

Competency Based Learning Materials (CBLM)

CAD Operation, Level-3



Barishal Mohila Technical Training Center

Overview

A competency standard is a written specification of the knowledge, skills and attitudes required for the performance of an occupation, trade or job corresponding to the industry standard of performance required in the workplace.

The purpose of a competency standards is to:

- provide a consistent and reliable set of components for training, recognizing and assessing people's skills, and may also have optional support materials
- enable industry recognized qualifications to be awarded through direct assessment of workplace competencies
 - encourage the development and delivery of flexible training which suits individual and industry requirements
- encourage learning and assessment in a work-related environment which leads to verifiable workplace outcomes

Competency standards are developed by a working group comprised of representative from NSDA, Key Institutions, ISC, and industry experts to identify the competencies required of an occupation in Informal Sector.

Competency standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. CS acknowledge that people can achieve technical and vocational competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.

With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.

Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of competency are documented in a standard format that comprises of:

- unit title
 - nominal duration
- unit code
- unit descriptor
- elements and performance criteria
 - variables and range statement
- curricular content guide
- assessment evidence guide

Together, all the parts of a unit of competency:

- describe a work activity

- guide the assessor to determine whether the candidate is competent or not yet competent
- The ensuing sections of this document comprise of a description of the relevant occupation, trade or job with all the key components of a unit of competency, including:
- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
 - the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

How to use this Competency Based Learning Material (CBLM)

The module, Maintaining and enhancing professional & technical competency contains training materials and activities for you to complete. These activities may be completed as part of structured classroom activities or you may be required you to work at your own pace. These activities will ask you to complete associated learning and practice activities in order to gain knowledge and skills you need to achieve the learning outcomes.

1. Review the **Learning Activity** page to understand the sequence of learning activities you will undergo. This page will serve as your road map towards the achievement of competence.
2. Read the **Information Sheets**. This will give you an understanding of the jobs or tasks you are going to learn how to do. Once you have finished reading the **Information Sheets** complete the questions in the **Self-Check**.
3. **Self-Checks** are found after each **Information Sheet**. **Self-Checks** are designed to help you know how you are progressing. If you are unable to answer the questions in the **Self-Check** you will need to re-read the relevant **Information Sheet**. Once you have completed all the questions check your answers by reading the relevant **Answer Keys** found at the end of this module.
4. Next move on to the **Job Sheets**. **Job Sheets** provide detailed information about how to do the job you are being trained in. Some **Job Sheets** will also have a series of **Activity Sheets**. These sheets have been designed to introduce you to the job step by step. This is where you will apply the new knowledge you gained by reading the Information Sheets. This is your opportunity to practice the job. You may need to practice the job or activity several times before you become competent.
5. **Specification sheets**, specifying the details of the job to be performed will be provided where appropriate.
6. A review of competency is provided on the last page to help remind if all the required assessment criteria have been met. This record is for your own information and guidance and is not an official record of competency

When working through this Module always be aware of your safety and the safety of others in the training room. Should you require assistance or clarification please consult your trainer or facilitator.

When you have satisfactorily completed all the Jobs and/or Activities outlined in this module, an assessment event will be scheduled to assess if you have achieved competency in the specified learning outcomes. You will then be ready to move onto the next Unit of Competency or Module

Competency Standards for National Skill Certificate, Level-3 2D & 3D CAD in Construction Sector
Level Descriptors of NSQF (BNQF 1-6)

Level & Job classification	Knowledge Domain	Skills Domain	Responsibility Domain
6-Mid-Level Manager/ Sub Assistant Engineer	Comprehensive actual and theoretical knowledge within a specific work or study area with an awareness of the validity and limits of that knowledge, able to analyses, compare, relate and evaluate.	Specialized and wider range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems. Communicate professional issues and solutions to the team and to external partners/users	Work under broad guidance and self-motivation to execute strategic and operational plan/s. Lead lower-level management. Diagnose and resolve problems within and among work groups.
5-Supervisor	Broad knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to scrutinize and break information into parts	Broad range of cognitive and practical skills required to generate solutions to specific problems in one or more work or study areas.	Work under guidance of management and self-direction to resolve specific issues. Lead and take responsibility for the

	by identifying motives or causes.	Communicate practice-related problems and possible solutions to external partners	work and actions of group/team members. Bridge between management.
4-Highly Skilled Worker	Broader knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to solve problems to new situations by comparing and applying acquired knowledge.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information. Communicate using technical terminology and IT technology with partners and users as per workplace requirements.	Work under minimal supervision in specific contexts in response to workplace requirements. Resolve technical issues in response to workplace requirements and lead/guide a team/group.
3-Skilled Worker	Moderately broad knowledge in a specific work or study area, able to perceive ideas and abstract from drawing and design according to workplace requirements	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and	Work or study under supervision with considerable autonomy. Participate in teams and responsible for group coordination.
2-Semi Skilled Worker	Basic understanding of underpinning knowledge in a specific work or study area, able to interpret and apply common occupational terms and instructions.	Skills required to carry out simple tasks, communicate with his team in the workplace presenting and discussing results of his work with required clarity.	Work or study under supervision in a structured context with limited scope of manipulation
1 –Basic Skilled Worker	Elementary understanding of ability to interpret the underpinning knowledge in a specific study area, able to interpret common occupational terms and instructions	Specific Basic skills required to carry out simple tasks. Interpret occupational terms and present the results of own work within guided work environment/ under supervision.	Work under direct supervision in a structured context with limited range of responsibilities

List of Abbreviations

CS	Competency Standard
ISC	Industry Skills Council
NSDA	National Skills Development Authority
NSQF	National Skills Qualifications Framework
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
SCVC	Standards and Curriculum Validation Committee
STP	Skills Training Provider
SOP	Standard Operating Procedure
UoC	Unit of Competency
OSNAP	Object Snap
LWT	Line Weight Text
UCS	Universal Coordinate System

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Competency Standards for National Skill Certificate, Level-3 in
 2D & 3D CAD in Construction Sector
 Course Structure

SL No	Unit code and Title	UOC Level	Nominal (hours)
Generic Units of Competencies			
1	GU002L2V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	2 15
2	GU005L3V1	Carryout Workplace Interaction in English	3 15
3	GU003L3V1	Perform Basic IT Skills	3 20
Sub Total			50
Sector Specific Units of Competencies			
4	SUCS001L2V1	Work in the Construction Sector	2 30
5	SUCS006L2V1	Interpret Drawings, Plans and Specification	2 20
Sub Total			50
Occupation Specific Units of Competencies			
6	OU-CON-2D3DCAD -01-L3-V1	Perform 2D CAD	3 80
7	OU-CON-2D3DCAD-02-L3-V1	Create 3D Interface, Orbit and Navigate Model	3 40
8	OU-CON-2D3DCAD-03-L3-V1	Insert Surface	3 30
9	OU-CON-2D3DCAD-04-L3-V1	Develop Solid Images	3 30
10	OU-CON-2D3DCAD-05-L3-V1	Merge Flat Objects from 3D Model	3 40
11	OU-CON-2D3DCAD-06-L3-V1	Interpret Drawings, Plans and Specification	3 20
Sub Total			240
Total Duration			360

Units & Elements at Glance

Generic Competencies

Code	Unit of competency	Elements of competency	Duration (hours)
GU002L2V1	Apply Occupational Safety and Health (OSH) procedure In the Workplace	<ol style="list-style-type: none"> 1. Identify OSH policies and procedures 2. Follow OSH procedure 3. Report hazards and risks 4. Respond to emergencies 5. Maintain personal well-being 	15
GU005L2V1	Carry out Workplace Interaction in English	<ol style="list-style-type: none"> 1. Interpret workplace communication and etiquette 2. Interpret workplace documents 3. Participate in workplace meetings and discussions 4. Practice professional ethics at workplace 	15
GU006L2V1	Perform Basic IT Skills	<ol style="list-style-type: none"> 1. Identify and use most commonly used IT Tools 2. Operate Computer. 3. Work with word processing software 4. Use spread sheet to create /prepare worksheets 5. Use presentation packages to create / prepare presentation 6. Print the documents 7. Use the Internet and Access E-Mail 	20
Total hours			50

