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**17/ENGO3/037**

**Civil Engineering Department**

**PRACTICAL A**

1. AutoCAD and its commands:

AutoCAD:

This is a [commercial](https://en.wikipedia.org/wiki/Commercial_software) [computer-aided design](https://en.wikipedia.org/wiki/Computer-aided_design) (CAD) software that lets you design 2-D and 3-D drawings and models, replacing traditional pencil and paper drafting to create blueprints with easily altered electronic files.

AutoCAD commands, their shortcuts, and uses:

**C:** It is the command used for making a circle in AutoCAD.

**PL:** This command can be used to make a Polyline in your drawing.

**REC:** This command will make a rectangle in AutoCAD.

**POL:** This command can be used to make a polygon with minimum of 3 sides and a maximum of 1024 sides.

**ARC:** As the name suggests, this command can be used to make an arc in AutoCAD.

**ELLIPSE:** As the name suggests, this command can be used to make an ellipse with the major and minor axis.

**REG:** This command can be used to make a region geometry in AutoCAD.

**CO:** This command is used to copy object(s) in AutoCAD.

**ARRAY:** Using this command you can make Rectangular, polar or Path array.

**TR:** This command is used for trimming a geometry.

**OP:** Using this command you can open options window which contains most of the settings of AutoCAD.

**SC:** This command is used to change the scale of an object.

**B:** This command is used for creating a block, the properties of the block can be defined using the block definition window.

## **DI (DISTANCE):** It can be used to find the distance between two points in the drawing.

## **GROUP:** Using this command you can group multiple objects as a single unit. This command is great for making groupings of the similar type of objects like a group of similar blocks. To break this group you can use UNGROUP command.

## **ARC:** As the name suggests, this command can be used to make an arc in AutoCAD.

## **EX (EXTEND):** This command is used for extending lines in a geometry.

1. Types of Staircase:

* Stairs can be broadly classified into three types:
  + Straight stairs
  + Turning stairs
  + Continuous stairs

**Straight stairs;**

Generally, for small houses, available width is very retractable. So, this type of straight stairs is used in such conditions which runs straight between two floors. This stair may consist of either one single flight or more than one flight with a landing.

**Turning stairs;**

Turning stairs are sub classified as:

* + . Quarter turn stairs;

A quarter turn stair is the one which changes its direction either to the right or to the left but where the turn being affected either by introducing a quarter space landing or by providing winders. In these type of stairs the flight of stair turns 90 degrees art landing as it rises to connect two different levels. So it is also called as L-stair. Again these quarter turn stairs are two types.

* Half turn stairs;

In case of half turn stairs its direction reversed, or changed for 180o. Such stairs are quite common. Again these are three types.

* Three quarter turn stairs

The direction of stairs changed three times with its upper flight crossing the bottom one in the case of three quarter turn stairs. These stairs are may either be newel or open newel type. This type stairs are generally used when the vertical distance between two floors is more and as well as length of the stair room is limited.

* Bifurcated stairs

Bifurcated stairs are commonly used in public building at their entrance hall. This has a wider flight at the bottom, which bifurcates into two narrower flights, one turning to the left and other to the right, at landing.it may be either of newel type with a newel post or of geometrical type with continuous stringer and hand rails.

**Continuous stairs;**

This type of stairs neither have any landing nor any intermediate newel post. They are geometric in shape. These are may be of following types;

* + Circular stairs
  + Spiral stairs
  + Helical stairs

1. Types of Doors and Types of Windows

Types of Doors;

1. Based on Location

* Exterior doors.
* Interior doors.

1. Based on Materials

* Wooden or Timber doors.
* Glass doors.
* Steel doors.
* PVC doors.
* FRP doors.

1. Based on Operation of Door Shutter

* Swinging doors.
* Folding doors.
* Sliding doors.
* Revolving doors.
* Pivot doors.

1. Based on Method of Construction

* Panel doors.
* Flush doors.
* Louvered doors.
* Wire gauzed doors.

Types of Windows

1. **Awning Windows:**

Awning windows open out by pivoting from the top of the window sash, operated by a crank.

1. **Casement Windows:**

[Casement windows](https://www.thebalancesmb.com/triple-glazed-windows-844733) also open out (like awning windows) and usually pivot from side hinges. Many casements have fairly large glass panes to provide ample light that is uninterrupted by muntin bars or other framing.

1. **Double-Hung and Single-Hung Windows:**

Single-hung has a movable lower sash and a fixed upper sash, while double-hung has two movable sashes; the upper sash slides down.

1. **Picture Windows:**

They are often large glass expanses occupying the center portion of a wall to provide broad views and ample sunlight.

1. **Slider Windows:**

Slider windows slide open sideways. Like casements, they can offer clear views and ample ventilation, but they cannot be sealed as tightly as casements.

