

**Computer Aided Engineering Graphics**

**Question Bank**

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Prepared By

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# Introduction

* Lettering for a simple sentence
  + - THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG – Uppercase
    - the quick brown fox jumps over the lazy dog – Lowercase
    - 0 1 2 3 4 5 6 7 8 9 – Numbers
* Division of a line and an angle into a number of equal parts
* Exercise on methods of dimensioning, arrow heads, thin, thick and types of lines.
* Construction of regular polygons in simple positions:
  + - Triangles
    - Square & Rectangle
    - Pentagon
    - Hexagon
* Exercises involving drawing of thin and thick lines, arcs, dimensioning etc.
* Dimensioning (All dimensions are in mm. Dimensions drawn to contain only numerals

and not “mm” along with it.)

* Title Box & Scales

# 2 Projection of Points

### 2.1 Class and Lab-work

1. A point P lies 30 mm in front of VP, 20 mm above HP and 25 mm in front of the left

profile plane (LPP). Draw its projections.

1. Draw the projections of a point A 30 mm behind VP and 15 mm above HP.
2. A point B is 30 mm behind VP, 15 mm below HP and 30 mm behind the right profile

plane (RPP). Draw its projections.

1. Draw the projections of a point Q 20 mm in front of VP and 25 mm below HP.

### 2.2 Sketchbook

1. 1. Draw the projections of the following points. The distance between the projectors are 40 mm. Draw its projections and dimension them.
   1. Point A lies 20 mm above HP and 42 mm in front of VP
   2. Point B lies 35 mm below HP and 20 mm in front of VP
   3. Point C lies 20 mm above HP and 36mm behind VP
   4. Point D lies 42 mm below HP and 25 mm behind VP
2. If a point lies N in the first quadrant, with the vertical plane 30 mm behind it and the

horizontal plane 60 mm below it, where is the elevation and plan obtained? Draw the

projections. Also draw both the profile plane projections.

1. If point R lies on the horizontal plane and 35 mm in front of VP, draw the projections of
2. the point and also obtain any one side view.

### Supplementary Questions

1. *A point K is lying in the first quadrant. The shortest distance of the point from xy-line is*

*55 mm. If the point is 30 mm above HP, draw its projections.*

1. *If point S lies on the vertical plane and 35 mm above HP, draw the projections of the point*

*and also obtain any one side view.*

1. *If point T lies on the horizontal plane and also on the VP, draw the projections of the*

*point and also obtain any one side view.*

1. *Point F is located in the second quadrant. The distances from HP and VP are 38 mm and*

*28 mm respectively. Similarly, point G is located in the fourth quadrant. The distances*

*from HP and VP are 40 mm and 25mm respectively. Draw projections of the points on*

*HP, VP and PP. The distance between points along xy-line may be taken as 30 mm.*

1. *If a plane lies between the observer and a point and the top view is obtained 35 mm above*

*the xy-axis, identify the quadrant in which the point rests. If the distance from the point*

*to the VP is only 45 mm. Draw the left side view of the point.*

# Projection of Lines

### Class and Lab-work

1. Draw the three principle views of a line AB 80 mm long when it is placed parallel to both

HP and VP. One of the ends of the line is 70 mm above HP, 60 mm in front of VP and

30 mm in front of RPP.

1. Draw the projections of a line MN, 80 mm long, placed perpendicular to HP. The line is

70 mm in front of VP and 60 mm in front of RPP. The lower end of the line is on HP.

1. A line PQ, 80 mm long, is inclined at 30o to HP and parallel to VP. The line is 90 mm

in front of VP. The lower end A is 35 mm above HP, 110 mm in front of RPP and away

from it than the upper end. Draw its projections.

1. A line PQ has its end P, 15 mm above HP and 10 mm in front of VP. The end Q is 55 mm

above HP and the line is inclined at 30o to HP. The distance between the end projectors

of the line, when measured parallel to the xy-line, is 50 mm. Draw the projections of the

line and find its inclination with VP.

