planes
J	Chain thick	J1 Indication of lines or surfaces to which a special requirement applies
K	Chain thin, double-dashed	K1 Outlines of adjacent parts K2 Alternative and extreme positions of movable parts K3 Centroidal lines

CONVENTIONAL REPRESENTATION OF MATERIALS:

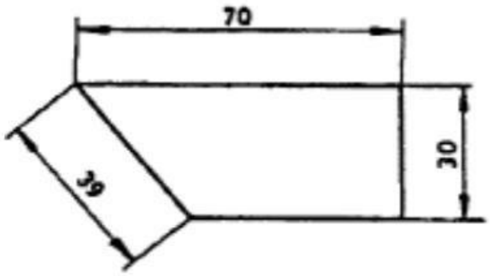
Type	Convention	Material
Metals		Steel, Cast Iron, Copper and its Alloys, Aluminium and its Alloys, etc.
		Lead, Zinc, Tin, White-metal, etc.
Glass		Glass
Packing and Insulating material		Porcelain, Stoneware, Marble, Slate, etc.
		Asbestos, Fibre, Felt, Synthetic resin products, Paper, Cork, Linoleum, Rubber, Leather, Wax, Insulating and Filling materials, etc.
Liquids		Water, Oil, Petrol, Kerosene, etc.
Wood		Wood, Plywood, etc.
Concrete		A mixture of Cement, Sand and Gravel

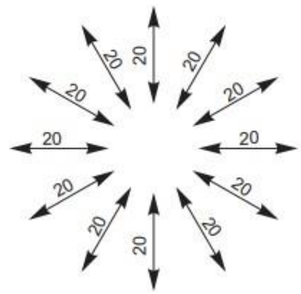
Dimensioning: Drawing of a component, in addition to providing complete shape description, must also furnish Information regarding the size description. These are provided through the distances between the Surfaces, location of holes, nature of surface finish, type of material, etc. The expression of these Features on a drawing, using lines, symbols, figures and notes is called dimensioning.

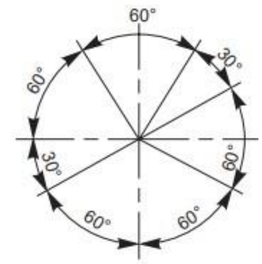


Methods of Indicating Dimensions: The dimensions are indicated on the drawings according to one of the following two methods.

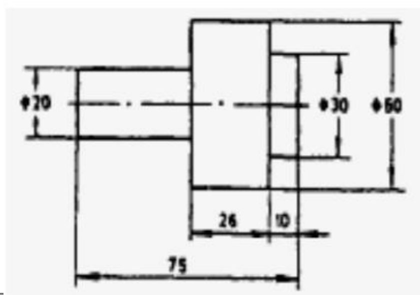
Method - 1 (Aligned method): Dimensions should be placed parallel to and above their dimension lines and preferably at the middle, and clear of the line. Dimensions may be written so that they can be read from the bottom or from the right side of the drawing. Dimensions on oblique dimension lines should be oriented and except where unavoidable, they shall not be placed in the 30° zone. Angular dimensions are oriented.



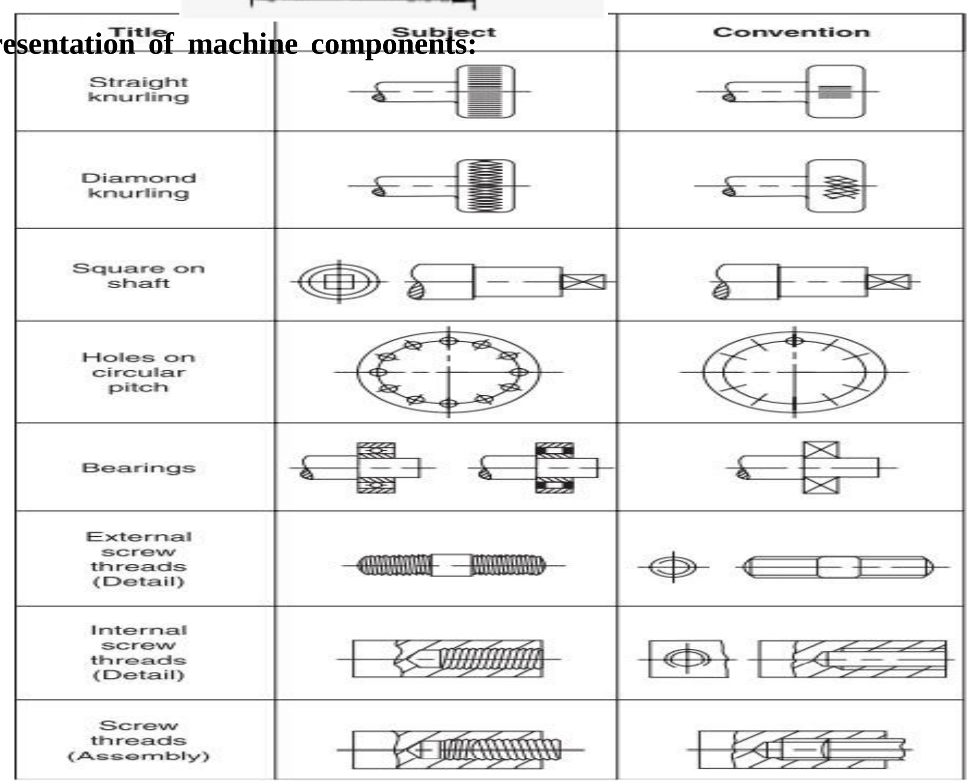




Method - 2 (Uni-directional): Dimensions should be indicated so that they can be read from the bottom of the drawing only. Nonhorizontal dimension lines are interrupted, preferably in the middle for insertion of the dimension. Note: Horizontal dimensional lines are not broken to place the dimension in both cases.



Conventional representation of machine components:



Title	Subject	Convention
Straight knurling		
Diamond knurling		
Square on shaft		
Holes on circular pitch		
Bearings		
External screw threads (Detail)		
Internal screw threads (Detail)		
Screw threads (Assembly)		

1. As far as possible, dimensions should be placed outside the view.
2. Dimensions should be taken from visible outlines rather than from hidden lines.
3. Dimensioning to a centre line should be avoided except when the centre line passes through the centre of a hole.
4. Each feature should be dimensioned once only on a drawing.
5. Dimensions should be placed on the view or section that relates most clearly to the corresponding features.
6. Each drawing should use the same unit for all dimensions, but without showing the unit symbol.
7. No more dimensions than are necessary to define a part should be shown on a drawing.
8. No features of a part should be defined by more than one dimension in any one direction.

Method of Execution:

The elements of dimensioning include the projection line, dimension line, leader line, dimension line termination, the origin indication and the dimension itself. The following are some of the principles to be adopted during execution of dimensioning:

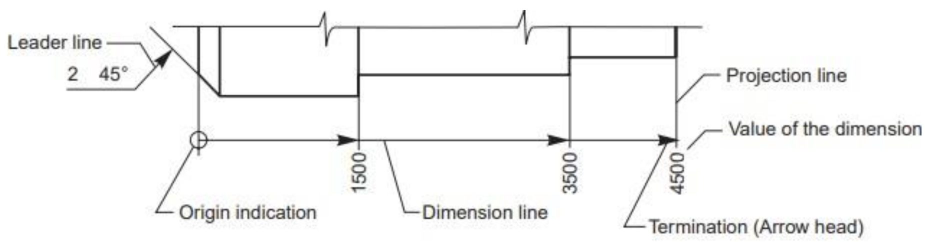
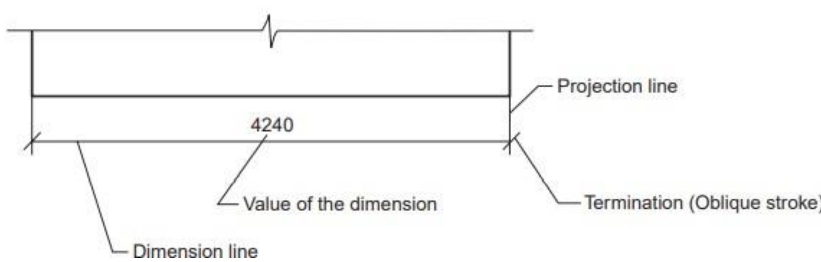


Fig. 2.28 Elements of dimensioning



1. Projection and dimension lines should be drawn as thin continuous lines.

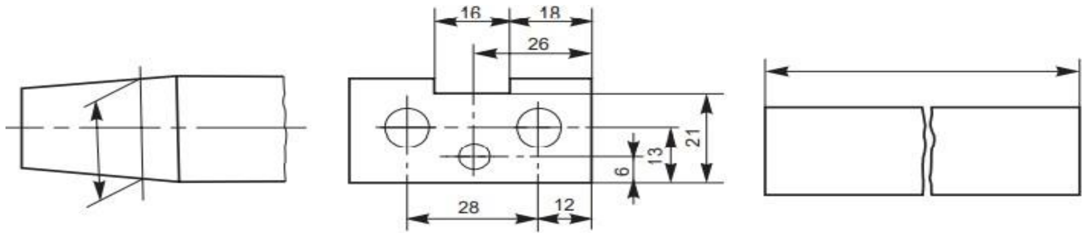
2. Projection lines should extend slightly beyond the respective dimension lines.

3. Projection lines should be drawn perpendicular to the feature being dimensioned. Where necessary, they may be drawn obliquely, but parallel to each other. However, they must be in contact with the feature.

4. Projection lines and dimension lines should not cross each other, unless it is unavoidable.

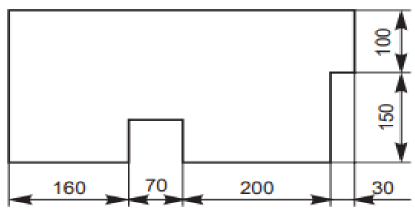
5. A dimension line should be shown unbroken, even where the feature to which it refers, is shown broken.

6. A centre line or the outline of a part should not be used as a dimension line, but may be used in place of projection line.



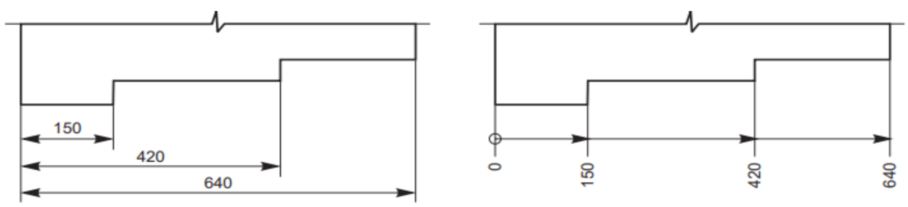
Arrangement of Dimensions: The arrangement of dimensions on a drawing must indicate clearly the design purpose. The following are the ways of arranging the dimensions.

Chain Dimensioning: Chains of single dimensions should be used only where the possible accumulation of tolerances does not endanger the functional requirement of the part.

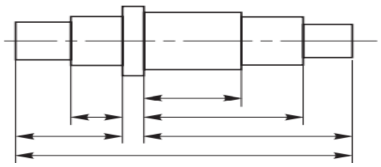


Parallel Dimensioning: In parallel dimensioning, a number of dimension lines, parallel to one another and spaced-out are used. This method is used where a number of dimensions have a common datum feature.

Super Imposed Running Dimensions: These are simplified parallel dimensions and may be used where there are space limitations.



Combined Dimensions: These are the result of simultaneous use of chain and parallel dimensions.



Orthographic Projections

Any object has three dimensions, viz., length, width and thickness. A projection is defined as a representation of an object on a two-dimensional plane. The projections of an object should convey all the three dimensions, along with other details of the object on a sheet of paper. The elements to be considered while obtaining a projection are :

(i) The object (ii) The plane of projection

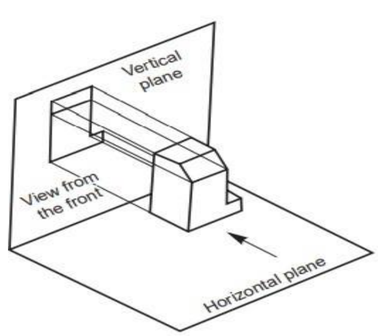
(iii) The point of sight (iv) The rays of sight

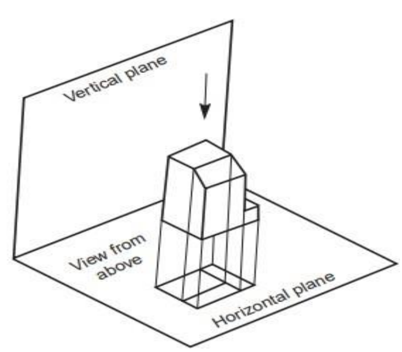
A projection may be obtained by viewing the object from the point of sight and tracing in correct sequence, the points of intersection between the rays of sight and the plane on to which the object is projected. A projection is called orthographic projection when the point of sight is imagined to be located at infinity so that the rays of sight are parallel to each other and intersect the plane of projection at right angle to it. The principles of orthographic projection may be followed in four different angles or systems, viz., first, second, third and fourth angle projections. A projection is said to be first, second, third or fourth angle when the object is imagined to be in the first, second, third or fourth quadrant respectively. However, the Bureau of Indian Standards (SP–46:1988) prefers first angle projection.

The Principle of First Angle of Projection: In first angle projection, the object is imagined to be positioned in the first quadrant. The view from the front of the object is obtained by looking at the object from the right side of the quadrant and tracing in correct sequence, the points of intersection between the projection plane and the rays of sight extended. The object is between the observer and the plane of projection (vertical plane). Here, the object is imagined to be transparent and the projection lines are extended from various points of the object to intersect the projection plane. Hence, in first angle projection, any view is so placed that it represents the side of the object away from it.

Method of Obtaining Orthographic Views:

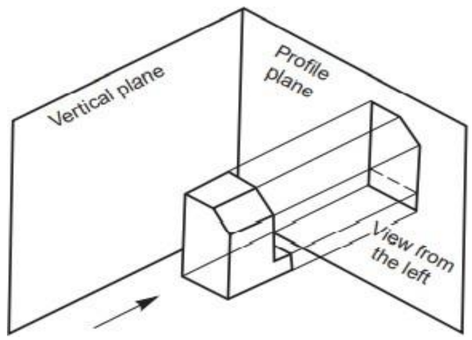
View from the front: The view from the front of an object is defined as the view that is obtained as projection on the vertical plane by looking at the object normal to its front surface. It is the usual practice to position the object such that its view from the front reveals most of the important features. Figure shows the method of obtaining the view from the front of an object.



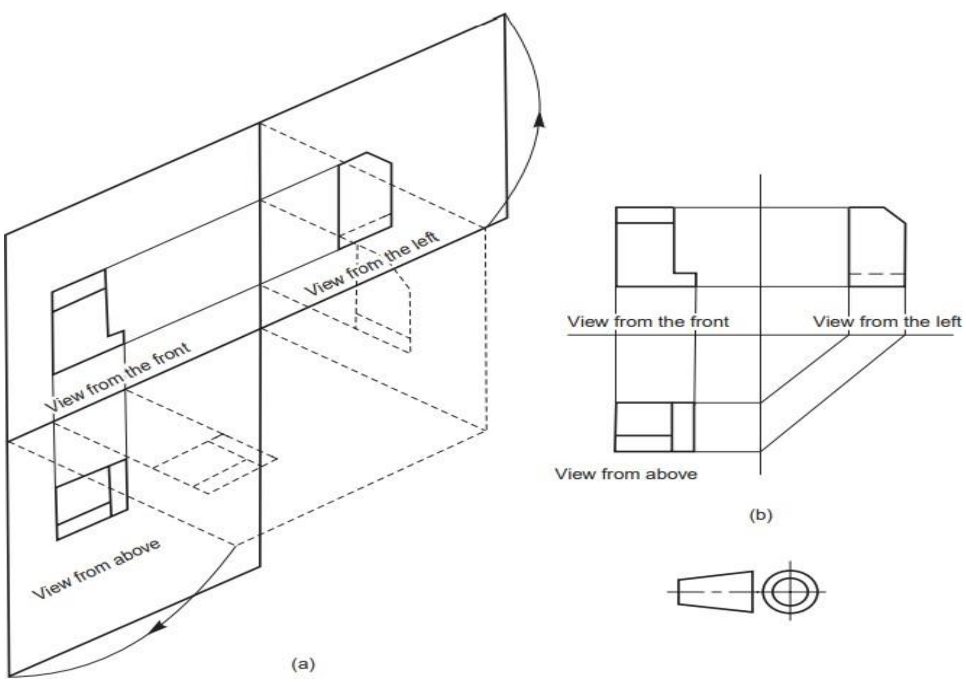


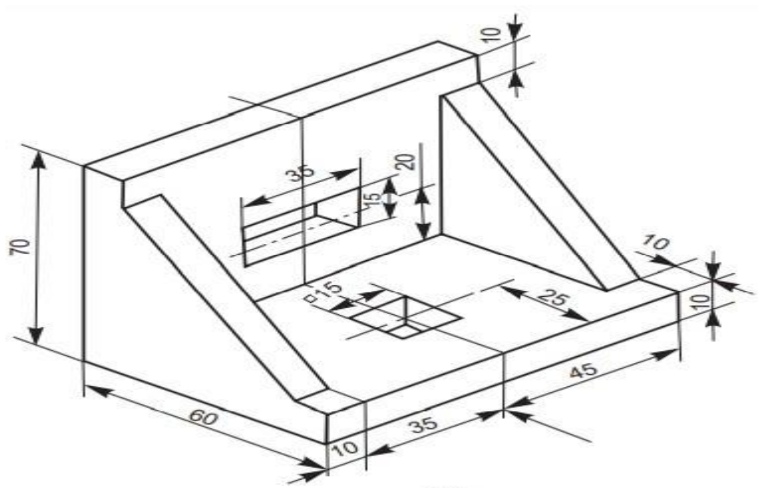
View from the above: The view from above of an object is defined as the view that is obtained as projection on the horizontal plane, by looking the object normal to its top surface. Figure shows the method of obtaining the view from above of an object.

View from the side: The view from the side of an object is defined as the view that is obtained as projection on the profile plane by looking the object, normal to its side surface. As there are two sides for an object, viz., left side and right side, two possible views from the side, viz., view from the left and view from the right may be obtained for any object. Figure shows the method of obtaining the view from the left of an object.

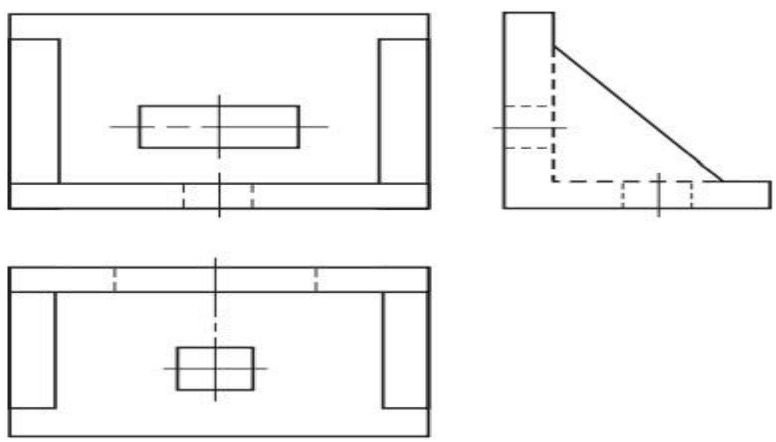


Presentation of Views: The different views of an object are placed on a drawing sheet which is a two dimensional one, to reveal all the three dimensions of the object. For this, the horizontal and profile planes are rotated till they coincide with the vertical plane. Figure shows the relative positions of the views, viz., the view from the front, above and the left of an object.

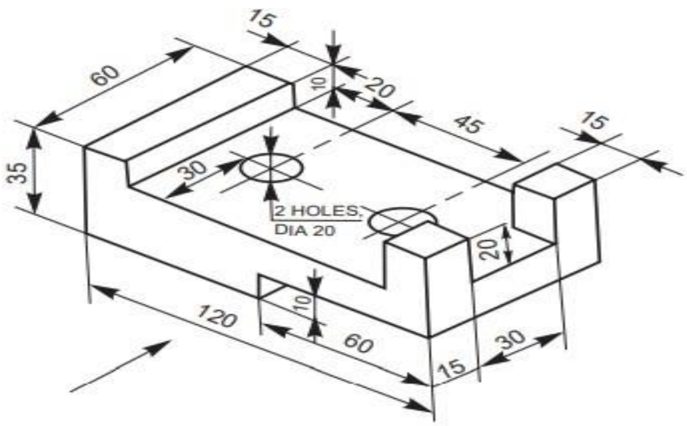




(a)



Exercise 1: Figure shows the isometric views of machine components. Draw their view from the front, the view from above and the view from the right.


15
60
10
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45
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35
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2 HOLES,
DIA 20
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120
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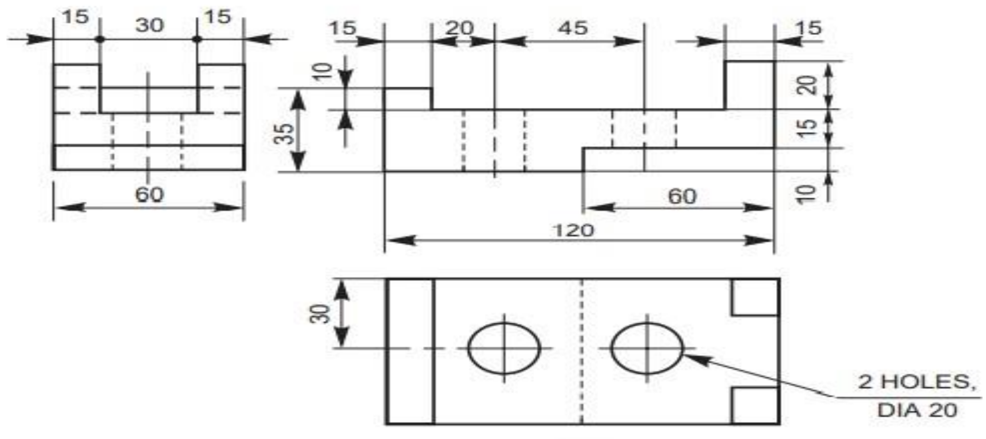
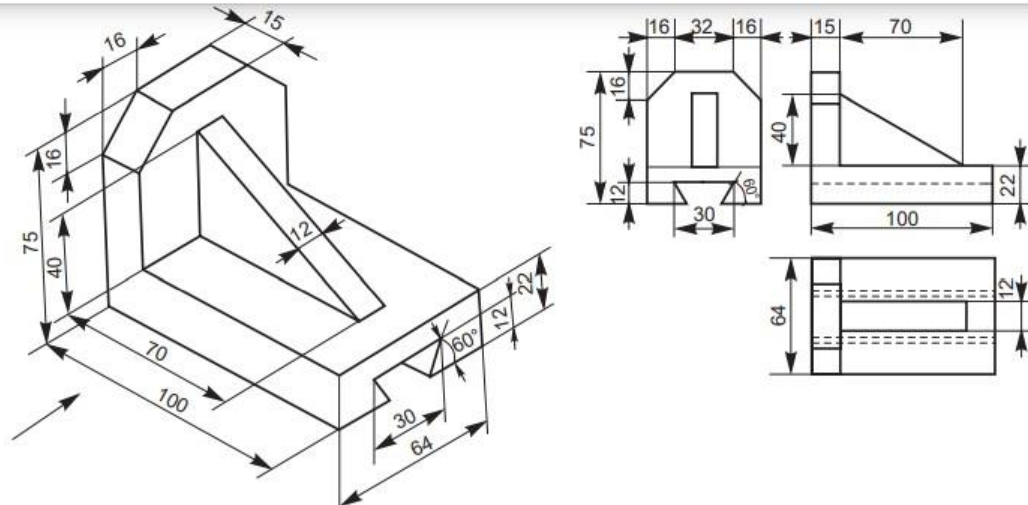
(a)

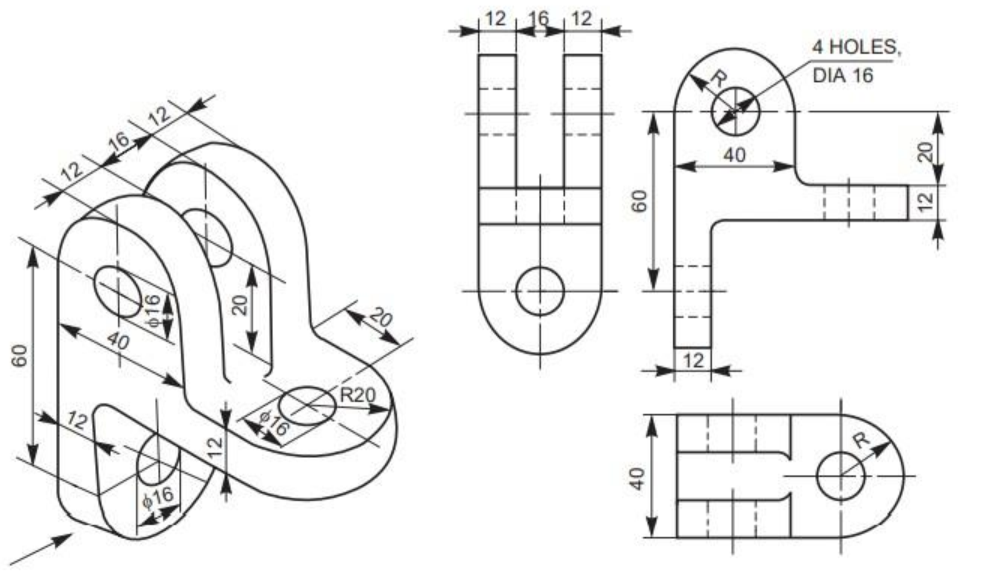

15
30
15
60
15
20
45
15
10
35
20
15
10
60
120
30
2 HOLES,
DIA 20

(b)


15
16
16
75
40
12
70
100
60°
22
12
30
64
16 32 16
15 70
75
16
12
60°
30
40
22
100
64
12

(a) (b)

Fig. 3.18


12
16
12
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20
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40
φ16
R20
φ16
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12 16 12
4 HOLES,
DIA 16
R
40
20
60
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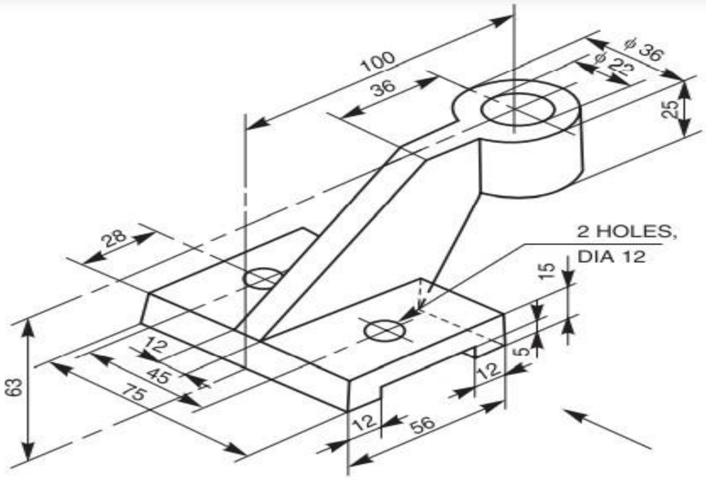
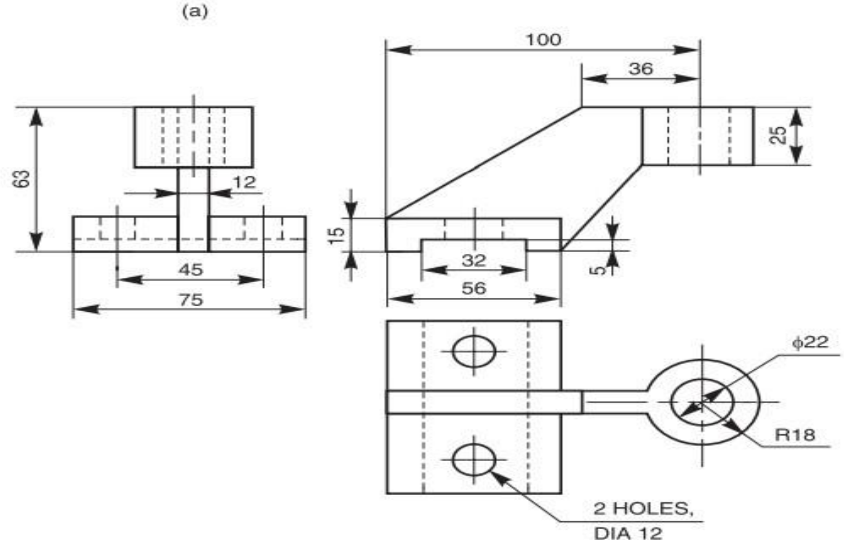
12
40
R

(a) (b)

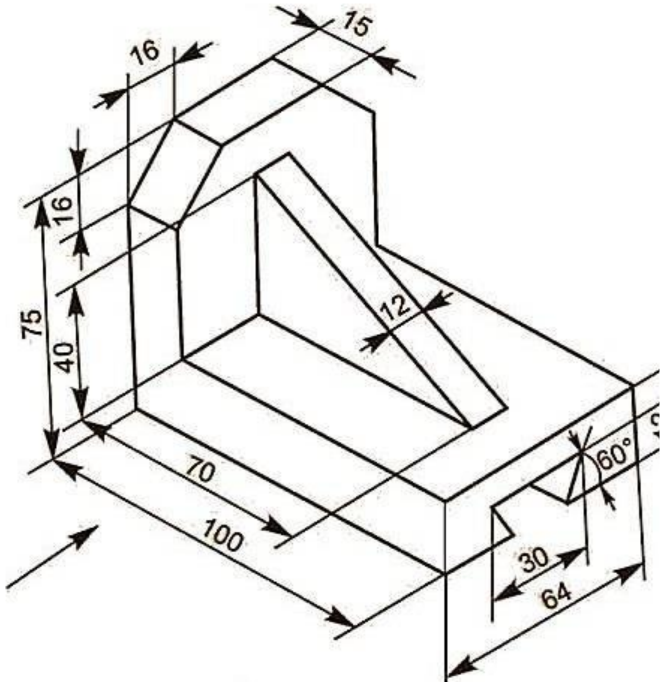


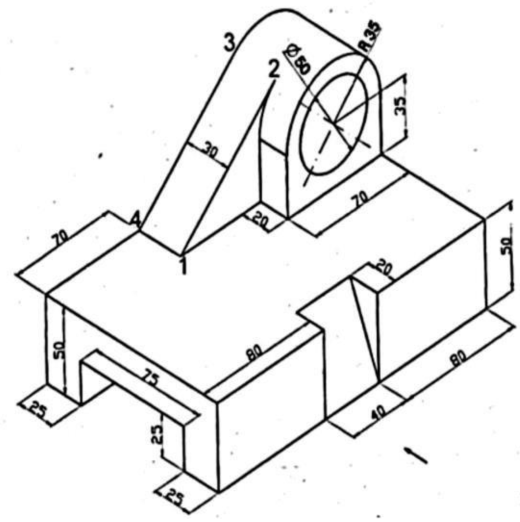
(a)



Practice Set:

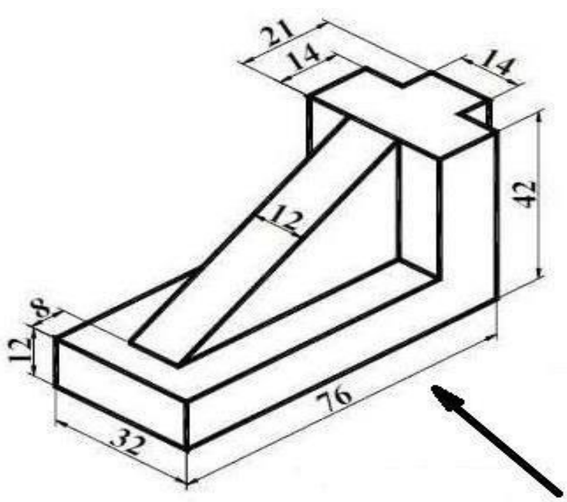
1. Draw F.V., T.V. and R.S.V. of the given object by First Angle Projection Method.