Sector specific competencies

Code	Unit of competency	Elements of competency	Duration (hours)
SUCS001L2V1	Work in the construction sector	<ol style="list-style-type: none"> 1. Identify the organizational structure within the sector 2. Identify work processes and procedures 3. Identify workplace requirements 4. Organize own workload 	30
SUCS006L2V1	Interpret drawings, plans and specification	<ol style="list-style-type: none"> 1. Carry out basic engineering drawings applied in construction 2. Access information from manuals, designs and plans 3. Interpret drawings and specifications from manuals, designs and plans 4. Store manuals, designs and plans 	20
Total hours			50

Occupation specific competencies

Code	Unit of competency	Elements of competency	Duration (hours)
OU-CON-2D3DCAD-01-L3-V1	Perform 2D CAD	1. Prepare for display in drawings 2. Create basic drawings 3. Draw 2D Solids and 3D Faces 4. Draw edges	80
OU-CON-2D3DCAD-02-L3-V1	Create 3D Interface, Orbit and Navigate Model	1. Develop basic 3D interface 2. Introduce thickness and elevation 3. Visualize model 4. Draw coordinates 5. Develop familiarity with 3D orbit 6. Perform 3D dimensional navigation 7. Operate 3D object	40
OU-CON-2D3DCAD-03-L3-V1	Insert Surface	1. Draw basic 3D surface 2. Create complex 3D surfaces 3. Create 3D surface panel	30
OU-CON-2D3DCAD-04-L3-V1	Develop Solid Images	1. Create images 2. Edit 3D Objects 3. Develop 3D Solid composites	30
OU-CON-2D3DCAD-05-L3-V1	Merge Flat Objects from 3D Model	1. Navigate sectional objects 2. Merge flat objects	40
OU-CON-2D3DCAD-06-L3-V1	Perform 3D Rendering	1. Execute rendering 2. Apply materials and lights 3. Demonstrate presentation	20
Total hours			240

Overview of the Module

Apply OSH Practices in a CBT&A Environment

This module comprises five elements (1 to 5), and five (5) learning outcomes derived from the unit of competency GU002L2V1: Apply OSH Practices in a CBT&A Environment.

Upon completion of this module, the trainee must be able to:

1. Identify OSH issues relating to work environment
2. Control and report OSH issues
3. Conduct work safely
4. Follow emergency response procedures
5. Maintain and improve health and safety in the work place

After completion of the training, the trainees will be required to demonstrate their competency through the following performance criteria:

- 1.1 Identified personnel responsible for OSH standards in the workplace.
- 1.2 Identified OSH standards that apply to the workplace.
- 1.3 OSH issues are identified in the workplace.

- 2.1 Workplace is routinely checked for OSH hazards prior to commencing and during training.
- 2.2 Issues or problems with the area are remedied or reported to the appropriate person.
- 2.3 Hazards and unacceptable performance are identified and corrective actions are taken within the level of responsibility.
- 2.4 Hazards and incidents are reported to appropriate personnel according to procedures.

- 3.1 OSH practices are applied in the training environment.
- 3.2 Appropriate personal protective equipment's (PPE) are selected and worn.
- 3.3 Safety Signs and symbols are identified and followed.

- 4.1 Emergency situations are identified.
- 4.2 Emergency procedures are followed as appropriate to the nature of the emergency and according to workplace procedures.
- 4.3 Emergency situations are reported to concern person.

4.4 Workplace procedures are followed for dealing with accidents, fires and emergencies within the scope of responsibilities

5.1 Risks are identified and appropriate control measures are implemented in the work area.

5.2 Recommendations arising from risk assessments are implemented within level of responsibility.

5.3 Opportunities for improving OSH performance are identified and raised with relevant personnel.

5.4 Green Practices area are identified.

5.5 Green skills are applied/maintained.

5.6 Safety records are documented according to company policies.

CONTENTS

This learning package includes the following:

1. Identify OSH issues relating to work environment
2. Control and report OSH issues
3. Conduct work safely
4. Follow emergency response procedures
5. Maintain and improve health and safety in the work place

Information 1.1

Identify OSH issues relating to work environment

Learning Objective:

After reading this Information Sheet, you must be able to Identify OSH issues relating to work environment.

Understanding Identify OSH issues relating to work environment is necessary for ensuring OSH practice in the workplace. It will give ideas on how to Identify OSH issues relating to work environment

Personnel responsible for OSH standards

This section discusses the work health and safety (WHS) roles and responsibilities for individuals in a range of positions. Roles and responsibilities can be legally-based – for example, for employers and other persons conducting an undertaking (PCBUs), other key decision makers at workplaces, designers and manufacturers of equipment and suppliers of chemicals, etc – or they can be practically or professionally-based – for example, for OHS

OHS laws

In an effort to make workplaces healthier and safer, government has written Occupational health and safety (OHS) laws which must be followed. Each of the States and Territories has made their own health and safety laws called an OHS Act, but much like road rules they are similar to each other, and have a lot in common. Under the OHS Act, almost everyone at the workplace has legal responsibilities for occupational health and safety. These responsibilities are known as a duty of care. Just like road rules, failing to meet a duty of care is against the law, and can result in prosecution. Fines from being prosecuted can be very substantial.

In your workplace it is likely that you will find people or groups of people with specific roles relating to workplace health and safety. Not all workplaces will have every type of person, but some of the most common safety groups you will find are:

- o Health and safety representatives
- o Supervisors
- o Safety officers
- o Health and safety committees

Safety representatives

Health and safety representatives are an important link between employees and Employers. They are elected by co-workers to act on their behalf, telling Employers about safety and health concerns and cooperating with employers to Implement and maintain workplace health and safety.

Supervisors

Supervisors need to make sure that the people they are looking after are given the safety instructions they need, and are able to perform their job safely

Occupational Health and Safety Standards

1. Identify the Hazard
2. Clear the area close to the Hazard
3. Partition the Hazard off or clearly identify the area to protect other people from harm

4. If the Hazard is easily and safely cleared, then do so

Self-Check: 1.1

Q 1. Who are the most common safety groups?

Q 2. Define Occupational Health and Safety

Q 3. What are the duties of Occupational health & Safety officers?

Q 4. Describe OSH Laws.

Q 5. The main purpose of the OH&S legislation is to:

- a. defines standards and responsibilities
- b. tell the worker how to do his or her job
- c. tells managers how to manage their work sites
- d. all of the above

Answer Sheet-1.1

1. Who are the most common safety groups?

Answer:

- o Health and safety representatives
- o Supervisors o Safety officers
- o Health and safety committees

2. Define Occupational Health and Safety

Answer:

1. Identify the Hazard
2. Clear the area close to the Hazard
3. Partition the hazard off or clearly identify the area to protect other people from harm.
4. If the hazard is easily and safely cleared, then do so.

3. What are the duties of Occupational health & Safety officers?

Answer:

These are trained people who are hired by the employer to help with the Management of health and safety at the workplace. Some of the tasks safety officers may do are:

- Organize OHS training
- Investigate accidents

- Provide first aid
- Undertake risk assessments at the workplace.

