

LAB MANUAL ON CAD & CAM LAB

(MECHANICAL ENGINEERING - 5TH SEM)



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INTRODUCTION TO AUTO-CAD

- AUTOCAD is a drawing package software developed by the company “AUTODESK” in USA .
- It is one of the widely used software for creating drawing easily.
- Generation of geometric modeling along with the Engineering analyze and evaluate the design and produce drawing for manufacturing with the help of computer.
- The first name of this software is “MICROCAD”. Which is evaluated in 1982?
- AutoCad is a command base, non-parametric and low end software. It is the best drawing software.

FILE	EDIT	MODIFY
UCS : User Co-ordinate System		

FUNCTION OF MOUSE BOTTOM:

MB1 – Left Click

- It Drags or Move the icons.

MB2 – Middle Scroll

- It is used for Zoom-In Or Zoom-out of the Object.

MB3 – Right Click

- It is used for select the icon. It is also shows the Menu option.

EXPERIMENT NO -01

AIM OF THE EXPERIMENT

To create a rectangle by using 2D drafting

THEORY-

A rectangle in a two dimensional plane has 4 corner points which are specified by coordinates. By knowing all coordinates we can construct/ create rectangles in a two dimensional plane by using Auto CAD.

APPARATUS/SOFTWARE REQUIRED –

1. Auto-Desk-2010

LIMIT COMMAND :

- 1) Limits ↵
- 2) Specify the lower left corner : 0,0 ↵
- 3) Specify the upper right corner : 297,210 ↵
- 4) Z ↵
- 5) A ↵

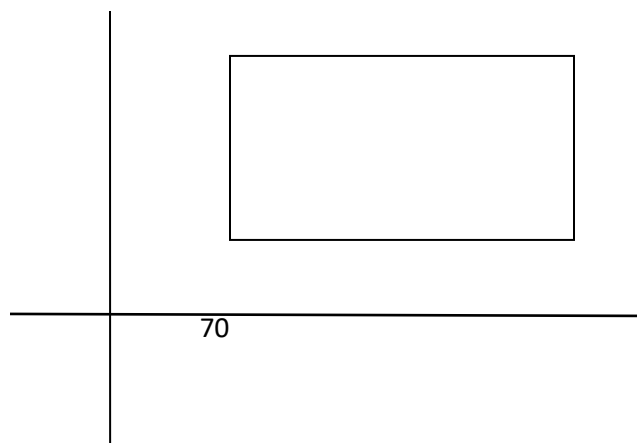
COMMAND FOR LINE :

1. Line/ L ↵
2. Specify the first point : (,) ↵
3. Specify the next point : (,) ↵
4. ESC ↵

PROBLEM -3 (To create a rectangle of size-30 ' x 40')

PROCEDURE⁻⁸⁰

1. Line ↵
2. 30, 50 ↵
3. 70, 50 ↵50
4. 70, 80 ↵
5. 30, 80 ↵30
6. 30, 50 ↵



CONCLUSION -

We successfully draw a rectangle by using 2D drafting where the co-ordinates of the rectangles are (30, 50), (70, 50), (70, 80) and (30, 80). One can take other co-ordinates and draw the rectangle also.

EXPERIMENT NO -02

AIM OF THE EXPERIMENT

Create a Circle by using 2D drafting

THEORY-

A Circle in a two dimensional plane has a fixed radius/diameter and its centre has specified by coordinates. By knowing its centre coordinates and radius/diameter we can construct/create Circle in a two dimensional plane by using Auto CAD.

APPARATUS/SOFTWARE REQUIRED –

1. Auto-Desk-2010

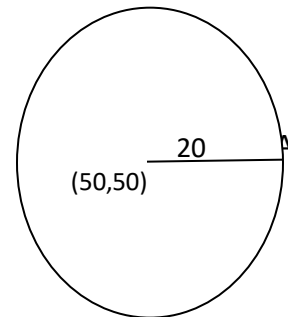
COMMAND FOR CIRCLE :

- 1) Circle / C ↵
- 2) Specify the center of circle ↵
- 3) Specify the radius or Diameter of the circle ↵
- 4) Specify the value of R / D of the circle ↵

PROBLEM : (Create a Circle/draw a circle of ϕ 40)

PROCEDURE –

1. C ↵
2. 50, 50 ↵
3. 20 ↵

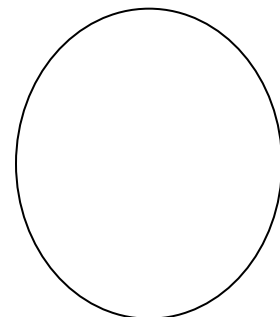


COMMAND FOR 2P (P = Point) CIRCLE :

- 1) Circle / C ↵
- 2) Specify the circle center (2P, 3P, TTR) ↵
- 3) 2P) ↵
- 4) Specify the first point ↵
- 5) Specify the second point ↵

