Syllabus

Chapter 10:Project Planning, Design and Implementation

10.1 Engineering drawings and its concepts:

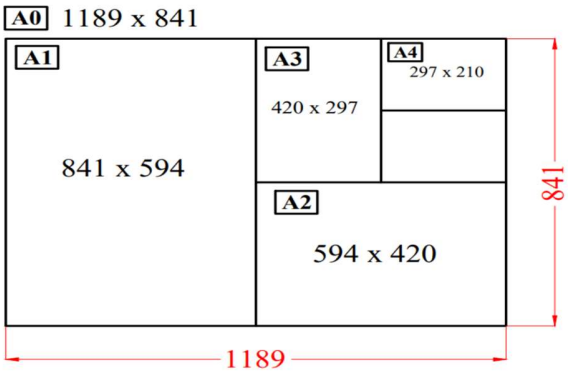
Fundamentals of standard drawing sheets, dimensions, scale, line diagram, orthographic projection, isometric projection/view, pictorial views, and sectional drawing.

Standard drawing sheet

✓Area of A0 sheet = 1 sq. m

✓Ratio of length of longer to shorter side = 2:1

✓From A0 to A4, the area of successive sheet reduces by half



Q. The area occupied by A0 sheet is …… times the area occupied by A4 sheet

A. 2 B. 4 C. 8 D. 16

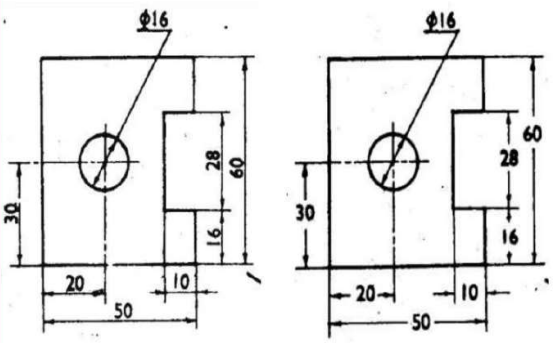
Right Answer: D

System of Dimensioning

Aligned System

- Dimensions are aligned with the entity being measured
- Dimensions are placed in such a way that they can be read from the bottom or right side of drawing sheet
- Dimensions are placed at the middle and on the top of dimension lines
- Commonly used in engineering drawing

Dimensioning systems



Aligned system (readable from bottom and right edge of sheet)

Unidirectional system (visible from bottom edge)

Unidirectional System

- Dimensions are placed in such a way that they can be read from the bottom edge of drawing sheet only
- Dimensions are inserted by breaking the dimension lines at the middle
- Used for detail dimensioning of machinery parts

Q. In case of aligned method of dimensioning, dimensions are readable from

a) bottom and right side of drawing sheet

b) bottom and left side of drawing sheet

c) bottom and top side of drawing sheet

d) all of the above

Q. In case of unidirectional method of dimensioning, dimensions are readable from

a) bottom side of drawing sheet only

b) right side of drawing sheet only

c) top side of drawing sheet only

d) left side of drawing sheet only

Scales

A scale is defined as the ratio of the linear dimensions of the object as represented to the actual dimensions of the element of the object itself

The proportion by which we either reduce or increase the actual size of the object on a drawing is known as scale

Full size scale:

If the actual size of an object is drawn, then the scaled is called full size scale. Its proportion is denoted by 1:1

Reducing scale:

If the actual size of an object is reduced by some proportion in the drawing, then the scale is called reducing scale. Eg. 1:2, 1:5

Enlarging scale:

If the actual size of an object is increased by some proportion in the drawing, then the scale is called enlarging scale. Eg. 2:1, 5:1

Representative Fraction (R.F.):

- The ratio of the length of the drawing to the actual length of the object is called representative fraction
- Unit should be same in numerator and denominator
- R.F. is unitless

Q. A machine part is drawn two times with different scales. The ratio of 1st drawing's R.F. to 2nd drawing's R.F. with respect to the actual object is found to be 2. The length of the second drawing is 10 mm. Find the 1st drawing length

a) 5 mm

b) 5 cm

c) 2 mm

d) 2 cm

$$\frac{\text{1st drawing's R.F.}}{\text{2nd drawing's R.F.}} = 2$$

$$\frac{\frac{\text{lenght of first drawing}}{\text{actual length}}}{\frac{\text{length of second drawing}}{\text{actual length}}} = 2$$

$$\frac{\text{length of first drawing}}{\text{length of second drawing}} = 2$$

$$\frac{\text{length of first drawing}}{10} = 2$$

$$\text{length of first drawing} = 20 \text{ mm} = 2 \text{ cm}$$

Q. If a rectangular shape land of actual size 30m × 50m is drawn by a rectangular of size 15mm × 25mm, the R.F. is equal to