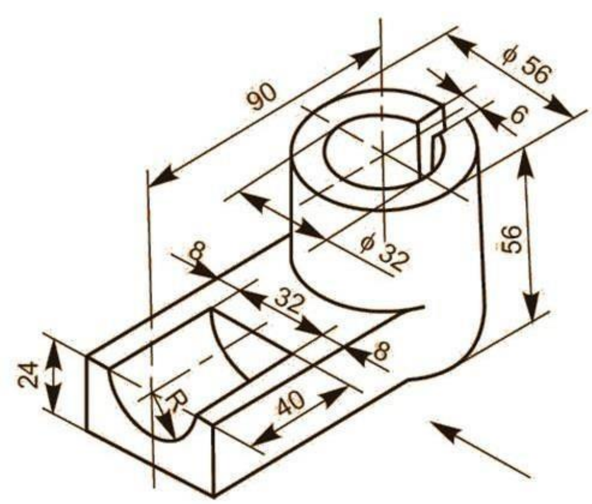




2. Draw F.V., T.V. and R.S.V. of the given object by First Angle Projection Method.

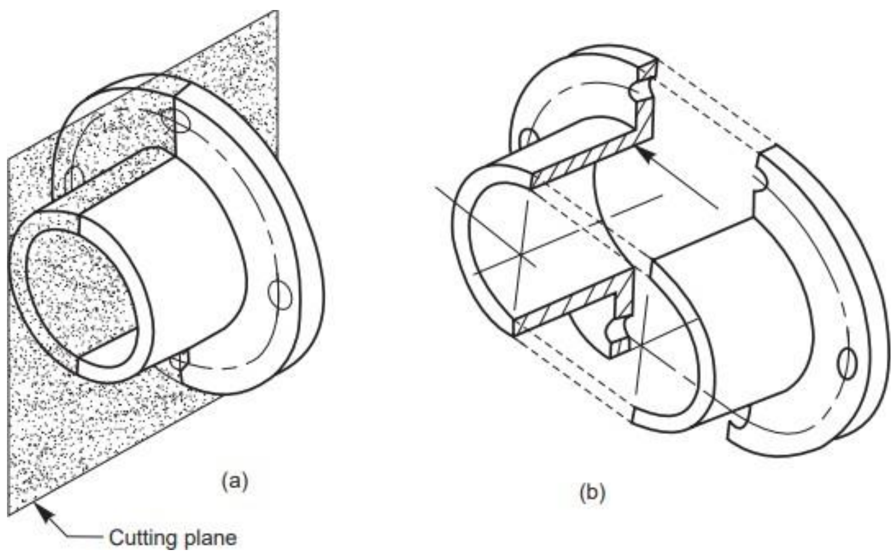
3. Draw F.V., T.V. and R.S.V. of the given object by First Angle Projection Method.





Sectional Views

Orthographic views when carefully selected, may reveal the external features of even the most complicated objects. However, there are objects with complicated interior details and when represented by hidden lines, may not effectively reveal the true interior details. This may be overcome by representing one or more of the views ‘in section’. A sectional view is obtained by imagining the object, as if cut by a cutting plane and the portion between the observer and the section plane being removed. Figure a show an object, with the cutting plane passing through it and Fig. b, the two halves drawn apart, exposing the interior details.



Full Section: A sectional view obtained by assuming that the object is completely cut by a plane is called a full section or sectional view. Figure 4.2a shows the view from the right of the object shown in Fig. 4.1a, in full section. The sectioned view provides all the inner details, better than the unsectioned view with dotted lines for inner details (Fig. 4.2b). The cutting plane is represented by its trace (V.T) in the view from the front (Fig. 4.2c) and the direction of sight to obtain the sectional view is represented by the arrow

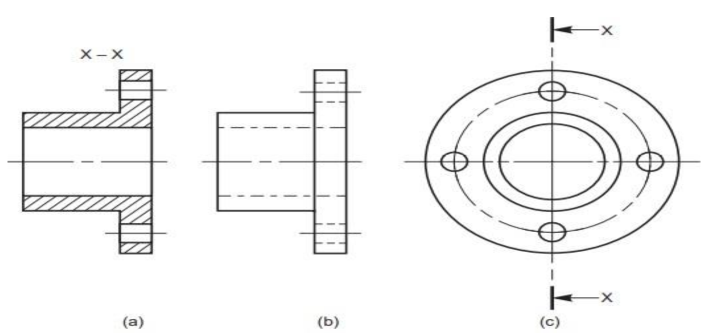


Fig. 4.2 Sectioned and un-sectioned views

It may be noted that, in order to obtain a sectional view, only one half of the object is imagined to be removed, but is not actually shown removed anywhere except in the sectional view. Further, in a sectional view, the portions of the object that have been cut by the plane are represented by section lining or hatching. The view should also contain the visible parts behind the cutting plane. Figure 4.3 represents the correct and incorrect ways of representing a sectional view. Sections are used primarily to replace hidden line representation, hence, as a rule, hidden lines are omitted in the sectional views.

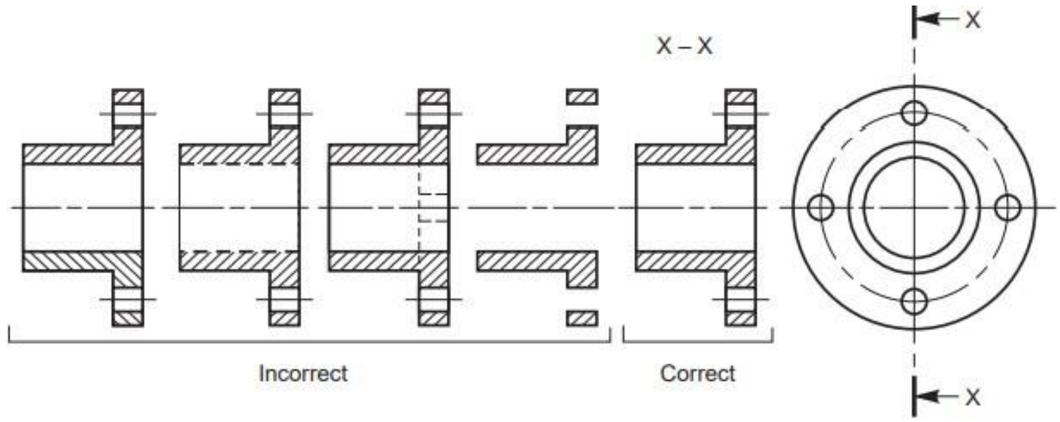


Fig. 4.3 Incorrect and correct sections

Half Section: A half sectional view is preferred for symmetrical objects. For a half section, the cutting plane removes only one quarter of an object. For a symmetrical object, a half sectional view is used to indicate both interior and exterior details in the same view. Even in half sectional views, it is a good practice to omit the hidden lines. Figure 4.4a shows an object with the cutting plane in position for obtaining a half sectional view from the front, the top half being in section. Figure 4.4b shows two parts drawn apart, exposing the inner details in the sectioned portion. Figure 4.4 c shows the half sectional view from the front. It may be noted that a centre line is used to separate the halves of the half section. Students are also advised to note the representation of the cutting plane in the view from above, for obtaining the half sectional view from the front.

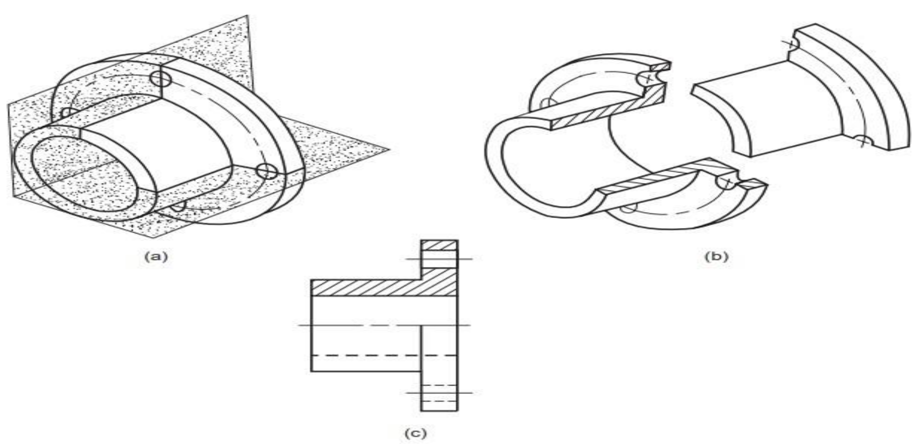


Fig. 4.4 Method of obtaining half sectional view

Exercise 1: Figure 4.6 shows the isometric view of a machine block and (i) the sectional view from the front, (ii) the view from above and (iii) the sectional view from the left.

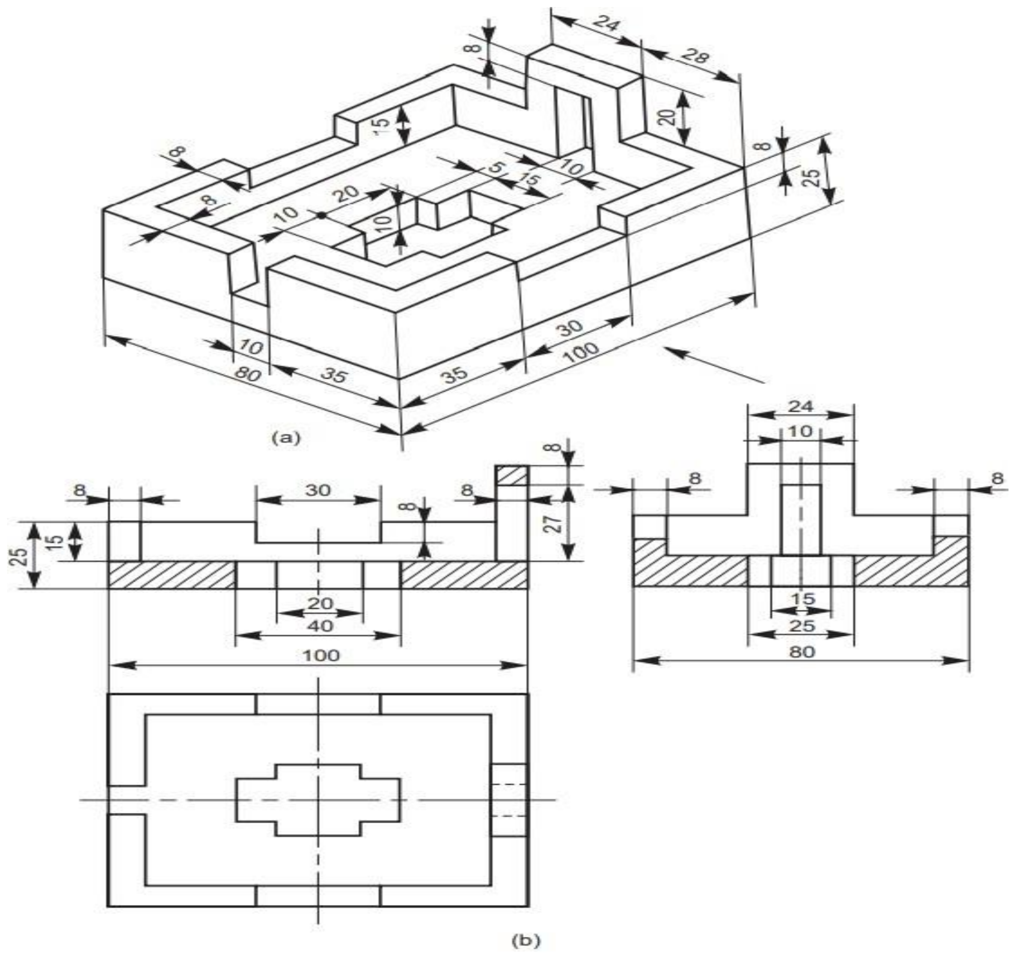


Fig. 4.6 Machine block

Exercise 2: Figure 4.7 shows the isometric view of a shaft support. Sectional view from the front, the view from above and the view from the right are also shown in the figure

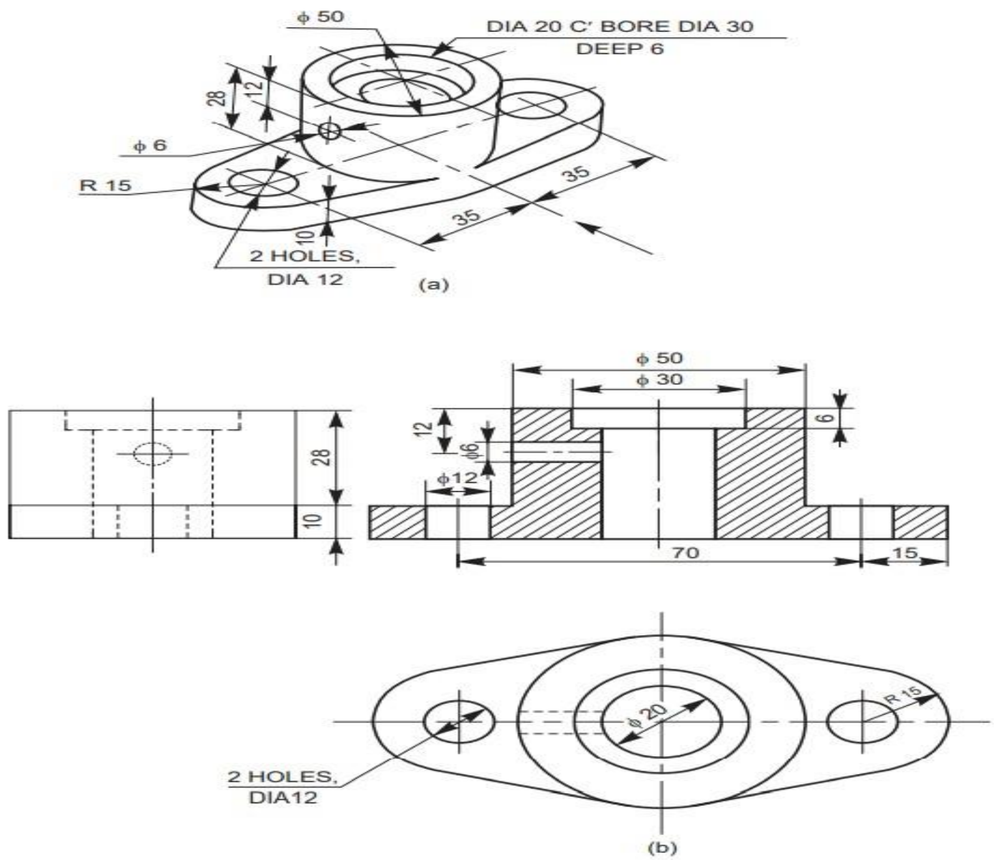
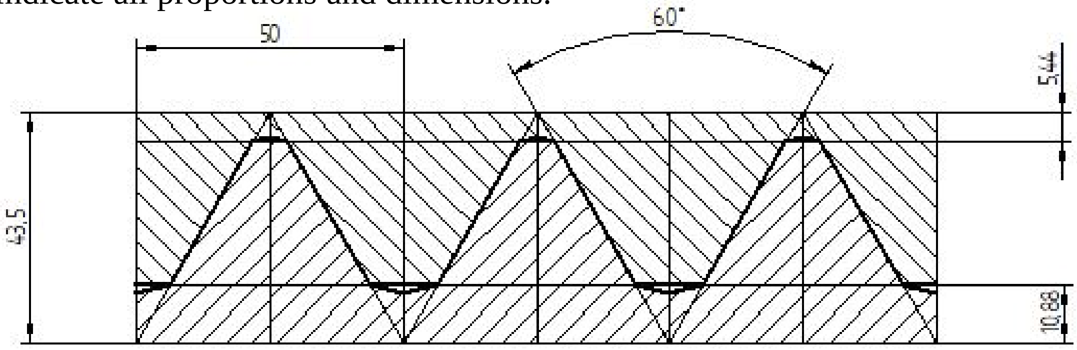


Fig. 4.7 Shaft support

Thread Forms

Screw Threads:

1. Draw neat and proportionate drawing of ISO screw thread profile of pitch 50mm. Indicate all proportions and dimensions.



ISO THREAD

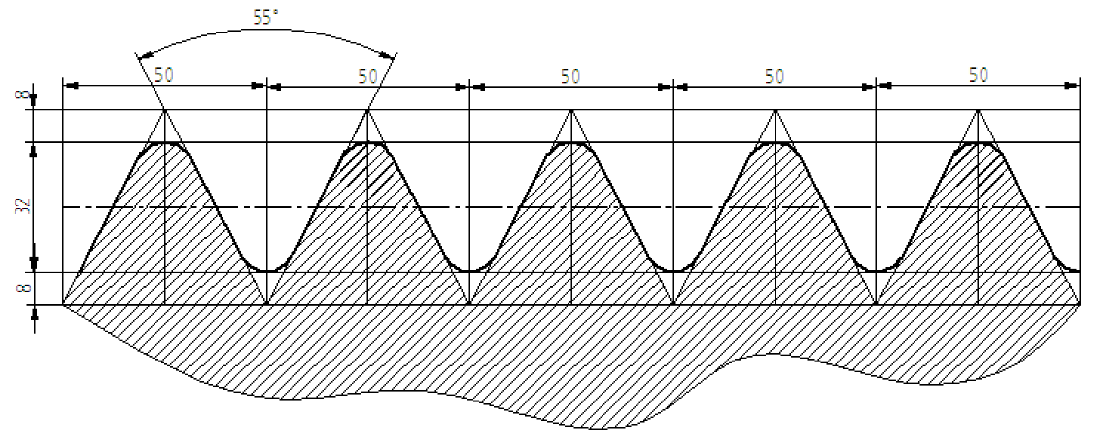
Depth of thread (Height of triangle) = H= 0.87P = 0.87 x 50 = 43.5mm

Addendum, $a = \frac{H}{8}$ $or\ 0.11P = 0.11 \times 50 = 5.5mm$

Dedendum, $h_f = \frac{H}{4}$ $or 0.22P = 0.22 \times 50 = 11mm$

$Thread\ angle, 2\theta = 60^0$

2. Draw BSW thread profile for a pitch of 50mm. Indicate all proportions and dimension



BSW Thread (Withworth Threads)

$H = 0.96\ P; h = 0.64\ p\ OR\ \frac{4}{6}H, a = h_f = 0.16\ P\ OR\ \frac{H}{6}$

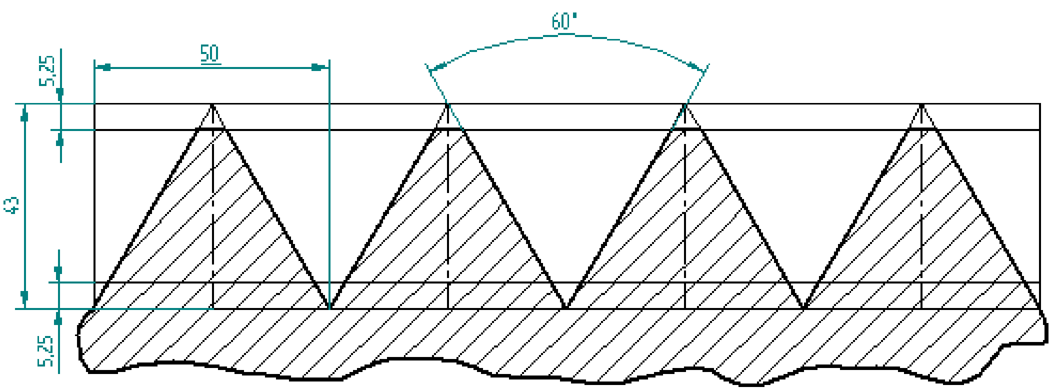
$H = 0.96\ P = 0.96 \times 50 = 48mm$

$a = 0.16\ P = 0.16 \times 50 = 8mm$

$h = 0.64\ P = 0.64 \times 50 = 32mm$

$h_f = 4 = 8mm; 2\theta = 55^0$

3. Draw sellers / American Standard Threads for a pitch of 50mm. Indicate all proportions and dimensions.



Seller Threads

$H=0.86\ P\ OR\ \frac{6}{8}H; h=0.65\ P; a=h_f = \frac{H-h}{2}\ OR\ \frac{H}{8}; 2\theta=60^0$

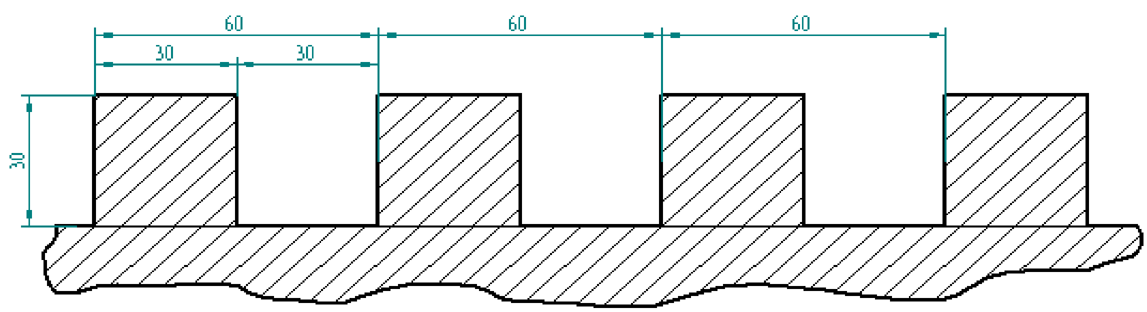
$H=0.86P=0.86\times50=43mm$

$h=0.65P=0.65\times50=32.5mm$

$a=h_f = \frac{H-h}{2} = \frac{43-32.5}{8} = 5.25;$

$2\theta=60^0$

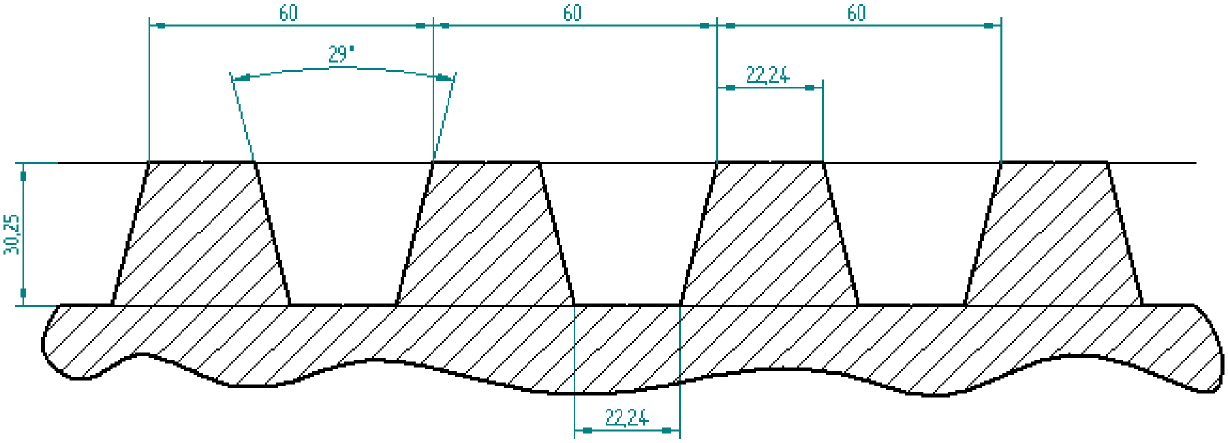
4. Draw square thread profile for a pitch of 60mm. Indicate all dimensions and proportions.



Square Threads

$H = T = \frac{P}{2} = \frac{60}{2} = 30mm$

5. Draw Acme thread profile for a pitch of 60mm. Indicate all dimensions and proportions



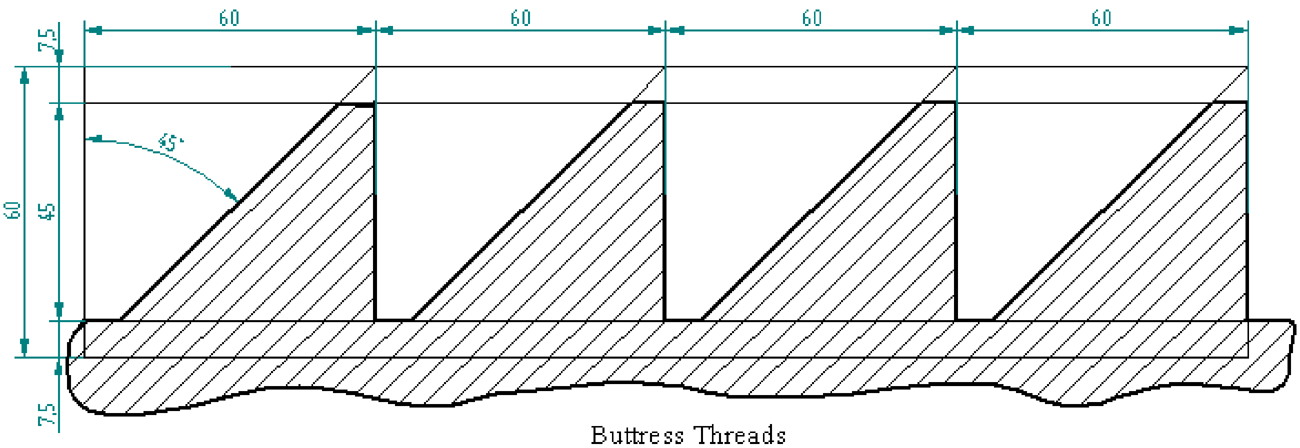
Acme Threads

$H = 0.5\ P + 0.25mm;\ T = 0.3707\ P;\ 2\theta = 29^0 T = 0.3707\ P = 0.3707 \times 60$

$H = [(0.5 \times 60) + 0.25] T = 22.44mm;$

$H = 30.25mm 2\theta = 29^0$

6. Draw Buttress thread profile to transmit power from right to left for a pitch of 60mm. Indicate all dimensions and proportions.



