

Q1/ There are many output devices use by data processing to carry out to outside world, what it, speak by details about two of them.

Solution:

Monitor:

Also called a video display terminal (VDT) and video display unit (VDU), a monitor is a video display screen. In its most common usage, monitor refers only to devices that contain no electronic equipment other than what is essentially needed to display and adjust the characteristics of an image.

Flat-panel display:

Thin screen displays found with all portable computers and becoming the new standard with desktop computers. Instead of utilizing the cathode-ray tube technology flat-panel displays use Liquid-crystal display (LCD) technology or other alternative making them much lighter and thinner when compared with a traditional monitor

Printer:

An external hardware device responsible for taking computer data and generating a hard copy of that data. Printers are one of the most used peripherals on computers and are commonly used to print text, images, or photos. The different printers are as follows:

Type	Mode of Printing
Dot – Matrix printer	Prints the character in dotted pattern through printer ribbon using either 24 pin or 9 pin
Ink Jet printer	Work by spraying ionized ink
Laser printer	Also called page printer. Uses laser beam to produce an image.
Line printer	Prints lines at a time instead of single characters.

Projector:

An output device that can take the display of a computer screen and project a large version of it onto a flat surface. Projectors are often used in meetings and presentations so that everyone in the room can view the presentation.

Plotter:

Plotters are used to print graphical output on paper. It interprets computer commands and makes line drawings on paper using multicolored automated pens. It is capable of producing graphs, drawings, charts, maps etc.

Q2/ The Keyboard is one of input device, what the other equipments of data inputs?

Solution:

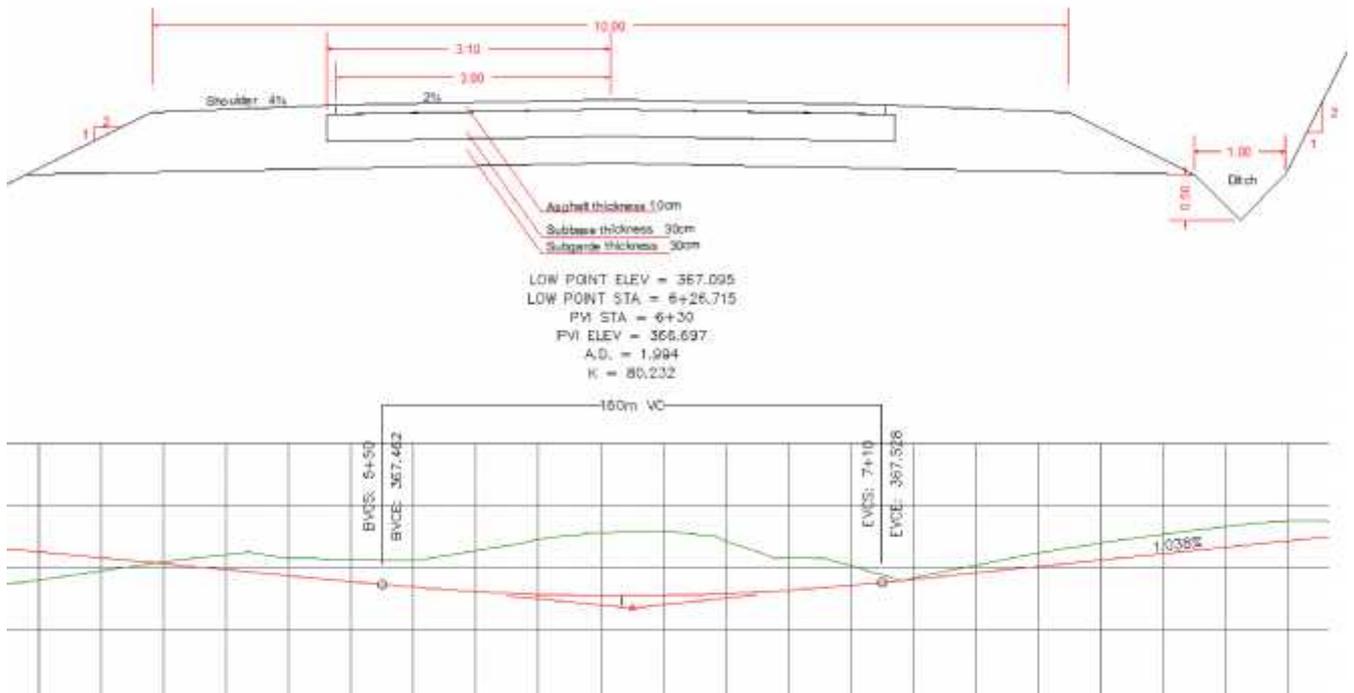
- a) **The keyboard**
- b) **The mouse**
- c) **Digitized or graphic tablets**
- d) **Scanners**
- e) **Digital camera**

