

Taiwo oladipupo olawale

18/eng02/090

Computer engineering

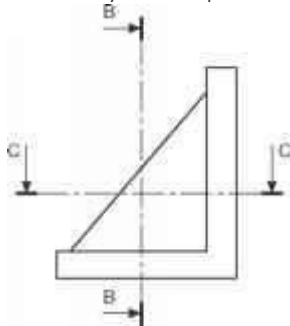
THEORY ANSWERS

1.) When an object becomes more complex, as in the case of an automobile engine block, a clearer presentation of the interior can be made by sketching the object as it would look if it were cut apart. In that way, the many hidden lines on the sketch are eliminated.

The process of sketching the internal configuration of an object by showing it cut apart is known as sectioning. Sectioning is used frequently on a wide variety of Industrial drawings.

A section is used to show the detail of a component, or an assembly, on a particular plane which is known as the cutting plane. A simple bracket is shown in below and it is required to draw three sectional views. Assume that you had a bracket and cut it with a hacksaw along the line marked B-B. If you looked in the direction of the arrows then the end view B-B in the solution below, would face the viewer and the surface indicated by the cross hatching would be the actual metal which the saw had cut through.

Alternatively, had we cut along the line C-C then the plan in the solution would be the result. A rather special case exists along the plane A-A where in fact the thin web at this point has been sliced. Now if we were to cross hatch all the surface, we had cut through on this plane we would give a false impression of solidity. To provide a more realistic drawing the web is defined by a full line and the base and perpendicular parts only have been cross hatched. Note, that cross hatching is never undertaken between dotted lines, hence the full line between the web and the remainder of the detail. However, the boundary at this point is theoretically a

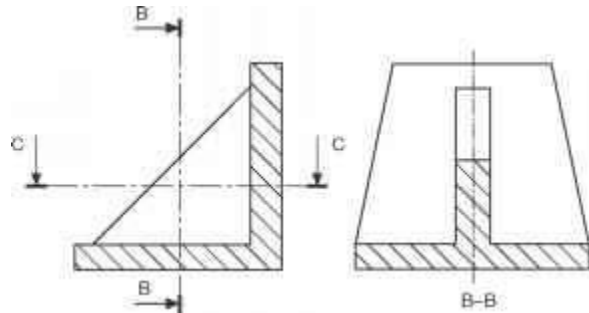


dotted line since the casting is formed in one piece and no join exists here. This standard drawing convention is frequently tested on examination papers.

Cutting planes are indicated on the drawing by a long chain line 0.35 mm thick and thickened at both ends to 0.7 mm. The cutting plane is lettered and the arrows indicate the direction of viewing. The sectional view or plan must then be stated to be A-A, or other letters appropriate to the cutting plane. The cross hatching should always be at 45° to the centre lines, with continuous lines 0.35 mm thick.

If the original drawing is to be microfilmed successive lines should not be closer than 4 mm as hatching lines tend to merge with much reduced scales. When hatching very small areas the minimum distance between lines should not be less than 1 mm.

In the case of very large areas, cross hatching may be limited to a zone which follows the contour of the hatched area. On some component detail drawings, it may be necessary to add dimensions to a sectional drawing and the practice is to interrupt the cross hatching so that the letters and numbers are clearly visible.



2.) Principles of Dimensioning

1. All dimension, extension, and leader lines should be thin, sharp, dark lines (.5mm/2H).
2. Extension lines indicate the points between which the dimension figures apply. They are drawn perpendicular to the dimension lines, start with a visible gap (~1/32") between them and the object, and terminate 1/8" (3.2 mm) beyond the last arrowhead.
3. Each dimension should be terminated by arrowheads touching the extension lines and pointing in opposite directions. Arrowheads are drawn freehand with .7mm/HB lead. The line should be broken only at the approximate center for the dimension figures.
4. Dimensions shown with dimension lines and arrowheads should be placed to be read from the bottom of the drawing (unidirectional system).
5. All dimensions should be given in decimal format. When dimensions are given in inches, leading zeros are omitted from dimension values less than 1.00
6. When all dimensions on a drawing are given in inches, the inch marks (") are omitted, the same applies to millimeters. If metric units are used, the word METRIC will appear boxed in a spot toward the lower portion of the drawing sheet.
7. A dimension line should never coincide with an object line or a center line, nor should it be an extension of these lines. Both, however, may be used as extension lines.
8. Crossing of extension lines or dimension lines should be avoided if possible. Where such crossings are unavoidable, there should be no break in either of the lines. However, if extension lines cross dimension lines through the arrowheads, the extension line may be broken.