Buttress Threads

$H = P = 60mm$

$h = \frac{6}{8} H\ OR\ 0.75\ P = 0.75 \times 60 = 45mm$

$a = h_f = \frac{H}{8} OR 0.125\ P = 0.125 \times 60 = 7.5mm$

Screwed Fasteners:

1. Draw the tree views of hexagonal bolt of 100mm long, 25mm, nominal diameter and a thread length of 50mm, with a washer and a hexagonal nut. Dimension the views

Data

$D = 25\text{mm} L = 100mm, X = 50mm$

$Nut\ Thickness\ T = D = 25mm$

$Bolt\ head\ thickness, t = 0.8\text{D} = 0.8 \times 25 = 20mm$

$Width\ across\ corners, W = 2\text{D} = 2 \times 25 = 50mm$

$Width\ across\ flats\ W_f = 1.5\text{D} + 3mm = (1.5 \times 25 + 3) = 40.5mm$

$Chamfer\ angle = 30^0$

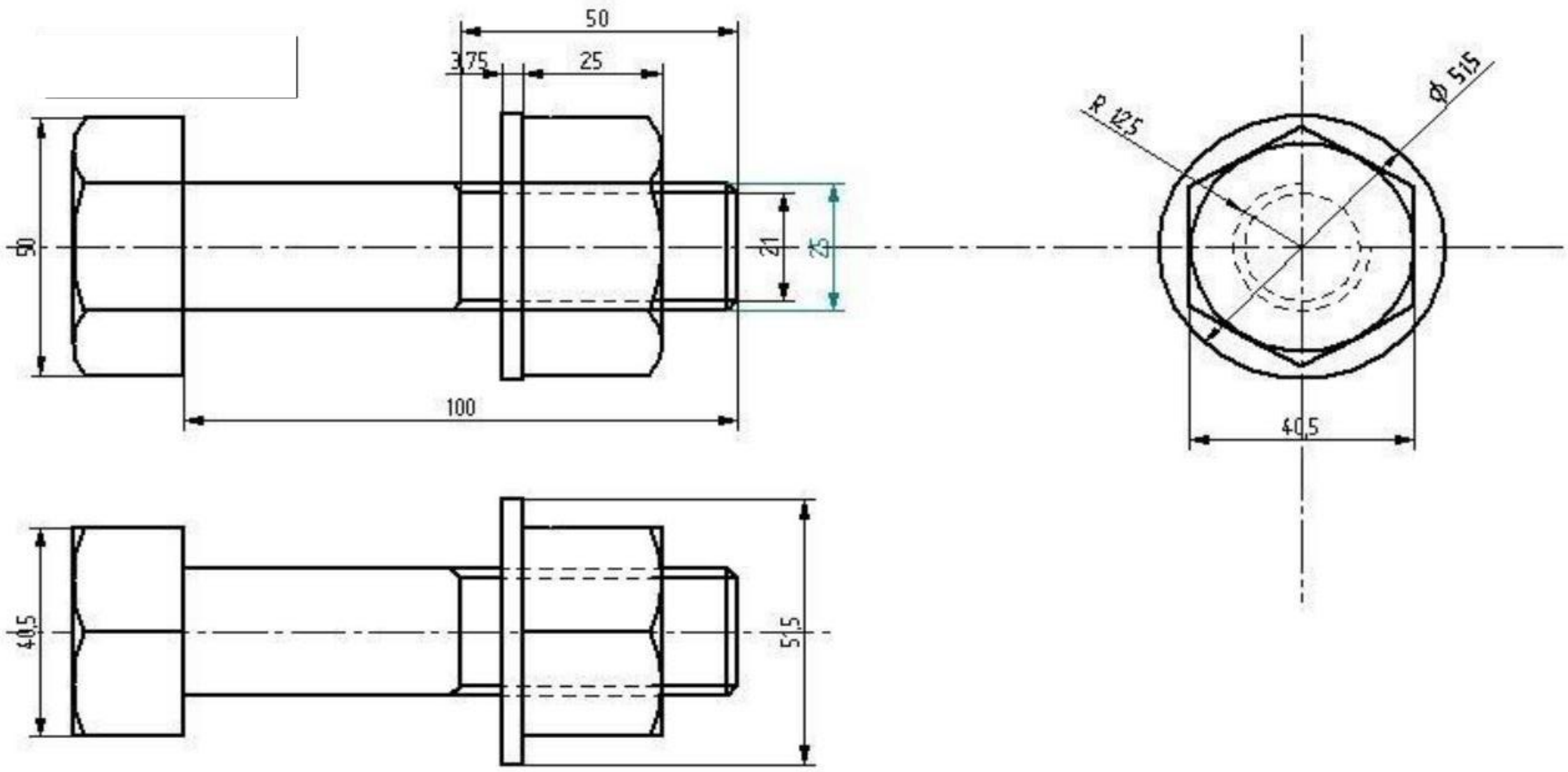
$Radius\ of\ Chamfer\ are, R = 1.5\text{D} = 1.5 \times 25 = 37.5mm$

$Root\ diameter = 0.9\text{D} = 0.9 \times 25 = 22.5mm$

$Bolt\ End\ Chamfer = 0.1\text{D} \times 45^0 = (01. \times 25) \times 45^0 = 2.5 \times 45^0$

$Diameter\ of\ plain\ washer = 2\text{D} + 1.5mm = [(2 \times 25) + 1.5] = 51.5mm$

$Thickness\ of\ wahser = 0.15D = 0.15 \times 25 = 3.75mm$



Hexagonal Nut & Bolt

Given: L=100mm, D= 25mm, X=50mm.

2. Draw all the three views of a square headed bolt of size 20mm dia and 100mm long with a square nut. Indicate all the dimensions on the drawing.

Data

$D = 20\text{mm} L = 100mm.$

$X = 2\text{D} + 10mm = (2 \times 20) + 10 = 50mm$

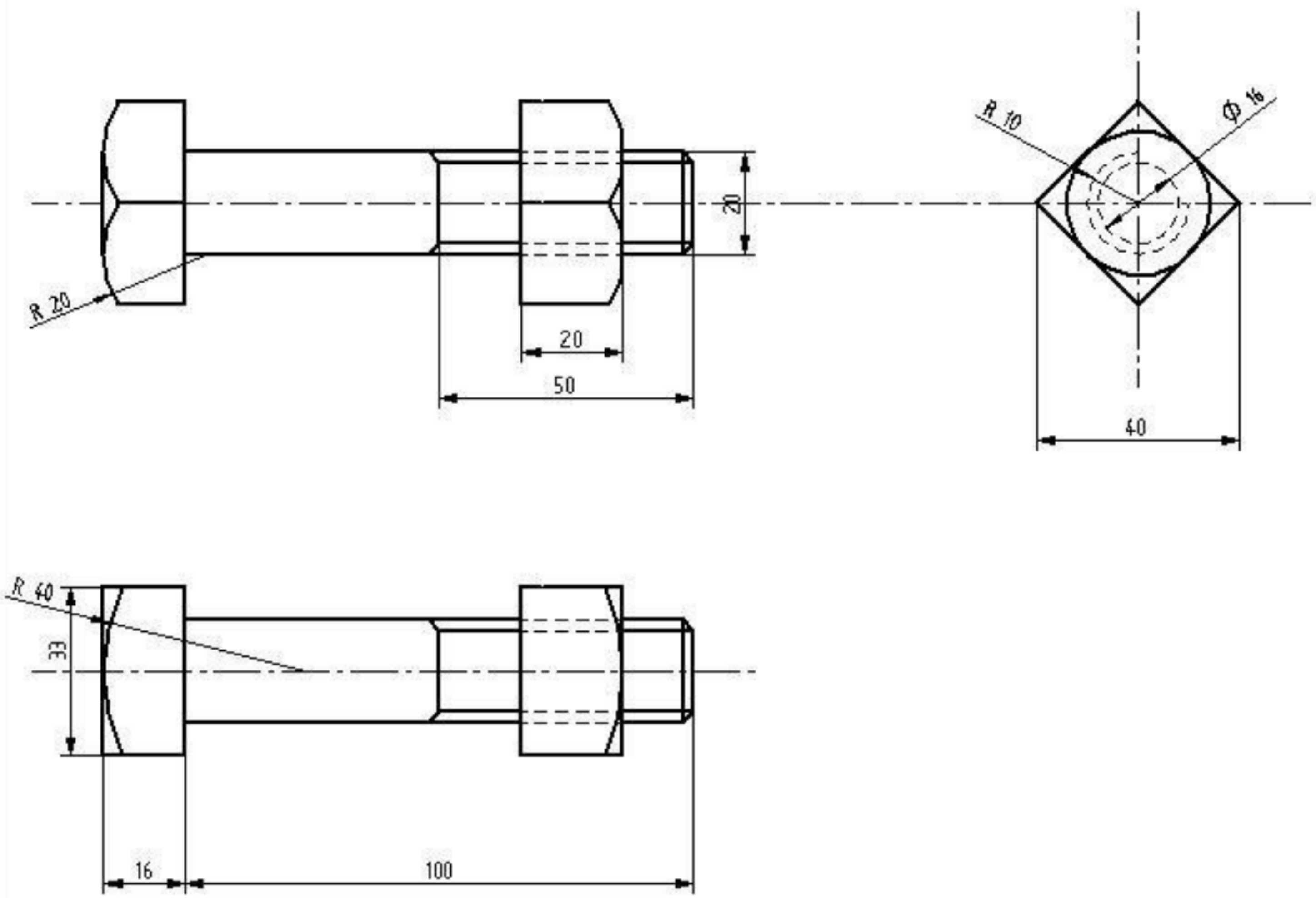
$R = 2\text{D} = 2 \times 20 = 40mm$

$T = D = 20\text{mm} t = 0.8\text{D} = 0.8 \times 20 = 16mm$

$Wc = 2\text{D} = 2 \times 20 = 40$

$Width\ across\ flat\ W_f = 1.5\text{D} + 3mm = (1.5 \times 20) + 3 = 33mm$

$Chamfer\ angle = 30^0$



Square Nut & Bolt

Given: D=20mm, L=100mm,

3. Draw the principal view of the joint in which a 30mm thick plate is to be connected to a main casting using a 20mm diameter stud and a hexagonal nut. Show all calculations. Insert the dimensions

Dats

$Stud\ Shank\ dia\ D = 20mm$

$Plate\ Thickness,\ t = 30mm$

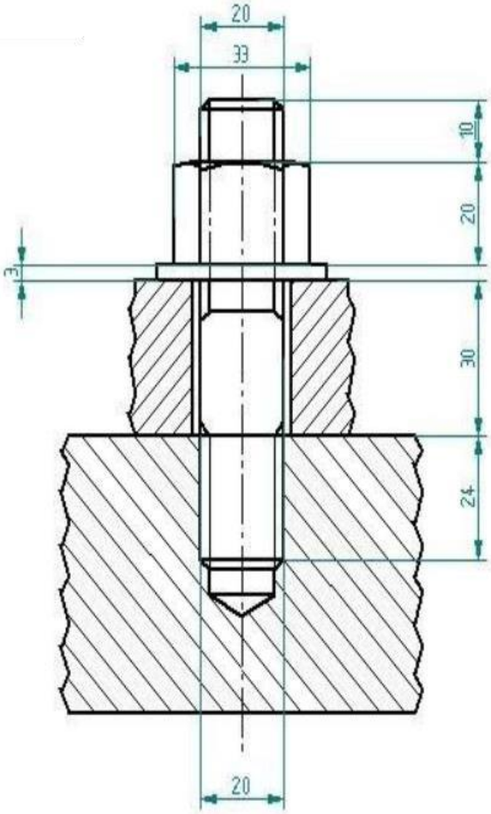
$Depth\ of\ thread = 1.3D = 1.3 \times 20 = 26mm$

$Thickness\ of\ nut, T = D = 20mm$

$Width\ across\ corner\ W_C = 1.5D + 3mm = \left(\overline{1.5 \times 20 + 3}\right) = 33mm$

$Diameter\ of\ plain\ washer = 2D + 1.5mm = (\overline{2 \times 20} + 1.5) = 41.5mm$

$Thockness\ of\ washer = 0.15D = 0.15 \times 20 = 3mm$

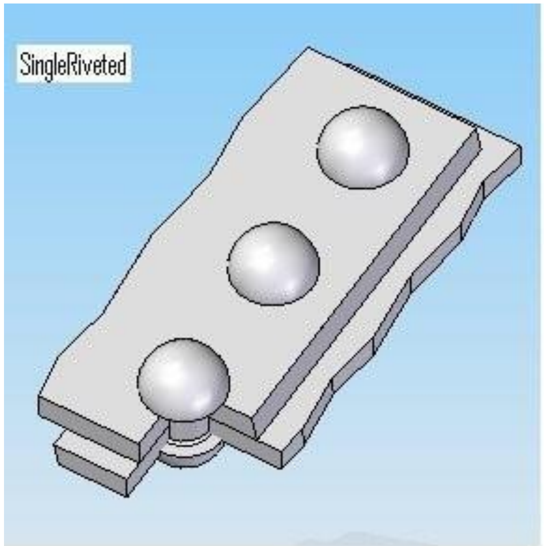


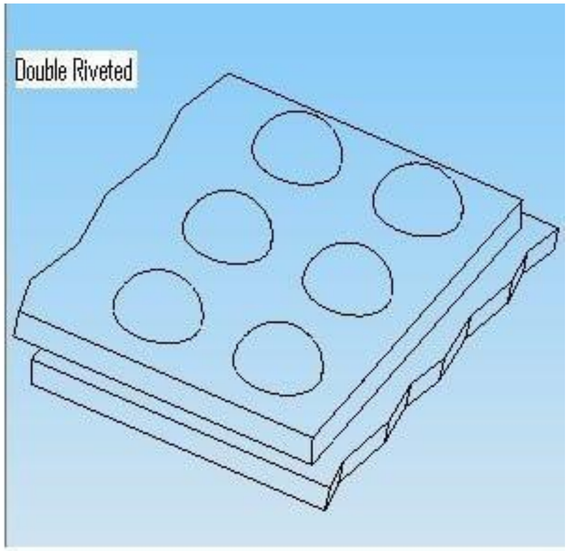
Metal end length, 1.2D=24mm
Nut end length, 1.5D=30mm
Thickness of nut, T=D
Wc=1.5D+3mm = 33mm
Dia of washer = 2D+1.5=41.5mm
Thickness of washer = 0.15D=3mm

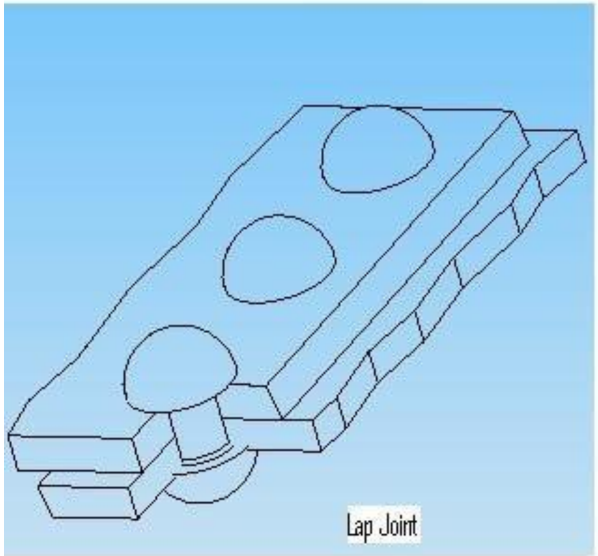
Stud with Nut & Washer

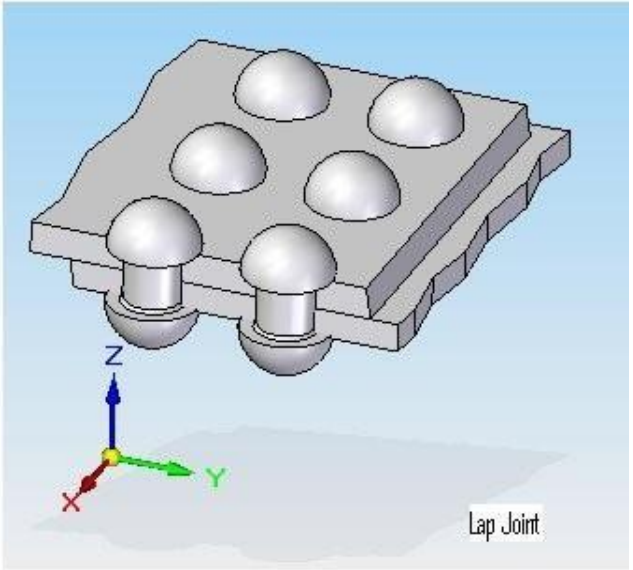
stud dia, D=20mm plate thickness, t=30mm

Rivets









1. Draw the top view and sectional front view of a single riveted lap joint to connect two plates of 9mm thickness. Use snap head rivets. Show minimum three rivets in the row. Adopt suitable scale and mark all dimensions on the views

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets (Referring section 9.1)

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9}$ =18mm

Rivet head diameter = 1.6d = 1.6 $\times$18 = 28.8mm

Rivet head thickness = 0.7d = 0.7 $\times$18 = 12.6mm

Fillet radius = 0.06d = 0.06 $\times$18 = 1.08mm

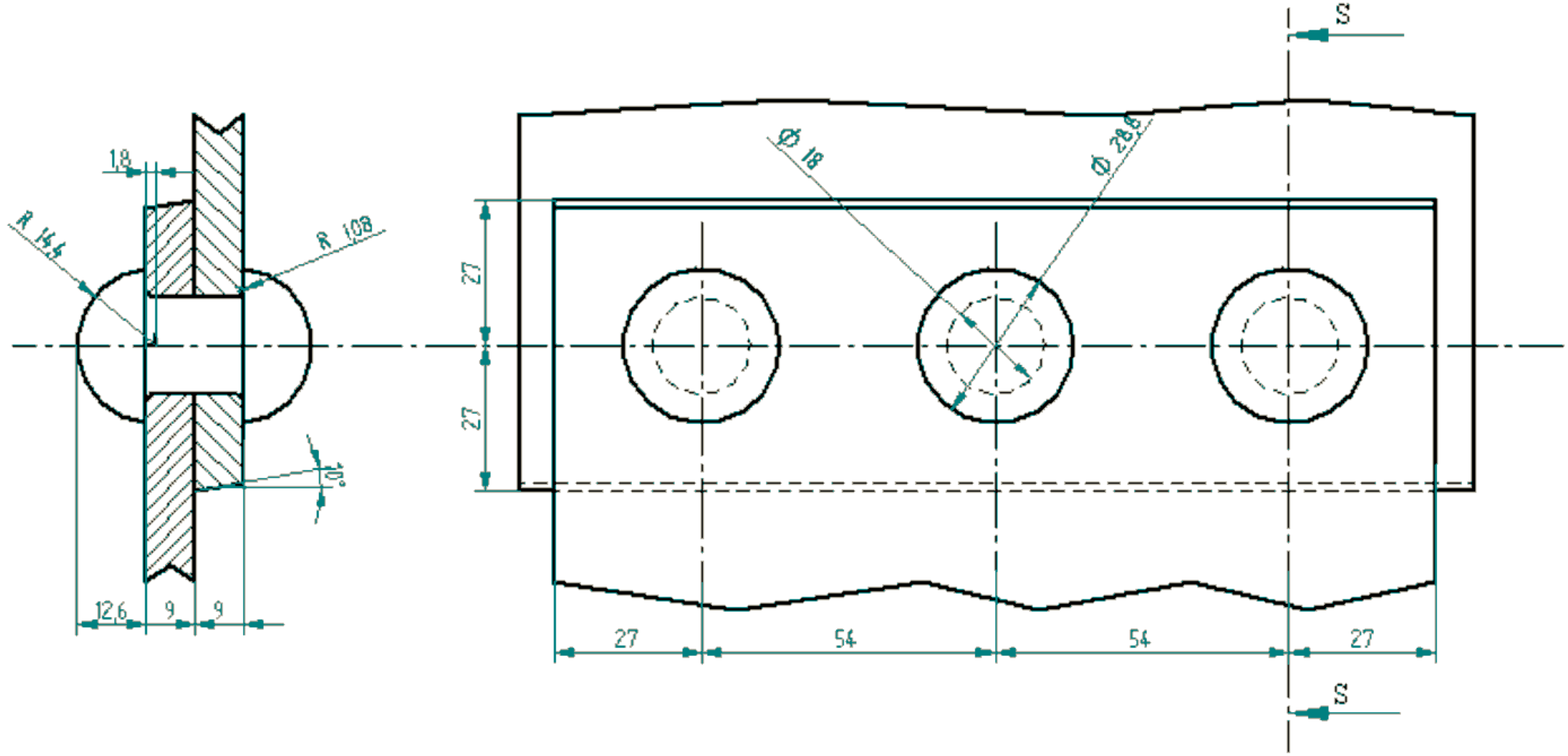
Center for head radius lies on the axis at 0.1 d = 0.1$\times$18 = 1.8mm from the flat face

Proportions for the riveted joint(from Table 9.3)

Longitudenal pitch , p = 3d = 3 $\times$18 = 54mm

margin, m = 1.5d = 1.5 $\times$18 = 27mm

overlap L = 2m = 2 $\times$ 27 = 54mm



Single Riveted Lap Joint

D=18mm, t = 9mm

2. Draw the top and sectional front view of a double riveted lap joint to connect two plates of 9mm thickness. Adopt suitable scale and insert all dimensions on the views

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets *(* Referring section 9.1*)*

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9} = 18$mm

Rivet head diameter = 1.6d = 1.6 ×18 = 28.8mm

Rivet head thickness = 0.7d = 0.7 ×18 = 12.6mm

Fillet radius = 0.06d = 0.06 ×18 = 1.08mm

Center for head radius lies on the axis at 0.1 d = 0.1×18 = 1.8mm from the flat face

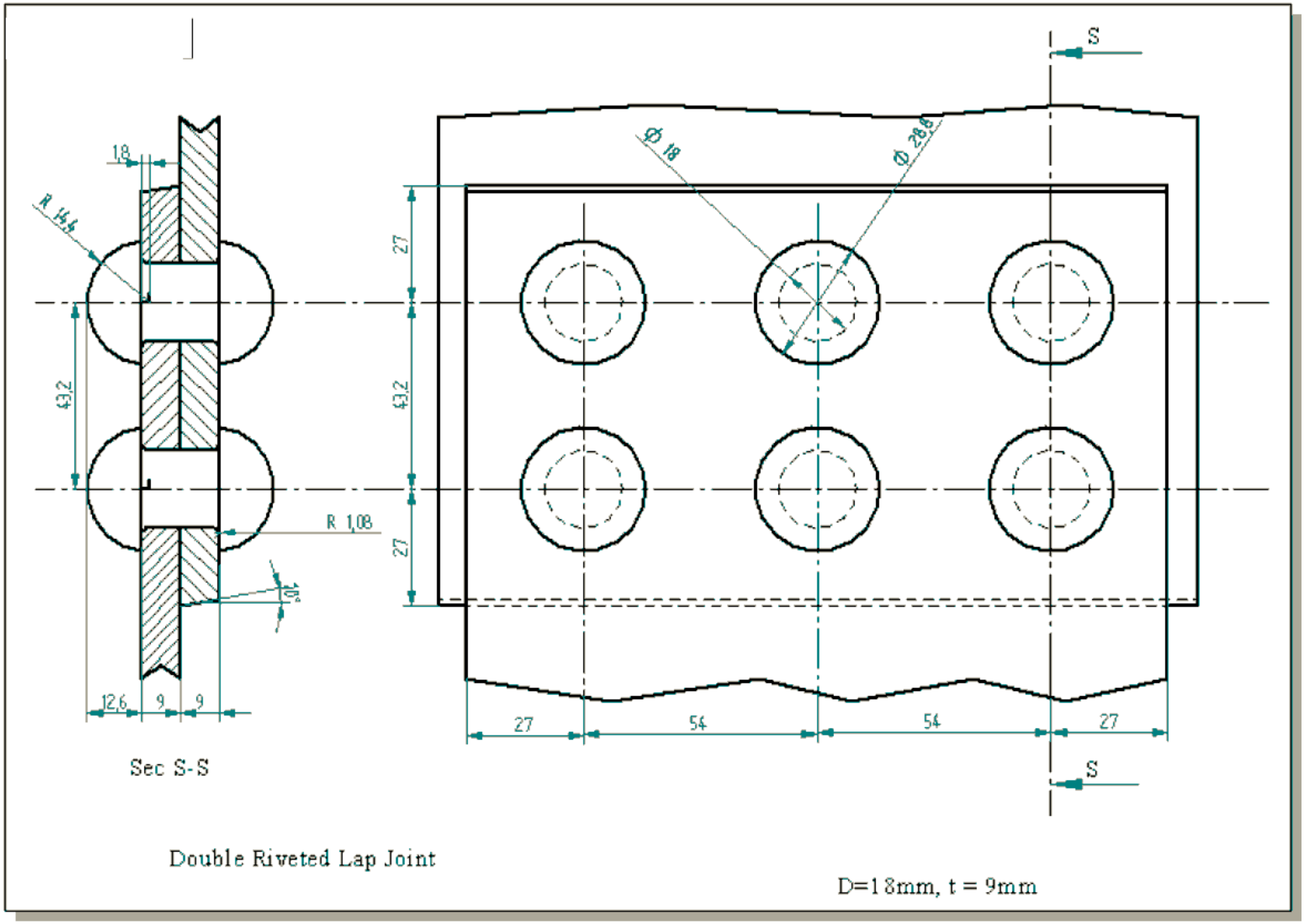
Proportions for the riveted joint*(* from Table 9.1*)*

Longitudenal pitch , p = 3d = 3×18 = 54mm

margin, m = 1.5d = 1.5 ×18 = 27mm

overlap L = 2m = 2 × 27 = 54mm

$p_t = 0.8p = 0.8 \times 54 = 43.2mm$


1.8
R 14.4
43.2
R 1.08
10°
12.6
9
9
Sec S-S
Ø 18
Ø 28.8
27
43.2
27
27
54
54
27
S
S
Double Riveted Lap Joint
D=18mm, t = 9mm

3. Draw the two view of a double riveted lap joint to connect two plates of 18mm diameter rivets. Adopt zig – zag arrangement of rivets. Adopt suitable scale use chain riveting.