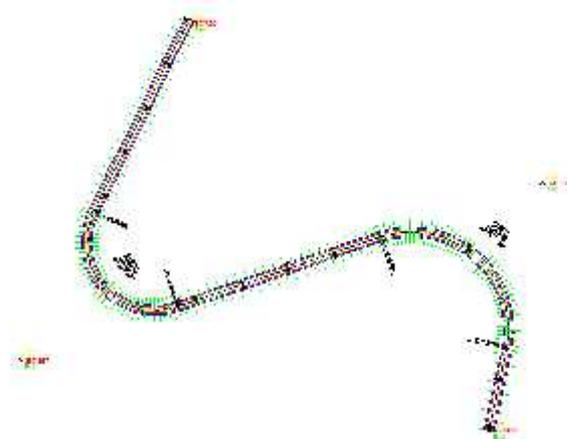
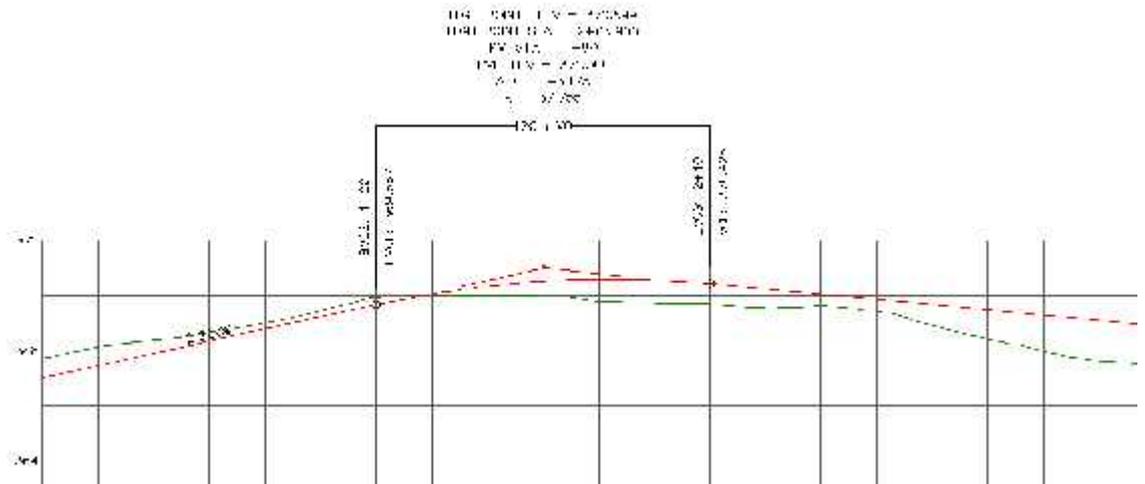
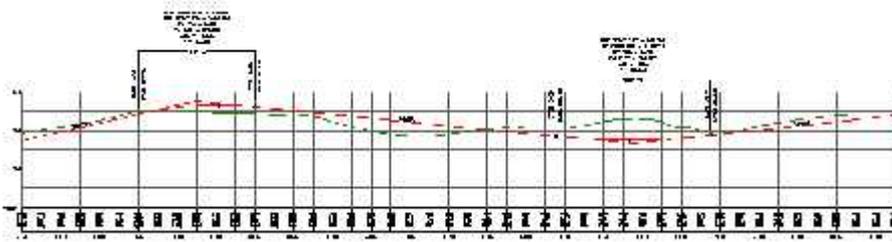
Program AutoLand

Q3/ Create the project and drawings under your name, save your project in land projects 2009. Point file name (Final Exam.txt) at location (D).For the alignment and

profile (Horizontal scale= 1:1000, Vertical scale= 1:100, Text style 3mm).For cross-sections: Horizontal scale=Vertical= 1:100, text style is 3mm.

- 1- Create contour line with contour interval 0.5m and create labels on the contour lines, with contour text style (6).
- 2- Create alignment from (Start, PI1, PI2, End) and create curve with (Radius=70m for PI1, Radius=100 for PI2), and create curve label for horizontal curve with (style=3, offset=8), create offset for (second offset Shoulder=5.00m for each side, Inner offset EOP=3.00m).
- 3- Create profile with design FG (Station 0.00, Elevation=367.00), (PVI station=180, PVI Elevation=371.00, Curve length=120m), (PVI station=630, PVI Elevation=366.697, Curve length=160m), (End station, Elevation=369.50).
- 4- Create cross section and sample from surface swath width (12m for Right 12m for Left), sample increments (tangents=10, Curves=5), and to draw the template with (Foreslope=1m, Depth=0.5m with Depth from hinge), and save it by name (final exam).
- 5- Plot sections by page (setting offset incr=1, offset lbl incr=2, Elevation incr=1, Elevation lbl incr=2) with volume table.





Q4/ When speak about Data Collection Methods, it have many methods. Type these methods and speak about two of them.

Solution:

Data collection methods:

a) Radiation by Total Station

In the radiation method, illustrated in Figure 7, with a total station instrument set up at a control point. The zenith angle, slope distance and direction are observed to each desired item of mapping detail. From the zenith angle and slope distance, the elevation of the point can be determined, and by merging the direction, its horizontal position can be computed.

b) Radiation by Stadia

This procedure enabled surveys to be completed relatively rapidly and efficiently, and it provided accuracy suitable for locating topographic details. Stadia can also be applied in lower-order trigonometric leveling, observing lengths of backsights and foresights in differential leveling and for making quick checks of observations made by higher-order methods.(Stadia observations can be taken with theodolites, transits and other equipments).

c) Coordinate Squares or Grid Method

The method of coordinate squares (grid method) is better adapted to locating contours than planimetric features, but can be used for both. The area to be surveyed is staked in squares (5, 10, 20, or 40 m) on a side, the size depending on the terrain and accuracy required. A total station instrument can be used to layout control lines at right angles to each other such as AD and $D3$ in Figure 8. Grid lengths are marked and the other corners staked and identified by the number and letter of intersecting lines. Elevations of the corners can be obtained by differential or trigonometric leveling. Contours are interpolated between the corner elevations (along the sides of the blocks) by estimation or by calculated proportional distances. Elevations obtained by interpolation along the diagonals will generally not agree with those from interpolation along the four sides because the ground's surface is not a plane.

d) Topographic Detailing with GPS

GPS receivers for topographic work are specially designed, small, and portable. It is interfaced with a keyboard for system control and entry of codes to identify features surveyed.

e) Laser Scanning

Laser scanners automate digital angle observation with reflector less, laser EDM technologies. They can quickly produce grids of three-dimensional coordinates for user-specified scenes.

f) Aerial Photos

Used in land surveying to compute coordinates of section corners boundary corners or points of evidence that help locate these corners. Large-scale maps are made by photogrammetric procedures for many uses, one being subdivision design. Aerial photo is used to map shorelines in hydrographic surveying, to determine precise ground coordinates of points in control surveying, and to develop maps and cross sections for route and engineering surveys. Photogrammetry is playing an increasingly important role in developing the necessary data for modern land and geographic information systems (LIS and GIS).

g) Satellite Imagery

Satellite images form one of the most important sources of raster data for GIS and image processing software. As the name implies, imagery can be obtained from many earth-orbiting satellites providing data gathered by a variety of sensors. Satellite data are referred to as *imagery* instead of photography, because the vast majority of satellite data are collected through electronic sensors, not a film based photographic process.

Q5/ Flat – panel display, plotter; are output devices. Speak briefly about each one.