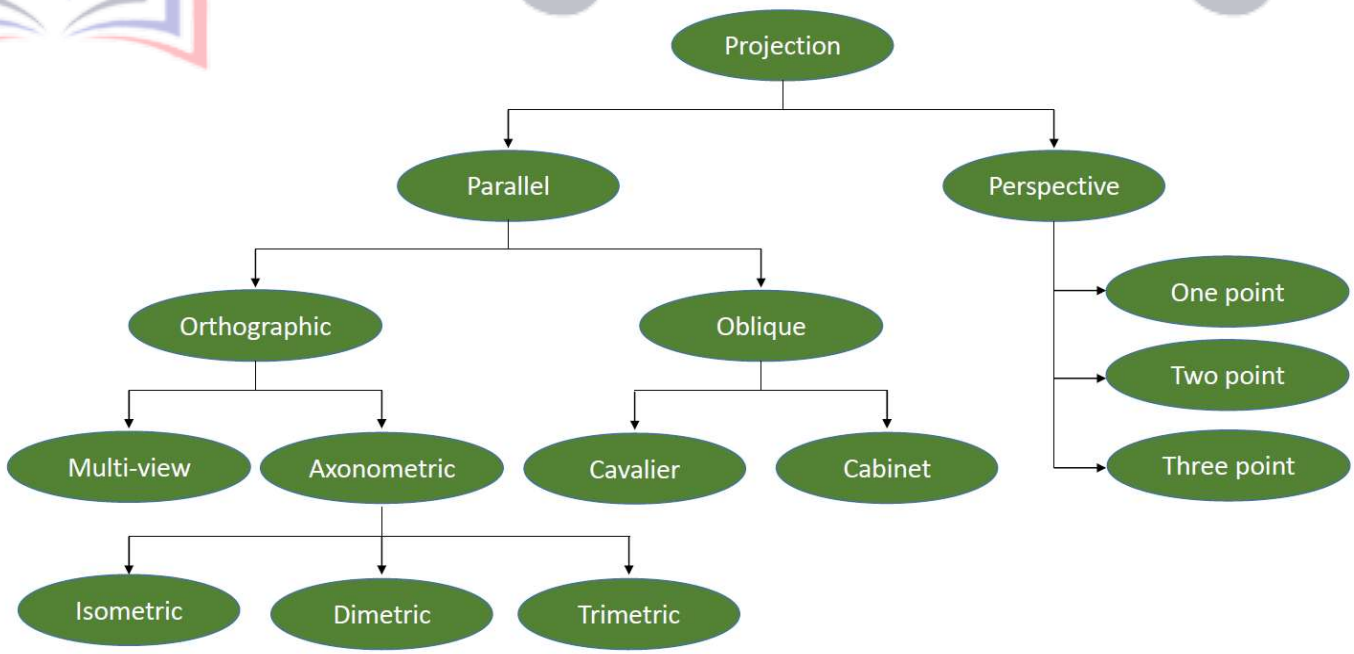
- a) 1 : 2000
- b) 1 : 200
- c) 1 : 2500
- d) 1 : 250