9. Dimensions should be at least 3/8" (10 mm) from the object outline, then equally spaced at least 1/4" (6 mm) apart. A continuous series of dimensions should be aligned rather than staggered. Standard practice is to place the shortest dimensions nearest to the object and space adjacent parallel dimension lines further away from the object in order of their length.

10. Dimensions are preferably placed outside the outlines of the views.

11. When placement outside the views will result in (a) dimensions too far from the distance they indicate, (b) long and confusing extension lines or leader lines that cross other lines of the drawing, or (c) any confusion in understanding where the dimension applies, they may be placed inside the view and close to the distance they indicate.

12. As the distance dimensioned becomes less than about 1/2" (12.7 mm), the space between extension lines becomes too small for both arrowheads and figures. For these small dimensions the methods shown may be used. Each dimension should have two arrowheads associated with it, pointing in opposite directions. Dimensions can 'share' arrowheads. The following depicts appropriate forms for linear dimensions.

13. Where there are several parallel dimension lines in a group, the dimension figures should be staggered so that they will not interfere with one another.

14. Lettering (notes) should always be placed horizontal on the page, to be read from the bottom of the drawing (.7mm HB).

15. Positive cylindrical features should always be located by their center lines in the circular view of the feature.

16. The diameter of cylindrical features should be specified in the rectangular view with a linear dimension. If clear space is available without conflict with other lines, a diameter dimension may be placed in the circular view; however, it is preferred in the rectangular view.

17. A series of concentric diameters on the same part should be dimensioned in the view where the cylindrical surfaces show as rectangles.

18. The dimension numeral should be preceded by the symbol \emptyset .

19. Holes are specified by a local note and placed in the view where the hole appears as a true circle. The leader line should extend radially from the circle, touching its circumference. See section on Leader Forms.

20. Dimensions locating holes should be given to both of the two center lines that intersect at right angles at the hole centers, and should be placed in the view where the hole appears as a true circle. Do not give location dimensions to the edge of holes.

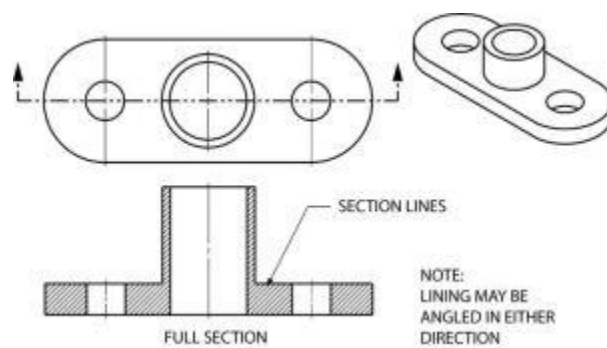
21. When specifying a hole, the numerical value of the hole size (diameters) should be preceded by \emptyset . Symbols should be used to indicate the specific details related to the hole. See example below. A summary of the symbols follows: Notes should be written in the same sequence by which the hole would be produced.

22. If two or more identical holes exist

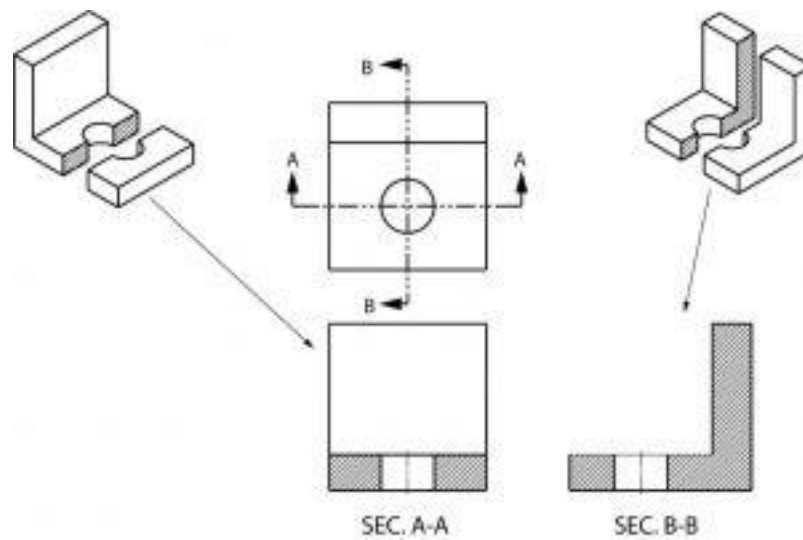
- 23. Radial dimensions are given for circular arcs that are less than 180°.
- 24. Radial dimension lines should always be placed in the circular view of the arc, and should be drawn at an angle, never horizontal or vertical.
- 25. The dimension figures should be horizontal on the page, and are preceded by "R".