Solution:

Flat-panel display:

Thin screen displays found with all portable computers and becoming the new standard with desktop computers. Instead of utilizing the cathode-ray tube technology flat-panel displays use Liquid-crystal display (LCD) technology or other alternative making them much lighter and thinner when compared with a traditional monitor

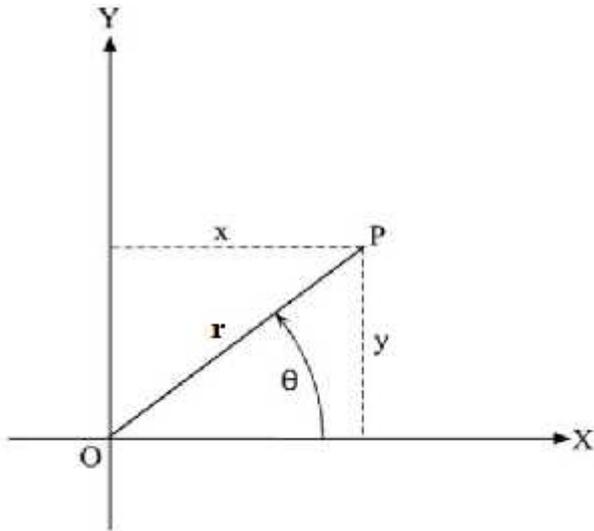
Plotter:

Plotters are used to print graphical output on paper. It interprets computer commands and makes line drawings on paper using multicolored automated pens. It is capable of producing graphs, drawings, charts, maps etc.

Q6/ Show relationship between polar and rectangular coordinates when coincide the two coordinates. (By equations & graph)

Solution:

If the polar axis coincides with the positive x-axis of a rectangular system of coordinates, the pole being at the origin, the relationship between the two coordinate systems is readily obtained using trigonometry as follows:



$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$r = \sqrt{x^2 + y^2}$$

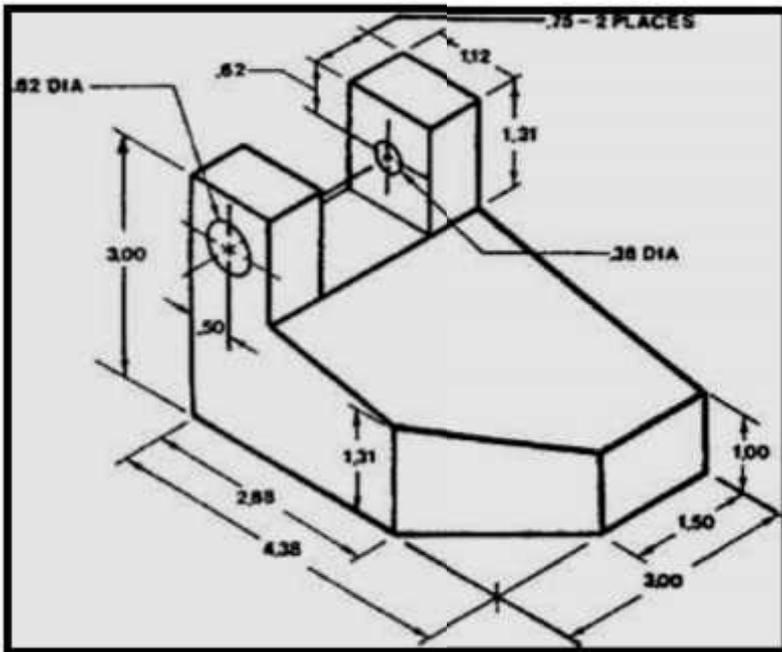
$$\theta = \tan^{-1} y/x$$

Program AutoLand

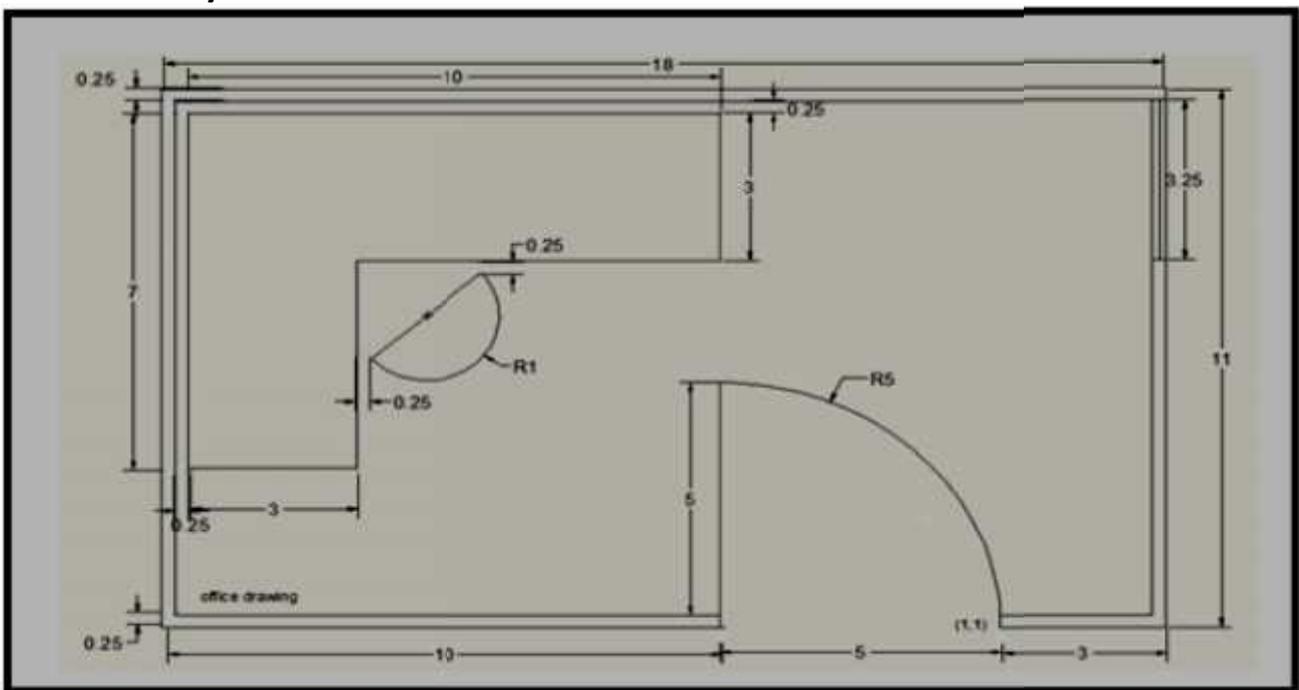
Q6/ Create the project and drawings under your name, save your project in land projects 2009. Point file name (Second Exam.txt) at location (D).For the alignment and profile (Horizontal scale= 1:1000, Vertical scale= 1:100, Text style 3mm).