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets *(* Referring section 9.1*)*

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9} = 18$mm

Rivet head diameter = 1.6d = $1.6 \times 18 = 28.8$mm

Rivet head thickness = 0.7d = $0.7 \times 18 = 12.6$mm

Fillet radius = 0.06d = $0.06 \times 18 = 1.08$mm

Center for head radius lies on the axis at $0.1\,d = 0.1 \times 18 = 1.8$mm from the flat face

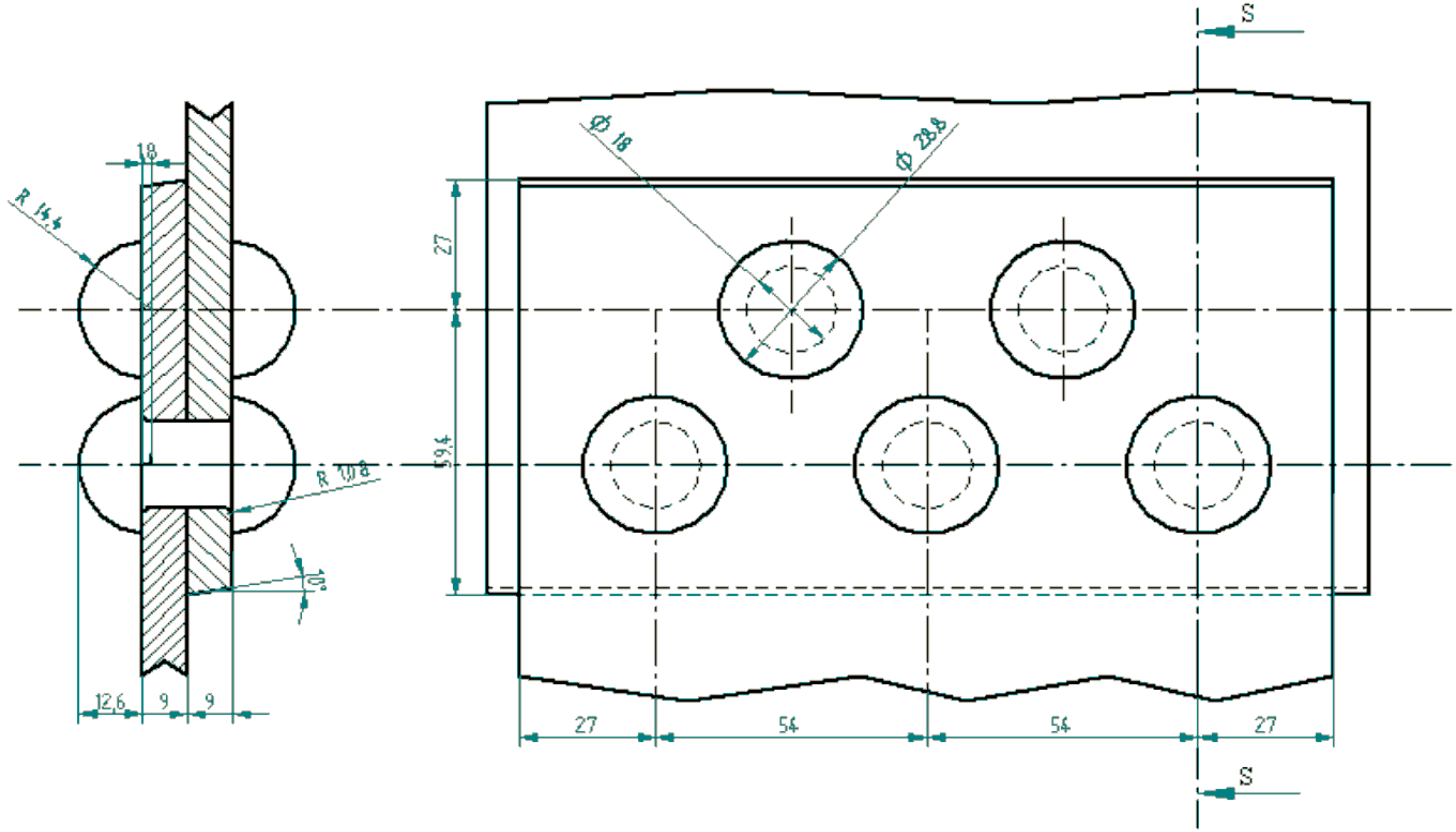
Proportions for the riveted joint*(* from Table 9.1*)*

Longitudenal pitch , p = 3d = $3 \times 18 = 54$mm

margin, m = 1.5d = $1.5 \times 18 = 27$mm

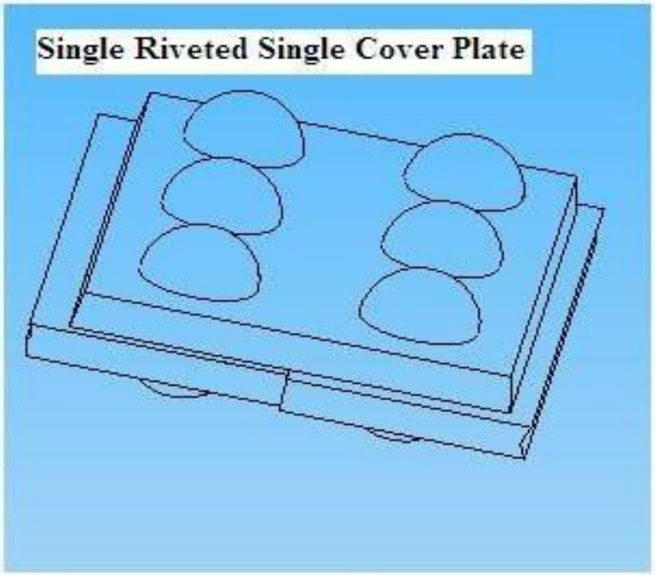
overlap L = 2m = $2 \times 27 = 54$mm

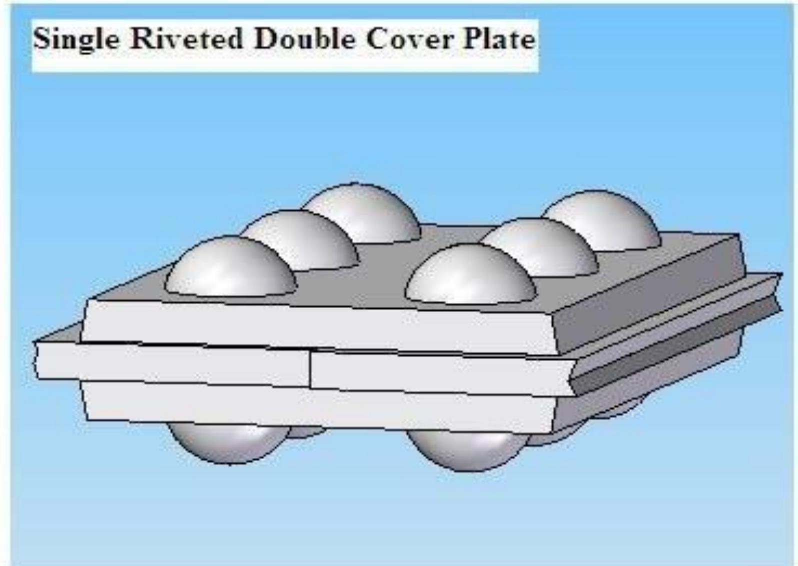
p_t = 0.6p = $0.6 \times 54 = 32.4\,mm$

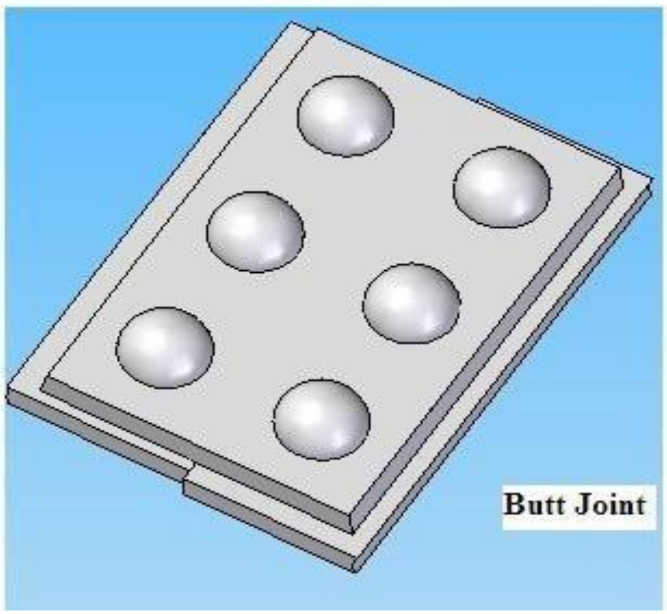


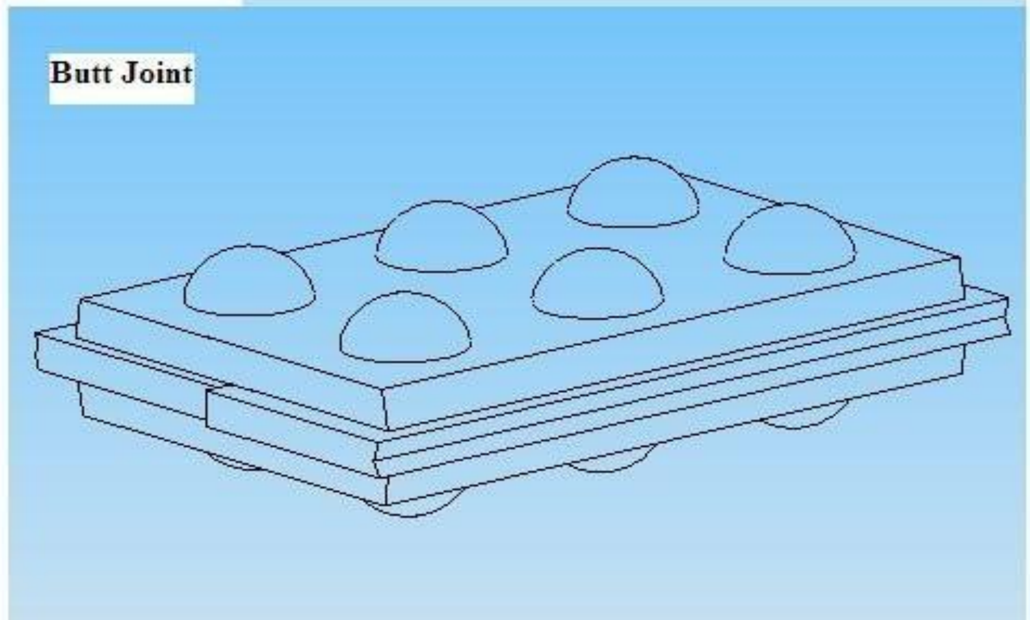
Dounle Riveted, Chain Riveting, Lap Joint

D=18mm, t = 9mm


Single Riveted Single Cover Plate


Single Riveted Double Cover Plate


Butt Joint


Butt Joint

4. Draw the two views of a Single riveted butt joint with a single cover plate to connect two plates of 9mm thickness.

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets *(* Referring section 9.1*)*

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9} = 18$mm

Rivet head diameter = 1.6d = 1.6×18 = 28.8mm

Rivet head thickness = 0.7d = 0.7×18 = 12.6mm

Fillet radius = 0.06d = 0.06×18 = 1.08mm

Center for head radius lies on the axis at $0.1\,d = 0.1 \times 18 = 1.8$mm from the flat face

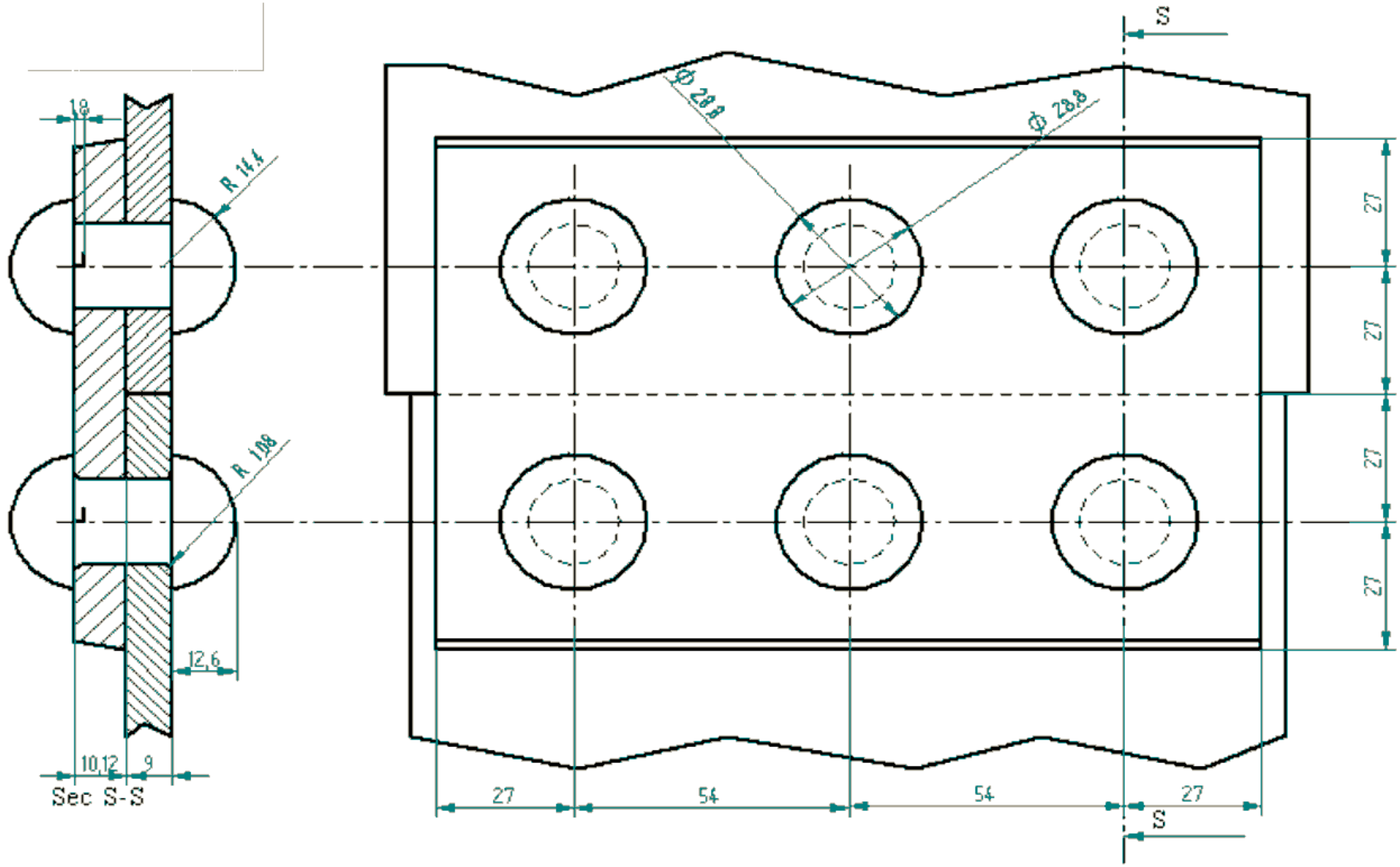
Proportions for the riveted joint*(* from Table 9.1*)*

Longitudenal pitch , p = 3d = 3×18 = 54mm

margin, m = 1.5d = 1.5×18 = 27mm

overlap L = 2m = 2×27 = 54mm

$t_1 = 1.125t = 1.125 \times 9 = 10.125mm$



Single Riveted Butt Joint

D = 18mm, t = 9mm

5. Draw the two views of a single riveted butt joint with two equal cover plate to connect two plates of 9mm thickness.

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets *(* Referring section 9.1*)*

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9} = 18$mm

Rivet head diameter = 1.6d = 1.6 ×18 = 28.8mm

Rivet head thickness = 0.7d = 0.7 ×18 = 12.6mm

Fillet radius = 0.06d = 0.06 ×18 = 1.08mm

Center for head radius lies on the axis at $0.1\,d = 0.1 \times 18 = 1.8$mm from the flat face

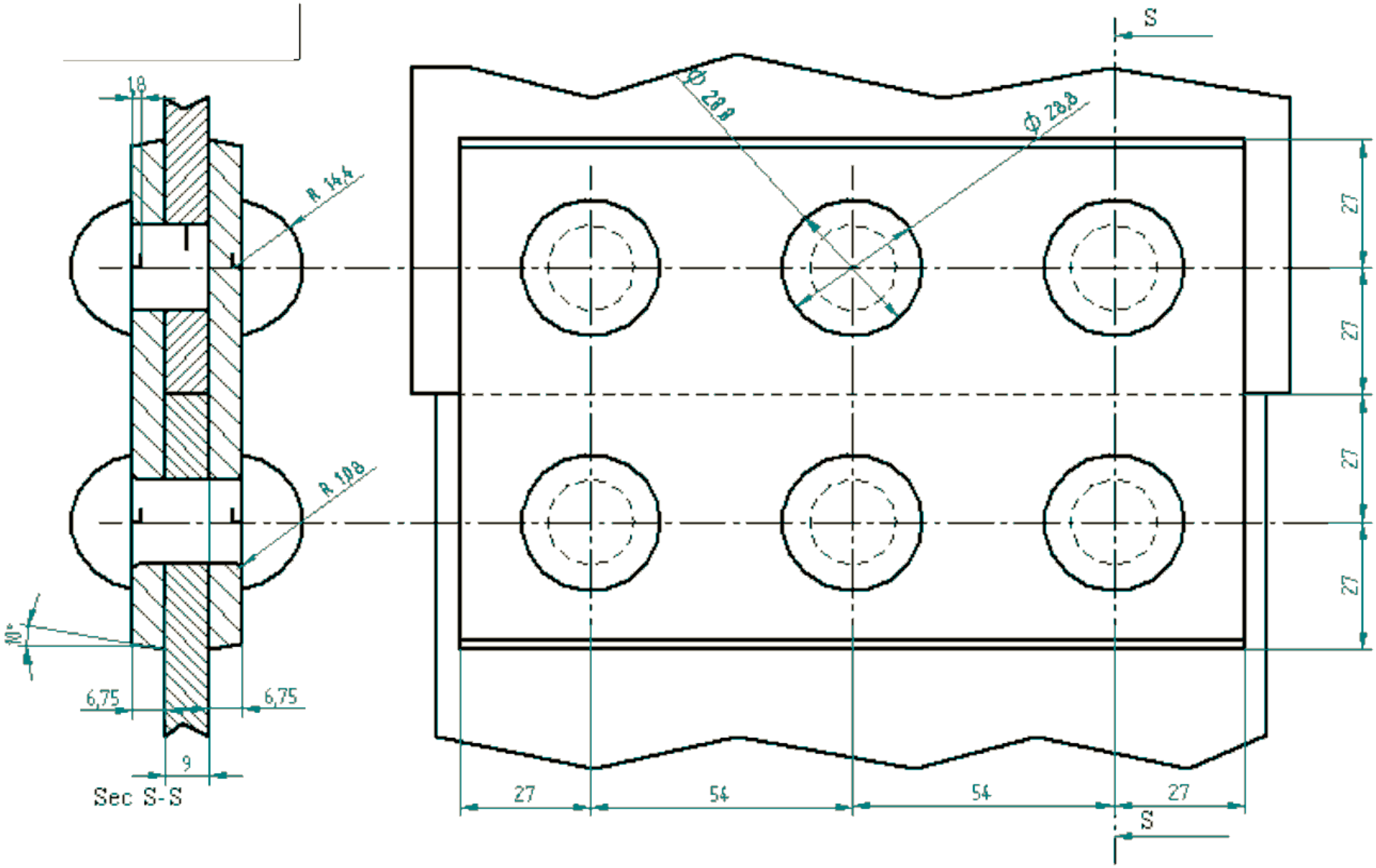
Proportions for the riveted joint*(* from Table 9.1*)*

Longitudenal pitch , p = 3d = 3 ×18 = 54mm

margin, m = 1.5d = 1.5 ×18 = 27mm

overlap L = 2m = 2 × 27 = 54mm

$t_1 = t_2 = 0.75t = 0.75 \times 9 = 6.75mm$



Single Riveted Butt Joint,
With double cover plate

D = 18mm, t = 9mm

6. Draw the two views of a double riveted butt joint with a single cover plate to connect two plates of 9mm thickness. Adopt chain arrangement of rivets.

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets (Referring section 9.1)

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9} = 18$mm

Rivet head diameter = 1.6d = 1.6 ×18 = 28.8mm

Rivet head thickness = 0.7d = 0.7 ×18 = 12.6mm

Fillet radius = 0.06d = 0.06 ×18 = 1.08mm

Center for head radius lies on the axis at $0.1\,d = 0.1 \times 18 = 1.8$mm from the flat face

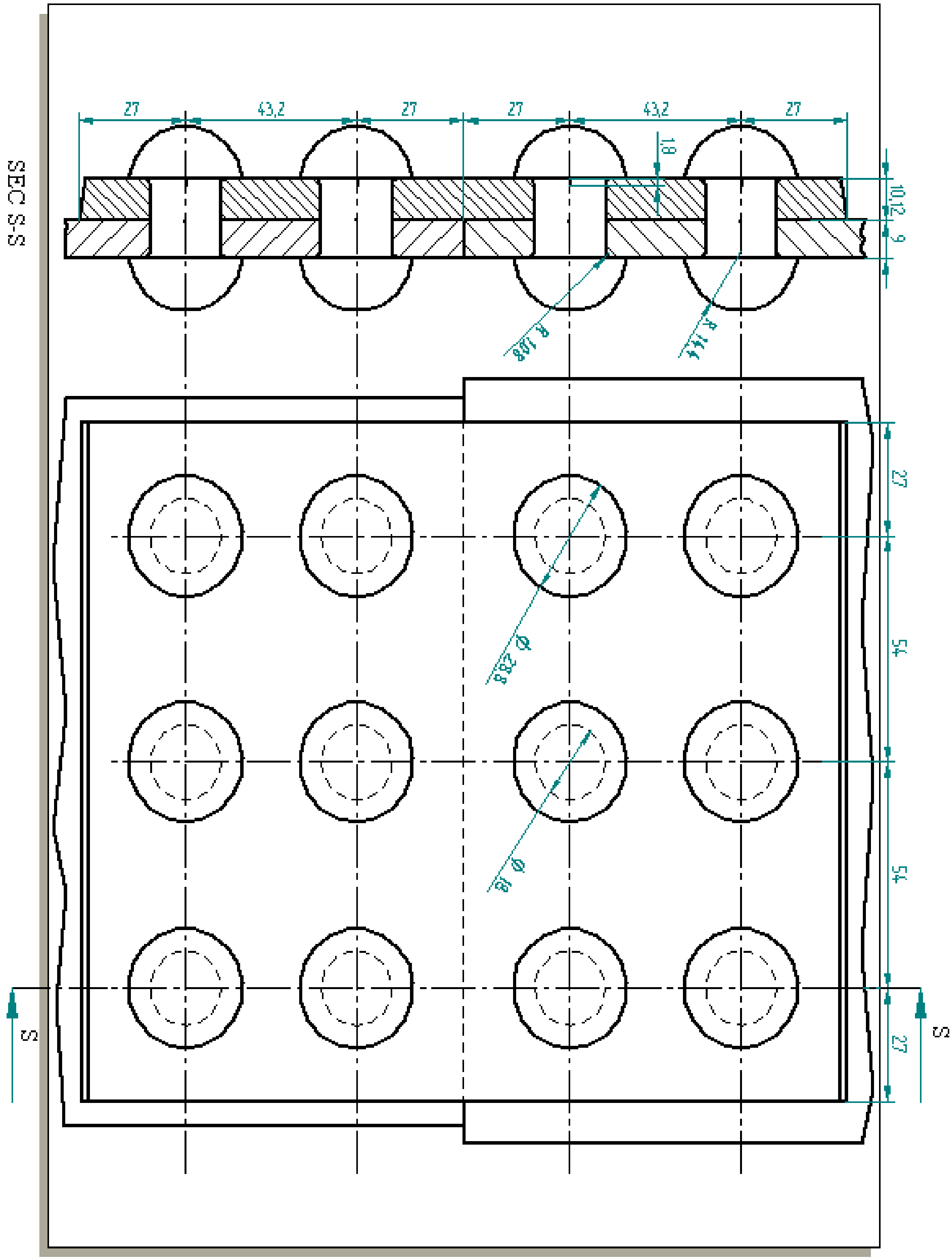
Proportions for the riveted joint(from Table 9.1)

Longitudenal pitch , p = 3d = 3 ×18 = 54mm

margin, m = 1.5d = 1.5 ×18 = 27mm

overlap L = 2m = 2 × 27 = 54mm

$t_1 = 1.125t = 1.125 \times 9 = 10.125mm$


SEC S-S
27
43,2
27
27
43,2
27
1,8
10,12
9
R 108
R 144
Φ 18
54
54
S
S

7. Draw the two views of a double riveted butt joint with a single cover plate to connect two plates of 9mm thickness. Adopt zig – zag arrangement of rivets.

Data :

Thickness of Plates, t = 9mm

Proportions of the rivets (Referring section 9.1)

Diameter of rivets , $d = 6\sqrt{t} = 6\sqrt{9}$ = 18mm

Rivet head diameter = 1.6d = 1.6 $\times$18 = 28.8mm

Rivet head thickness = 0.7d = 0.7 $\times$18 = 12.6mm

Fillet radius = 0.06d = 0.06 $\times$18 = 1.08mm

Center for head radius lies on the axis at 0.1 d = 0.1$\times$18 = 1.8mm from the flat face

Proportions for the riveted joint(from Table 9.1)

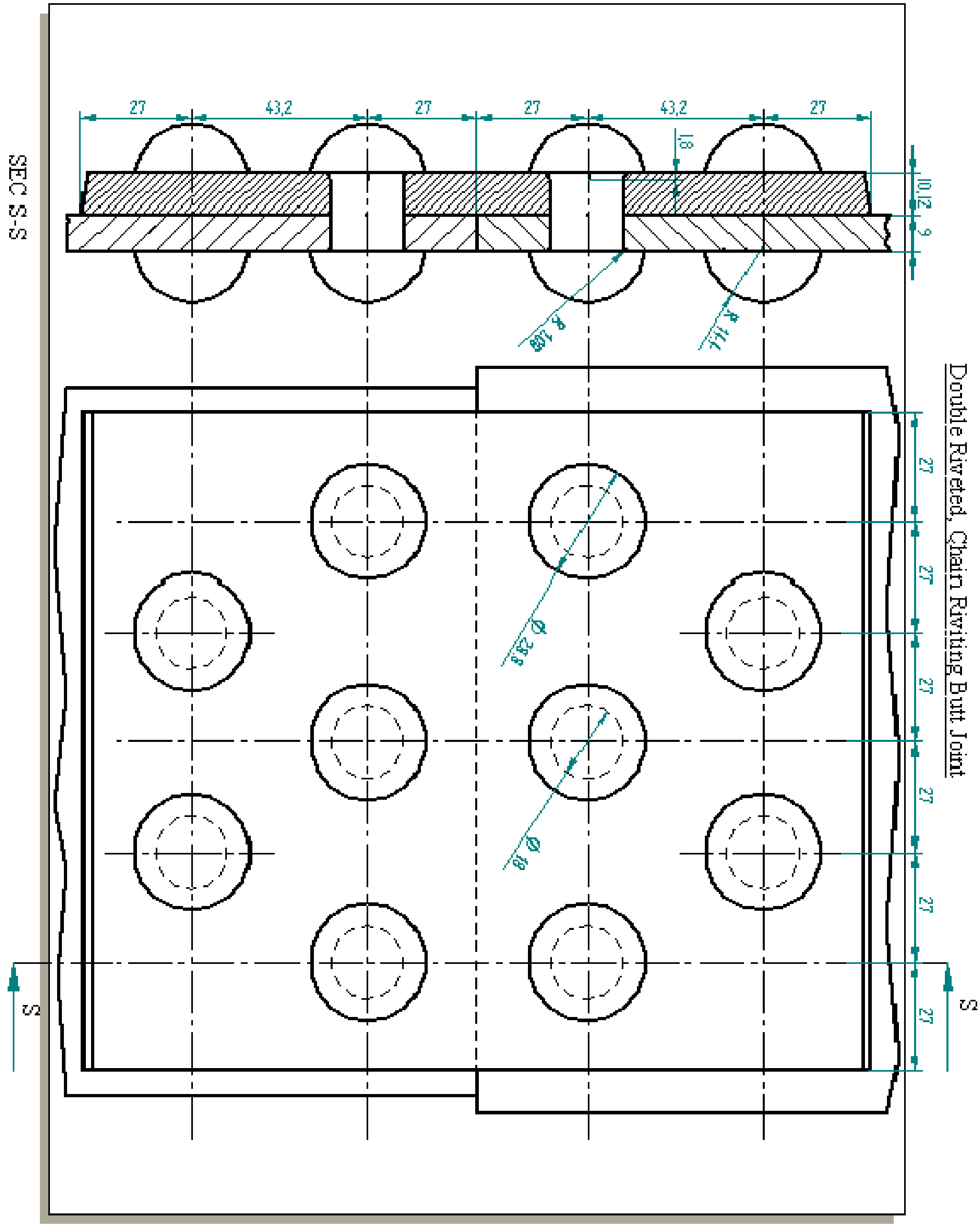
Longitudenal pitch , p = 3d = 3 $\times$18 = 54mm