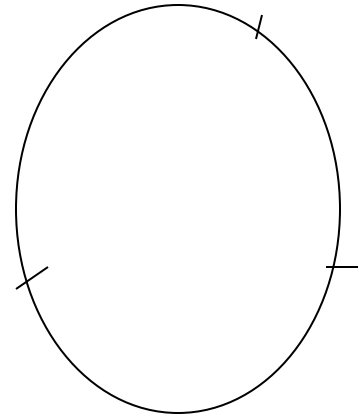
PROBLEM : To Create/draw 2P Circle of ϕ 60)

1. C ↵
2. 2P ↵ (20,40) (80,40)
3. (20, 40) ↵
4. (80, 40) ↵



COMMAND FOR 3P (P = Point) CIRCLE :

- 1) Circle / C ↵
- 2) Specify the circle center (2P, 3P, TTR)↵(55,75)
- 3) 3P)↵
- 4) Specify the first point ↵
- 5) Specify the second point ↵
- 6) Specify the third point ↵



PROBLEM :To Create /draw a 3P circle of $\phi 50$)(30,50)(80,50)

1. C ↵
2. 3P ↵
3. (30, 50) ↵
4. (80, 50) ↵
5. (55, 75) ↵

COMMAND FOR TTR (Tangent, Tangent, Radius)

- 1) Circle/ C ↵
- 2) TTR ↵
- 3) Specify the first tangent on the circle ↵
- 4) Specify the second tangent on circle↵
- 5) Specify the radius on the circle ↵

PROBLEM :Create a Circle TTR (Tangent, Tangent, Radius)

- 1) C ↵
- 2) TTR ↵
- 3) Select the first tangent on the circle ↵
- 4) Select the second tangent on the circle↵
- 5) Radius found ↵

CONCLUSION –

We successfully draw a Circle by using 2D drafting where ...

- i. Radius and coordinate of centre are given.
- ii. any arbitrary 2 points on the circumference of the circle are given .
- iii. any arbitrary 3 points on the circumference of the circle are given .
- iv. any 2 tangents are given and from it we can found the radius of the circle.

AIM OF THE EXPERIMENT

Create a Polygon by using 2D drafting.

THEORY-

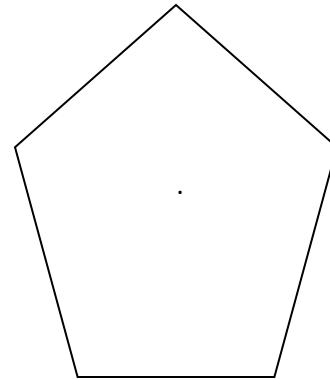
A Polygon of various no. of sides can be created /drawn if the centres of the polygon and no of sides are specified. We can also inscribe or circumscribe a circle in the polygon in a two dimensional plane by using Auto CAD.

APPARATUS/SOFTWARE REQUIRED –

1. Auto-Desk-2010

COMMAND FOR POLYGON

1. Polygon ↵
2. Enter no of sides ↵
3. Specify centre of polygon ↵
4. Specify inscribed or circumscribed ↵
5. Specify radius of the circle ↵



PROBLEM-(To draw a Polygon of any size)

1. Polygon ↵
2. 5 ↵
3. 50,50 ↵
4. I or C ↵
5. 30 ↵

CONCLUSION –

We have successfully drawn a Polygon using 2D drafting where no. of sides is 5 and its centre coordinates (50, 50), having circle of radius 30 inscribed in the polygon.

AIM OF THE EXPERIMENT

Dimensioning a rectangle / Circle/ Polygon

THEORY-

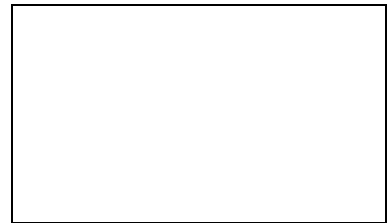
In this case **corner coordinates of any rectangle, centre coordinates and radius of the circle and no of sides and circle inscribed or circumscribed on a polygon** are given then we can make necessary dimensioning of the side of the rectangle, centre, diameter / radius of a circle and the distance (dimension) of any sides of the polygon in a two dimensional plane by using Auto CAD.