- ▮ Create contour line with contour **interval 1.00m** and create labels on the contour lines, with contour text **style (4)**.
- ▮ Create alignment from (**Start, PI, End**) and create curve with (**Radius=175m**), and create curve label for horizontal curve with (**style=3, offset=8**), create offset for (**second offset Shoulder=6.00m for each side, Inner offset EOP=3.50m**).
- ▮ Create profile with (**left & right sampling offset 6.00m**) and design FG center line (**Station 0.00, Elevation=547.00**), (**PVI station=120, PVI Elevation=548.20, Curve length=120m**), (**PVI station=500, PVI Elevation=561.00, Curve length=160m**), (**End station, Elevation=562.50**).

Q7: Type procedure to draw the three views for following drawing, Apply Absolute Coordinate System



Q8: Draw the office floor plan on board its' sides are (12,8ft),note that the figure faraway (1ft) horizontality and (1ft) vertically from original point (0,0).Using Absolute Coordinate System.



Q9: what is the result expected from executing the following Program on AutoCAD application.

Command : Line
Specify First Point: 100,100
Specify Next Point: 100,0
Key board: Esc

Command : Line
Specify First Point: 0,100
Specify Next Point: @100,0
 :@-100,-100
 :@100,0
 :@ 100,100
 :@0,-100

Key board: Esc

Command : Line
Specify First Point: 25,50
Specify Next Point: @35.355<45
 :@35.355<315
 :@ 35.355<225
 :@35.355<135

Key board: Esc

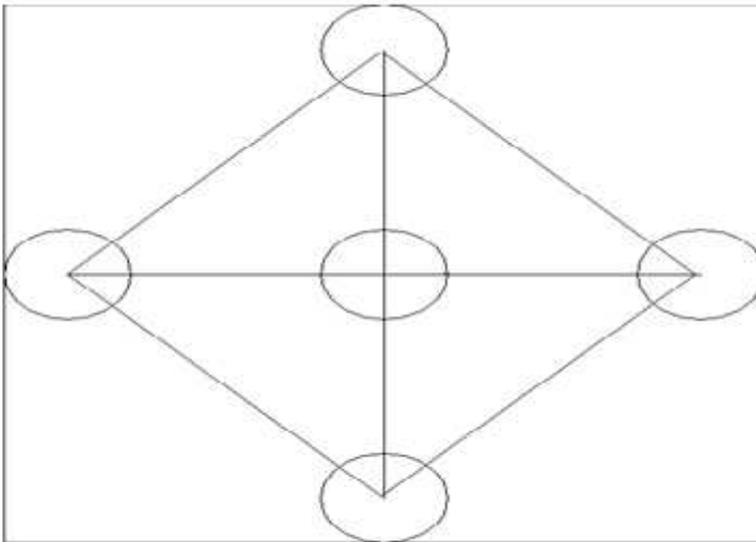
Command : Circle
Specify the center Point: 25,50
Specify the radius: 10
Key board: Esc

Command : Circle
Specify the center Point: 50,25
Specify the radius: 10
Key board: Esc

Command : Circle
Specify the center Point: 75, 50
Specify the radius: 10
Key board: Esc

Command : Circle
Specify the center Point: 50,75
Specify the radius: 10

Answer:



Q10: What is the expected result from execute following commands in AutoCAD Program?

Command: rectangle
 Command: fillet
 Specify radius of fillet: 0.1
 Specify first corner point: 0,0
 Specify other corner point: @1,1

Command: Rectangle (enter)
 Specify first corner point: 0.250,0.250
 Specify other cornerpoint:@0.5,0.5

Command: Rectangle (enter)
 Specify first corner point: 0.250, - 0.5
 Specify other cornerpoint:@0.5,0.5

Command: Rectangle (enter)
 Specify first corner point: 1,0.250
 Specify other cornerpoint:@0.5,0.5

Command: Rectangle (enter)
 Specify first corner point: 0.250,1
 Specify other cornerpoint:@0.5,0.5

Command: Rectangle (enter)
 Specify first corner point: -0.5,0.250
 Specify other cornerpoint:@0.5,0.5

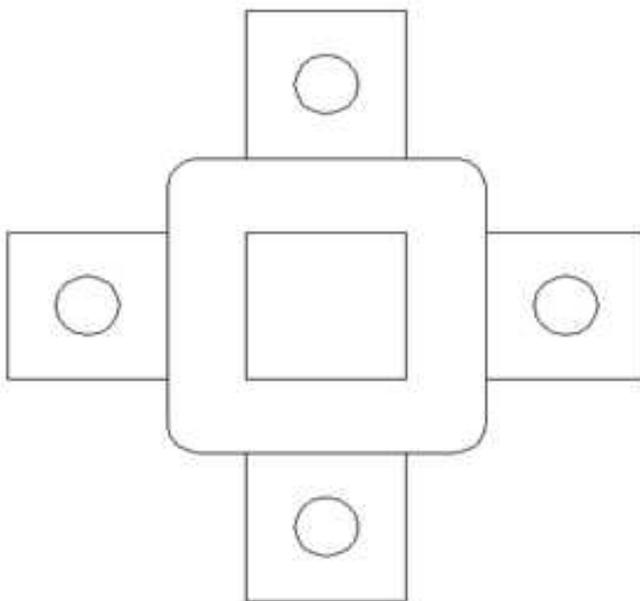
Command: Circle
 Specify the center Point: 0.5,-0.250
 Specify the radius:0.1

Command: Circle
 Specify the center Point: 1.250,0.5
 Specify the radius:0.1

Command: Circle
 Specify the center Point: 0.5,1.250
 Specify the radius:0.1

Command: Circle
 Specify the center Point:- 0.250,0.5
 Specify the radius:0.1

Answer:



Q11/ Computerized system that performs mathematical operations on input data to transform it into the output form desired by a system user. Describe that. (10 Marks)

Answer:

General: Operations performed on a given set of data to extract the required information in an appropriate form such as diagrams, reports, or tables.