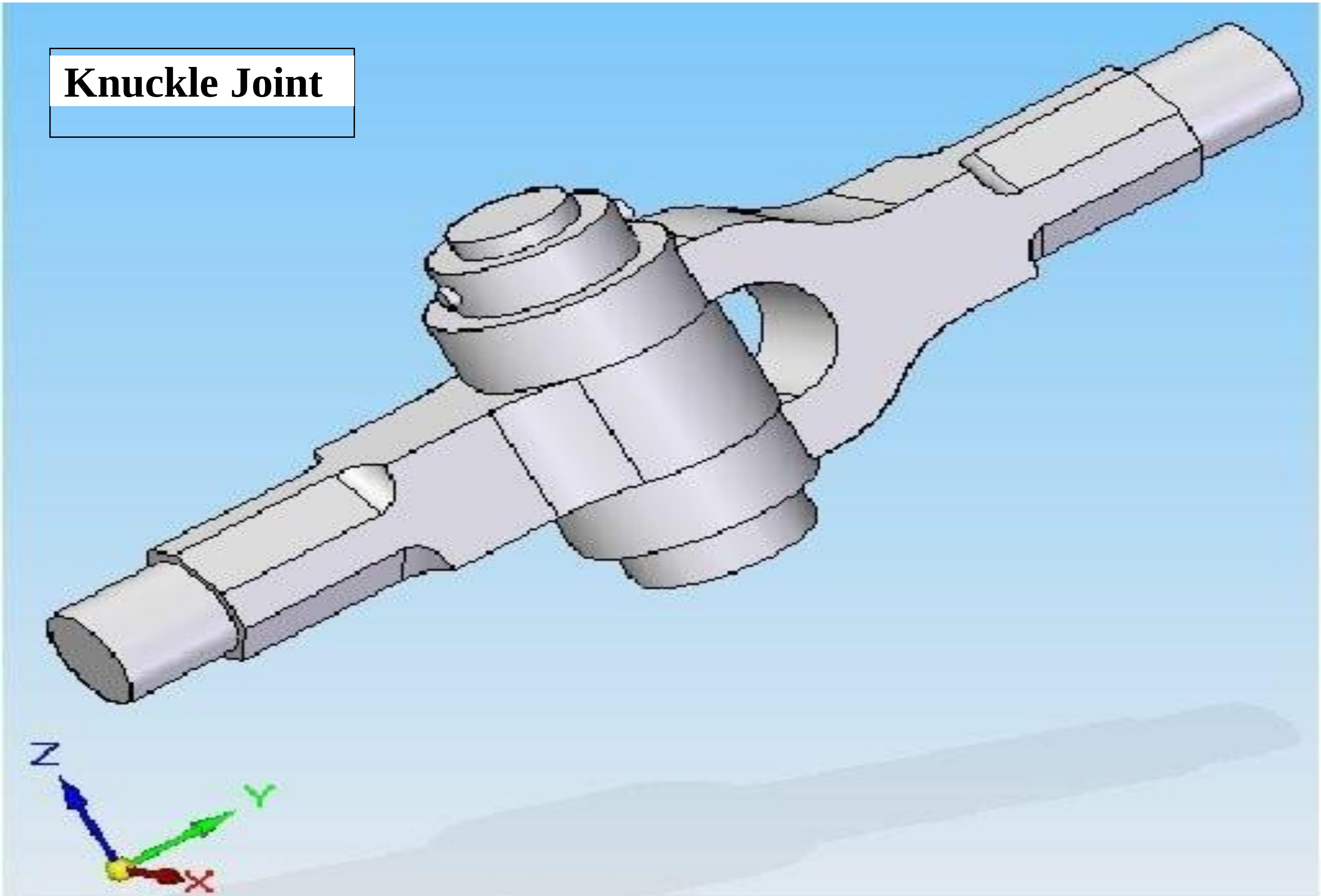
margin, m = 1.5d = 1.5 $\times$18 = 27mm

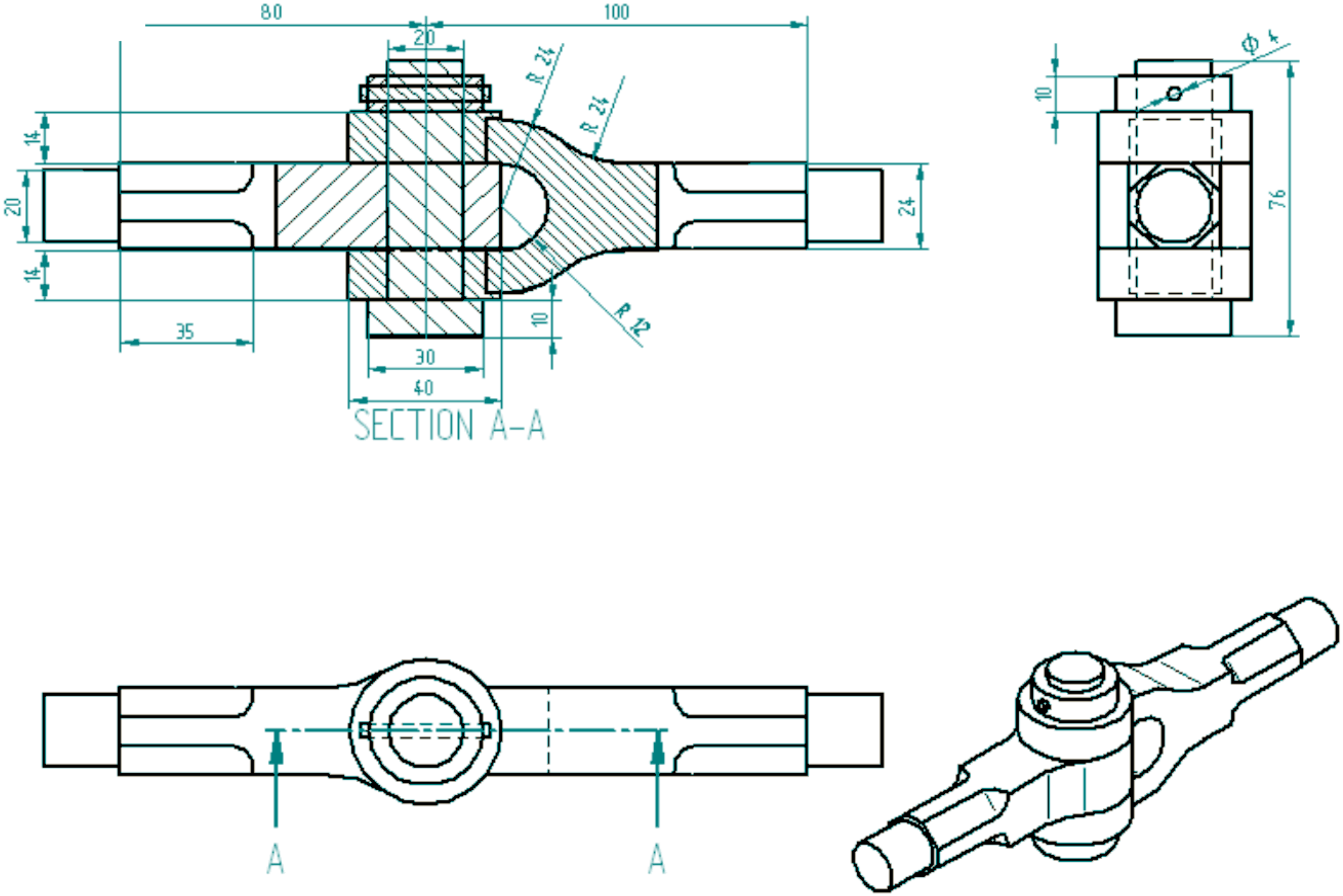
overlap L = 2m = 2 $\times$ 27 = 54mm

$t_1 = 1.125t = 1.125 \times 9 = 10.125mm$

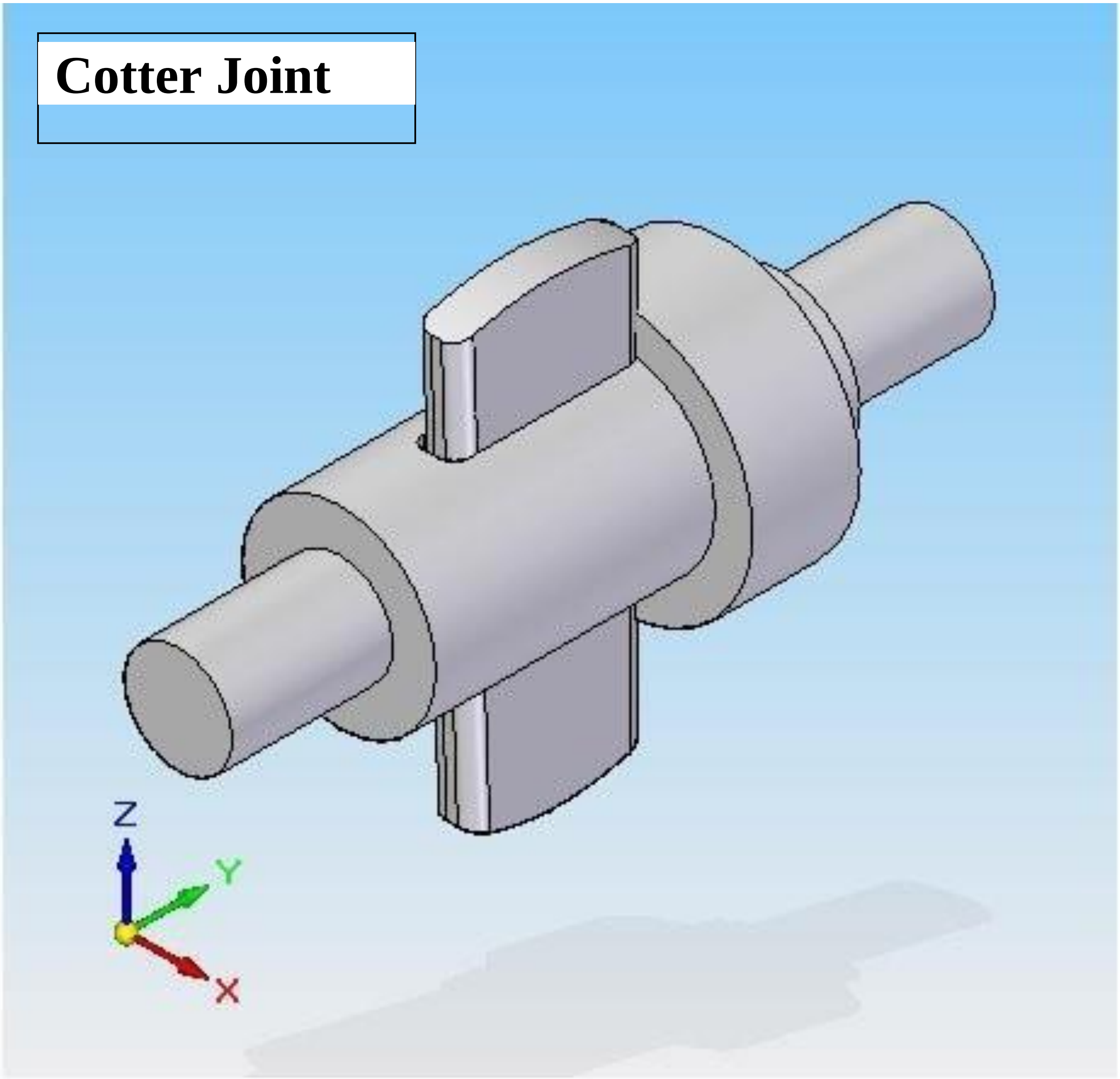
p_t = 0.6p = 0.6 $\times$ 54 = 32.4mm

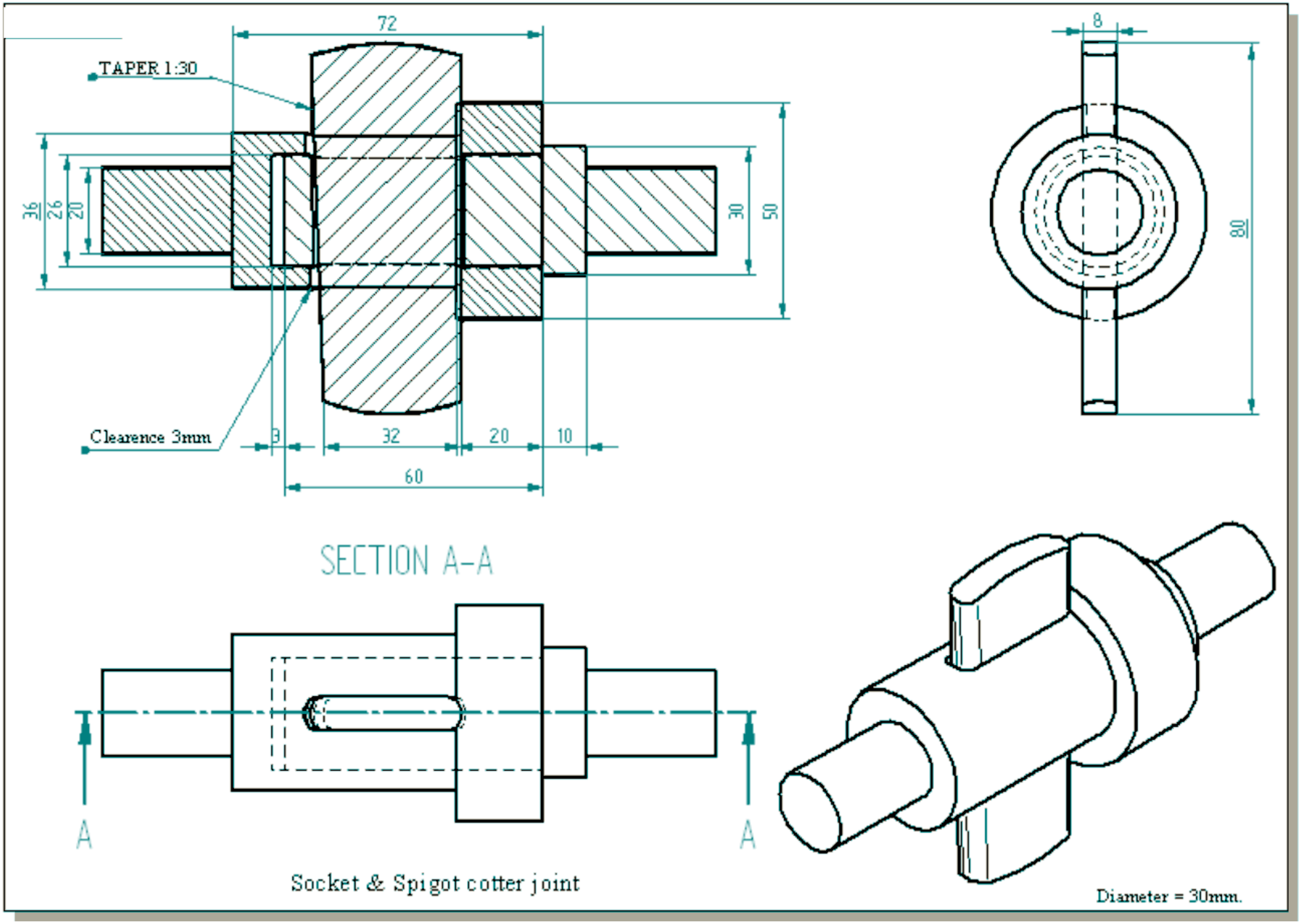

Double Riveted, Chain Rivting Butt Joint
SEC S-S
S
S
27
43,2
27
27
43,2
27
1,8
10,12
9
R 14,4
R 10,8
Φ 23,8
Φ 18

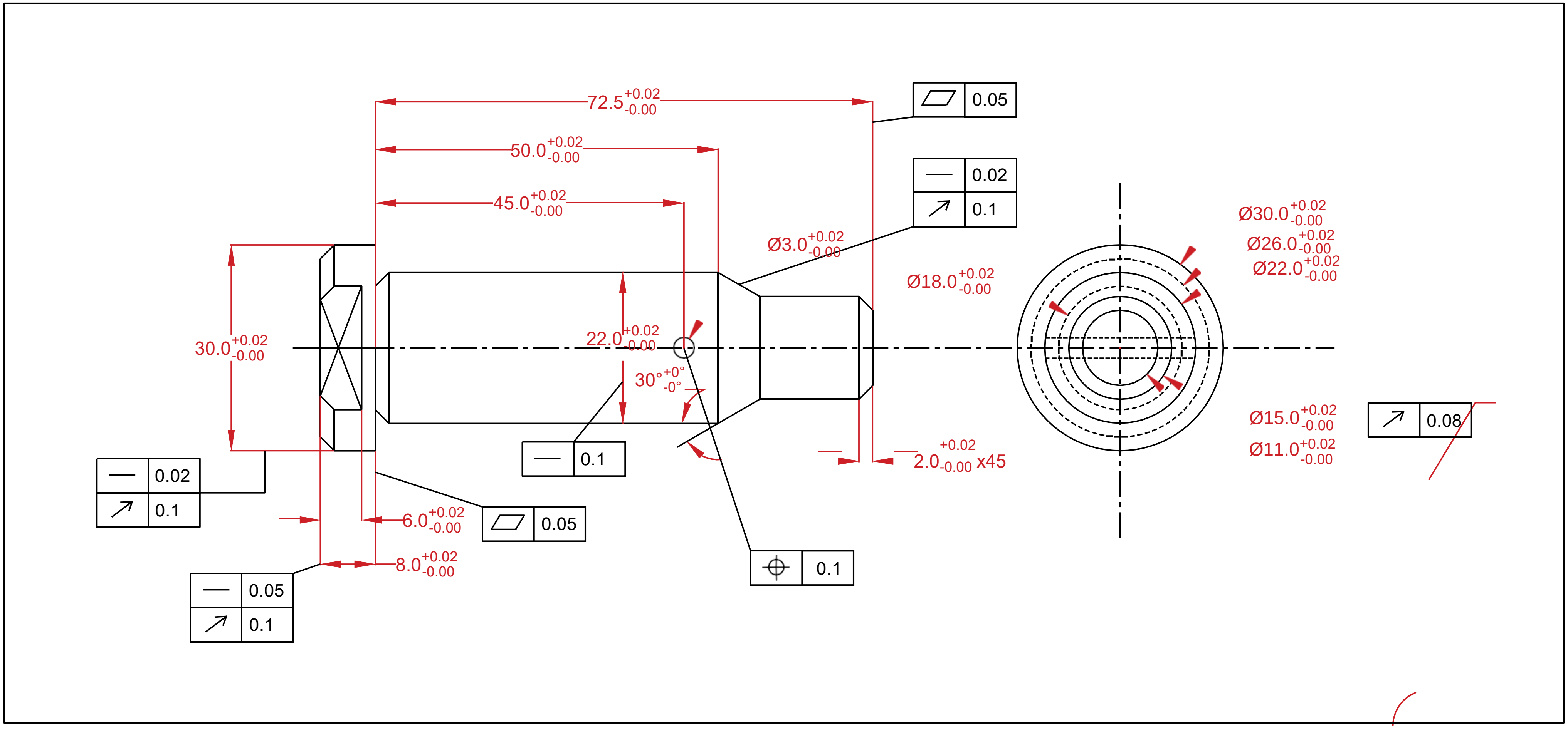

Knuckle Joint
Z
Y
X

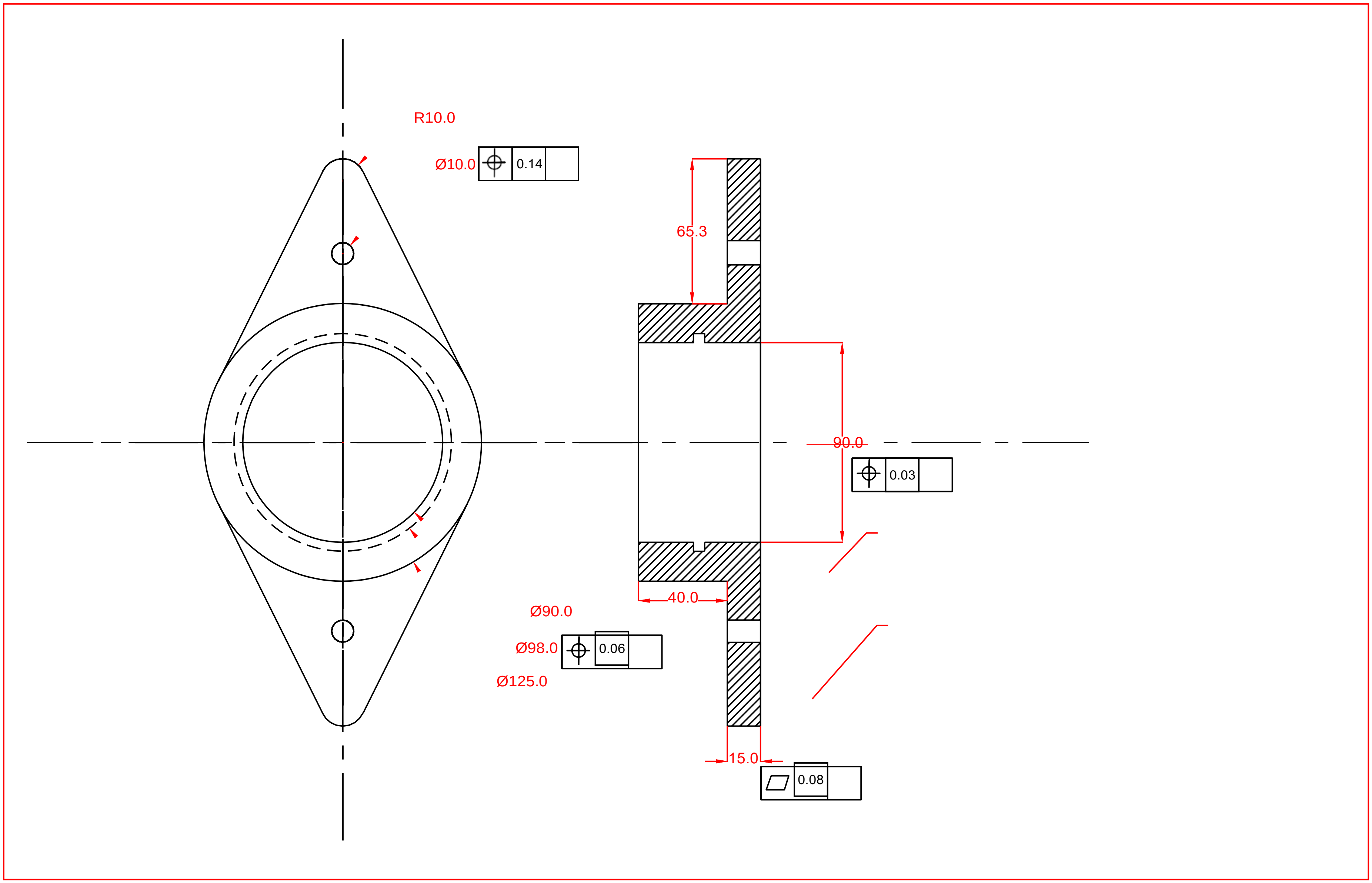


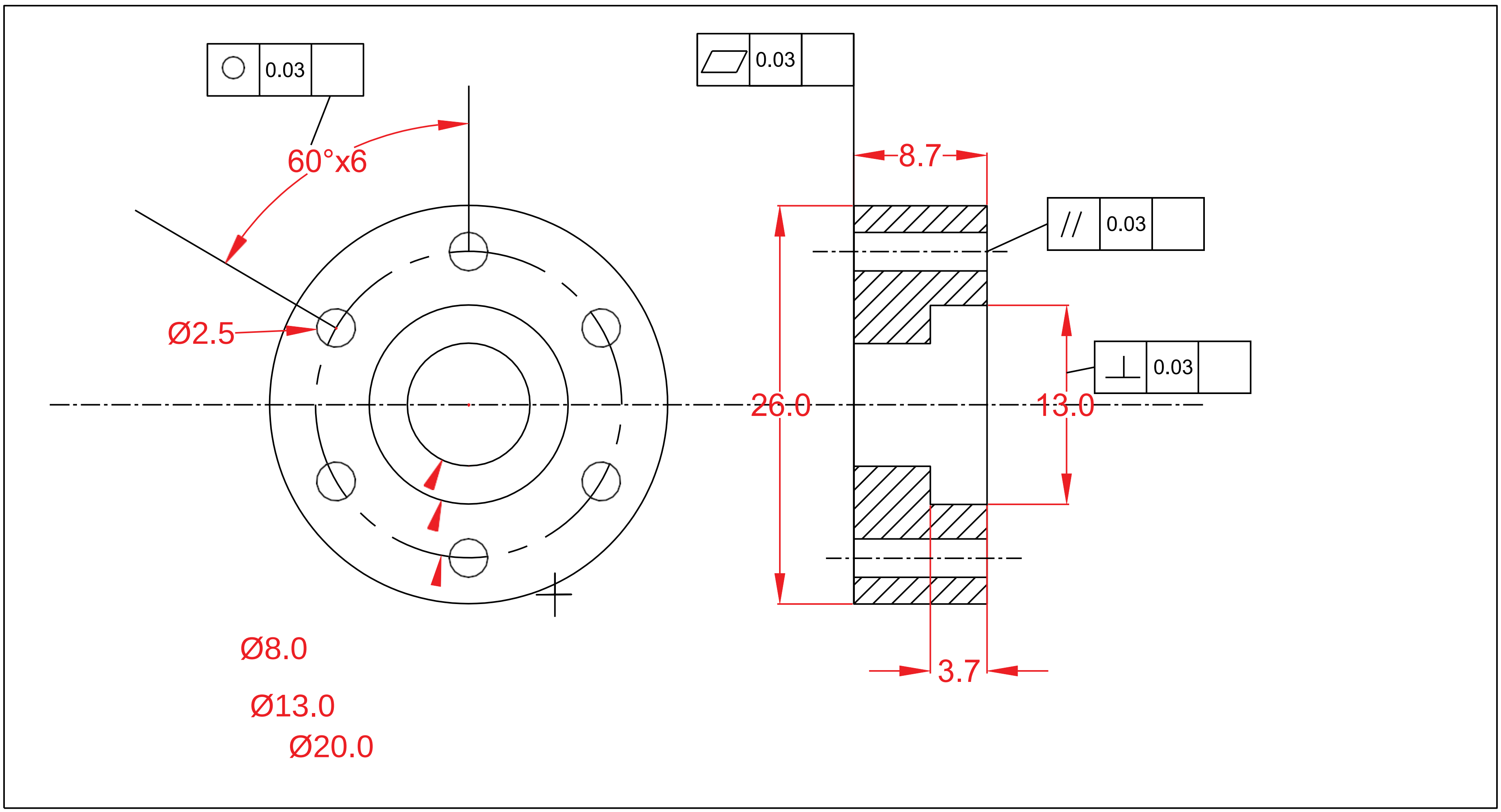
Knuckle Joint


Cotter Joint
Z
Y
X

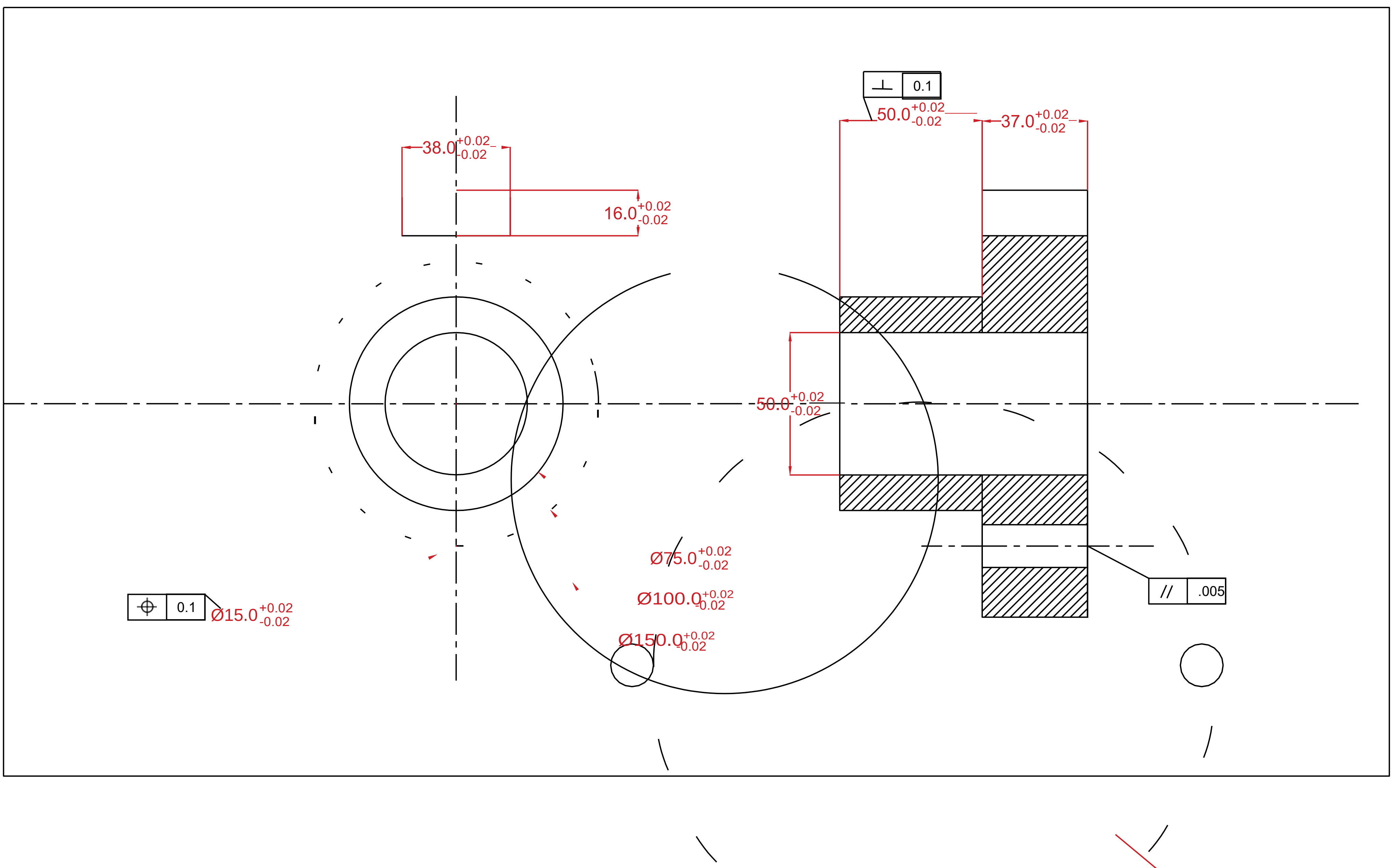

72
TAPER 1:30
36
26
20
30
50
8
80
Clearence 3mm
3
32
20
10
60
SECTION A-A
A
A
Socket & Spigot cotter joint
Diameter = 30mm.