4. Describe OSH Laws. why it is important for Trainer, trainee and industry people?

Answer:

In an effort to make workplaces healthier and safer, government has written Occupational health and safety (OHS) laws which must be followed. Each of the States and Territories has made their own health and safety laws called an OHS Act, but much like road rules they are similar to each other, and have a lot in common. Under the OHS Act, almost everyone at the workplace has legal responsibilities for occupational health and safety. These responsibilities are known as a duty of care. Just like road rules, failing to meet a duty of care is against the law, and can result in prosecution. Fines from being prosecuted can be very substantial

Q 5.The main purpose of the OH&S legislation is to:

Answer:

- a. defines standards and responsibilities

Information sheet -1.2

Control and report OSH issues

Introduction

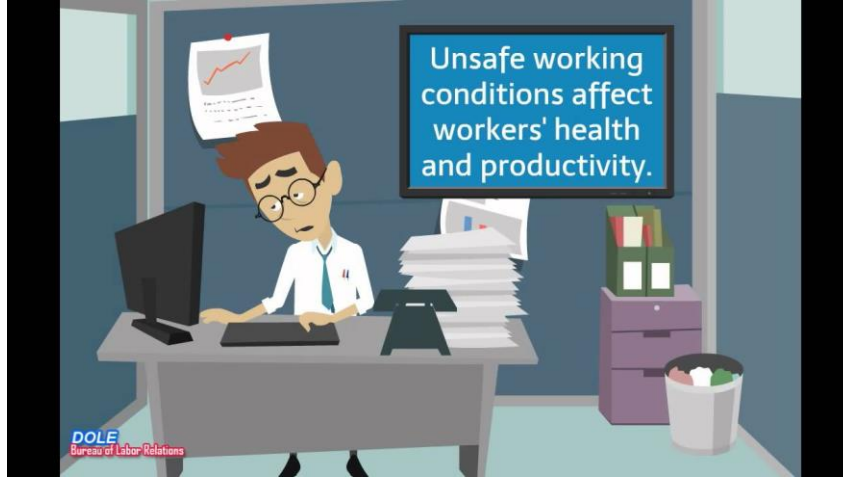
Occupational safety, health and Environment is a very growing concern for its importance and necessity in workplace or industries. The subject is composed of very basic needs of working people, while engaged at the work place. "Work place is dangerous. It always will be as long as human beings have to operate the processes of production. Again production will constitute hazards."

Workplace is routinely checked for OSH hazards prior to commencing and during training. Issues or problems with the area are remedied or reported to the appropriate person. Hazards and unacceptable performance are identified and corrective actions are taken within the level of responsibility.

Hazards and incidents are reported to appropriate personnel according to procedures .

These steps may include:

- reporting the issue verbally to your **supervisor or manager**
- reporting the issue through the workplace's hazard reporting procedures
- raising the issue with the **health and safety representative**
- raising the issue with management through your **Safety Officers**



Hazard

Hazard is a very familiar word, commonly used to mean risk, accident, fear etc. In industrial situation, hazard is any undesirable situation or system that exists, can cause inconvenience, which may end-up with fire, explosion, toxic release etc. Hazard in severe play can cause death, property damage, environmental impact or inconvenience in production operation. Hazards may be biological, Chemical, Physical, Ergonomic and Psychological.

Type of Hazards?

1. Physical Hazard
2. Chemical Hazard
3. Biological Hazard
4. Ergonomic Hazard

What is a Hazard?

 Physical Hazards	 Biological Hazards	 NATURAL HAZARD
 Chemical Hazards	 Ergonomic Hazards	 ANTHROPOGENIC HAZARD
 Safety Hazards	 Psychological Hazards	 TECHNOLOGICAL HAZARD

Something which has the potential to cause harm.

Biological Hazards:

Hazards are caused by living organisms which include insects, molds, fungi, viruses, and bacterial contamination; from defects in sanitation and housekeeping procedures, such as in the provision of potable water, removal of industrial waste and sewage, food handling and personal cleanliness

1. Bacteria –simple, one-celled organisms that may or may not be harmful.
2. Viruses –organisms that depend on a host cell for development or reproduction.

3. Fungi –may be small or large parasitic organisms growing in a living or dead plant animal matter.

4. Rickettsia –rod-shaped microorganisms that are smaller than bacteria and depend on a host for development or reproduction. Microorganisms transmitted by fleas, ticks, and lice

Common Health Problems from Biological Hazards

A Tuberculosis (TB)

B Tetanus,

C Viral Hepatitis

D HIV/AIDS

Diseases caused by virus

A Upper Respiratory Tract Infection

B Hepatitis Infection

C Acquired Immunodeficiency Syndrome (AIDS)

D Rabies

- Biological hazard commonly Found in the Workplace
- Sharing equipment, clothing, supplies
- Hand contact from contaminated surfaces
- Blood and body fluids
- Human handling
- Bug bites
- Plant and food allergies/poisons
- Animal handling and/or bites



Chemical Hazards:

Hazards arise from inhaling chemical agents in the form of vapors, gases, dusts, fumes, mists, or by skin contact with these materials.

- Mists.: Fine particles of a liquid float in air
- Gases.: Substances in gaseous state but are always airborne at room temperature.
- Vapors.: Results when substances that are liquids at room temperature evaporate
- Dusts.: Solid harmful substances are ground, cut or crushed by mechanical actions.
- Fumes. Gas is condensed in air, chemically changed and becomes fine solid particles which float in air

Chemical Hazards:



Physical hazards:

- Physical hazards include Fire, glass, plastic, metal, wood, stone, bone, dust and insect parts.
- Physical hazards can be introduced anywhere along the food processing line from equipment or employees or can be inherent in the raw materials.



Electrical Hazard

Electrical

Hazards



Fire Hazard

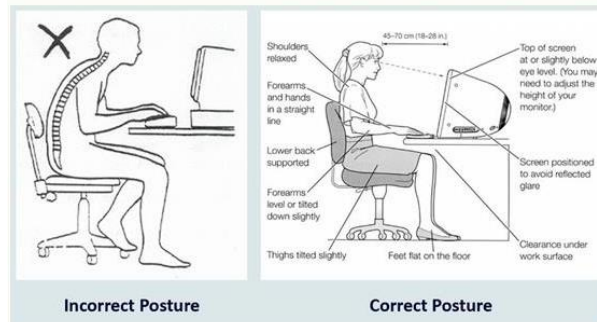


Ergonomic Hazards?

Hazards are commonly seen in the workplaces which are improperly designed tools or work areas, improper lifting or reaching, poor visual conditions or repeated motions in an awkward position that may be responsible for fatigue, stress and strain and may lead to accidents in the occupational environment.

Effects of Ergonomic Hazards

- low productivity
- high rate of errors
- material wastage and equipment



Health Problems caused by Ergonomics

- musculoskeletal problems
- vascular problems
- visual problems
- hearing problems
- skin problem
- psychological problems



Hazard control

Hazard control is a continuous process in industries. This start with the design phase, continue during the operation and ends with the dismantling/ close down of the industry. Here, we will discuss a very basic and primary concept of hazard control. Now a days, different specialized concept is developed and is used according to the merit of requirement. But following procedures as described below are the basis of all concepts.

Steps for Hazard control are

- Hazard identification
- Hazard inventory
- Hazard ranking
- Assessing probability of occurrence
- Hazard rank assessment
- Hazard elimination/reduction/control.

Self-Check 1.2

Q.1.What is Hazard?

Q.2. How many kinds of Hazard?

Q.3: How many Steps are in Hazard control?

Multiple Choices: Read and analyze the statement carefully. Choose the best answer and write the letter only in your answer sheet

Q4. Hazards due to transfer of energy between an object and a worker

- a. Chemical Hazards
- b. Physical Hazards
- c. Biological Hazards
- d. Ergonomics Hazards

Q5. What classification of hazards when a welder's hand deadened because of unadvisable position during welding?

- a. Chemical Hazards
- b. Physical Hazards
- c. Biological Hazards
- d. Ergonomics Hazards

Q6. Impact resulting from being struck by and struck against objects may cause serious accidents.

- a. Chemical Hazards
- b. Physical Hazards
- c. Biological Hazards
- d. Ergonomics Hazards

Q7. Toxics pass through gastrointestinal organ

- a. Ingestion
- b. Inhalation
- c. Absorption
- d. injection

Q8. People who work with animals, animal products or animal wastes have a greater risk of infection

- a. Chemical Hazards
- b. Physical Hazards
- c. Biological Hazards
- d. Ergonomics Hazards

Answer Key 1.2

Q.1.What is Hazard?