1. Types of Paper Size;

ISO A paper sizes

The A-series consists of a logical set of paper sizes that are defined by the ISO 216 standard. The largest size (A0) measures one square meter. The height/width ratio remains constant (1:1.41) for all sizes. This means you get the A1 size by folding an A0 paper in two along its shortest side. Then fold the A1 size in two to get an A2 size paper, and so on… A-sizes are used to define the finished paper size in commercial printing: A4 is for office documents, A5 is for notepads and A6 is for postcards. A4 paper is the most commonly-used for printing and measures

**Paper Size Width x Height (mm)**

A0 841mm X 1189mm

A1 594mm X 841mm

A2 420mm X 594mm

A3 297mm X 420mm

A4 210mm X 297mm

A5 148mm X 210mm

A6 105mm X 148mm

A7 74mm X 105mm

A8 52mm X 74mm

1. Site Planning;

Site planning in [landscape architecture](https://en.wikipedia.org/wiki/Landscape_architecture) and engineering refers to the initial stage of the landscape and structural design process. It involves the organization of land use, access, climate, privacy, security, shelter, land drainage, and other factors. This is done by arranging the compositional elements of landform, planting, water, buildings and paving in [site plans](https://en.wikipedia.org/wiki/Site_plan). Also, site planning is the design and process of planning for a new development project.

**TEST A**

1. **Building and construction** steps involving any type of structure is not an easy task, it requires lots of cost and calculations. Although, building construction requires lots of time and is tedious work, yet its result is a permanent asset for us. Therefore, care should be taken in building construction process. Before planning building construction projects important aspects must be considered.

**PROCEDURE:**

1. Create a Building design **personally**:

A builder or contractor for construction must be chosen carefully because it is a major factor for securing building construction quality and timely construction of work. Pre investigation must be done about the builder before handing work. In the contract document, all the work-related details must be clearly stated. The contract document should cover layout and work details along with the payment methods, time scales and costs. The condition of the contract should be thoroughly checked before signing a final deal.

1. After, planning and structural detailing completed these details are transferred to the building estimator. The building estimator will estimate the material quantity, quantity of different items of work, and prepare an abstract sheet that shows the cost of building construction. Of course, after getting appropriate permissions from building and construction authorities.
2. Builders or contractors for construction must be chosen carefully as it is a major factor for securing building construction quality and timely construction of work. In the contract document, all the work-related details must be clearly stated. The contract document should cover layout and work details along with the payment methods, time scales and costs.
3. Site Preparation or Leveling:

The construction site must be cleaned before the work is executed. This work involves the removal of roots of trees, debris and leveling ground area.

1. Excavation and PCC:

The foundation of building ground is excavated with the help of excavating machines as per the building dimension specified in drawings. In this foundation trench, a layer of PCC (Plain cement concrete) is laid in the dug portion before placing the reinforcements for the foundation.

1. Foundation:

The building is supported on the foundation is the lowermost part of the building that is in contact with the soil. A building is load transferred from the superstructure to the soil and needs to be extremely strong to handle the load. After the PCC work foundation reinforcement work is started. The foundation bottom level must check before concreting it. The remaining space between the foundation is filled with earth.

1. Plinth Beam and Slab:

After the foundation work is done ground beam formwork preparation is started and poured with concrete. Over the plinth beam, masonry work is started. And space between foundation and plinth beam filled with soil.

1. Superstructure – Column:

The superstructure is the portion above the plinth level of the building. The main component of the superstructure is a column and beam. The columns are built up to slab level and the frame for further construction is prepared.

1. Brick Masonry Work:

As column and beam framework completed masonry work is started with different materials such as bricks, concrete blocks, fly ash bricks, etc. according to building drawing. Masonry work is done using a cement mortar mix. It is a mixture of cement & sand. During this carefully and as per drawing gaps are laid for doors and windows during the masonry work.

1. **DIFFERENCES BETWEEN;**
2. **A Working drawing** is a drawing or blueprint based on explanations. It is completed with a thorough plan and views (details, notes, and dimensions) to ensure the [product](https://knowtechie.com/tag/gadgets) construction or replication without any additional information. it is a scale drawing of an object to be made or structure to be built intended for direct use by the workman, WHILE **A Presentation drawing** is any of a set of design drawings made to articulate and communicate a design concept or proposal such as for an exhibition, review, or publication intended to explain a scheme and to promote its merits.
3. **A Bill of Engineering Measurements and Evaluation (BEME).** A **BEME** review is a description and evaluation of evidence pertinent to a clearly formulated concept that uses explicit scientific methodologies and methods to systematically identify, assemble, critically analyse and synthesise information relevant to the review topic, WHILE The **Bill of Quantities** (sometimes referred to as **'BOQ'** or **'BQ'**) is a document prepared by the cost consultant that provides project specific measured quantities of the items of work identified by the drawings and specifications in the tender documentation.
4. A **Section** of an element or a structure is cut through that shows the interior details of how an element/structure/material is made in the inside which reveals more details whereas the elevation is the exterior appearance of the same, WHILE  the term **'Elevation'** refers to an orthographic projection of the exterior (or sometimes the interior) faces of a building, that is a two-dimensional drawing of the building's façades.
5. **A Septic tank** is an underground chamber made of concrete, fiberglass, or plastic through which domestic wastewater flows for basic treatment. Settling and anaerobic processes reduce solids and organics, but the treatment efficiency is only moderate. Septic tank systems are a type of simple onsite sewage facility, WHILE **A Soakaway** is simply a hole dug into the ground, filled with rubble and coarse stone which allows surface water to percolate back into the earth close to where it falls. **Soakaway** construction is a low environmental impact solution to drainage because it uses few materials.

# **PRACTICAL B**

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