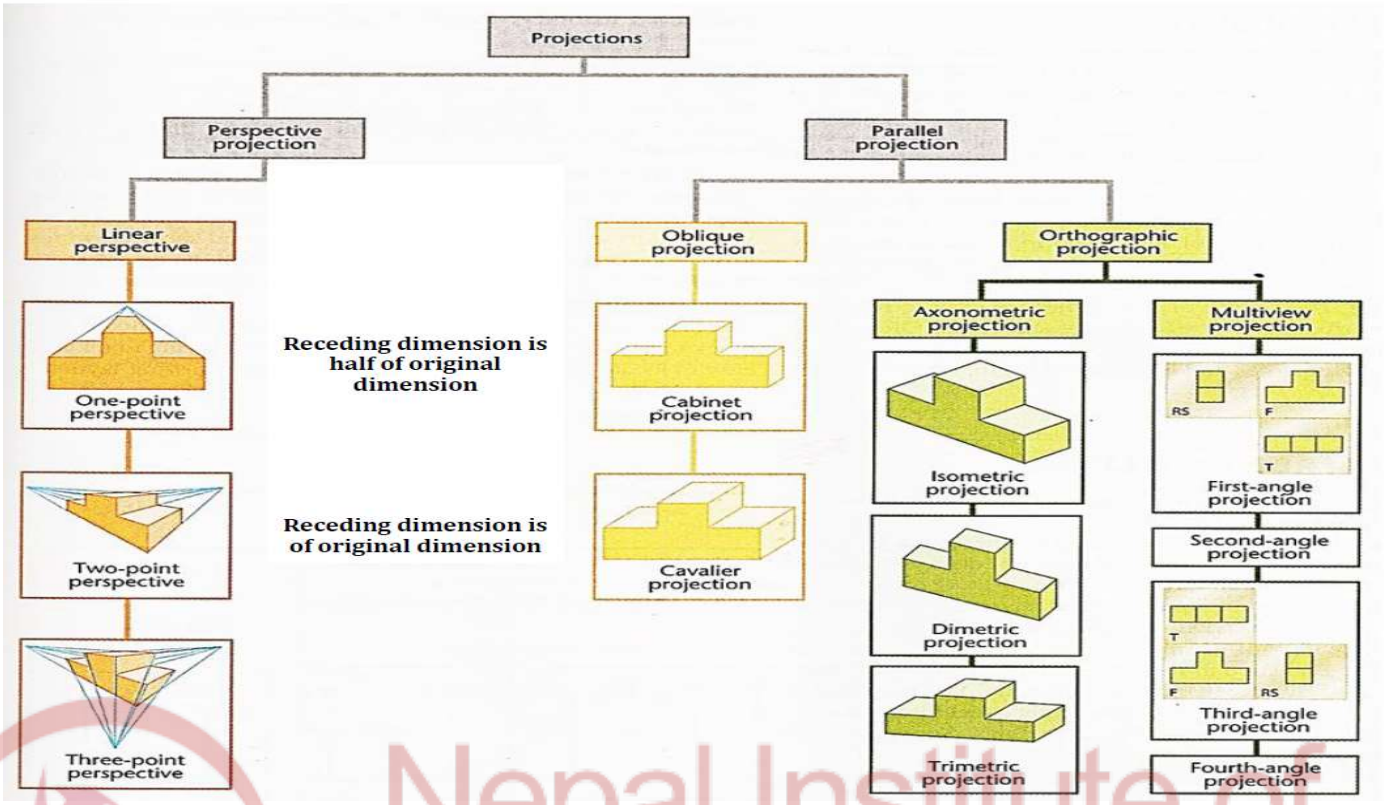
Q. A map of 10cm × 8cm represents an area of 50000 square meter. The R.F. of the scale is