Ans. A hazard is anything that may cause injury or illness if not controlled, reduced or prevented.

Q.2. How many kinds of Hazard?

Ans. Food hazards may be biological, chemical or physical.

Q.3 How many Steps are in Hazard control?

Ans: Steps for Hazard control are

- Hazard identification
- Hazard inventory
- Hazard ranking
- Assessing probability of occurrence
- Hazard rank assessment
- Hazard elimination/reduction/control.

Q4. b

Q5. d

Q6. b

Q7. a

Information sheet -1.3

PPE and SAFE Work practice

Personal Protective Equipment (PPE):

Personal protective equipment (PPE) is any clothing. Equipment or substance designed to protect a person from risks of injury or illness.

The types of Personal Protective Equipment:

Personal Protective Equipment (PPE) is classified according to target organs potentially affected the risk of danger.

Target organs:

1. Hand and Arm

Sources of danger: extreme temperatures, sharp objects, crushed by heavy objects, electric shock, skin infections.

PPE: Gloves (gloves), Armlets, Mitts.



2. Foot

Source hazards: slippery floors, wet floors, sharp objects, falling objects, splashes and liquid metals, aberration falling live line wire on the floor etc.

PPE: safety shoes, safety boots. Leggings, spat.



Safety Shoes: Safety shoes help worker to protect their feet from heavy metal, melted metal, and sharp object to fall and also work as a protective equipment to avoid electric shock.

Furthermore, before deciding which type of personal protective equipment should we use. Do first hazard identification (hazard identification) and risk assessment of a job, process or activity. Review every aspect of the job, so that we can identify potential hazards. Do not decide just based on an estimate.

3. Face

Source hazards: Breathability, comfort, and safety are critical.

PPE: safety Mask

Self-Check 1.3

Q 1. What is Personal Protective Equipment (PPE)?



Tick the Correct answer to the following statements below.

Q1. Hazard control is closely Related with personal Protective Equipment (PPE)

- a) True b) False

Q 2. Safety sign are important for avoid danger

- a) True b) False

Q 3. Before Using any tools, you should know about safety

- a) True b) False

Answer Key 1.3

Q 1. What is Personal Protective Equipment (PPE)?

Ans. 1: Personal Protective Equipment (PPE) is any clothing, equipment or substance designed to protect a person from risks of injury or illness.

Tick the Correct answer to the following statements below

Ans 1: Hazard control is closely Related with personal Protective Equipment (PPE)

- √ a) True b) False

Ans 2: Safety sign are important for avoid danger

- √ a) True b) False

Ans 3: Before Using any tools, you should know about safety

- √ a) True b) False

Perform Basic IT Skills-2

Module: Operate a Personal Computer and Use Office Application software.



Version: 01.0 – Pilot Program

TEVET Reform Project

Information Sheet No: 2.1 - Start the computer following OSH practices.

Personal Protective Equipment (PPE):

- PPE is defined in the Personal Protective Equipment at Work Regulations as: 'All equipment which is intended to be worn or held by a person at work which protects them against one or more risks to their health and safety'.

The computer

Before you start it helps to know what a computer is and a little about how it works.



You will probably be using a desktop computer that looks something like this.

What you see is simply a collection of electronic circuits, boxes and other components, known as computer hardware.

The computer box houses the parts that make the computer work. The other hardware components connect to the computer box by cables. Some components put information into the computer (the keyboard, mouse and scanner) and others output information (the monitor, printer and speakers).

Storage of information:

The computer contains two different kinds of data storage: memory chips are for temporary storage and disks are used for permanent storage.

Disk storage:

Each computer has its own internal hard disk, usually labeled C: drive. This is where the computer stores software programs and data files. Data stored on the hard disk is not lost when the computer is switched off. Data can also be permanently stored in a range of portable devices, The most Common is the usb pen drive.

Software:

Software is the name given to the sets of instructions that tell the computer what to do. The machine itself (the hardware) is useless without software.

The Operating System:

The operating system (OS) is the most important set of instructions. It enables the computer to understand all the other instructions (programs) it receives. When you turn on your computer it is the OS software that gets the computer going.

The OS for most computers is Microsoft Windows. There are several different Versions of Windows®. Your computer may have Windows 98, Windows ME or Windows XP.

Recycle Bin in Windows:

In the Microsoft Windows operating systems, the **Recycle Bin** is a holding area for files and folders before final deletion from a storage device.

Safety rules:

In the Computer lab you should observe basic safety rules.

1. Report any hazards in the lab.
2. Do not have food or drink near the computers at any time.
3. Always shut down the computer via Windows' Start button
4. Do not use computer if the power cables are damaged. Only plug computers with a reliable source of power.
5. Unplug the computer or turn off the wall socket when the machine is not in use.
6. Always have at least two copies of all your important files, in case the worse happens!

Electrical hazards:

Electricity has long been recognized as a serious workplace hazard, exposing employees to electric shock, electrocution, burns, fires, and explosions.

Roughly half of electrical incidents causing injury were caused by working directly on energized electrical equipment.

Report faulty equipment, do not use till properly repaired.

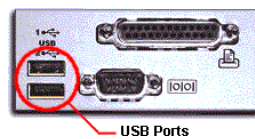
Information Sheet No: 2.2 – Basic computer Components / equipment of IT Support:

Key Devices for Personal Computer



System Unit (CPU) :

System unit is the core unit of a computer. It is the brain of the computer. To provide and see instruction it needs some key components to be connected such as a keyboard, mouse, monitor etc.



Keyboard:

The keyboard is an input device used to enter in text, characters and other commands.

There are two types of common connector's available in the market to connect the keyboard to the system unit.

- 1) PS2 and
- 2) USB (Universal Serial Bus).

If this is a PS/2 keyboard, then it will connect with the purple PS/2 board available in I/O Socket.

Mouse :

Mouse is an input device that gives commands into the computer to do selective work. It uses generally two types of port as keyboard do. If this is a PS/2 mouse, then it will connect with the green PS/2 board available in I/O Socket.



The mouse controls the arrow on the screen.

The easiest way to control the mouse is to cup your right hand firmly over it with your index finger resting lightly on the left button.

Your mouse may have several buttons. At this stage I will concentrate on the two main buttons.

- The left button is used for most actions – Clicking on objects, selecting text or menu options, or for operations such as closing programs.
- The right button is used to get a shortcut menu.

Monitor :

Monitor is an output device to display what you look at when use on a computer. It connects with system unit using VGA port. The colour of VGA port is blue. It has 15 pins to connect.



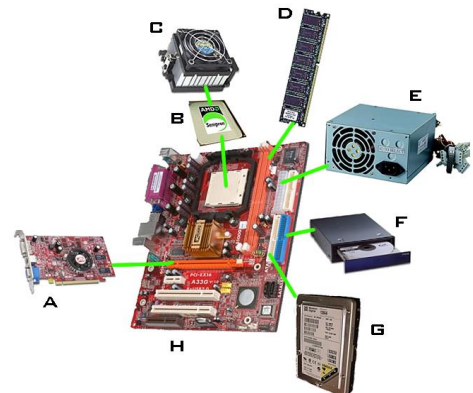
Printer :



A Printer is an output device that provides the output as a printed paper document. There are several types of printer. Such as laser printer, dot matrix printer etc.