72.5 +0.02 -0.00
50.0 +0.02 -0.00
45.0 +0.02 -0.00
0.05
0.02
0.1
Ø3.0 +0.02 -0.00
Ø18.0 +0.02 -0.00
Ø30.0 +0.02 -0.00
Ø26.0 +0.02 -0.00
Ø22.0 +0.02 -0.00
30.0 +0.02 -0.00
22.0 +0.02 -0.00
30° +0° -0°
2.0 +0.02 -0.00 x45
Ø15.0 +0.02 -0.00
Ø11.0 +0.02 -0.00
0.08
0.02
0.1
0.1
0.05
6.0 +0.02 -0.00
8.0 +0.02 -0.00
0.05
0.1
0.1

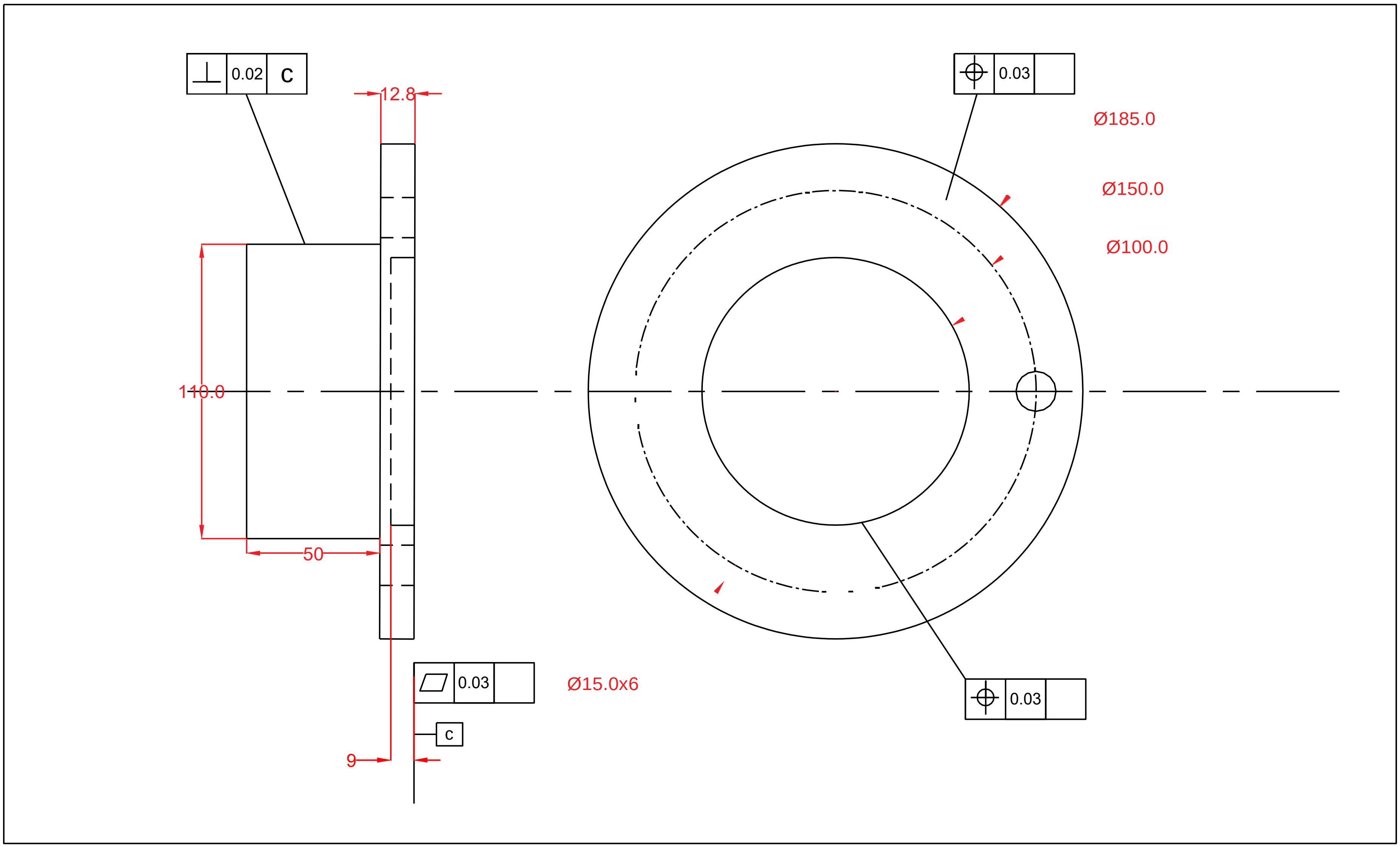

R10.0
Ø10.0
0.14
65.3
90.0
0.03
40.0
Ø90.0
Ø98.0
0.06
Ø125.0
15.0
0.08



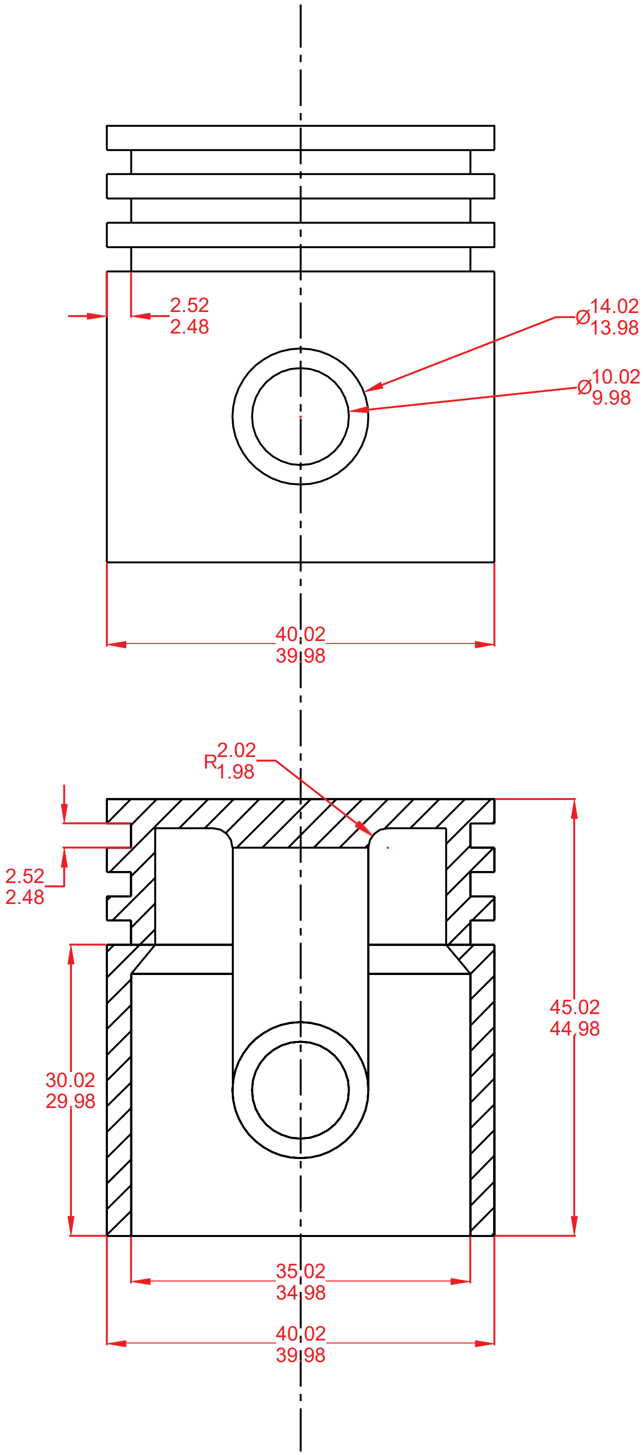
0.03
0.03
60°x6
8.7
0.03
Ø2.5
0.03
26.0
13.0
Ø8.0
3.7
Ø13.0
Ø20.0



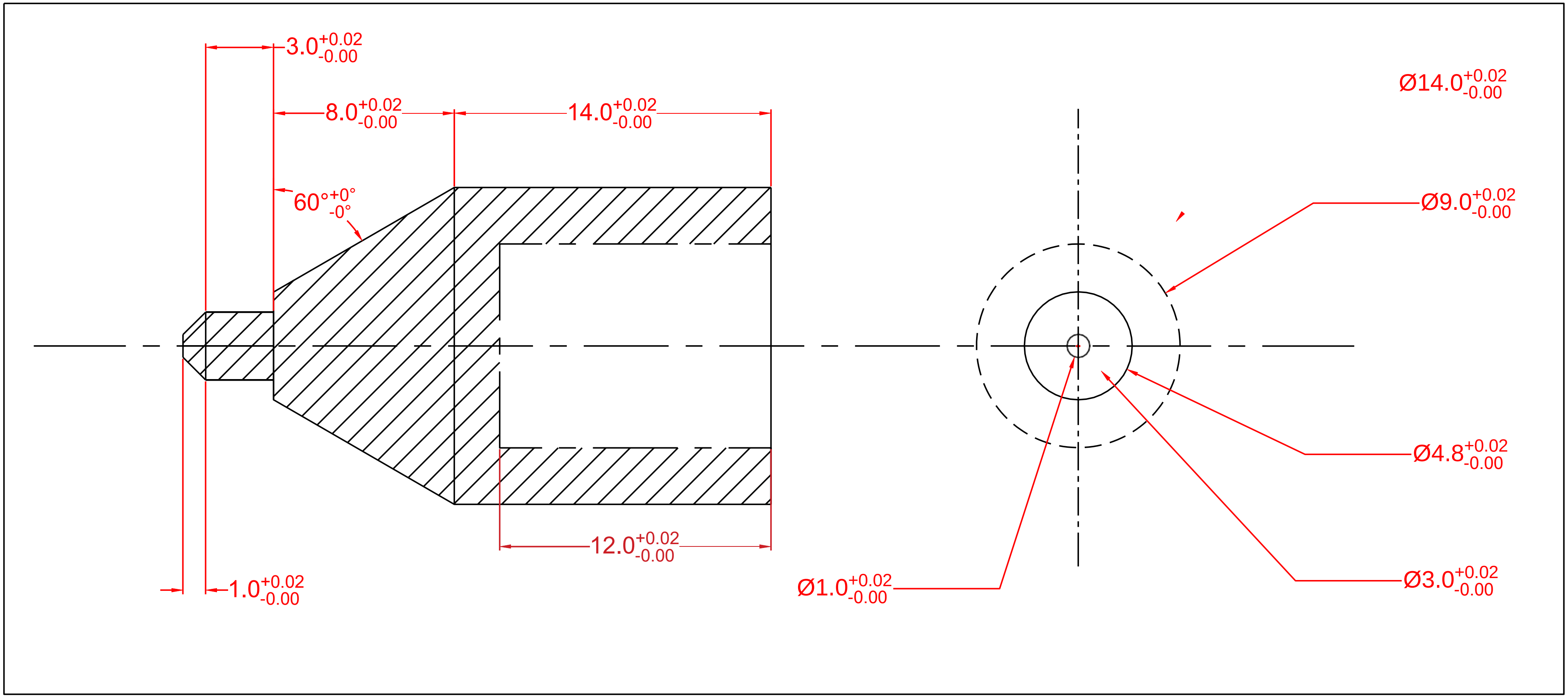
38.0 +0.02 -0.02
16.0 +0.02 -0.02
0.1
50.0 +0.02 -0.02
37.0 +0.02 -0.02
50.0 +0.02 -0.02
Ø75.0 +0.02 -0.02
Ø100.0 +0.02 -0.02
Ø150.0 +0.02 -0.02
0.1
Ø15.0 +0.02 -0.02
.005



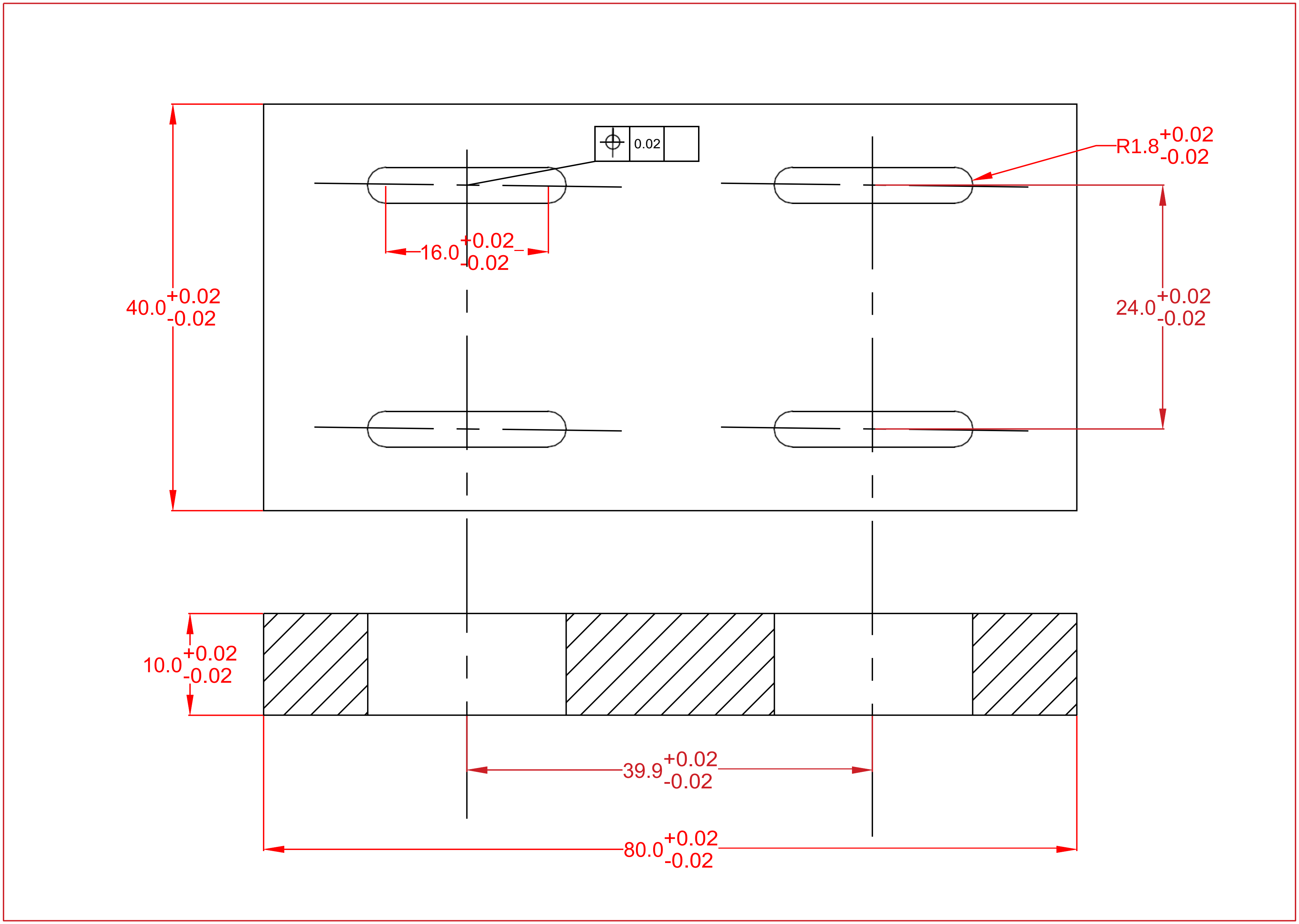
0.02
C
12.8
0.03
Ø185.0
Ø150.0
Ø100.0
110.0
50
0.03
Ø15.0x6
C
9
0.03



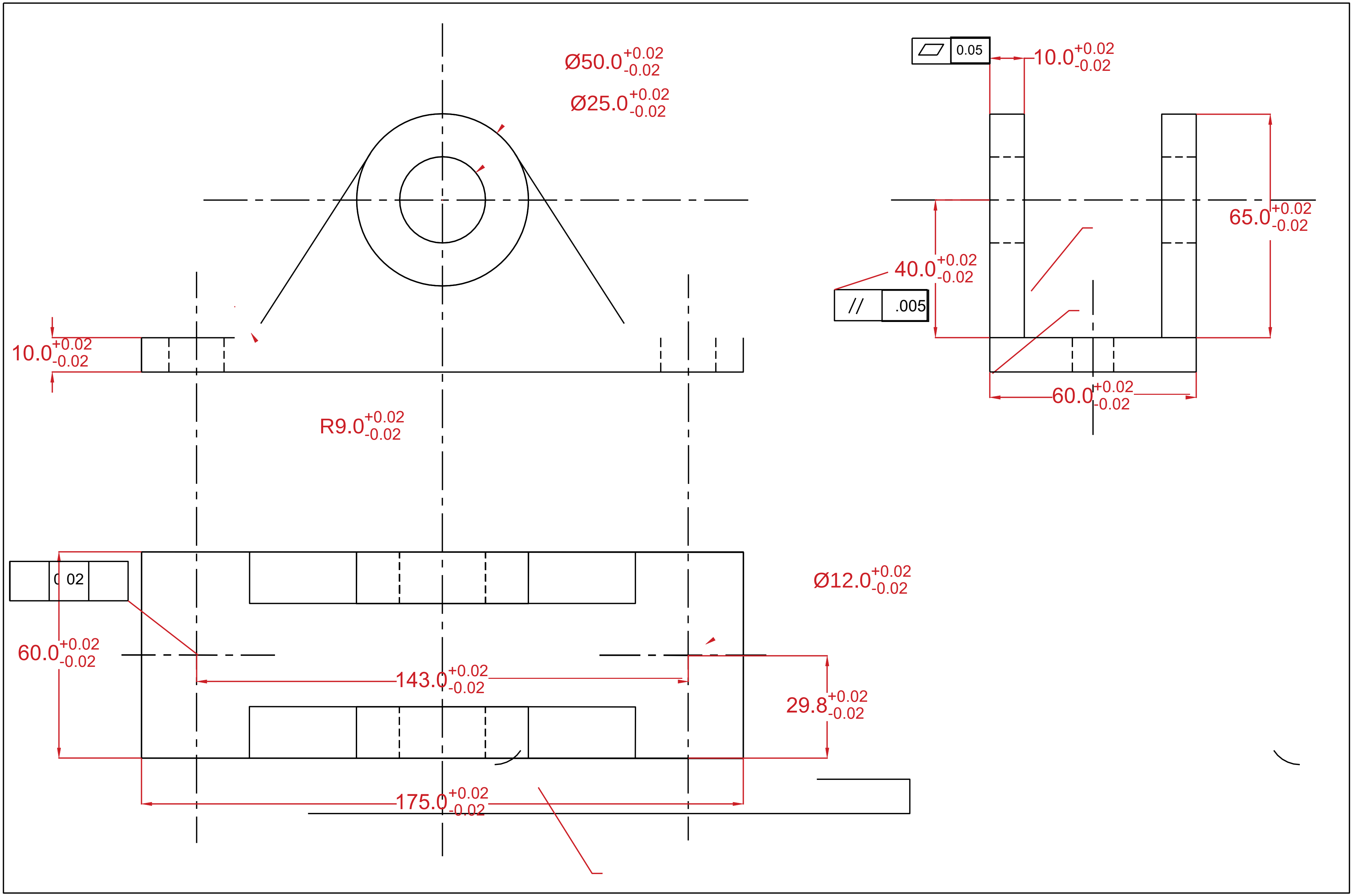
2.52
2.48
Ø14.02
13.98
Ø10.02
9.98
40.02
39.98
R2.02
1.98
2.52
2.48
45.02
44.98
30.02
29.98
35.02
34.98
40.02
39.98

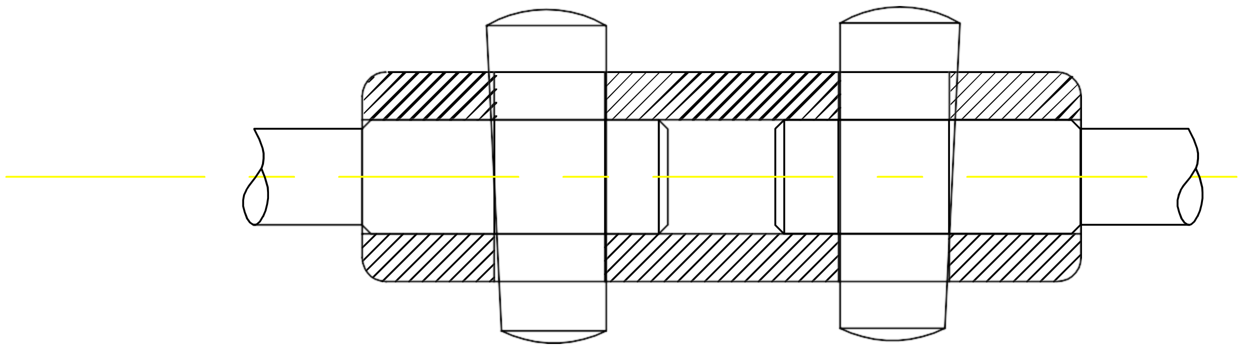


3.0 +0.02 -0.00
8.0 +0.02 -0.00
14.0 +0.02 -0.00
60° +0° -0°
12.0 +0.02 -0.00
1.0 +0.02 -0.00
Ø14.0 +0.02 -0.00
Ø9.0 +0.02 -0.00
Ø4.8 +0.02 -0.00
Ø3.0 +0.02 -0.00
Ø1.0 +0.02 -0.00

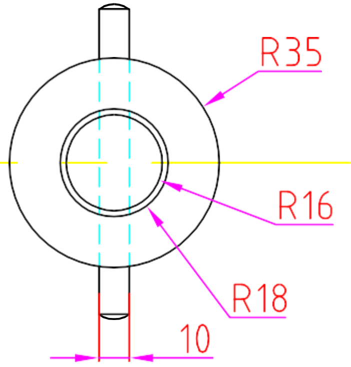


0.02
R1.8 +0.02 -0.02
16.0 +0.02 -0.02
40.0 +0.02 -0.02
24.0 +0.02 -0.02
10.0 +0.02 -0.02
39.9 +0.02 -0.02
80.0 +0.02 -0.02

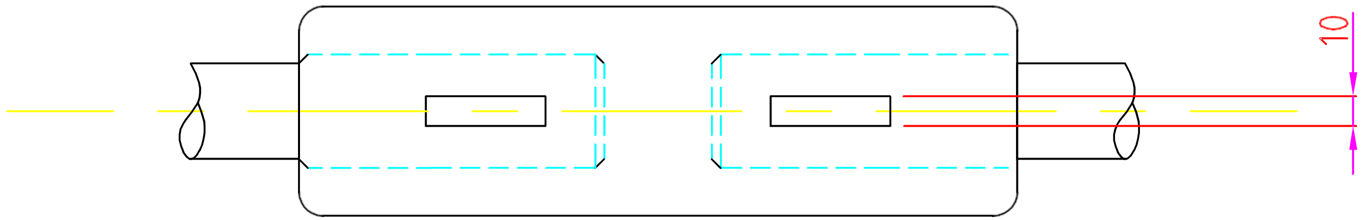

Ø50.0 +0.02 -0.02
Ø25.0 +0.02 -0.02
0.05
10.0 +0.02 -0.02
65.0 +0.02 -0.02
40.0 +0.02 -0.02
.005
10.0 +0.02 -0.02
60.0 +0.02 -0.02
R9.0 +0.02 -0.02
Ø12.0 +0.02 -0.02
02
60.0 +0.02 -0.02
143.0 +0.02 -0.02
29.8 +0.02 -0.02
175.0 +0.02 -0.02