1. A room is 5m × 3m × 4m high. An electric lamp is suspended vertically from the center of

the ceiling and at a distance of 0.8 m from it. Find the distance of the lamp from any one

of the ground corners and the slope angle of the connecting line with the ground. Take a

scale of 1 : 100.

### Sketchbook

1. A line CD, 80 mm long, is inclined to 45o to VP and parallel to HP. The end nearer to

VP is 30 mm in front of VP, 60 mm above HP and 30 mm in front of LPP. Draw its

projections.

1. Draw the projections of a line, 80 mm long, placed perpendicular to VP, with the rear

end of the line, 30 mm in front of VP. The line is 55 mm above HP and 50 mm in front

of LPP.

1. A line AB, 60 mm long, has one of its extremities 20 mm in front of VP and 15 mm above

HP. The line is inclined at 25o to HP and 40o to VP. Draw its top, front and left views.

1. Line AB is 90 mm long. Its front view measures 65 mm and is inclined at 45 to the

xy-line. End A is 15 mm above HP and on VP. Draw the projections of the line and find

its inclinations with HP and VP.

1. The front view of an 80 mm long line measures 50 mm. The whole line is in the HP and

its one end is 30 mm in front of the VP. Draw the three principal projections and find

final inclination of the line with VP.

### *Supplementary Questions*

1. *Draw the projections of a 60 mm line PQ, which is situated in HP and VP both.*
2. *Line CD is inclined 45o to VP and contained in HP. The end C is 16mm in front of VP. Draw the projections of the line if the true length of line CD is 50 mm. Measure the apparent length.*
3. *Line MN is parallel to VP and has a plan length 48 mm in the top view. If the end A is 40 mm above HP and 24 mm in front of VP, while the end B is 10 mm above HP, draw the front, top and side views of the line. Also find its true length and true inclination of the line.*
4. *A 50 mm long line AB has its end A 30 mm above HP and 20 mm in front of VP. The*

*front view of the line is a point. Draw its projections.*

1. *The top view of a line 80 mm long measures 55 mm. The line is in the VP and one of its*

*end lies 20 mm above HP. Draw its projections and find the final inclination with HP.*

1. *A line AB, 70mm long has one of its extremities 30mm in front of VP and the other,*

*70mm above HP. The line is inclined at 45o to HP and 30o to VP. Draw its top and front views.*

1. *A 70 mm long line PQ has its end P 20 mm above the HP and 30 mm in front of the VP.*

*The line is inclined at 45o to the HP and 30o to VP. Draw its projections and left side*

*view. Determine the apparent inclination to the RPP.*

1. *The projectors of the ends of a line AB are 60 mm apart. The end A is 40 mm above the*

*horizontal plane and inclined at 30o. Find the true length of the line, if the top view of*

*the line is inclined 60o to VP. Also find the true inclination to VP.*

# Projection of Planes

### Class and Lab-work

1. A regular triangular lamina of sides 30 mm rests with one of its edges on HP, with its

plane surface inclined at 25o to HP. The edge on which it rests is inclined at 40o to VP.

Draw its top and front views.

1. Draw the top and front views of a square lamina resting with an edge on HP with its surface inclined at 45o to HP. The edge on which the lamina rests is parallel to both HP & VP.
2. A pentagonal lamina of 30 mm side rests with one of its corners on HP, such that the two edges passing through the corner make equal inclinations with HP. The surface of the lamina is inclined at 30o to HP. The diagonal passing through the corner on which the lamina rests, appears to be inclined at 50o to VP. Draw the front and top views of the lamina in its final position. Also determine the true inclination of the diagonal with VP.
3. Draw the top and front views of a circular lamina of diameter 60 mm, resting with a point of its circumference on HP, and its surface inclined at 35o to HP. The diameter passing through the point on which the lamina rests, appears to be inclined at 45o to VP. Also determine the true inclination of the diameter with VP.