Basic Computer Components

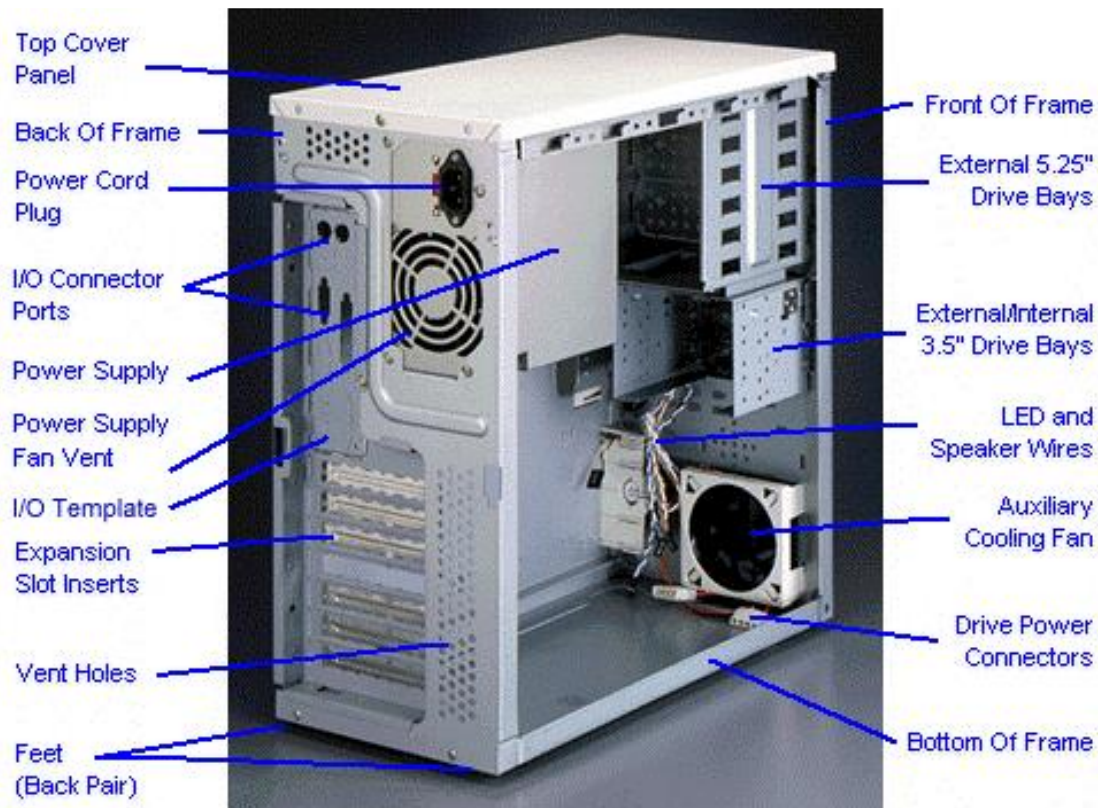
Computers come in all different shapes and forms (examples: desktops, laptops), but the main components that make up a computer pretty much stay the same. Components can also be referred to as; hardware or parts.



Computer Components

Every computer Consists of the following basic components:

Computer Case – Computer case is nothing but a box where all of the components are stored except monitor, keyboard, mouse, and printer. This is like the protecting body that contains, holds, and protects the vital components.



Processor – It's another name is [CPU \(Central Processing Unit\)](#). This is the actual "brains" of the computer. It does the calculations, the processing of data, the reading (and interpreting) of the computer code and converts it to whatever output we or the program tells it. It also controls the other components in the computer.



Heat sink: A heat sink is an object that transfers thermal energy from a higher temperature to a lower temperature *fluid medium* (such as air, water, oil). If the fluid medium is water, the 'heat sink' is frequently called a cold plate.

A **heat sink** is a term for a component or assembly that transfers heat generated within a solid material to a fluid medium, such as air or a liquid.

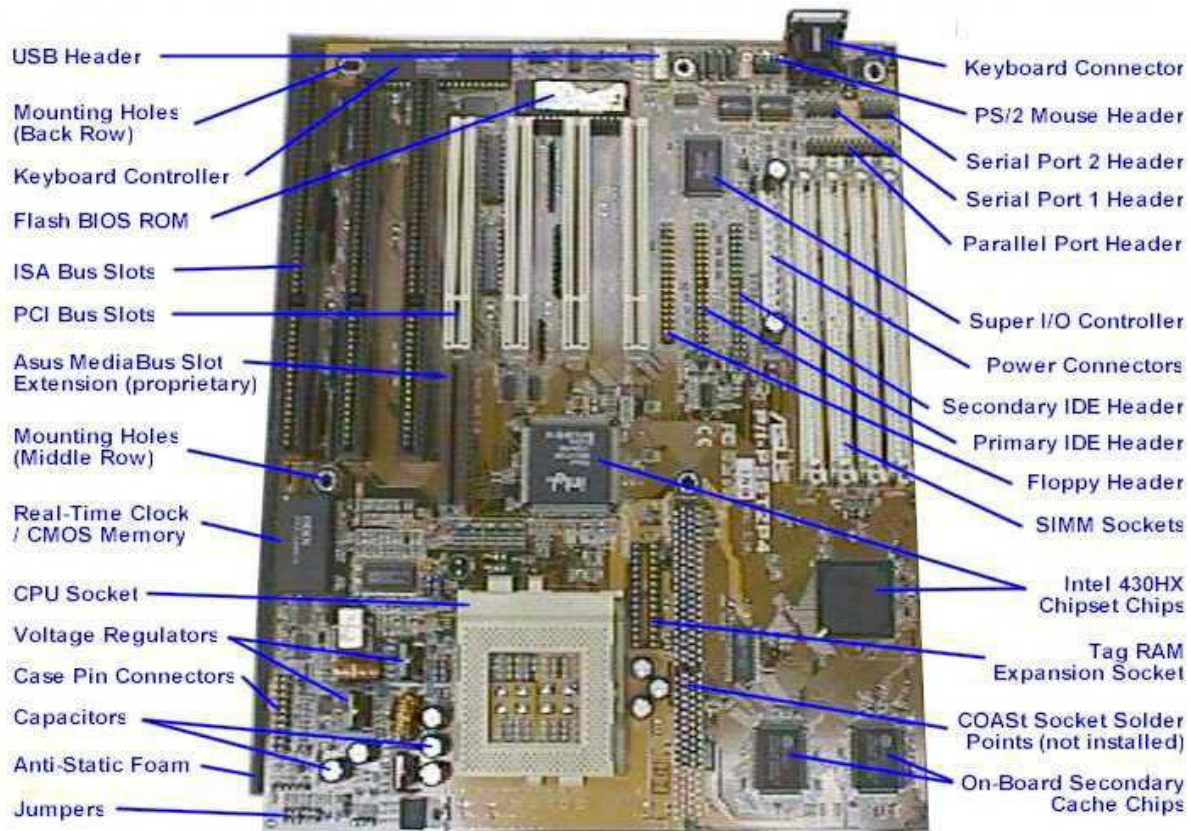


A heat sink is physically designed to increase the surface area in contact with the cooling fluid surrounding it, such as the air. Approach air velocity, choice of material, fin (or other protrusion) design and surface treatment are some of the design factors which influence the thermal resistance, i.e. thermal performance, of a heat sink. One engineering application of heat sinks is in the thermal management of electronics, often computer central processing unit (CPU) or graphics processors. For these, heat sink attachment methods and thermal interface materials also influence the eventual junction or die temperature of the processor(s). Thermal adhesive (also known as thermal grease) is added to the base of the heat sink to help its thermal performance. Theoretical, experimental and numerical methods can be used to determine a heat sink's thermal performance.

RAM (Random Access Memory) – RAM is hardware used to temporarily store and access data. RAM provides space for your computer to read and write data to be accessed by the CPU (central processing unit). When people refer to a computer's memory, they usually mean its RAM. If you add more RAM to your computer, you reduce the number of times your CPU must read data from your hard disk. This usually allows your computer to work considerably faster. RAM is volatile, so data stored in RAM stays there only as long as your computer is running. As soon as you turn the computer off, the data stored in RAM disappears.



Motherboard – A Motherboard is the most important component in a computer system. All of the other hardware in a computer system connects to the motherboard. In personal computers, a motherboard is the central printed circuit board (PCB) in many modern computers and holds many of the crucial components of the system, providing connectors for other peripherals. The motherboard is sometimes alternatively known as the main board, system board, or, on Apple computers, the logic board.