FULL SECTION FRONT VIEW

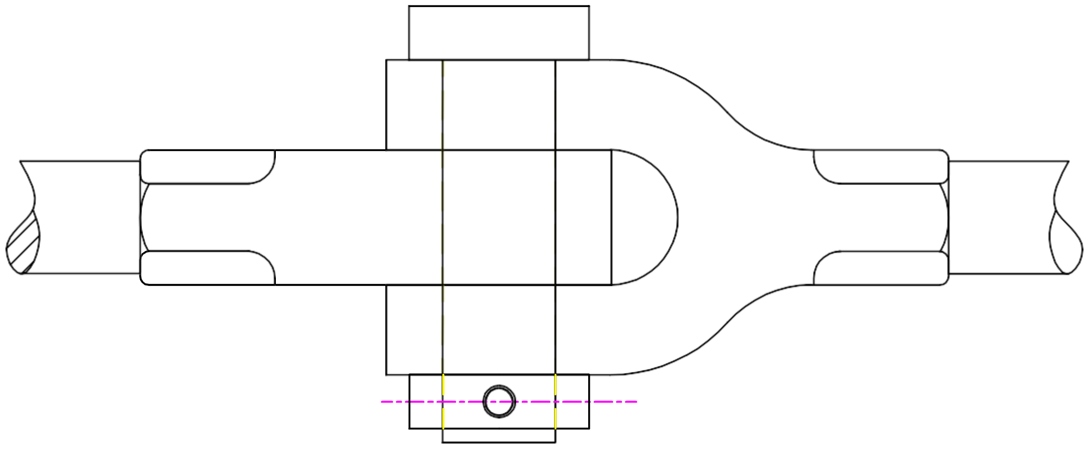


SIDE VIEW

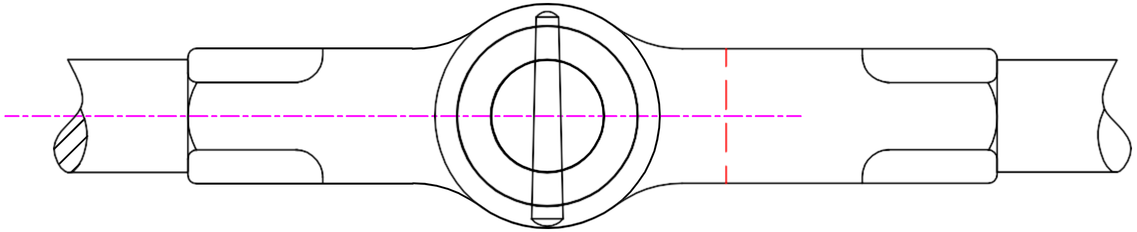


TOP VIEW

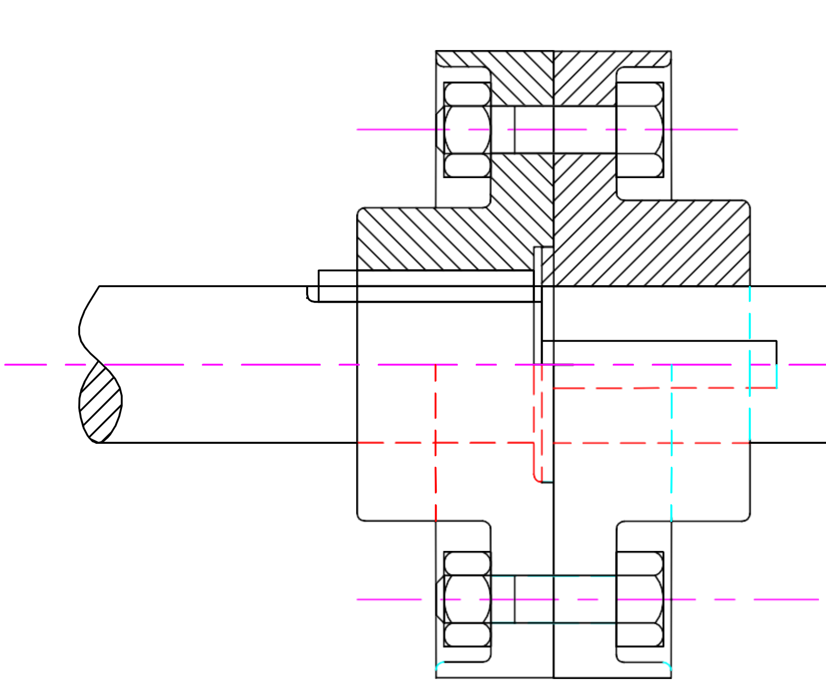
ASSEMBLY OF SLEEVE AND COTTER JOINT IN FIRST ANGLE PROJECTION SYSTEM



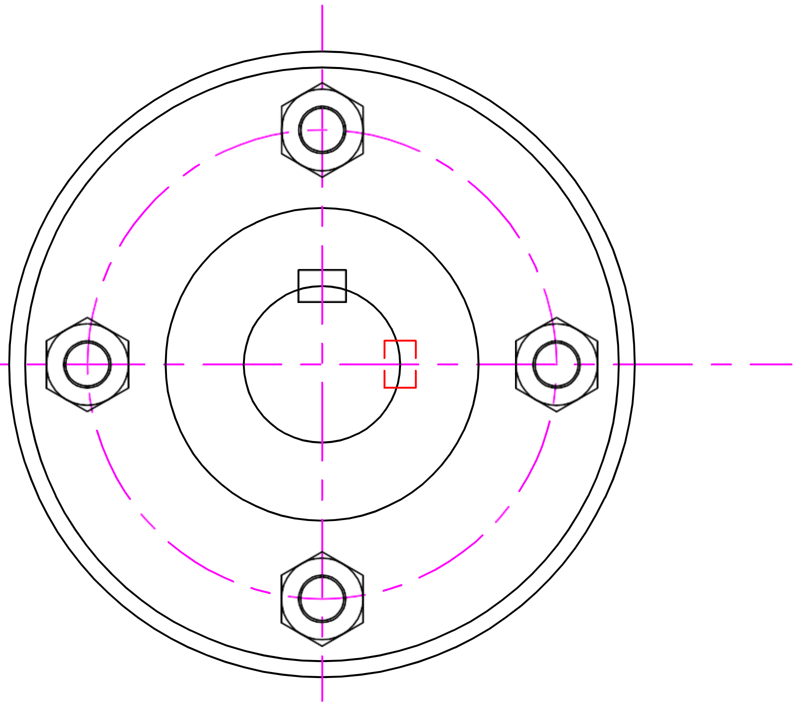
FRONT VIEW



TOP VIEW

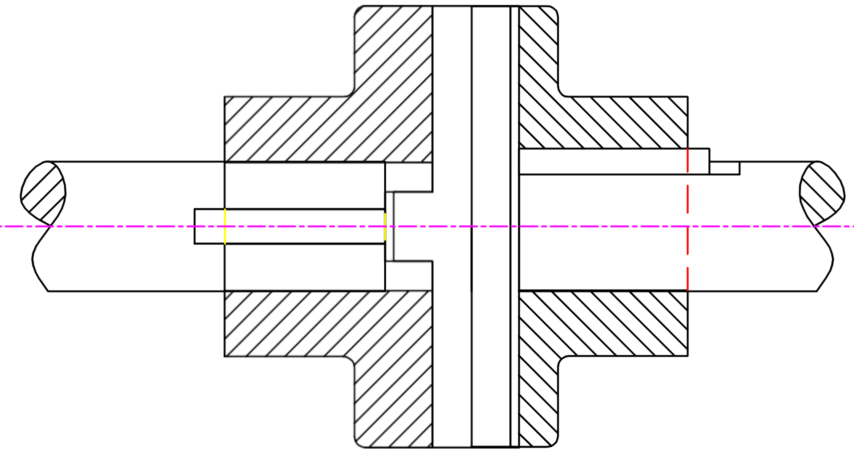


HALF SECTIONAL FRONT VIEW

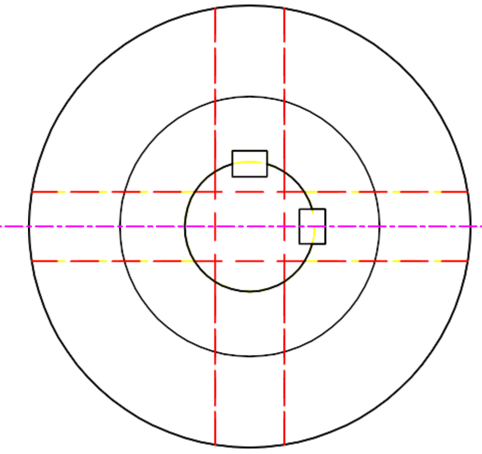


LEFT HAND SIDE VIEW

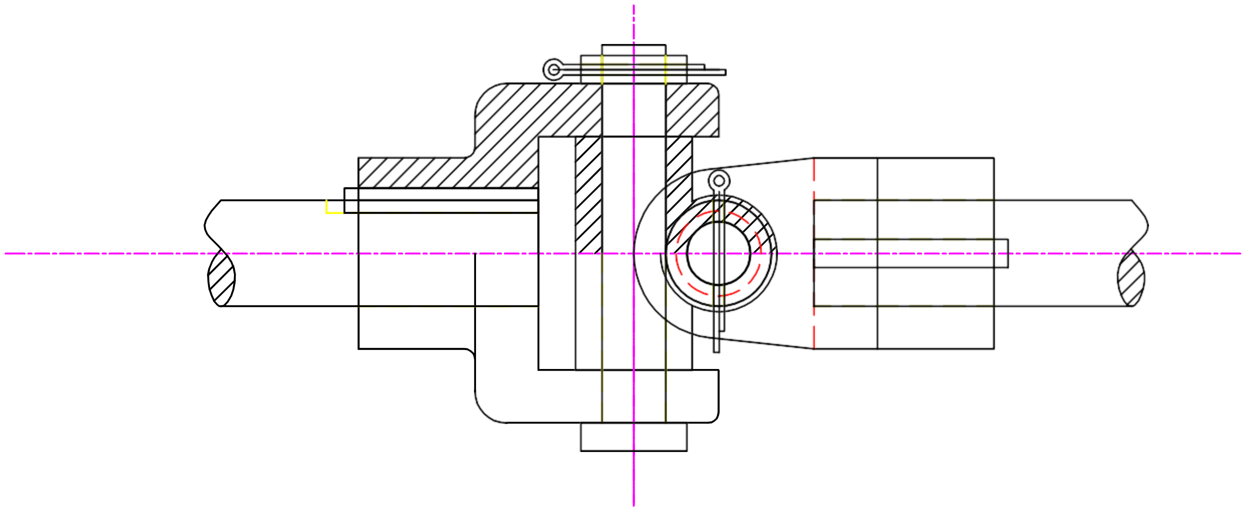
ASSEMBLY DRAWING OF PROTECTED TYPE FLANGE COUPLING



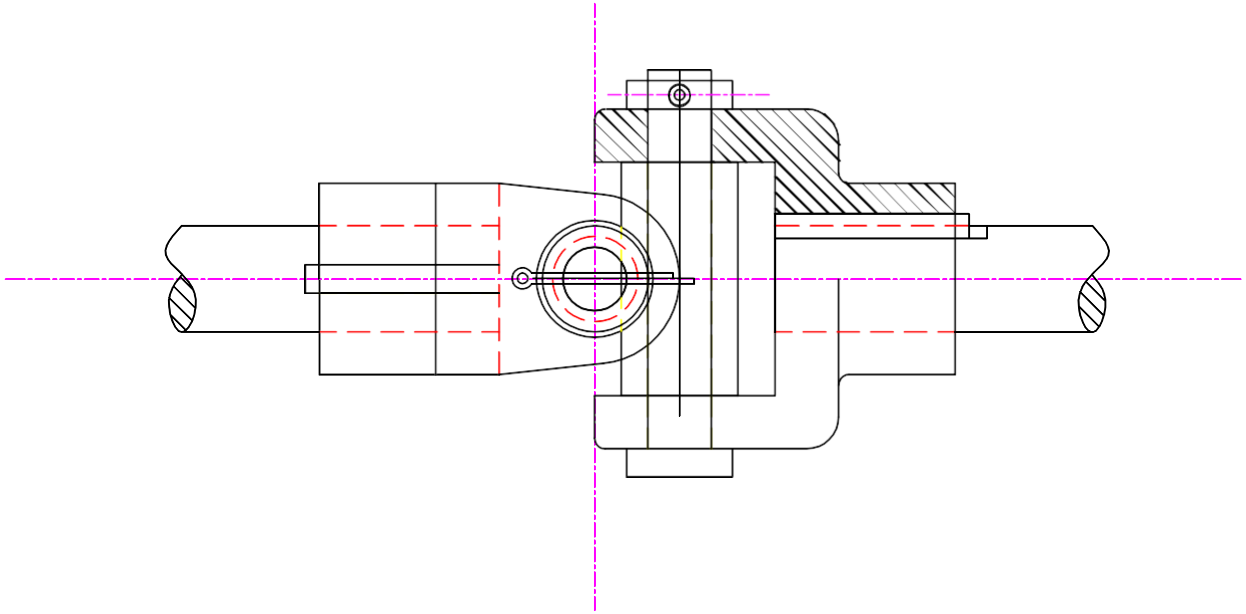
Full Section front view



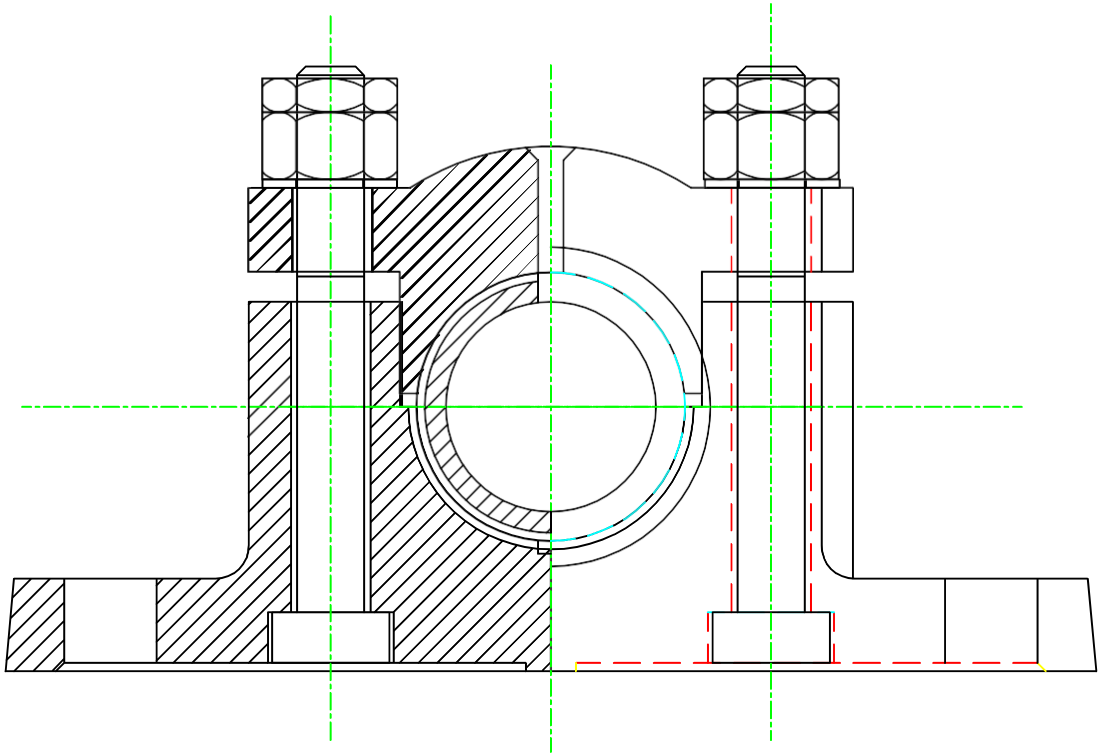
Side view



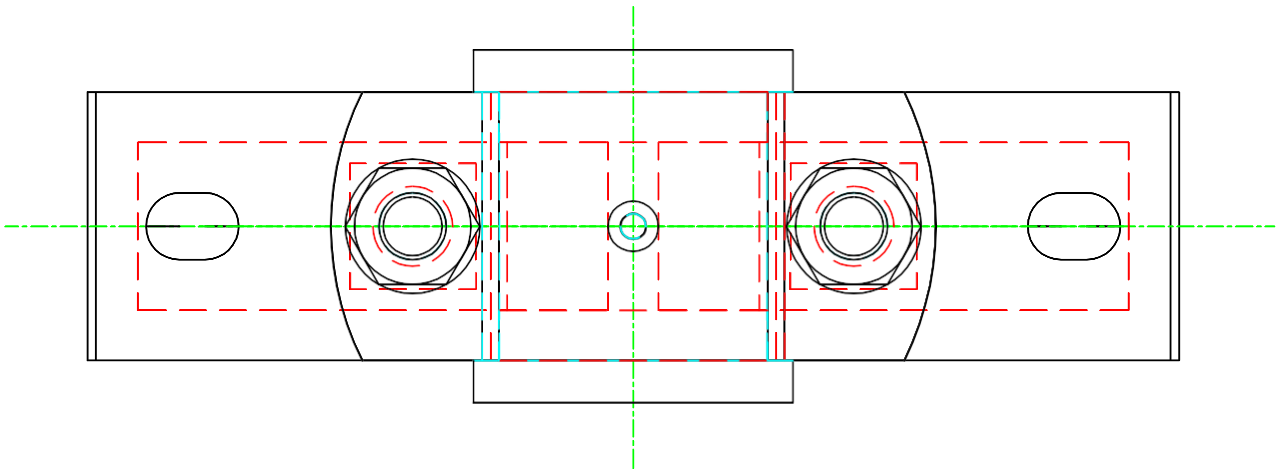
FRONT VIEW



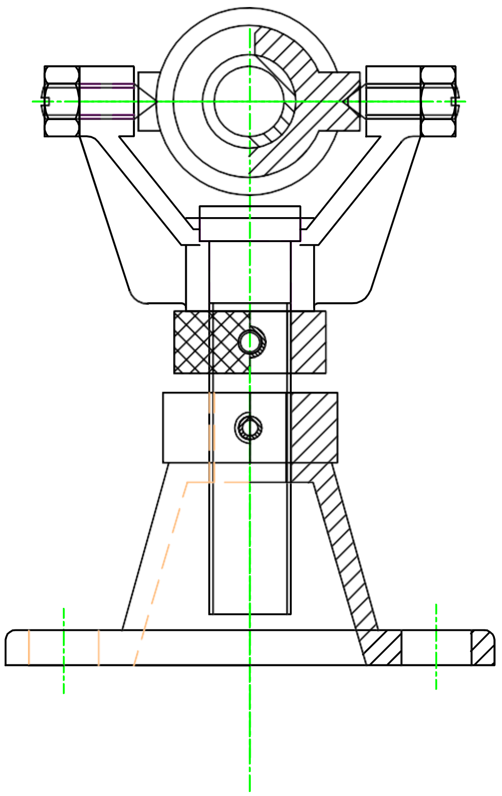
TOP VIEW



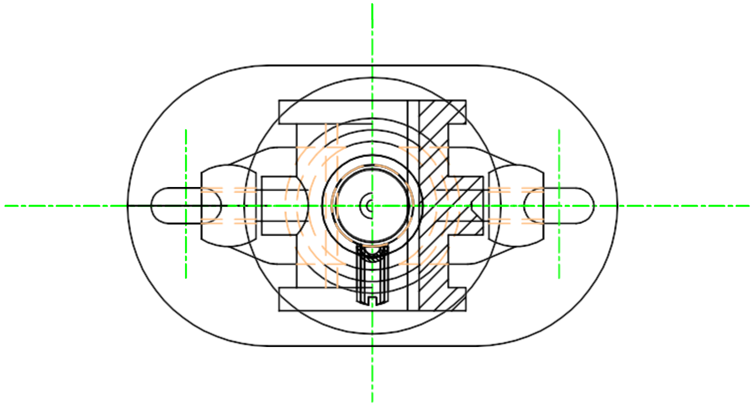
Half Section Front View



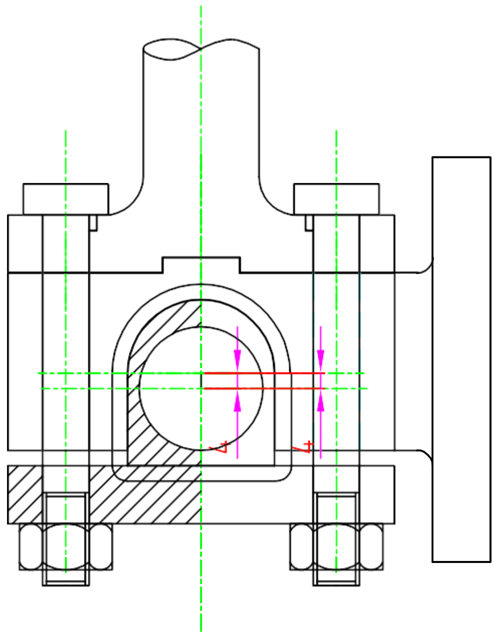
Top View



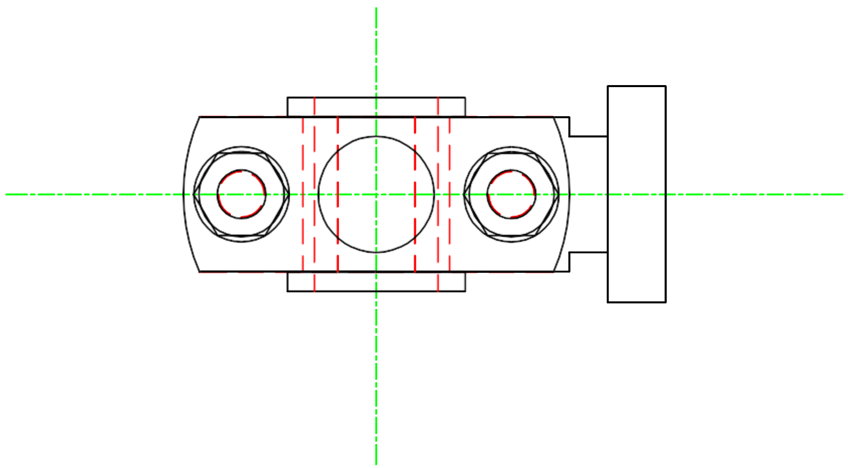
Half section front view



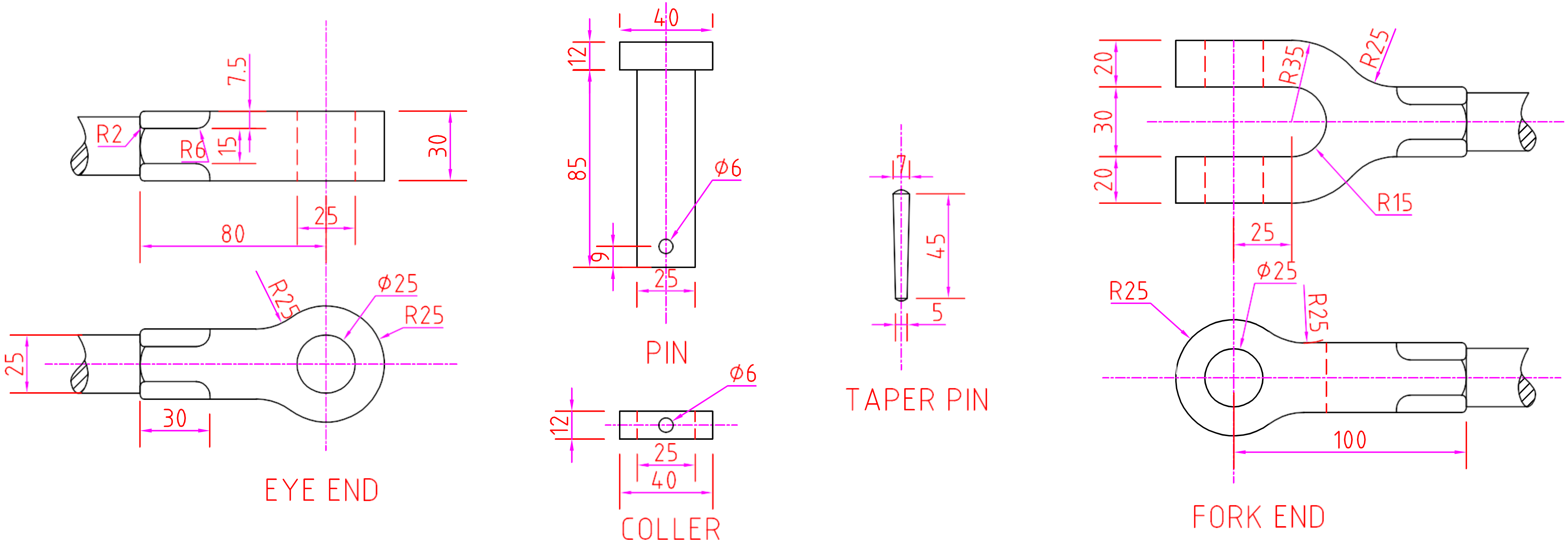
Top view



FRONT VIEW

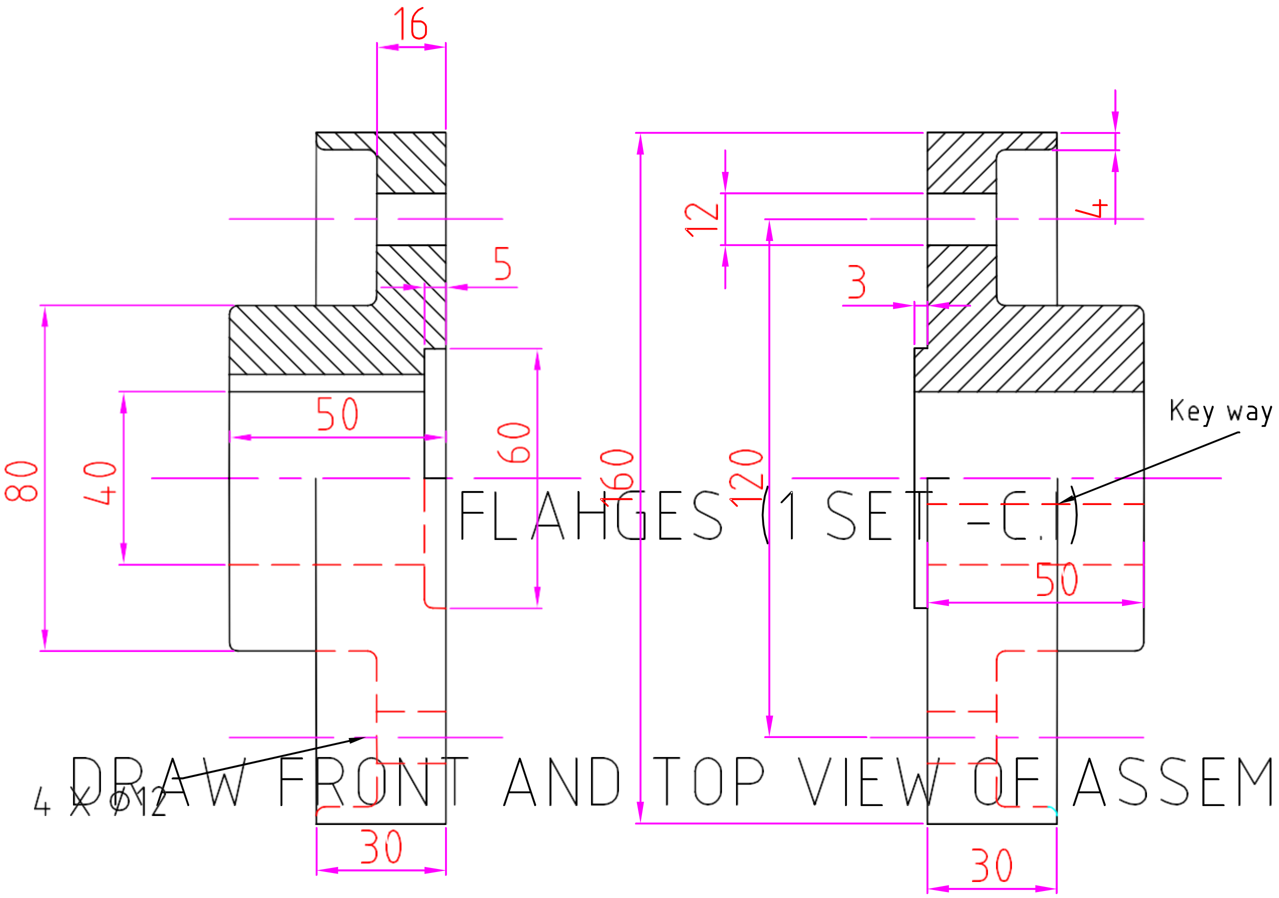


TOP VIEW



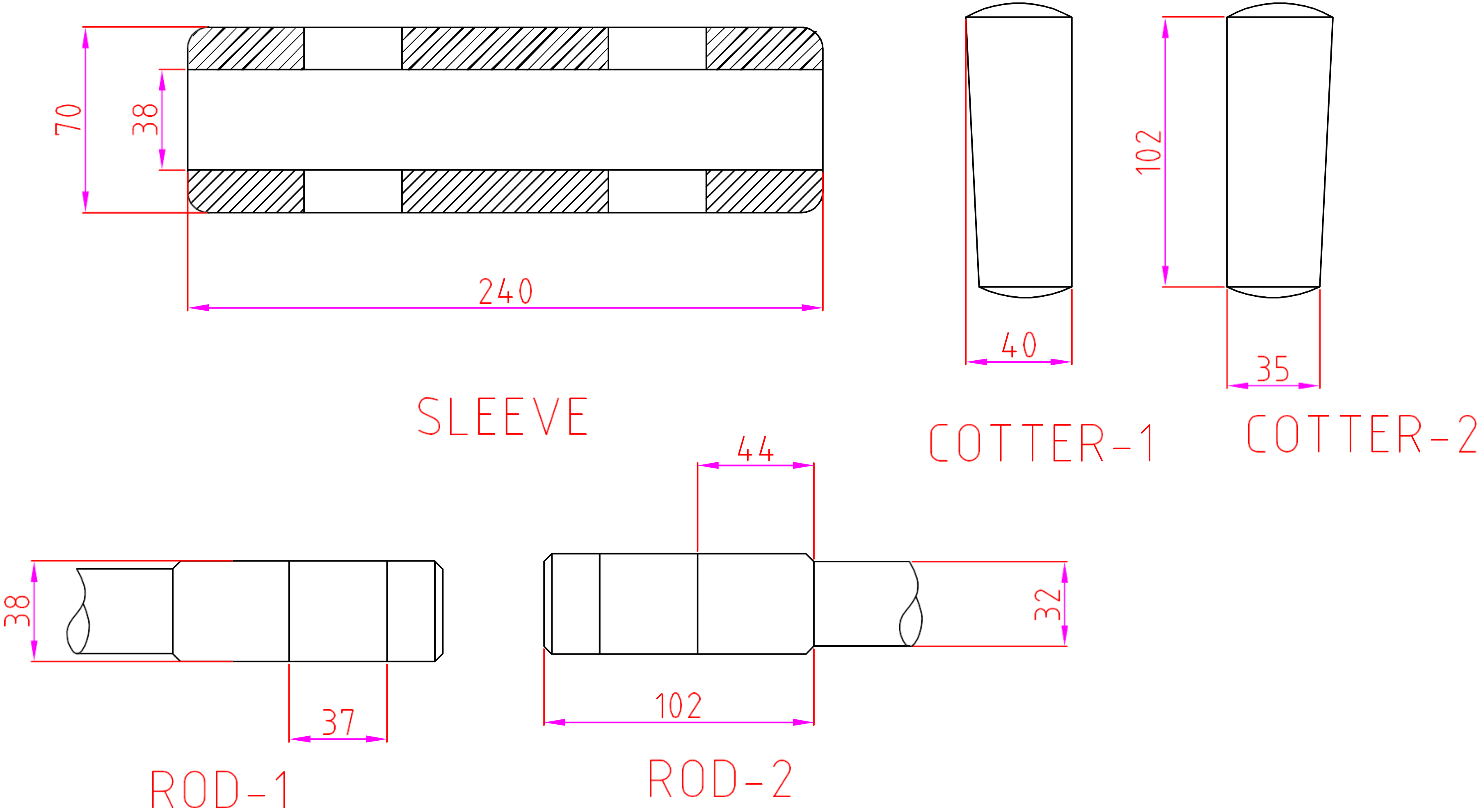
DRAW THE ASSEMBLED FRONT VIEW AND TOP VIEW OF GIVEN JOINT

12D wide



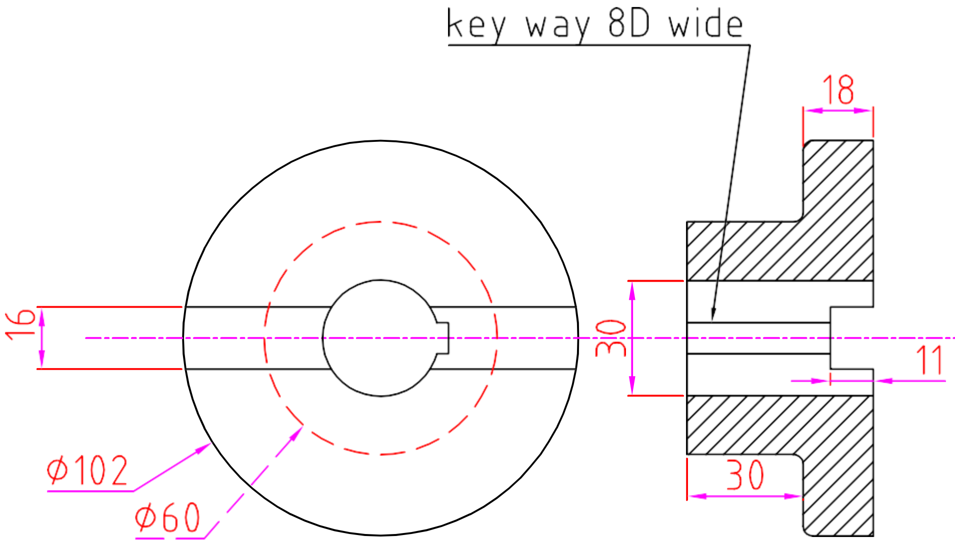
SHAFT END (2 NOS-STEEL)