### Sketchbook

1. A regular triangular lamina of sides 40 mm is resting on one of its corners, such that the

two edges passing through the corner make equal inclinations with HP. The surface of the

lamina is inclined at 30oHP. The side opposite to the corner on which the lamina rests

is inclined at 40o to VP. Draw its top and front views.

1. A regular pentagonal lamina of sides 30 mm rests with one of its edges on HP with its

plane surface inclined at 45o to HP. The median passing through the edge on which the

lamina rests, appears to be inclined at 60o to VP. Draw its top and front views. Also determine the true inclination of the median with VP.

1. A hexagonal lamina of 30 mm side rests with one of its corners on HP, such that the

two edges passing through the corner make equal inclinations with HP. The surface of the

lamina is inclined at 30o to HP. The diagonal passing through the corner on which the

lamina rests, appears to be inclined at 50o to VP. Draw the front and top views of the

lamina in its final position. Also determine the true inclination of the diagonal with VP.

1. Draw the top and front views of a circular lamina of diameter 50 mm, resting with a

point of its circumference on HP, and its surface inclined at 45o to HP. The diameter

perpendicular to the diameter passing through the point on which the lamina rests, is

parallel to VP.

### Supplementary Questions

1. *1. A rectangular lamina of 35 mm×20 mm rests on HP on one of its shorter edges. The lamina is rotated about the edge on which it rests till it appears as a square in the top view. The edge on which the lamina rests is inclined 30o to VP. Draw its projections and find its inclination to HP.*
2. *A square plate of 30 mm slide rests on HP such that one of the diagonals is inclined at*

*30o to HP and in the top view, the same edge appears to be inclined at 45o to VP. Draw*

*its projections and determine the true inclination of the side with VP*

1. *A regular pentagonal lamina of 25 mm is resting on one of its corners on HP, while the*

*side opposite to this corner touches VP. If the lamina makes an angle of 60o with HP and*

*30o with VP, draw the projections of the lamina.*

1. *Draw the top and front views of a circular lamina of diameter 50 mm, resting on HP such*

*that one of its diameters is inclined at 30o to VP and 45o to HP . Draw its front and top*

*views.*

1. *A hexagonal lamina of sides 30 mm is resting on HP with one of its corners in VP and*

*its surface inclinde at an angle of 30o with VP. The diagonal passing through that coorner*

*which is in VP is inclined at 45o to HP. Draw the projections of the lamina.*

# Projection of Solids

### Class and Lab-work

# **Prism**

1. A right-regular triangular prism, 30 mm side of base and axis 50 mm long rests with one of its shorter edges on HP. Its axis is inclined at 30o to HP and appears to be inclined at 45o to VP. Draw its front and top views. Also determine the true inclination of the axis with VP.
2. A right-regular pentagonal prism, 30 mm side of base and axis 60 mm long, is resting on a corner, such that the two base edges passing through the corner make equal inclinations with HP. The base of the prism is inclined at 60o to HP, while its axis appears to be inclined at 45o to VP. Draw its front and top views. Also determine the true inclination of the axis with VP.
3. A right-regular hexagonal prism, 30 mm side of base and axis 55 mm long is placed with one of its rectangular faces on HP such that its axis is inclined at 30o to VP. Draw its front and top views.

# **Pyramids**

1. 1. A right-regular pentagonal pyramid, 30 mm side of base and 50 mm altitude rests with

one of its base edges on HP. Its axis is inclined at 30o to HP and appears to be inclined at 45o to VP. Draw its top and front views. Also determine the true inclination of the axis with VP.

1. A right-regular square pyramid of base edge 40 mm and height 60 mm rests on one of its

base edges such that the triangular face containing that edge is perpendicular to HP and

parallel to VP. Draw its top and front views.