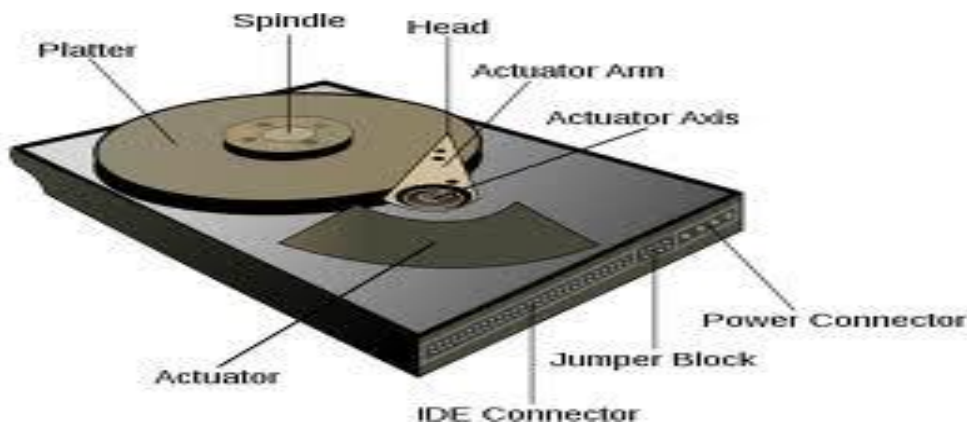


Power Supply – A Power Supply is the sends power to all of the other hardware so they can operate. A Computer Power Supply (PSU) is vital to the operation of a computer. The Power Supply converts AC current to DC current and then sends power to all of the [internal components](#) in the computer system so they can function. It is a metal box usually located inside the top backside of the computer case. The power supply is visible from the back of the computer. It is easily identified by the presence of a port for the power cable. There are three typical voltages used in a power supply: 3.3 volts, 5 volts, and 12 volts.



The 3.3 and 5 volt supplies are usually used by digital circuits, while the 12 volt supplies are more typically used to supply power to fans, motors, and disk drives.

Hard Drive - A Hard Drive is used for permanently storing files and programs. The hard drive uses disks that are made of aluminum or glass (and therefore 'hard'). Each disk can store much more information than either a floppy or CD-ROM. Sometimes, there may be several disks in a hard drive. However, the disks in a normal hard drive cannot be removed or replaced. Today, hard drives are measured in gigabytes. It is a storage device, not memory! Drives give you a place to store your data, install programs that are larger than what would fit on a floppy disk, and drastically speed up the time spent accessing programs. With the huge drives available today, you can think of the hard disk drive as a room full of filing cabinets, which store papers, files and data. Having a fast hard drive is useful ONLY if you have a fast controller. Data can only travel as fast as the combination of the drive, controller, and motherboard allows. Drive speed is measured in two places, usually: 1. Megabytes per second, and 2. RPM's (the higher the number the faster - in both cases).



Self-Check 2

Q 1: List 3 computer input devices.

Q 2: List 3 computer output devices.

Q 3: What is the common name for a portable device where data can be permanently store?

Q 4: Name the two connection port used to connect a keyboard and a mouse with the system unit?

Q 5: What is the term used to describe the screen you see when you first start up your computer.

Answer Key 2

Q 1: List 3 computer input devices.

Ans: The keyboard, mouse and scanner are the devices used for input information into the computer.

Q 2: List 3 computer output devices.

Ans: The monitor, printer and speakers are the devices used for output information into the computer.

Q 3: What is the common name for a portable device where data can permanently store?

Ans: USB pen drive, USB hard drive are portable devices where data can permanently store.

Q 4: Name the two connection port used to connect a keyboard and a mouse with the system unit?

Ans: There are two types of common connector's available in the market to connect the keyboard and mouse to the system unit.

- 1) PS2 and
- 2) USB (Universal Serial Bus).

Q 5: What is the term used to describe the screen you see when you first start up your computer ?

Ans: Computer desktop.

Information Sheet No: 03

Work in the Construction Sector

Variables	Range (may include but not limited to)
1. Major Fields	1.1. Residential Construction 1.2. Industrial Construction 1.3. Roads & Highway construction 1.4. Bridge & Calvert Construction 1.5. Railway Construction 1.6. Foundation Works (Anchoring & Piling) 1.7. Pipe laying 1.8. Tunnel/Marine Construction
2. Occupations	2.1 Masonry 2.2 Finishing carpentry 2.3 Shuttering 2.4 Painting 2.5 Residential Electrical Wiring and Cabling 2.6 Dogging 2.7 Rigging 2.8 Scaffolding 2.9 Rod Binding 2.10 Plumbing 2.11 Tile and Marble Setting

3. Employment conditions	<ul style="list-style-type: none"> 3.1 Code of Practice 3.2 Salary/Wage System 3.3 Labor Practices 3.4 Anti-Discrimination Policy 3.5 Gender Issues 3.6 Collective Bargaining and Other Practices 3.7 Awards 3.8 Grievance management
4. Instructions	<ul style="list-style-type: none"> 4.1 Specifications and requirements 4.2 Standard operating procedures 4.3 Manuals of Instruction 4.4 Environmental Guidelines 4.5 Gender and Develop Guidelines
5. Workplace requirements	<ul style="list-style-type: none"> 5.1 Goals and objectives 5.2 Strategic and Operational Plans 5.3 Systems and Processes 5.4 Monitoring and Evaluation 5.5 Reports and Documentation
6. Problem-solving strategies	<ul style="list-style-type: none"> 6.1 Asking questions 6.2 Feedback and feed forward system 6.3 Reference to Standard Operating Procedures 6.4 Accessing Information 6.5 Reviews 6.6 Brainstorming

Self-Check 3

Q 1: What is the ratio of slope of Ramp?

- a. 1 : 6 b. 1: 8 c. 1: 10 d. 1:

Q 2: Where we use Stirrup?

- a. Column b. door c. window d. kitchen

Q 3: What is done in the store room of building?

- a. cooking b. planting c. keeping Goods d. sleeping

Q 4: which kind of stair is used in residential house?

- a. One-way b. Geometrical c. Spiral d. Dog legged

Q 5: The material is attached-

- a. Face b. blank space c. any space d. none of the above

Q 6: What safety measure is essential during residential electrical installation to prevent electrical shock?

- a. Overloading circuits b. Using bare wires
c. proper grounding and earthing d. Installing fewer electrical outlets

Q 7: Generally in which height shuttering start from feet?

- a) 3'-0" b) 6'-0" c) 5'-0" d) 2'-0"

Q 8: What will we say if the structure built on river less than 6 meter?

- a) Culvert b) Deck bridge c) Bridge d) Pool

Answer Key 3

Q 1: What is the ratio of slope of Ramp?

Ans: b. 1: 8

Q 2: Where we use Stirrup?

Ans: a. Column

Q 3: What is done in the store room of building?

Ans: c. keeping Goods

Q 4: which kind of stair is used in residential house?

Ans: d. Dog legged

Q 5: The material is attached-

Ans: a. Face

Q 6: What safety measure is essential during residential electrical installation to prevent electrical shock?

Ans: c. proper grounding and earthing

Q 7: Generally in which height shuttering start from feet?

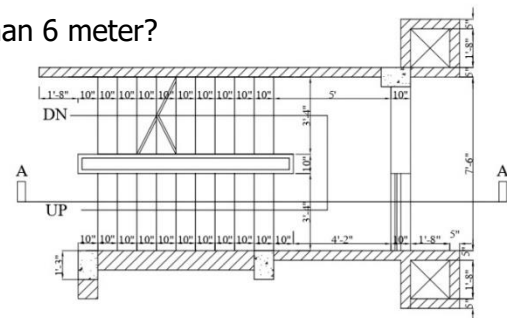
Ans: c) 5'-0"

Q 8: What will we say if the structure built on river less than 6 meter?