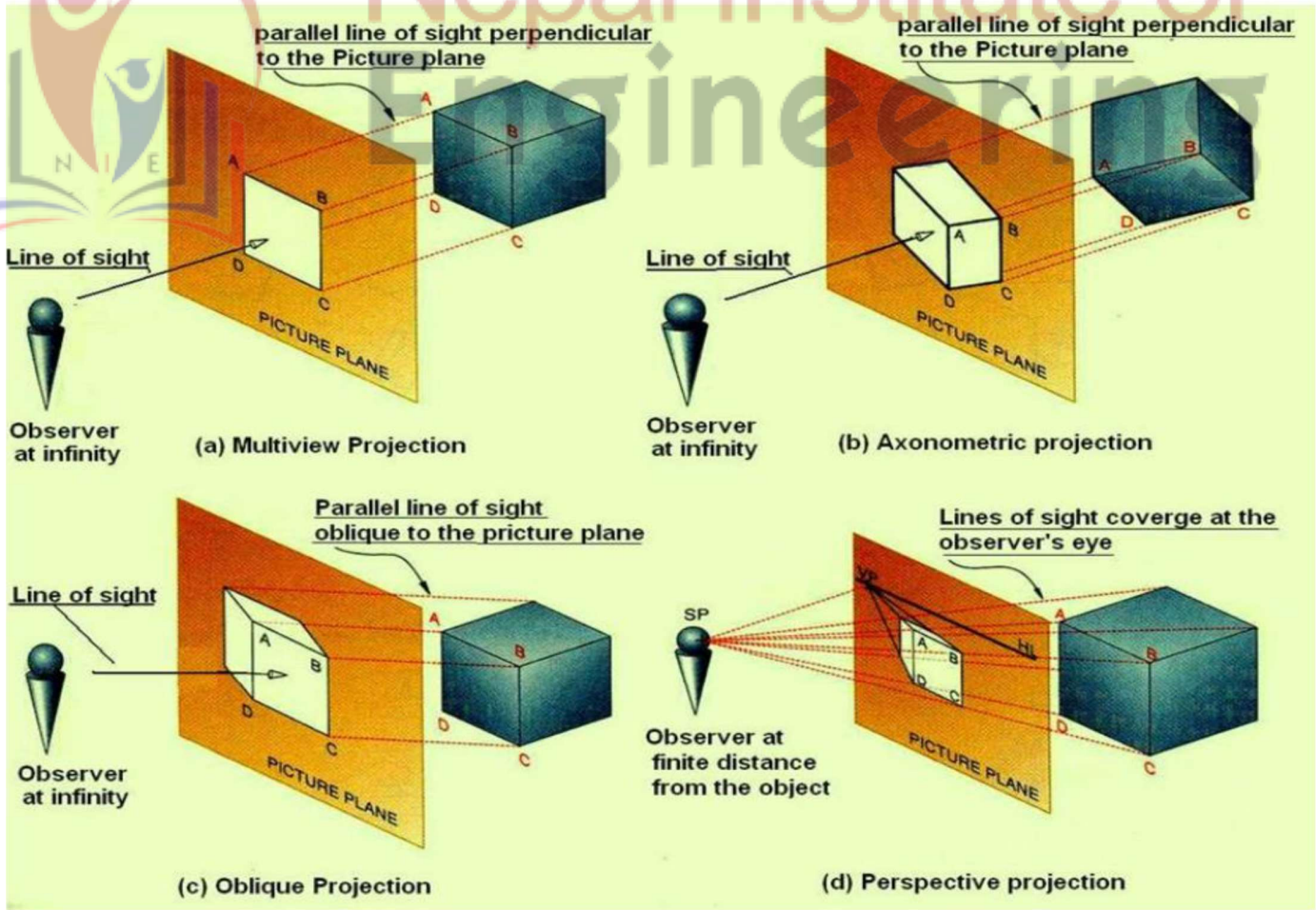
- a) 1/25
- b) 1/625
- c) 1/2500
- d) 1/6250000

$$R.F. = \sqrt{\frac{drawing\ area}{actual\ area}} = \sqrt{\frac{0.1 \times 0.08}{50000}} = \sqrt{\frac{1}{6250000}} = \frac{1}{2500}$$