Computing: Manipulation of input data with an application program to obtain desired output as an audio/video, graphic, numeric, or text data file.

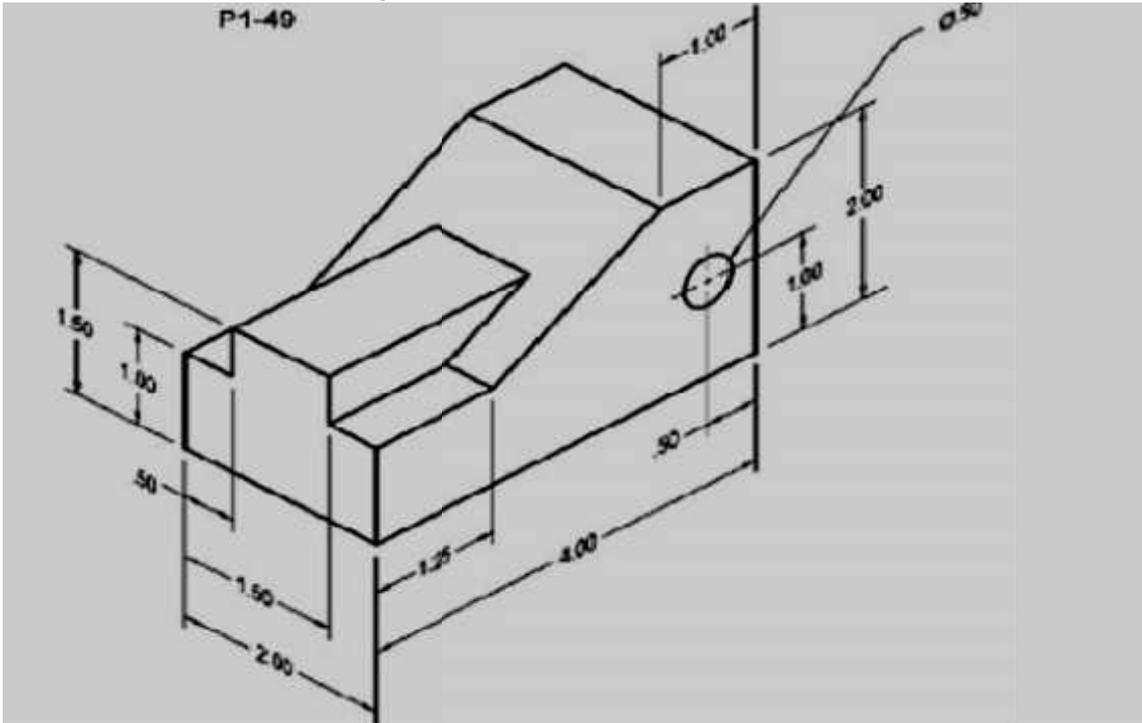
Q12/ AutoCAD supplies two different types of text objects, what it, how can use it? Draw example for it.

Answer:

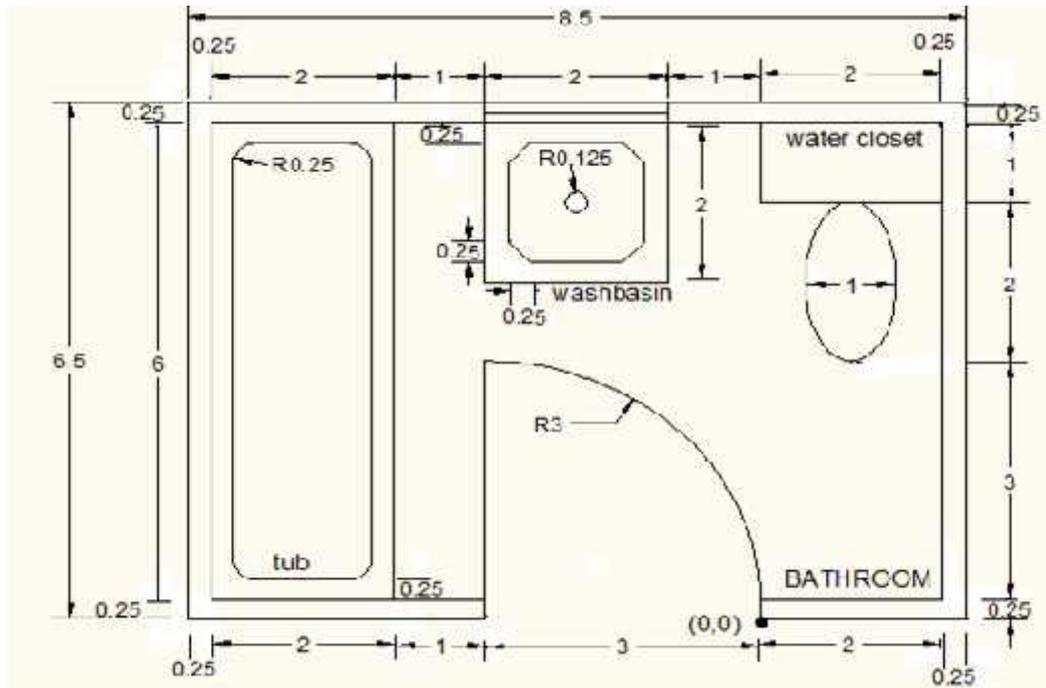
1. The Dtext command inserts one or more lines of text as single line objects. The Dtext command enables you to display AutoCAD text dynamically in the drawing as you type it. It also allows you to justify, or align, the text in several ways, including left, right, and center justification.

2. The Mtext Command treats one or more paragraphs of text as single objects. The Mtext command creates a multiple line object called Mtext. AutoCAD uses a text editor to create Mtext objects.

Q13/ Type procedure to draw the three views for following drawing, Apply Absolute Coordinate System



Q14/ Draw the Bath floor plan on board its' sides are (12, 8ft), note that the figure faraway (1ft) horizontality and (1ft) vertically from original point (0, 0). (Relative Polar Coordinates System)



Q15/ What is the expected result from execute following commands in AutoCAD Program?