Ans: a) Culvert

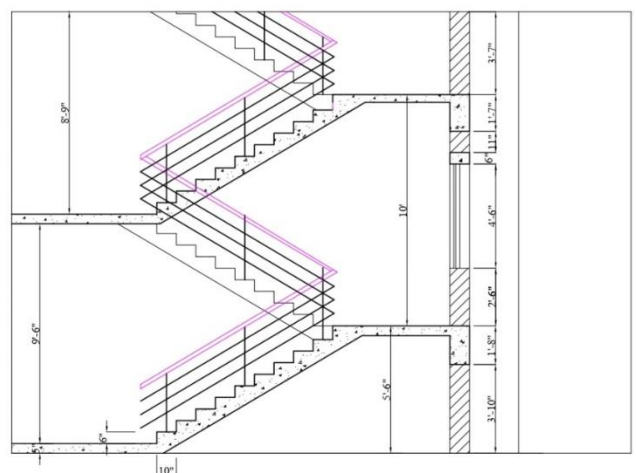
Job Sheet: 3.1

Job Name : Draw a Stair Using Auto CAD



STAIR PLAN DETAIL

SCALE : not to scale



STAIR SECTION : A-A

SCALE : not to scale

Information Sheet No: 4

Interpret Drawings, Plans and Specifications

Variables	Range (may include but not limited to)
1. Shapes and objects	1.1 Lines 1.2 Geometrical shapes 1.3 Projections 1.4 Pictorial drawings 1.5 Isometric drawings
2. Manual drafting equipment	2.1 Pencils 2.2 Compass 2.3 Divider 2.4 Set square 2.5 T-square 2.6 French curve 2.7 Protractor 2.8 Eraser
3. Geometric shapes	3.1 Circle 3.2 Oval 3.3 Ellipse 3.4 Square 3.5 Rectangle 3.6 Polygons
4. Manuals	4.1 Manufacturer's Specification Manual 4.2 Repair Manual 4.3 Maintenance Procedure Manual 4.4 Periodic Maintenance Manual 4.5 Quality Manual 4.6 Instruction Manual
5. Drawings	5.1 Technical drawings 5.2 Sketches
6. Specifications	6.1 Product specifications 6.2 Performance specifications 6.3 Method specifications

Self-Check 3

Q 1. What is the shortcut key for "Find and Replace" dialog box?

- a. Ctrl + F b. Ctrl+R c. Ctrl + H d. Ctrl+Shift + F

Q 2. What is the shortcut for zoom command?

- a. Z + Enter b. Rotate mouse wheel c. ZOOM Command d. All of the above

Q 3. Which state grid is used to design perspective?

- a. Parametric b. Isometric c. Pro-optic d. Rectangular

Q 4. How many pixels grip size in AutoCAD?

- a. 1-255 b. 10-254 c. 1-254 d. 0-25

Q 5. When we use Sketches?

- a) after the final drawing b) before the final drawing
c) after Rajuk permission d) none of these

Q 6. How to draw Rectangular not using Rectangular tools?

- a. Polyline b. Construction line c. Line d. Spline

Q 7. What is Product specifications ?

Q 8. Offset Section means

- a. When a cutting plane line passes entirely through an object
b. A view of an object showing one-half of the view in section.
c. Used for complex parts that has several important features that cannot be sectioned using a straight cutting plane.
d. A section removed from its normal projected position in the standard arrangement of views

Q 9. What safety measure is essential during residential electrical installation to prevent electrical shock?

- a. Overloading circuits b. Using bare wires
c. proper grounding and earthling d. Installing fewer electrical outlets

Answer Key 3

Q 1. What is the shortcut key for "Find and Replace" dialog box?

Ans: c. Ctrl + H

Q 2. What is the shortcut for zoom command?

Ans: a. Z + Enter

Q 3. Which state grid is used to design perspective?

Ans: b. Isometric

Q 4. How many pixels grip size in AutoCAD?

Ans: a. 1-255

Q 5. When we use Sketches?

Ans: b) before the final drawing

Q 6. How to draw Rectangular not using Rectangular tools?

Ans: a. Polyline

Q 7. What is Product specifications ?

Ans: A product specification is a document that outlines the requirements of a particular product or feature.

Q 8. Offset Section means

Ans: c. Used for complex parts that has several important features that cannot be sectioned using a straight cutting plane.

Q 9. What safety measure is essential during residential electrical installation to prevent electrical shock?

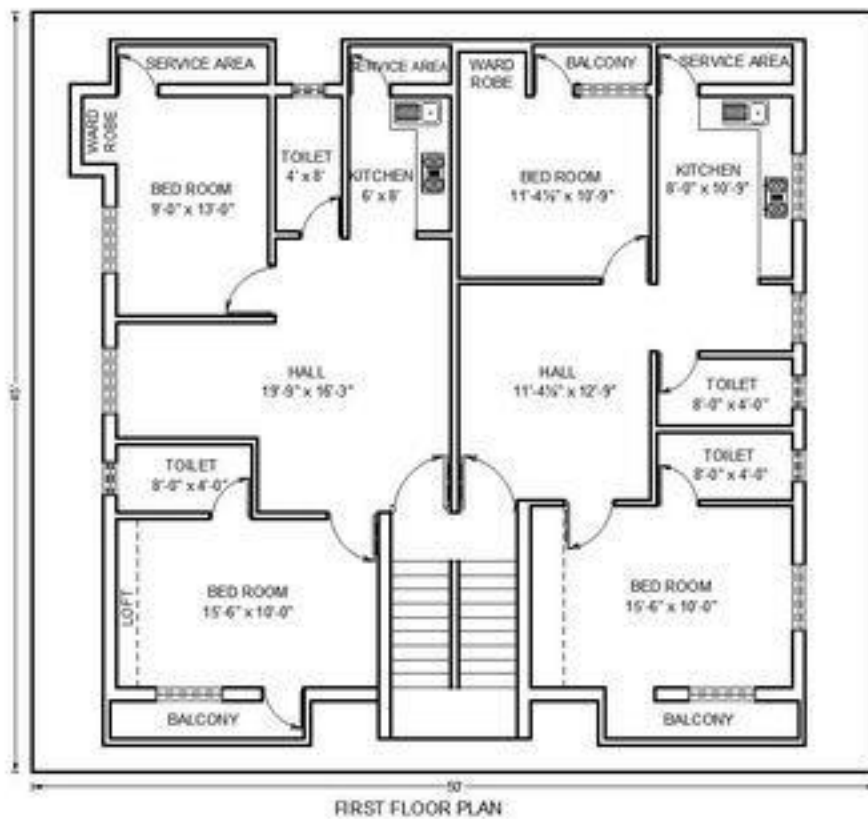
Ans: c. proper grounding and earthing

Occupation Specific Units of Competencies

Information Sheet No: 01

Perform 2D CAD

AutoCAD is a 2D and 3D computer-aided design software application developed by Autodesk. It was first released in December 1982 for the CP/M and IBM PC platforms as a desktop app running on microcomputers with internal graphics controllers.