3.) Full Sections

When a cutting plane line passes entirely through an object, the resulting section is called a full section. Fig. 7 illustrates a full section.



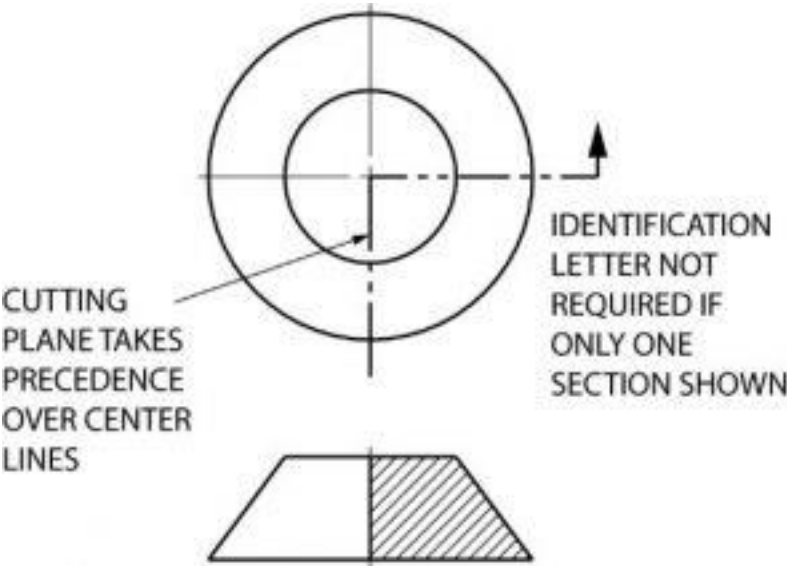
It is possible to section an object whenever a closer look intentionally is desired. Here is an object sectioned from two different directions.



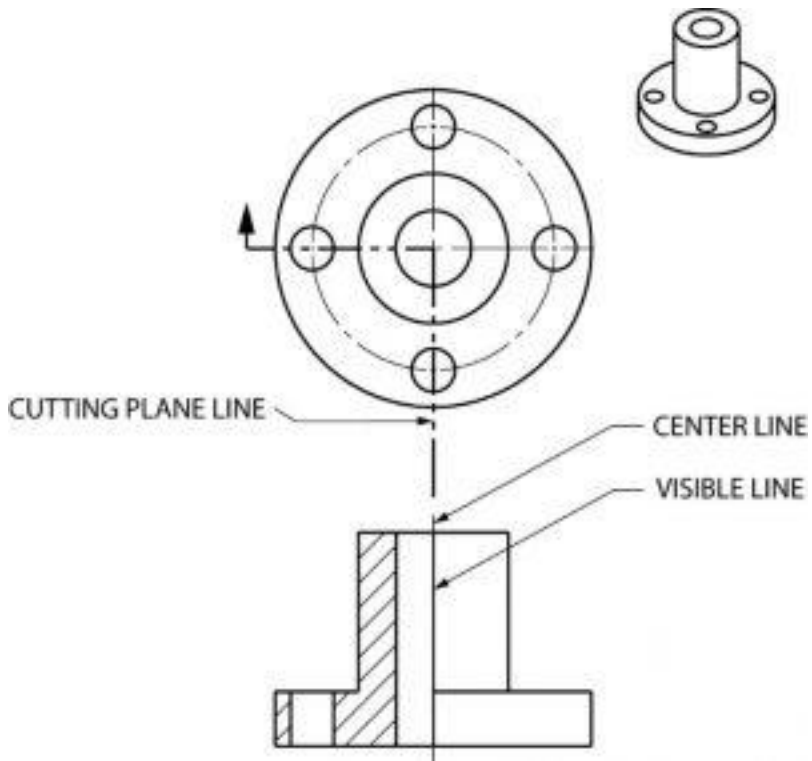
Half Sections

If the cutting plane is passed halfway through an object, and one-quarter of the object is removed, the resulting section is a half section. A half section has the advantage of showing both inside and outside configurations.