APPARATUS/SOFTWARE REQUIRED –

1. Auto-Desk-2010

COMMAND FOR RECTANGLE

1. Rectangle
2. Specify 1st corner of the rectangle : (,) ↵
3. Specify the 2nd corner corner of the rectangle : (,) ↵
4. Select dimension linear : (,) ↵(150,125)

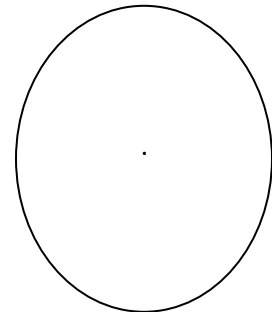


PROBLEM-

1. Rectangle ↵
2. 50, 50 ↵
3. 150, 125 ↵(50,50)
4. Select dimension –Linear ↵
5. Specify 1st selection line origin ↵selected
6. Specify 2nd extension line origin ↵

COMMAND FOR CIRCLE :

- 1) Circle / C ↵
- 2) Specify the center of circle ↵
- 3) Specify the radius or Diameter of the circle ↵
- 4) Specify the value of R / D of the circle ↵

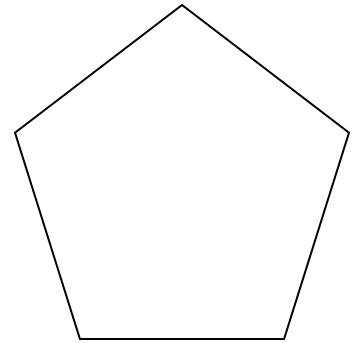


PROBLEM :(Dimensioning of a circle)

1. C ↵
2. Specify the center and radius ↵
3. Select the dimension–radius ↵
4. Select Arc or circle ↵

COMMAND FOR POLYGON

1. Polygon ↵
2. Enter no of sides ↵
3. Specify centre of polygon ↵
4. Specify inscribed or circumscribed ↵
5. Specify radius of the circle ↵



PROBLEM-(To draw a Polygon of any size)

1. Polygon ↵
2. 5 ↵
3. Specify the centre of the polygon ↵
4. I or C ↵
5. 30 ↵
6. Specify the radius of the circle.↵
7. Select dimension –Linear.↵
8. Specify 1st selection line origin.↵
9. Specify 2nd extension line origin.↵

CONCLUSION –

We successfully dimensioning a rectangle , Circle and Polygon.

AIM OF THE EXPERIMENT

Commands essential for creating 2D drawing

THEORY-

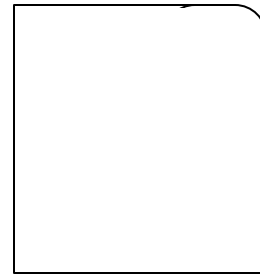
In this case we are required to smoothening out one corner/edge of required radius of curvature by using 2D drawing of a Square/Rectangle. Further we can also draw an exact replica (mirror) of a given figure or an object. Similarly we can make/draw Ellipse and Chamfer of an Object etc. by using Auto CAD Command.

APPARATUS/SOFTWARE REQUIRED--R-2

1. Auto-Desk-2010

COMMAND FOR FILLET :

- 1) Fillet / F ↵
- 2) Radius / R ↵
- 3) Specify the radius value ↵
- 4) Specify or select the first line of the first object ↵
- 5) Specify or select the second line of the first object ↵



PROBLEM:

Choose / make a rectangular whose one corner is smoothed/Fillet radius 2

1. F↵
2. R↵
3. 2↵
4. Specify or select the first line of the first object↵
5. Specify or select the second line of the first object↵

COMMAND FOR MIRROR(rectangle, circle etc) :

- 1) Mirror / MI ↵
- 2) Select the object ↵
- 3) Select the first end point of the mirror line ↵
- 4) Select the second end point of the mirror line ↵

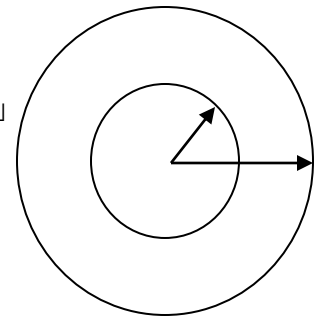
PROBLEM:(Choose an object)

Make an exact Replica of an Object/Figure.

1. Mirror↵
2. Select the object ↵
3. Select the first and point of the mirror↵
4. Select the second and point of the mirror↵

COMMAND FOR DONUT :

- 1) DONUT ↵
- 2) Specify the inside diameter : (,) ↵
- 3) Specify the outside diameter : (,) ↵
- 4) Select the position for Donut / Specify the center point of donut ↵



PROBLEM:

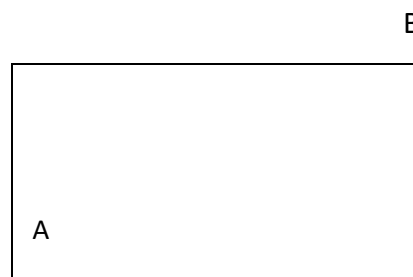
1. Do Nut↵
2. 40↵
3. 60↵
4. Select the position for Do nut↵

COMMAND FOR RECTANGLE :

- 1) Rectangle ↵
- 2) Specify the first corner of the rectangle : [(0,0)/ (x1, y1)]↵
- 3) Specify the second corner of the rectangle : [(x2,y2)/ (x3, y3)]↵
- 4) ESC ↵