1. A right-regular hexagonal pyramid of base edge 30 mm and axis 50 mm long has one of its slant edges on HP such that two of its triangular faces containing that edge on which it rests are equally inclined to HP. The axis of the pyramid appears to be inclined at 60o to VP. Draw the top and front views. Also determine the true inclination of the axis with VP.

# **Cylinder, Cone Tetrahedron**

1. A right cylinder of diameter 50 mm and height 60 mm rests with a point of one of its circular faces touching HP. The axis is inclined at 40 to HP and appears to be inclined at 50o to VP. Draw its top and front views. Also determine the true inclination of the axis with VP.
2. 2. A right cone of base diameter 60 mm and axis 60 mm long, rests with a point of its circular face touching HP. Its axis is inclined at 45o to HP and appears to be inclined at 30o to VP. Draw its top and front views. Also determine the true inclination of the axis with VP.
3. A regular tetrahedron of sides 30 mm rests with one of its edges on HP. One of the faces containing that edge is inclined at 30o to HP while the edge on which solid rests is inclined at 45o to VP. Draw its top and front views.

### Sketchbook

1. A pentagonal prism 25 mm sides of base and 60 mm axis length rests on HP on one of its

edges of the base which is inclined to VP at 30o. Draw the projections of the prism when

the axis is inclined to HP at 40o.

1. A hexagonal pyramid 25 mm side of base and 50 mm axis length rests on HP on one of its

edges of the base whioch is inclined to VP at 30o. Draw the projections of the pyramid

when the axis is inclined to HP at 45o.

1. A cone of base diameter 40 mm and axis length 50 mm is resting on a point on the circumference of its base such that its apex is at 40 mm above the HP and the top view of its axis is inclined at 60o to VP. Draw the top and front Views of the solid. Also, determine the inclination axis when the base is nearer to the observer.
2. A right cylinder of diameter 50 mm and height 60 mm rests with a point of one of its circular faces touching HP. The axis is inclined at 45o to HP and appears to be inclined at 30o to VP. Draw its top and front views. Also determine the true inclination of the axis with VP.

### *Supplementary Questions*

1. *1. A square prism 35 mm side of base and 60 mm axis length is suspended freely from one*

*of its corners. Draw the projections of the prism when the axis appears to be inclined to*

*VP at 45o .*

1. *A hexagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its*

*edges of the base. Draw the projections of the prism when the axis is inclined to HP at*

*45o and inclined towards VP at 30o.*

1. *A square pyramid 35 mm side of base and 60 mm axis length rests on HP on one of its*

*corners of the base such that the two base edges containing the corner on which it rests*

*make equal inclinations with HP. Draw the projections of the pyramid when the axis of*

*the pyramid is inclined to HP at 30o and to VP at 30o.*

1. *A pentagonal pyramid 25 mm sides of base and 60 mm axis length rests on HP on one of*

*its edges of the base. Draw the projections of the pyramid when the axis is inclined to HP at 40o and VP at 30o.*

1. *A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of*

*its corners of the base such that the two base edges containing the corner on which it rests*

*make equal inclinations with HP. Draw the projections of the pyramid when the axis of*

*the pyramid is inclined to HP at 45o and appears to be inclined to VP at 45o .*

1. *A cone of base diameter 40 mm and 60 mm axis length rests on HP on one of its generators.*

*Draw the projections of the cone when the axis is inclined to VP at 45o.*

1. *A cone of base diameter 40 mm and 60 mm axis length rests on HP on its apex. Draw*

*the projections of the cone when the axis is inclined to VP at 45o.*

1. *8. A cylinder of base diameter 40 mm and 60 mm axis length rests on HP on one of its generators. Draw the projections of the cylinder when the axis is inclined to VP at 45o.*
2. *A cylinder of base diameter 40 mm and 60 mm axis length rests on HP Draw the projections of the cylinder when the axis is inclined to VP at 45o and to HP is 45o.*