DRAW FRONT AND TOP VIEW OF ASSEMBLY OF GIVEN COUPLING

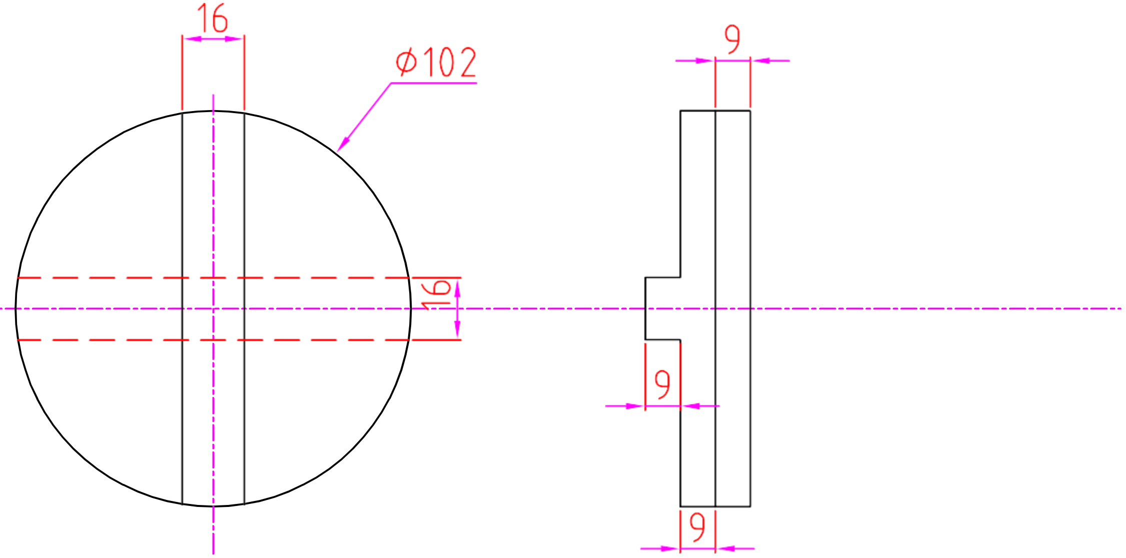


PARTS DETAIL OF SLEEVE AND COTTER JOINT

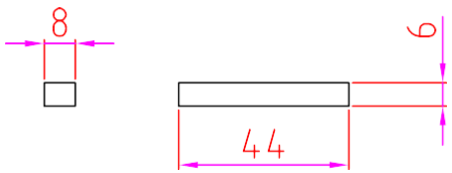
DRAW ASSEMBLED FULL SECTIONAL FRONT VIEW, SIDE VIEW AND TOP VIEW OF THE GIVEN JOINT



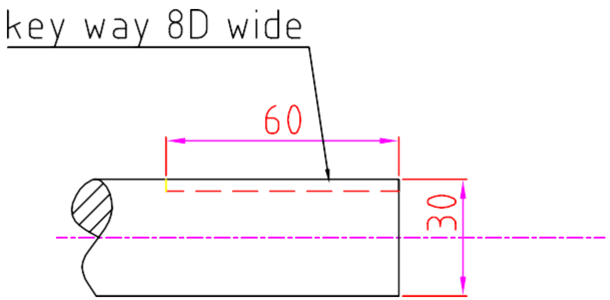
FLANGE (2 NOS STEEL)



DISC (1 NO STEEL)

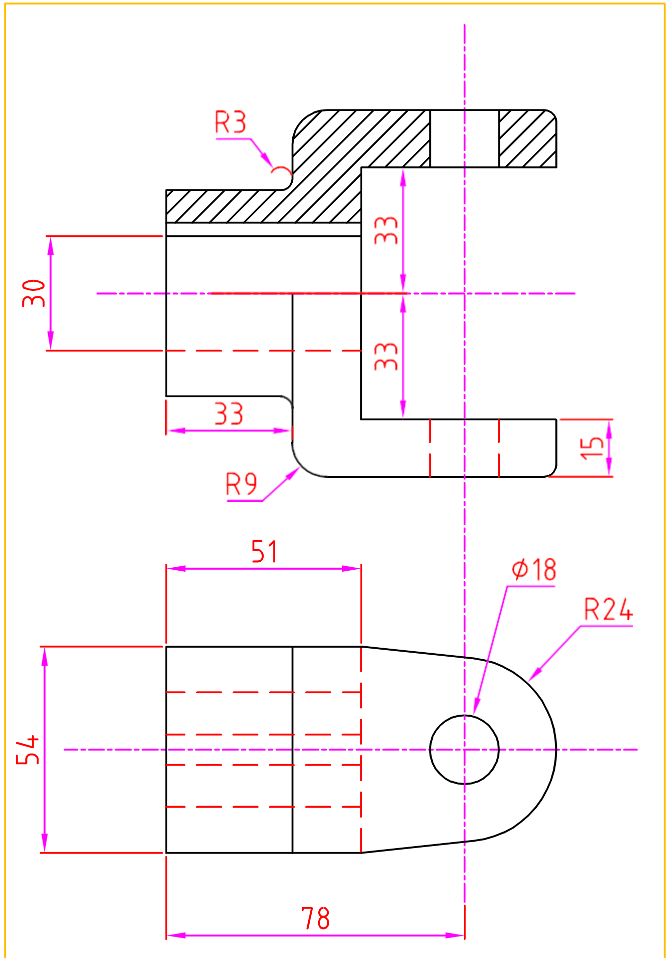


KEY (2 NOS STEEL)

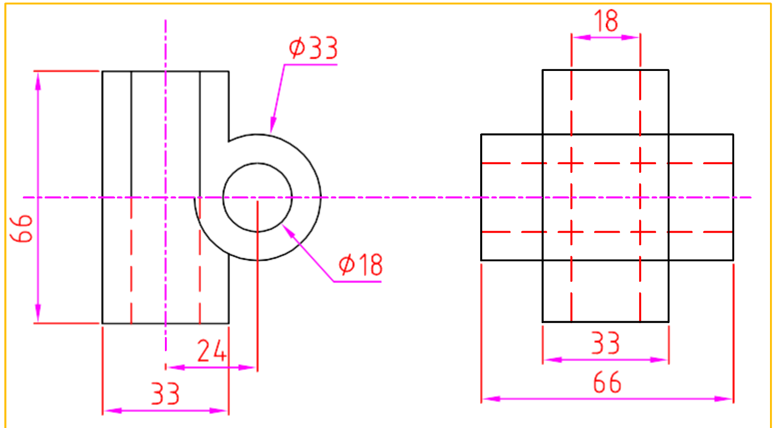


SHAFT END (2 NO STEEL)

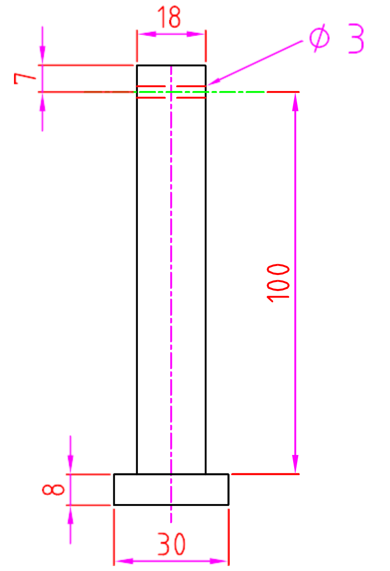
DR\RAW FULL SECTION FRONT VIEW AND SIDE VIEW OF GIVEN COUPLING



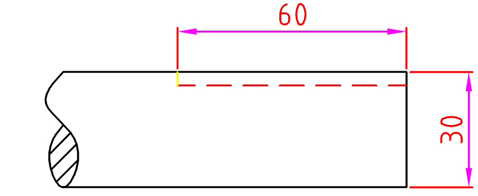
FORK (2 no. STEEL)



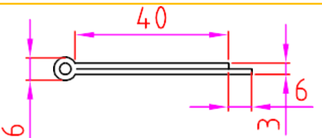
CENTRE BLOCK (1 no. STEEL)



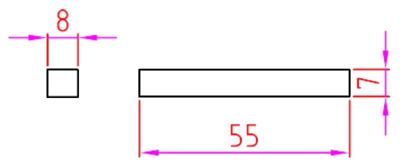
PIN (2 no. MS)



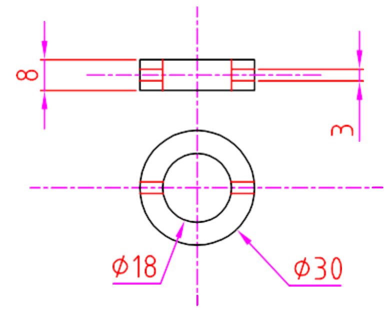
SHAFT END (2 no. STEEL)



SPLIT PIN (2 no. MS)

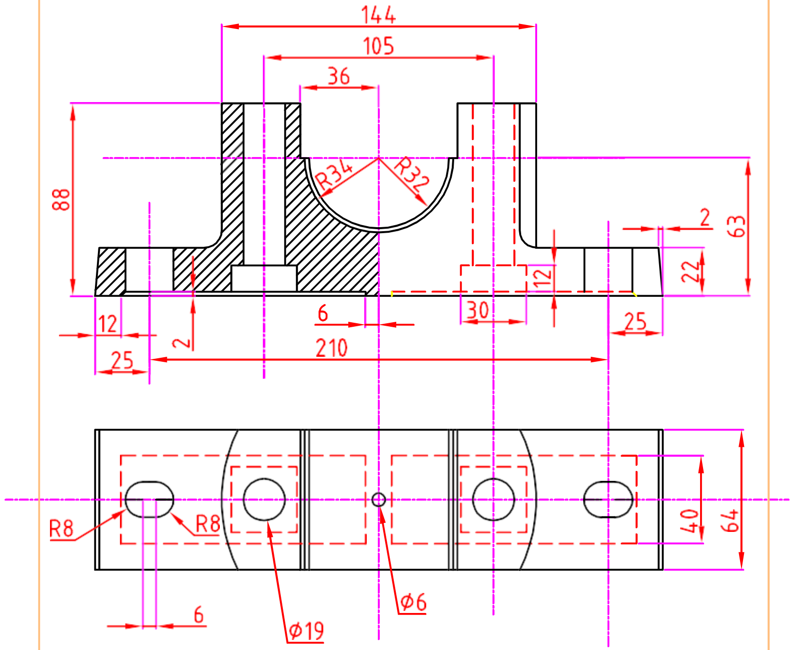


KEY (2 no. STEEL)

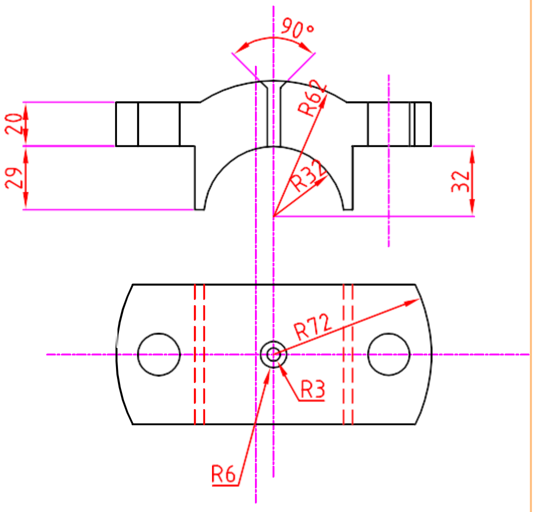


COLLER (2 no. MS)

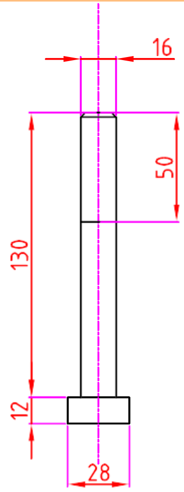
DRAW FRONT AND TOP VIEW OF GIVEN JOINT



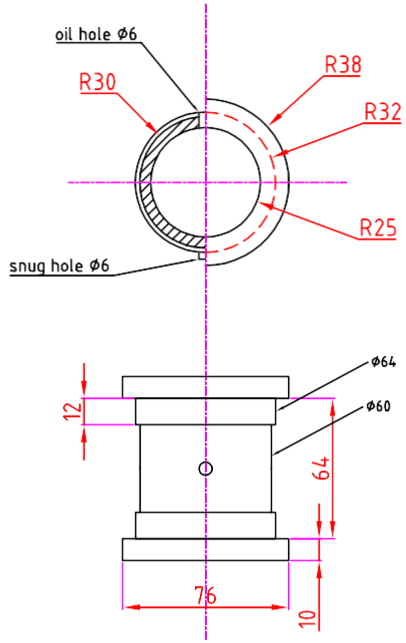
BASE 01 CI



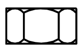
CAP 01 CI



BOLT 02 MS

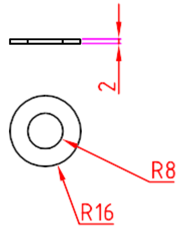


BRASSES 01 set Gunmetal



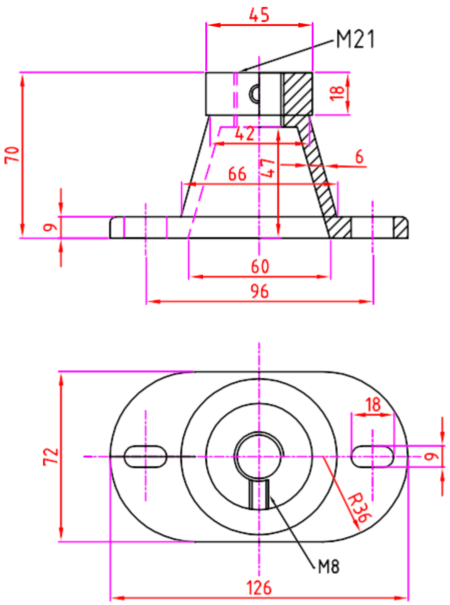
NUT 02 MS

LOCK NUT 02 MS

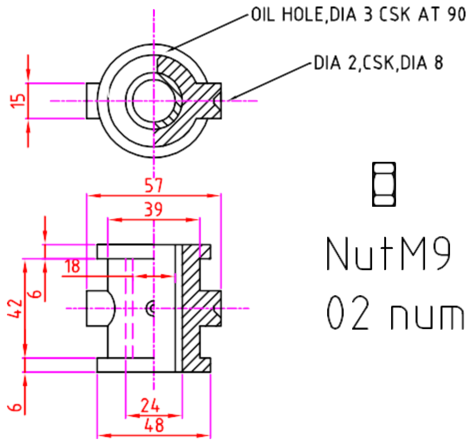


WASHER 02 MS

DRAW ASSEMBLED HALF SECTIONAL FRONT AND TOP VIEW OF GIVEN BEARING

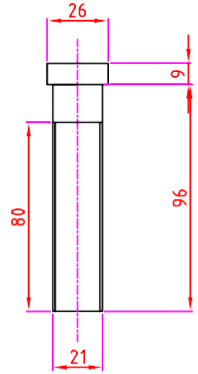


Body 01 num.

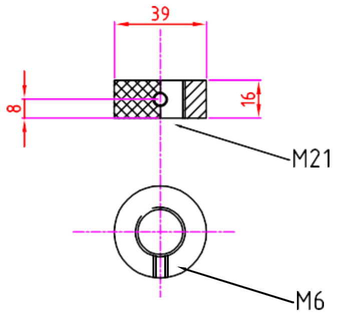


Nut M9
02 num.

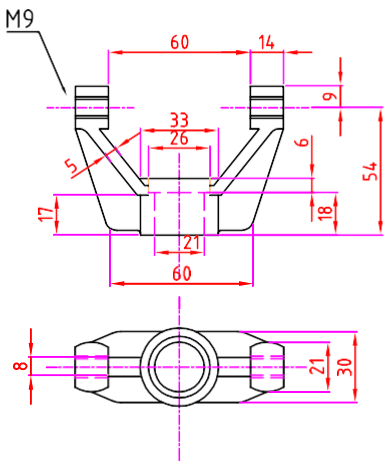
Bearing with Bush 01 num.



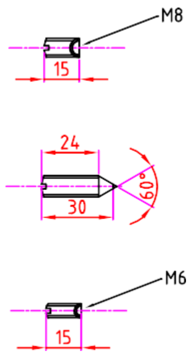
Spindle 01 num.



Lock Nut 01 num.



Fork 01 num.



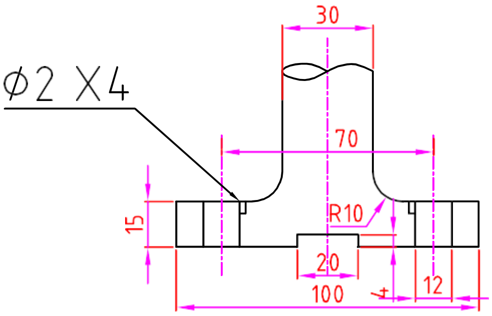
01 num.

02num.

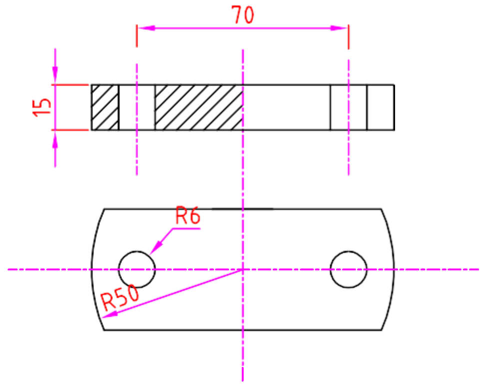
01 num.

Set Screws
(M8,M9,M6)

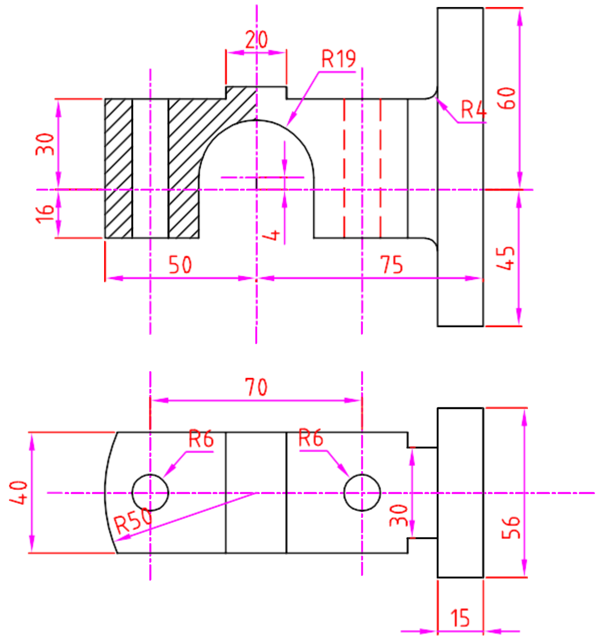
Draw its half section front view and top view



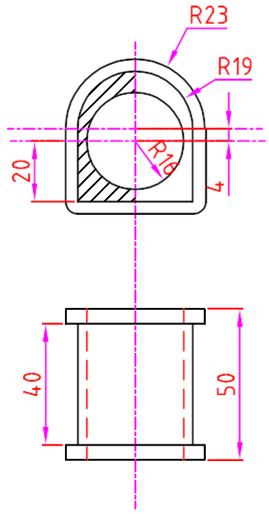
rod end (01 no)



cover plate (01 no)



body (01 no)



brasses (01 no)

DRAW FRONT AND TOP VIEW OF ASSEMB

QUIZ

1. The first step in creating a traditional technical drawing is to ________.
(A) Draw a series of guide lines
(B) Set up the meter line
(C) Align the paper so that it will be positioned square to the parallel bar
(D) Sharpen the leads in the technical pens

2. The primary unit of measurement for engineering drawings and design in the mechanical industries is the:
(A) Millimeter
(B) Centimeter
(C) Meter
(D) Kilometer

3. Traditional drafters need to be able to create several different line widths because ________.
(A) Different line widths convey different information
(B) The line width has to do with how dark it appear in the finished drawing
(C) They seem to transmit better in a fax machine
(D) It makes no difference

4. The bounding box method for setting up an isometric drawing helps the drafter ________.
(A) Confine the isometric drawing to its maximum size
(B) Figure what lines are to be illustrated vertical and horizontal
(C) Position the isometric drawing in paper space
(D) None of the above

5. In working drawings, these show all necessary information not given directly on the drawing with its dimensions and notes:
(A) Document strips
(B) Portable documents
(C) Formatting forms
(D) Title and record strips

6. A fillet is a rounded surface on the ________ corner of a part.
(A) Inside
(B) Outside
(C) Radial
(D) Isoplane

7. Inserting blocks into a drawing file usually requires exacting placement. The drafter should insure that ________ is turned on. (in Auto CAD)
(A) O Snaps
(B) Ortho
(C) Grid
(D) Dynamic Input

8. Drawings created with commercial software are typically saved as:
(A) Rapid prototypes
(B) Electronic files

(C) Draft drawings
(D) Change orders

9. Which of the following is one of the basic types of welded joints:
(A) T-joint
(B) Rear joint
(C) Angle joint
(D) Groove joint

10. A circular arc is dimensioned in the view where you see its true shape by giving the value for its:
(A) Diameter
(B) Arc length
(C) Radius
(D) Chord length

11. Technical drawings typically serve one of three purposes:
(A) Visualization, Communication, or Documentation
(B) Visualization, Dimensioning, or Documentation
(C) Communication, Documentation, or Installation
(D) Documentation, Installation, or Engineering

12. This allows the designer to conceptualize objects more easily without having to make costly illustrations, models, or prototypes:
(A) Computer-aided manufacturing
(B) Computer-aided design
(C) Computer-aided engineering
(D) Computer-aided prototyping

13. Welding drawings are a special type of this kind of drawing:
(A) Symbol
(B) Perspective
(C) Assembly
(D) Isometric

14. This is a common method for connecting steel members of buildings and bridges:
(A) Assembly
(B) Fabricating
(C) Riveting
(D) Welding

15. The principle views associated with orthographic projection are ________.
(A) Front view
(B) Right side view
(C) Top view
(D) All of the above

16. his is formed where three or more surfaces intersect:
(A) Oblique
(B) Line

(C) Edge
(D) Vertex

17. This line pattern is composed of three dashes, one long dash on each end with a short dash in the middle:
(A) Object
(B) Hidden
(C) Center
(D) Phantom

18. This is a thin solid line directing attention to a note or dimension and starting with an arrowhead or dot:
(A) Dimension line
(B) Extension line
(C) Leader
(D) Specification

19. The ________ dimension tool will place the length of an angled line.
(A) Aligned
(B) Angle
(C) Linear
(D) Radial

20. This is the plane upon which the top view is projected:
(A) Horizontal
(B) Frontal
(C) Profile
(D) Base

21. The object we see in our surrounding usually without drawing came under which projection?
a) Perspective projection
b) Oblique projection
c) Isometric projection
d) Orthographic projection

22. In orthographic projection, each projection view represents how many dimensions of an object?
a) 1
b) 2
c) 3
d) 0

23. In orthographic projection an object is represented by two or three views on different planes which __________________
a) gives views from different angles from different directions
b) are mutually perpendicular projection planes
c) are parallel along one direction but at different cross-section
d) are obtained by taking prints from 2 or 3 sides of object

24. The hidden parts inside or back side of object while represented in orthographic projection are represented by which line?
a) Continuous thick line
b) Continuous thin line
c) Dashed thin line
d) Long-break line

25. In perspective projection and oblique projection, the projectors are not parallel to each other.
a) True
b) False

26. The front view of an object is shown on which plane?
a) Profile plane
b) Vertical plane
c) Horizontal plane
d) Parallel plane

27. The commands Erase, Copy, Mirror, Trim, Extend, Break etc belongs to which tool bar?
a) Layer tool bar
b) Style tool bar
c) Modify tool bar
d) Draw tool bar

28. The commands Donut, Block, Spline, Polygon, and Arc etc belong to which tool bar?
a) Layer tool bar
b) Style tool bar
c) Modify tool bar
d) Draw tool bar

29. The command which works on two lines or a single poly line to create a beveled edge is __________
a) Chamfer
b) Fillet
c) Stretch
d) Extend

30. The command which is used to create a round corner between two lines is __________
a) Chamfer
b) Fillet
c) Stretch
d) Extend

31. The command 'break' is used for ____________________
a) erases a portion of line, arc, circle or a 2D poly line between two selected points
b) reverses the effects of a series of previously used commands
c) breaking a poly line into individual segments
d) editing of poly line properties

32. The command 'Explode' is used for _________________________

a) erases a portion of line, arc, circle or a 2D poly line between two selected points
b) reverses the effects of a series of previously used commands
c) breaking a poly line into individual segments
d) editing of poly line properties

33.The command which is used to set a new coordinate system by shifting the working XY plane to be the desired location is?
a) 3DFACE
b) VPOINT
c) UCS
d) ELEV

34. The command which identifies the points on drawing entities that are visible on screen is ________ and this option allows the user to pick-up the points very accurately with respect to drawing displayed.
a) OSNAP
b) TABSURF
c) SNAP
d) GRID

35. .The command which is used to set elevation and thickness properties for 2D wireframe objects such as line, point, circle, polygon, arc is ____________
a) 3DFACE
b) VPOINT
c) UCS
d) ELEV

SOLUTION
1.c, 2.a, 3.a, 4.a, 5.d, 6.a, 7.a, 8.b, 9.a, 10.c, 11.a, 12.b, 13.c, 14.d, 15.d, , 16.d, 17.c, 18.c, 19.a, 20.a, 21.a, 22.b, 23.b, 24.c, 25.b, 26.b, 27.c, 28.d, 29.a, 30.b, 31.a, 32.c, 33.c, 34.a, 35.d

VIVA QUESTIONS

1. What do you mean by orthographic and oblique projection?
2. What are principle plane of projection?
3. What do you mean by four quadrants?
4. What do you mean by first angle and third angle projection systems?
5. Normally projection in 1st angle or 3rd angle projection system. Why not in IInd and IVth angle projection systems.
6. Students should know to draw the projection of a point, when point lies in either of four quadrants.
7. What do you mean by HT & VT of a line and a plane? What is difference in the shape of trace of line and trace of a plane.
8. What are different types of planes?
9. What are auxiliary planes? What is use of these planes?
10. What is difference between line, plane and solid?
11. What is difference between prism and pyramid?
12. What do you mean by right & regular prism, pyramid, cone & cylinder?
13. What is difference between cone & cylinder?
14. What do you mean by generator of a cone?
15. What is difference between frustum of a cone and truncated cone?
16. Why a section of a section of machine part is taken.
17. Students should know to find true length and true inclination of a line when projection of a line when projections of a line are given and vice-versa.
18. What are standards specification of drawing board, drawing sheets, and pencils.
19. What is difference between true inclination of a line and apparent angles.
20. Define engineering drawing. Why drawing is called universal language of engineers?
21. Name different drawing instruments.
22. What are the standard sizes of drawing sheets according to L.S.1. and which is suitable for drawing work?
23. What are the ways of sharpening a pencil for good and accurate work and which type of pencil is more suitable for drawing work?
24. What is layout of drawing sheet?
25. Why is the layout of sheet is necessary?
26. List out the contents of title block.
27. What do you mean by convention/ code?

28. What do you understand by thickness of lines?
29. What Are Different Methods Of Dimensioning?
30. Name The Principal Planes Of Projection.
31. What Is A? Why Are Sectional Views Used In Drawing?
32. What Do You Understand By The V.t. And H.t. Of A Section Plane?
33. Give the practical applications of intersection of surfaces or interpenetration of solids.
34. What Is Meant By Conventions In Drawings?
35. What Is The Necessity Of Dimension A Drawing?
36. What Are A Single And A Double Stroke Letters?
37. What Is Angle Of Inclination Of Section Lines?
38. What Is Meant By Scale In Drawing?
39. What Are Applications Of Scales?
40. What Are The Requirements For The Construction Of A Scale?
41. Which Are The Types Of Projections Done In Engineering Drawing?
42. Discuss Some Key Features About The Projection Of Points?
43. What Are The Standard Sizes Of Drawing Sheets According To Ls.i. And Which Is Suitable For Drawing Work?