Command:Rectangle (enter)
 Specify first corner point: 5,3
 Specify other cornerpoint:@5,5

Command:Line (enter)
 Specify first point :7.5,3
 Specify next Point :@2.5,2.5
 :@-2.5,2.5
 :@-2.5,2.5
 :@-2.5,-2.5
 :@2.5,-2.5

Command:Line (enter)
 Specify first point :5,3
 Specify next Point :@1.250,1.250

Command:Line (enter)
 Specify first point :10,3
 Specify next Point :@-1.250,1.250

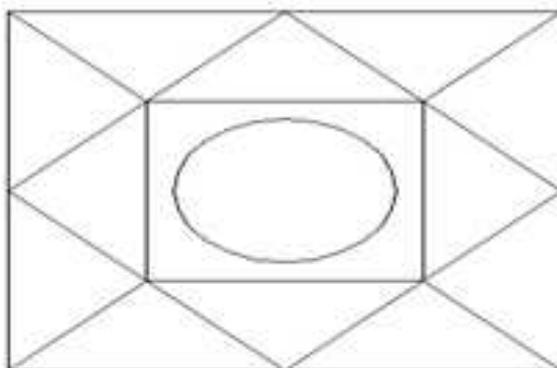
Command:Line (enter)
 Specify first point :10,8
 Specify next Point :@-1.250,-1.250

Command:Line (enter)
 Specify first point :5,8
 Specify next Point :@1.250,-1.250

Command:Rectangle (enter)
 Specify first corner point:
 6.250,4.250
 Specify other cornerpoint:@2.5,2.5

Command :Circle
 Specify the center Point:7.5,5.5
 Specify the radius:1

Answer:



Q16/ What is the expected result from execute following commands in AutoCAD Program? (Put all the necessary coordinates on the resulting shape).

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Command: Line (enter)
Specify first point: 0,0
Specify next point: @12<0
Specify next point: @2<90
Specify next point: @12<0
Specify next point: @2<270
Specify next point: @12<0
Specify next point: @6<90
Specify next point: @6<180
Specify next point: @6<90
Specify next point: @6<0
Specify next point: @6<90
Specify next point: @12<180
Specify next point: @2<270
Specify next point: @12<180
Specify next point: @2<90
Specify next point: @12<180
Specify next point: @6<270
Specify next point: @6<0

```

```

Specify next point: @6<270
Specify next point: @6<180
Specify next point: @6<270

```

```

Command: Circle (enter)
Specify center point of circle: 12,6
Specify radius of circle: 2

```

```

Command: Circle (enter)
Specify center point of circle: 24,6
Specify radius of circle: 2

```

```

Command: Circle (enter)
Specify center point of circle: 12,12
Specify radius of circle: 2