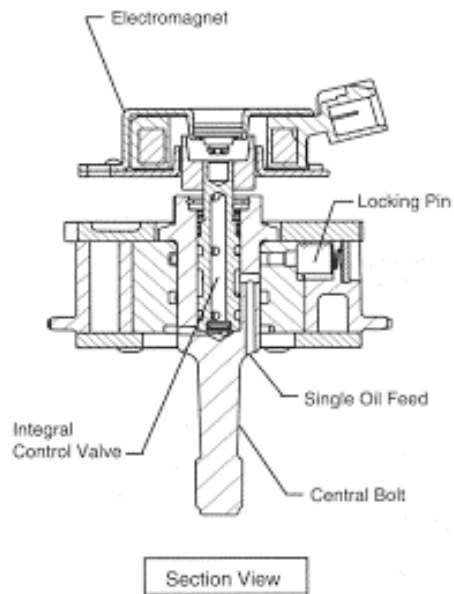
It is frequently used for symmetrical objects. Hidden lines are usually not shown on the un-sectioned half unless they are needed for clearness or for dimensioning purposes. As in all sectional drawings, the cutting plane takes precedence over the center line.



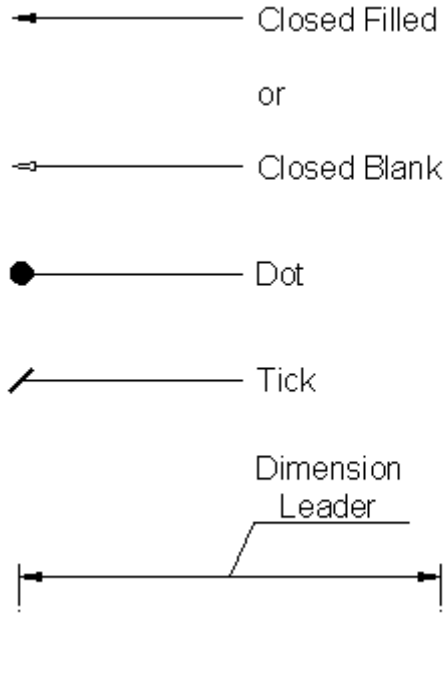
Here is another example of a half section. Remember that only one fourth of the object is removed with a half section, whereas half of the object is generally removed with a full section.



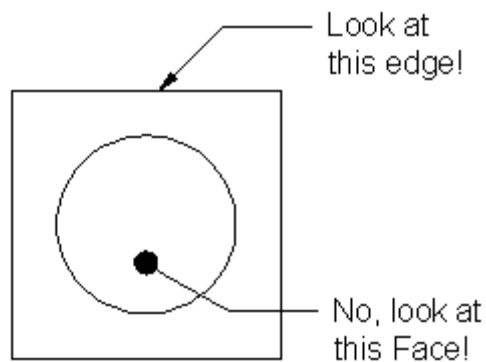
This manufacturer's drawing, using both full and half section, illustrates the advantages of sectional views. The different line directions indicate different parts and materials used in the assembly of this valve.



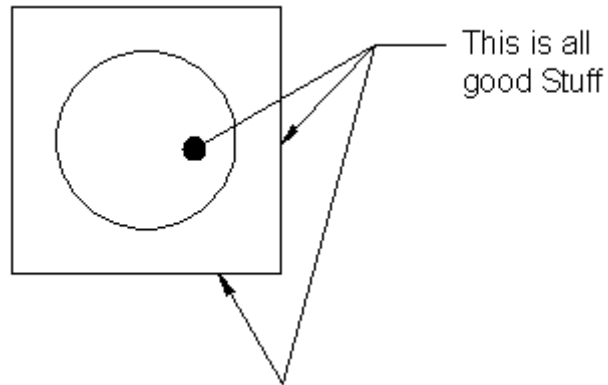
4.) The British technical drawing standards give us four different types of terminators to use with our leader lines.



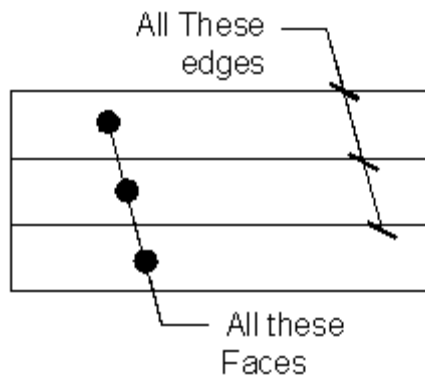
An arrow terminator is used to point to an edge of an item. The dot is used to point to a face. The Architectural tick can be used for referring to multiple parallel edges. The final type of line has no terminator, and is used for pointing at dimension lines or lines of Symmetry.