Projection







Q. In oblique projection, projectors from an object are ..... to each other and..... to the plane of projection

a) inclined, perpendicular

b) parallel, inclined

c) parallel, perpendicular

d) inclined, parallel

Q. One plane projection is

a) axonometric projection

b) oblique projection

c) both (a) and (b) above

d) none of the above

Q. Axonometric projection is a special type of

a) orthographic projection

b) perspective projection

c) isometric projection

d) multi view projection

Q. The ratio of isometric length to the actual length is

a) $\frac{2}{3}$

b) $\frac{3}{2}$

c) $\sqrt{\frac{2}{3}}$

d) $\sqrt{\frac{3}{2}}$

Q. In first angle orthographic projection, the right hand side view of an object is drawn

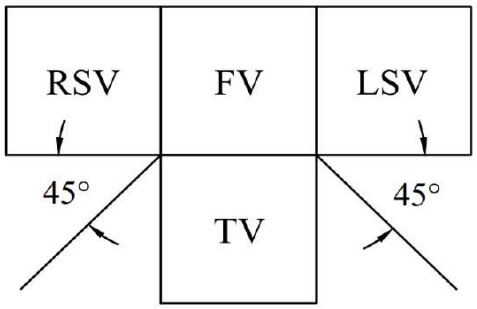
a) above the elevation

b) below the elevation

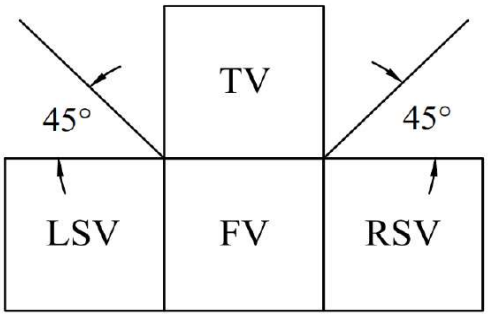
c) left of the elevation

d) right of the elevation

Placement of views in orthographic projection



First angle orthographic projection



Third angle orthographic projection

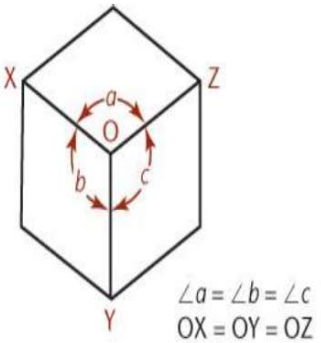
Q. The angle between isometric axes is

a) 30°

b) 60°

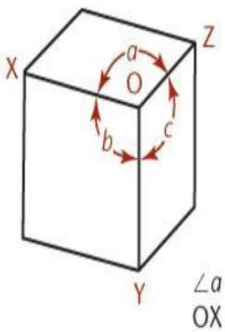
c) 90°

d) 120°



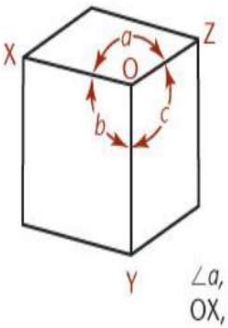
$\angle a = \angle b = \angle c$
OX = OY = OZ

(a) Isometric



$\angle a = \angle c$
OX = OY

(b) Dimetric



$\angle a, \angle b, \angle c$ unequal
OX, OY, OZ unequal

(c) Trimetric

Q. When a sphere is cut by a plane, the surface formed is

- a) ellipse
- b) parabola
- c) hyperbola
- d) circle

Q. The solid which is generated by the revolution of a rectangle about one of its sides which remains fixed is called

- a) prism
- b) pyramid
- c) cylinder
- d) cone

Q. The solid which is generated by the revolution of a right angled triangle about one of its perpendicular sides which remains fixed is called

- a) prism
- b) pyramid
- c) cylinder
- d) cone

Q. What type of view is used to provide clarity and interior features of a part?

- a) section view
- b) oblique view
- c) auxiliary view
- d) pictorial view

Q. In an isometric sketch of a cube

- a) The frontal face appears in its true shape
- b) The receding axes are at 45 degrees to the horizontal
- c) All faces are equally distorted
- d) Only the depth must be reduced

Q. In orthographic projection, each projection view represents how many dimensions of an object?

- a) 1
- b) 2
- c) 3
- d) 0

Q. The point, from which the observer is assumed to view the object, is called

- a) center of projection
- b) point of projection
- c) point of observer
- d) view point

Q. The top view of an object is shown on which plane?

- a) profile plane
- b) horizontal plane
- c) vertical plane
- d) parallel plane

Q. The minimum number of orthographic view required to represent a solid on flat surface is

- a) 1
- b) 2
- c) 3
- d) 4

Q. In first angle projection, the ..... lies between ..... and .....

- a) object, projection plane, observer
- b) Projection plane, object, observer
- c) observer, object, projection plane
- d) all of the above

Q. A regular cone is rested on base on horizontal plane, the front view will be

- a) circle
- b) scalene triangle
- c) equilateral triangle
- d) isosceles triangle

Q. In third angle projection, the ..... lies between ..... and .....

- a) object, projection plane, observer
- b) Projection plane, object, observer
- c) observer, object, projection plane
- d) all of the above

Q. A regular cone is rested on base on horizontal plane, the top view will be

- a) circle
- b) scalene triangle
- c) equilateral triangle
- d) isosceles triangle

Q. Perspective projection is used to represent

- a) real exact size of object
- b) real exact shape of object
- c) natural view of the object
- d) all of the above

Q. Hatching line is a line which makes an angle of 45° with

- a) horizontal
- b) vertical
- c) main line of the section
- d) all of the above

Q. A circle will appear on an isometric drawing as

- a) ellipse
- b) cycloid
- c) circle
- d) parabola

Q. The length to width ratio of an arrow head is

- a) 1:1
- b) 2:1
- c) 3:1
- d) 4:1

Q. If a lamina is parallel to the HP, then it will be ..... to the VP

- a) parallel
- b) perpendicular
- c) inclined
- d) Both (a) and (b) of above

Q. If a lamina is perpendicular to the HP, then its top view will be a

- a) point
- b) straight line
- c) polygon
- d) circle

Q. If a line is perpendicular to the HP, then its top view will be a

- a) point
- b) straight line
- c) polygon
- d) circle

Q. If a line is perpendicular to the HP, then its front view will be a

- a) point
- b) straight line
- c) polygon
- d) circle