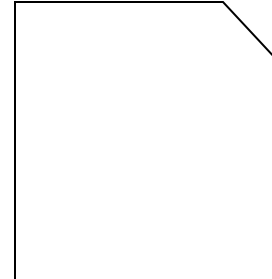
PROBLEM:(150,75)

1. Rectangle↵
2. (50,50)↵
3. (150, 75)↵
4. ESC ↵(50,50)



COMMAND FOR CHAMFER :

- 1) Chamfer / CHA ↵
- 2) Specify the chamfer distance i.e. D ↵
- 3) Specify the first chamfer distance (,) ↵
- 4) Specify the second chamfer distance (,) ↵



PROBLEM:

Draw a Rectangle

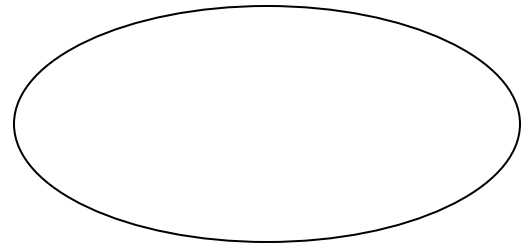
1. CHA ↵
2. 6 ↵
3. 2 ↵
4. 4 ↵

COMMAND FOR ELLIPSE :

- 1) Ellipse ↵
- 2) Specify the center point of the ellipse (,) ↵
- 3) Specify the major axis of the ellipse (,) ↵
- 4) Specify the minor axis of the ellipse (,) ↵

OR

1. Toll bar >Ellipse > click over ellipse >
2. Define major axis (,) ↵
3. Define minor axis (,) ↵



PROBLEM: Draw an Ellipse

1. Ellipse ↵
2. 50,50 ↵
3. 150,75 ↵
4. 100,25 ↵

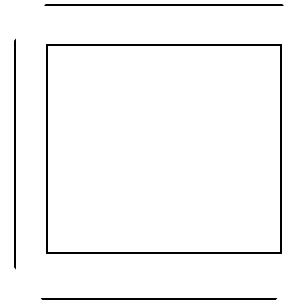
COMMAND FOR OFFSET :

1. O ↵
2. Specify the offset distance : (,) ↵
3. Select the line ↵
4. Choose the side for offsetting the line and click here ↵

PROBLEM:

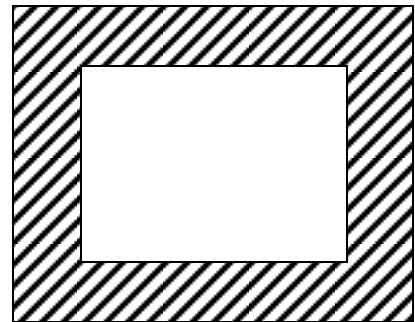
Make an offset for a rectangle

1. 0 ↵
2. 5 ↵
3. Select the line ↵
4. Choose the side of the offsetting ↵



COMMAND FOR HATCHING:

1. Hatch ↵
2. Click over add : pick a point ↵
3. Hatch type (Predefined) ↵
4. Select pattern of hatch ↵
5. Preview , OK ↵



PROBLEM :

1. Hatch ↵
2. Pick a point ↵
3. Hatch type (select from table) ↵
4. Select pattern of hatch ↵
5. Preview OK ↵

COMMAND FOR TEXT :

1. Text ↵
2. Specify the starting point of the text ↵
3. Specify the text height ↵
4. Specify the rotation angle of text ↵
5. Writing text ↵

PROBLEM:

1. Text ↵
2. Specify the starting point of ↵
3. Specify the text height ↵
4. Specify the rotation angle of text ↵
5. Writing text ↵

COMMAND FOR VERTICAL LINE :

1. XL ↵
2. V ↵
3. Place the vertical line ↵

PROBLEM:

1. XL ↵
2. V ↵
3. Selected the vertical line ↵



COMMAND FOR HORIZONTAL LINE:

1. XL ↵
2. H ↵
3. Place the horizontal line ↵

PROBLEM:

1. XL ↵
2. H ↵
3. Selected the horizontal line ↵



CONCLUSION –

We successfully know the various essential commands for creating 2D drawing.

EXPERIMENT NO -06

AIM OF THE EXPERIMENT

Create/draw a Screw Jack by using 2D drafting

THEORY-COMMANDS USED

APPARATUS/SOFTWARE REQUIRED –

1. Auto-Desk-2010

COMMAND USED FOR MAKING A SCREW JACK:

1. Line command ↵
2. Circle command ↵
3. Hatching command ↵
4. OSNAP command ↵
5. ORTHO command ↵
6. OFFSET command ↵
7. Method of increment ↵
8. Fillet command ↵

PROBLEM:

CONCLUSION –

We successfully draw a screw jack using 2D drafting.