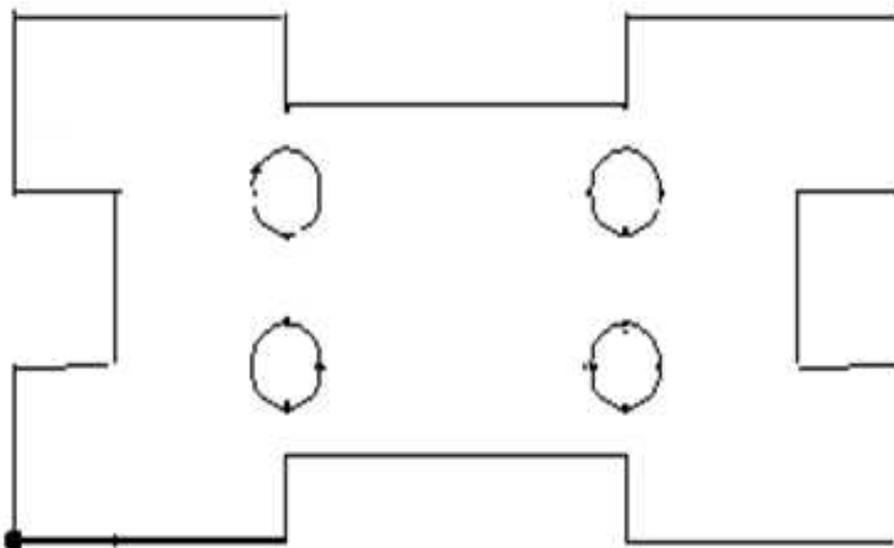
```

```

Command: Circle (enter)
Specify center point of circle: 24,12
Specify radius of circle: 2

```

Answer:



Q17/ What mean Effectiveness of Graphics Language and explain element of technical drawing?

Answer:

- Try to write a description of this object.
- Test your written description by having someone attempt to make a sketch from your description.

You can easily understand that: The word languages are inadequate for describing the size, shape and features completely as well as concisely.

Graphic language use lines to represent the surfaces, edges and contours of objects.

The language is known as “drawing” or “drafting”.

A drawing can be done using freehand, instruments or computer methods

Elements

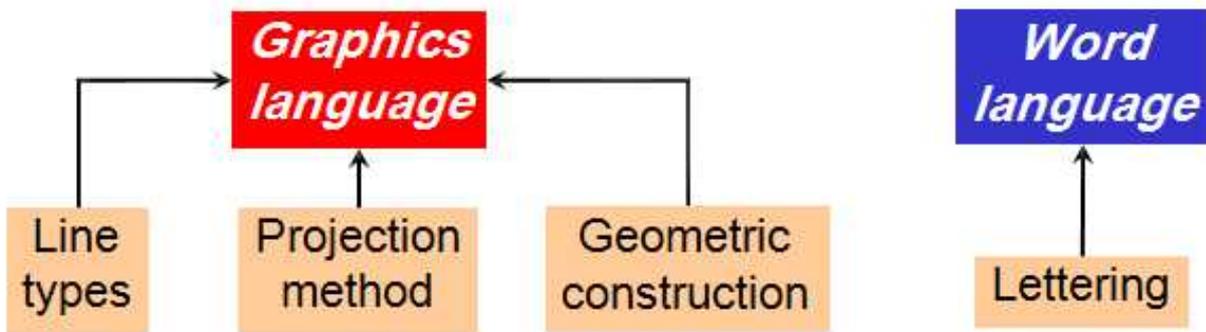
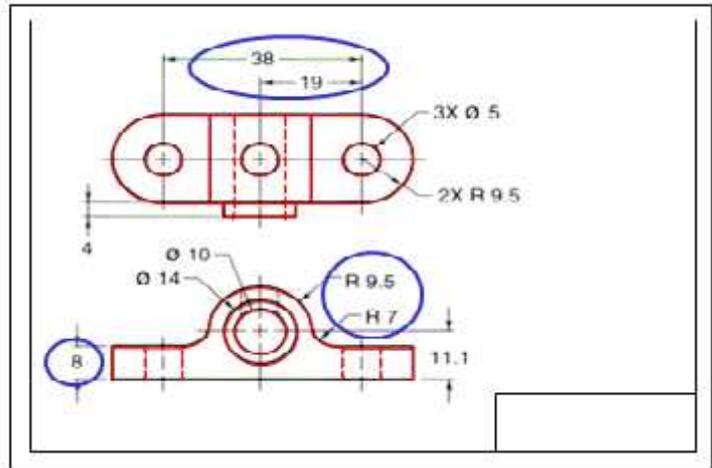
Drawing comprises of *graphics language* and *word language*.

Graphics language

Describe a shape (mainly).

Word language

Describe size, location and specification of the object.



Q18/ Briefly explain basic elements used in descriptive geometry include: Points, Lines, Planes then define Coordinate systems that use in describing spatial information

Answer:

The basic elements used in descriptive geometry include: Points, Lines, Planes

Coordinate systems are mathematical tools useful in describing spatial information: Cartesian coordinate systems are the most commonly used.

Cartesian coordinate system

Points are located relative to the origin of the coordinate system.

Points

- A point has no width, height, or depth.
- A point represents a specific position in space as well as the end view of a line or the intersection of two lines.
- The graphical representation of a point is a small symmetrical cross.

Lines

- Lines represent the place of points that are directly between two points.
- A line is a geometric primitive that has no thickness, only length and direction.
- A line can graphically represent the intersection of two surfaces, the edge view of a surface, or the limiting element of a surface.
- Lines are vertical, horizontal, or inclined. A vertical line is defined as a line that is perpendicular to the plane of the earth (horizontal plane).

Planes

- Planes are surfaces that can be uniquely defined by:
 - Three non-linear points in space,
 - Two non-parallel intersecting vectors,
 - Two parallel vectors, or
 - A line and point not on the line.

Plane Classifications

- Planes are classified as
 - Horizontal
 - Vertical
 - Profile
 - Frontal
 - Inclined (perpendicular to a principle plane)
 - Oblique (not perpendicular to a principle plane)
- Horizontal and Vertical planes are principle planes.

Q19/ Explain Descriptive Geometry, aim, use of it. What mean drawing scale? Explain By details.

Answer:

- Descriptive Geometry is the graphical solution of point, line and plane problems in space. These solutions are accomplished by means of the same principles of drawing which are involved in making a simple view drawing of an object.
- Descriptive Geometry is the graphical solution of the more advanced problems of Engineering Drawing.
- Descriptive geometry is the graphic representation of plane, solid, and analytical geometry used to describe real or imagined technical devices and objects.
- It is the science of graphic representation in engineering design.

Descriptive Geometry can be defined as the projection of three-dimensional figures onto a two-dimensional plane of paper in such a manner as to allow geometric manipulations to determine lengths, angles, shapes, and other descriptive information.

The aim of Descriptive Geometry is to describe the three-dimensional objects by two-dimensional drawings so as to allow to reconstitute their original forms.

Uses of Descriptive Geometry

The application of descriptive geometry is used in:

- The design of buildings
- The design of road systems
- The design of mechanical systems
- The design of Electrical circuits