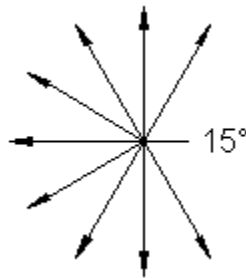
Leader lines can have multiple segments and you can use one annotation to reference multiple faces and edges.



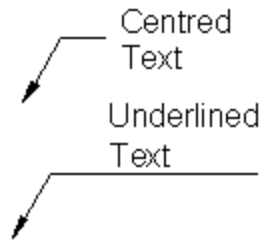
You can reference multiple parallel edges or faces with one leader.



It is recommended that you draw your leader lines at an angle to the rest of the drawing – i.e. Not parallel to the drawing itself. Increments of 15° are advised.



Finally, your Instruction text can be centred to the reference line, or it can sit above the reference line. The text should be a least twice the line thickness above the reference line. The text should never touch the reference line itself.



5.) scale= 5:1 means that the drawing should be 5 times bigger than it is in real i.e. if you have 2mm in this scale it will be drawn as 10mm

SCALE= 1:10 means that the drawing is 10 times smaller than it is in real life

6.) diameter= \emptyset .

Radius="R"

7.) **Orthographic projection** is a means of representing 3 dimensional objects in two dimensions It is a form of parallel projection, in which all the projection lines are orthogonal, to the projection plane, resulting in every plane of the scene appearing in affine transformation on the viewing surface. The obverse of an orthographic projection is an oblique projection, which is a parallel projection in which the projection lines are *not* orthogonal to the projection plane.

The term *orthographic* is sometimes reserved specifically for depictions of objects where the principal axes or planes of the object are also parallel with the projection plane, but these are better known as *Multiview purposes* Furthermore, when the principal planes or axes of an object in an orthographic projection are *not* parallel with the projection plane, but are rather tilted to reveal multiple sides of the object. orthographic projection is a type of 'parallel' projection in which the four orthogonal views of an object are shown.

8.) **First angle projection** means the **object** is placed in **first** quadrant and the top view of the **object** is below the front view so the bottom view is above the front view. This is obtained as the bottom view is viewed from bottom and so is **projected** upwards. **First angle projection** is a method of creating a 2D drawing of a 3D object.

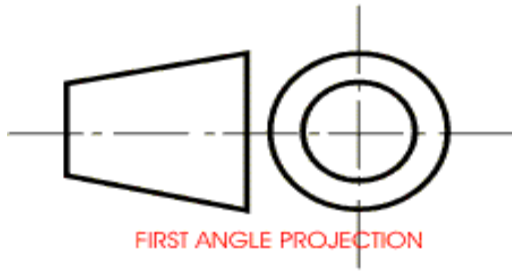
9.) It's a way of showing a 3D object on a 2D piece of paper, and it shows what a part looks like from each direction - top, bottom, left right. If some details of a view can be inferred from another, then you don't bother to draw that view.

The 'first angle' moniker refers to the way the drawing is laid out, as opposed to third angle.

The easiest way to visualise first angle projection is to imagine you have an upside-down bowl in front of you. Put the part you want to draw on the bottom of the bowl.

This is your main (primary) view.

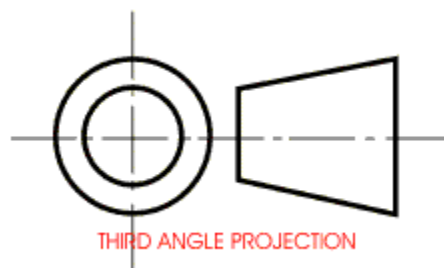
To create the top, bottom, left and right views, you 'slide' your part off the side of the imaginary upside-down bowl, and draw what you see.



Third angle projection:

Third angle projection is one of the methods of orthographic projection used in technical drawing and normally comprises the three views (perspectives): front, top and side. Orthographic projection is a method of expressing a three-dimensional object on a flat surface and has the advantage of enabling the form of an object to be displayed accurately. The way in which we position these three views, differentiates third angle projection from first angle projection.

When using third angle projection to compile a diagram of the three views, we first draw the most prevalent side of the object as the front view. The top view is positioned directly above the front view and for the side view, we generally position the right side view on the right of the front view. (If the left side is used, it is positioned on the left side.) The respective views are thus placed in their prescribed positions. It is particularly important to note that the top view is to be placed above the front view.



OBJECTIVES

- 1). d
- 2.) a
- 3.) d
- 4.) a

5.) a

6.) b

7.) c

8.) b

9.) a

10.) a

11.) c

12.) a

13.) a

14.) c

15.) d