# Development of Surfaces

### Class and Lab-work

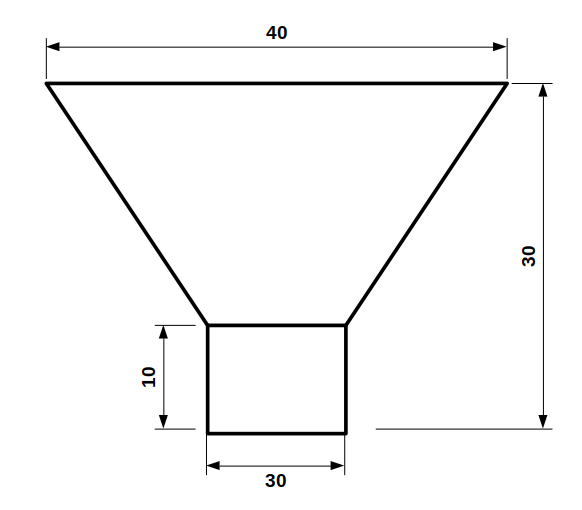
1. Draw the development of a right-regular triangular prism of side of base 30 mm and height 50 mm.
2. Draw the development of a right cylinder of base diameter 50 mm and height 60 mm.
3. Draw the development of a right-regular triangular pyramid with side of base 30 mm and

height 50 mm.

1. Draw the development of a right-regular square pyramid with side of base 30 mm and

height 50 mm.

1. Draw the development of a right cone of diameter 50 mm and height 60 mm.
2. Draw the development of a funnel consisting of a frustum of cone and a cylinder of dimensions provided in the figure below.

  
Illustration 1

# Sketchbook

1. Draw the development of a right-regular triangular prism of side of base 30 mm and height 50 mm.
2. Draw the development of a right cylinder of base diameter 50 mm and height 60 mm.
3. Draw the development of a right-regular triangular pyramid with side of base 30 mm and

height 50 mm.

1. Draw the development of a right-regular square pyramid with side of base 30 mm and

height 50 mm.

1. Draw the development of a right cone of diameter 50 mm and height 60 mm.
2. Draw the development of a funnel consisting of a frustum of cone and a cylinder of dimensions provided in the figure above.

# Isometric Projections

### Class and Lab-work

1. Draw the isometric projections of a Right-regular pentagonal prism of 30 mm side of base

and height 60 mm resting on one of its pentagonal faces.

1. Draw the isometric projections of a Right-regular hexagonal prism of 35 mm side of base

and height 65 mm resting on one of its rectangular faces.

1. Draw the isometric projections of a Right cylinder of diameter of base 40 mm and height

50 mm, resting on one of its circular faces.

1. Draw the isometric projections of a Right cone of diameter of base 50 mm and height 60

mm, resting on its circular face.

### Sketchbook

1. A cylinder of diameter 80mm and thickness 30mm is resting on the ground on its circular

surface. Draw the isometric projection of the solid.

1. Draw the isometric projection of a regular pentagonal prism of base edge 30mm and axis

60mm resting on HP on its pentagonal surface.

1. Draw the isometric projections of a Right-regular hexagonal pyramid of 30 mm side of

base and height 60 mm resting on its hexagonal face.

1. Draw the isometric projections of a Right cone of diameter of base 50 mm and height 60 mm, resting on its circular face.

### *Supplementary Questions*

1. *A square pyramid of base side 40mm and height 70mm rests centrally over a cube of edge*

*50mm, which itself is placed on a cylinder of diameter 80mm and thickness 30mm. Draw*

*the isometric projection of the solids, if the axes of the three solids are in common line.*

1. *Draw the isometric projection of a hexagonal prism of sides of base 40 mm and height 60*

*mm with a right circular cone of base 40 mm diameter and altitude 50 mm, resting on its*

*top such that the axes of both the solids are collinear.*

1. *A square prism base side 40 mm, height 50 mm is placed centrally on a cylindrical slab of*

*diameter 100 mm and thickness 30 mm. Draw the isometric projection of the combination*

*of solids.*