- The design of any Imaginary part

Scale is the ratio of the linear dimension (length, size) of an element of an object shown in the drawing to the real linear dimension of the same element of the object.

Designation of a scale consists of the word "SCALE" followed by the indication of its ratio, as follow

SCALE 1:1 for full size

SCALE X:1 for *enlargement* scales

SCALE :1X for *reduction* scales

Full Size - A scale with the ratio 1: 1

Enlargement Scale: A scale where the ratio is larger than 1:1. It is said to be larger as its ratio increases.

Reduction Scale: A scale where ratio is smaller than 1: 1. It is said to be smaller as its ratio decreases.

<i>Category</i>	<i>Recommended Scales</i>		
Enlargement Scales	50:1 5:1	20:1 2:1	10:1
Full size			1:1
Reduction Scales	1:2 1:20 1:200 1:2000	1:5 1:50 1:500 1:5000	1:10 1:100 1:1000 1:10000

Q20/ Show different between Multi-view drawing and axonometric drawing.
 Answer:

ORTHOGRAPHIC VIEW

NOTES

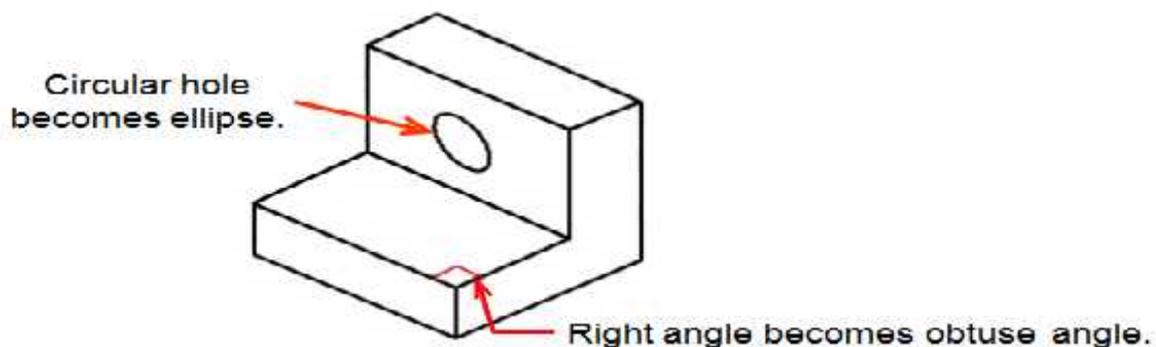
- Orthographic projection technique can produce either
 - 1) **Multiview drawing** that each view show an object in two dimensions.
 - 2) **Axonometric drawing** that show all three dimensions of an object in one view.
- Both drawing types are used in technical drawing for communication.

Axonometric (Isometric) Drawing

Advantage Easy to understand

Disadvantage Shape and angle distortion

Example Distortions of shape and size in isometric drawing

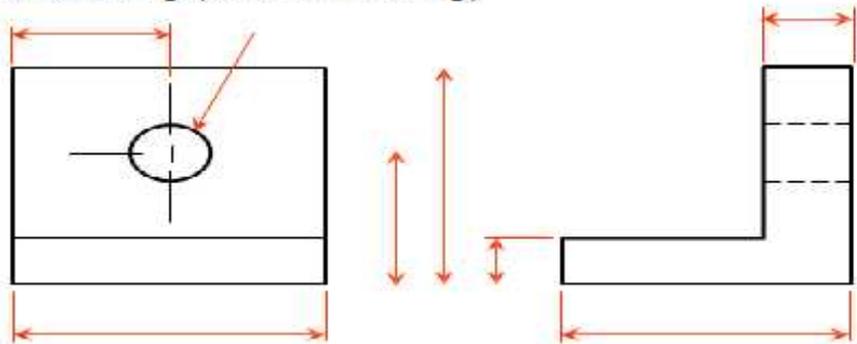


Multiview Drawing

Advantage It represents accurate shape and size.

Disadvantage Require practice in writing and reading.

Example Multiview drawing (2-view drawing)



A) Explain different types of Lines.

Answer:

Basic Line Types

Types of Lines	Appearance	Name according to application
Continuous thick line		Visible line
Continuous thin line		Dimension line Extension line Leader line
Dash thick line		Hidden line
Chain thin line		Center line

Meaning of Lines

Visible lines represent features that can be seen in the current view

Hidden lines represent features that can not be seen in the current view

Center line represents symmetry, path of motion, centers of circles, axis of axisymmetrical parts

Dimension and Extension lines indicate the sizes and location of features on a drawing

Q21/ What mean dimensioning, why using, what different types that contain, and what guidelines that should follow.

Answer:

Dimensioning

The purpose of dimensioning is to provide a clear and complete description of an object. A complete set of dimensions will permit only one interpretation needed to construct the part. Dimensioning should follow these guidelines.

1. Accuracy: correct values must be given.
2. Clearness: dimensions must be placed in appropriate positions.
3. Completeness: nothing must be left out, and nothing duplicated.
4. Readability: the appropriate line quality must be used for legibility.

The dimension line is a thin line, broken in the middle to allow the placement of the dimension value, with arrowheads at each end

An Arrowhead is approximately 3 mm long and 1 mm wide. That is, the length is roughly three times the width. An extension line extends a line on the object to the dimension line. The first dimension line should be approximately 12 mm (0.6 in) from the object. Extension lines begin 1.5 mm from the object and extend 3 mm from the last dimension line.

Q22/ Type procedure to draw the three view for following drawing, Apply Absolute Polar Coordinate system for figure 1 and Absolute Coordinate System for figure 2

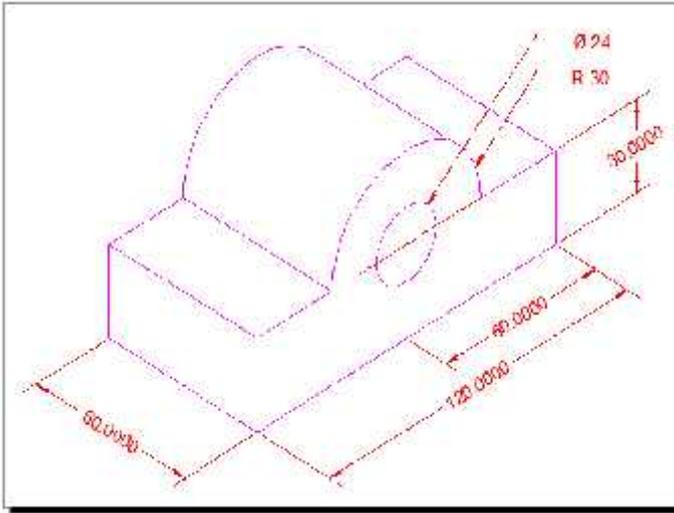
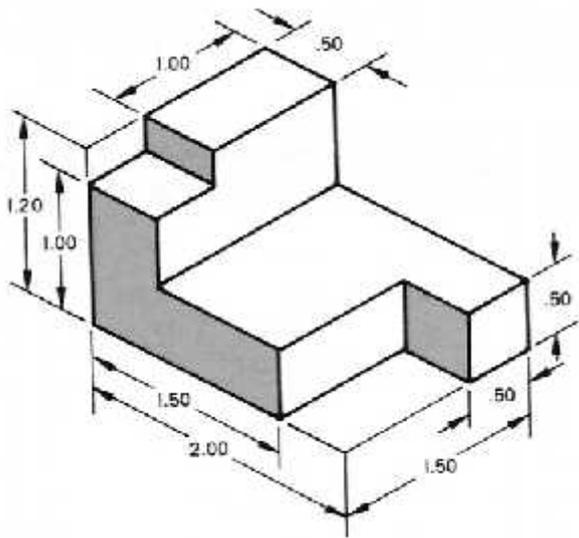
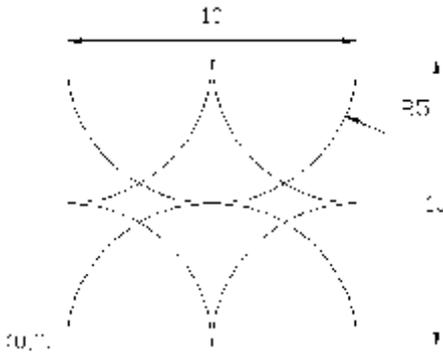


Figure 1

Figure 2

Q23/ Draw the following figure in board its' sides are (12×12 inch). if you know the figure is start from original point(0,0).



Q24/ Draw the following figure in board its' are sides (20×20 cm). if you know the figure is start from original point(0,0).