2D Commands

Variables	Range (may include but not limited to)
1.CAD software	1.1 Auto CAD 1.2 Sketch up
2. Visual reference commands	2.1 Drawing unit 2.2 Dimension style 2.3 Drawing limits 2.4 Layer 2.5 Grid set and display
3. Tools bar	3.1 Draw 3.2 Modify 3.3 Dimension 3.4 Layer 3.5 View port 28 3.6 Insert
4.Draw tools bar commands	4.1 Line 4.2 Construction line 4.3 Polyline 4.4 SP line 4.5 Rectangle 4.6 Polygon 4.7 Circle 4.8 Make block 4.9 Hatch 4.10 Arc 4.11 Grid 4.12 Radios 4.13 Angular line 4.14 Text 4.15 D-text 4.16 Point 4.17 Cloud

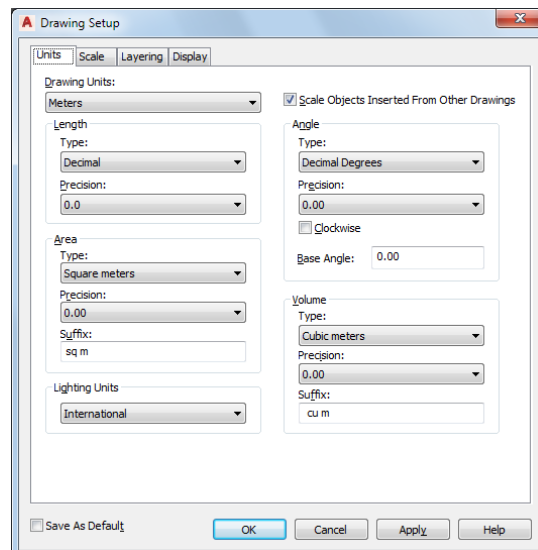
5.Modify commands	5.1 Erase 5.2 Copy 5.3 Move 5.4 Offset 5.5 Mirror 5.6 Trim 5.7 Extend 5.8 Stretch 5.9 Break 5.10 Chamfer 5.11 Divided 5.12 Explode 5.13 Fillet 5.14 Array 5.15 Rotate 5.16 Ellipse 5.17 Donut
6. Dimension commands	6.1 Quick dimension 6.2 Linear 6.3 Align 6.4 Arc length 6.5 Radius 6.6 Diameter 6.7 Angular 29 6.8 Baseline 6.9 Continues 6.10 Tolerance

	6.11 Center marks
7. Basic drawings	<p>7.1 Structural drawings</p> <p>7.1.1 Columns center line</p> <p>7.1.2 Footing</p> <p>2.2 Job Name : Draw a Column & Beam Layout Plan</p> <p>2.2 Job Name : Draw a Column & Beam Layout Plan</p> <p>7.1.3 Slab details</p> <p>7.1.4 Beam details</p> <p>7.2 Architectural Drawings</p> <p>7.2.1 Plan</p> <p>7.2.2 Elevation</p> <p>7.2.3 Section</p> <p>7.2.4 Working drawing</p> <p>7.2.5 Furniture layout plan</p> <p>7.3 Electrical drawings</p> <p>7.3.1 Points details</p> <p>7.3.2 Circuit diagram</p> <p>7.3.3 Fixture arrangement plan</p> <p>7.4 Plumbing drawings</p> <p>7.4.1 Fixture and faucet arrangement plan</p> <p>7.4.2 Pipe lines diagram</p>

Drawing unit

Unit setup Procedure.

- Ans: Format → unit select
- Length Type → Architectural
- Precision → 0'-0"
- Insertion Scale → inches

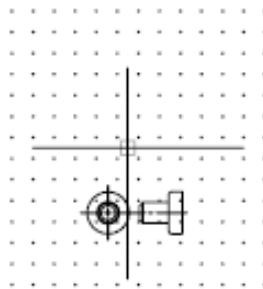


Drawing limits

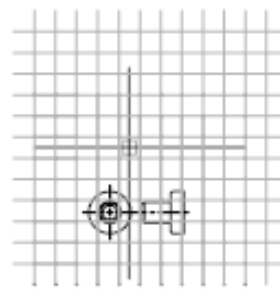
DRAWING LIMITS

- The drawing limits are there for a reason. When you start a new drawing, then decide how much space do I need for my drawing. Think of it as the size of your drawing area. Then you can define drawing limits correctly. Type LIMITS enter.
- Type 0, 0 as lower left corner then type or click the coordinate for upper right corner.
- Furthermore, the drawing limits defines the extent of ZOOM all.

Grid set and display



Visual styles = 2D wireframe



Visual styles = hidden

Self-Check 01

1. How many ways a circle can be drawn?
a) 1 b) 2 c) 3 d) 4
2. Write the types of setups in CAD?
a) 1 b) 2 c) 3 d) 4
3. Write the type of setup in CAD.
4. Write the function of Osnap.
5. Write the drawing limit setup procedure.
6. Write the difference between drawing and sketch.

7. Write the difference between the line & polyline.
8. Write the difference between copy and offset.
9. Write the difference between trim and extend.
10. Write the difference between chamfer and fillet.
11. write the function of match properties
12. write the function of mirror command
13. write the function of the divide command
14. Write the function of explode command.
15. Write the function key of ortho commands.

Answer Key 01

1. How many ways a circle can be drawn?
 a) 1 b) 2 c) 3 d) 4√
2. Write the types of setups in CAD?
 a) 1 b) 2√ c) 3 d) 4
3. Write the type of setup in CAD.

Ans: Auto CAD G `yB fv±e †mU Avc Kiv hvq|

1. Metric unit
2. Imperial unit

4. Write the drawing limit setup procedure.

Ans: Format => drawing limit =>0,0 enter =>100,100 enter

5. Write the function of Osnap.

Ans: Object Snap লাইনের বিভিন্ন জায়গায় মার্ক করার জন্য ব্যবহার করা হয়।

6. Write the difference between drawing and sketch.

Ans: Sketching এটি একটি দ্রুত ও কোন যন্ত্রপাতি ছাড়া খালি হস্তে অঙ্কন যা ডিজাইনের শুরুতে চিন্তা ভাবনাকে রেখা চিত্রের মাধ্যমে ফুটিয়ে তোলা হয়।

Drawing এটি একটি সময়সাপেক্ষ ও যত্নশীল প্রক্রিয়া যার দ্বারা ডিজাইনকে পরিপূর্ণরূপে ও সঠিকমাপে তৈরী করা হয় যেন কাঠামো নির্মানের সময় তা সঠিক মাপে করা হয়।

7. Write the difference between the line & polyline.

Ans :Line : line command দ্বারা অংকিত প্রতিটি line এককভাবে বা আলাদা আলাদা ষরহব হিসাবে কাজ করে।

Polyline : Polyline command দ্বারা অংকিত সকল line একত্রে গ্রুপ হয়ে কাজ করে। সব ষরহব মিলে একটি ষরহব হয়ে যায়।

8. Write the difference between copy and offset.

Ans :Copy : একটি অবজেক্টও সাদৃশ্য অপর এক বা একাধিক অবজেক্ট তৈরি করার জন্য Copy Command ব্যবহার করা হয়।

Offset : রেখা, বৃত্ত, পলিগোনাল অবজেক্ট পলিলাইনে আঙ্কিত বস্তুও সমান্তরাল বস্তু বা রেখা তৈরির জন্য Offset Command ব্যবহার করা হয়।

9. Write the difference between trim and extend.

Ans : Trim : কোন Object বা Line এর বর্ধিত অংশ কেটে বাদ দেওয়ার জন্য Trim Command ব্যবহার করা হয়।

Extend : কোন Object বা Line কেনির্দিষ্ট দূরত্বে বর্ধিত করার জন্য Extend Command ব্যবহার করা হয়।

10. Write the difference between chamfer and fillet.

Ans: Chamfer দুইটি কৌনিক সরল রেখাকে নির্দিষ্ট দূরত্বে কোনাকোনি ভাবে সরল রেখা দিয়ে জোড়া দেওয়ার জন্য Chamfer Command ব্যবহার করা হয়।

Fillet দুইটি বিচ্ছিন্ন রেখাকে নির্দিষ্ট দূরত্বে বক্র রেখা বা বৃত্তচাপ দিয়ে জোড়া দেওয়ার জন্য Fillet Command ব্যবহার করা হয়।

11. write the function of match properties

Ans: match properties একটি layer কে অন্য layer এর একই বৈশিষ্ট্যতে রূপান্তরিত করে।

12. write the function of mirror command

Ans: Mirror command দ্বারা অবজেক্ট এর মুখোমুখি প্রতিচ্ছবি অঙ্কন করা হয়।

13. write the function of the divide command

Ans: Divide command দ্বারা একটি রেখাকে নির্দিষ্ট অংশে ভাগ করা হয়।

14. Write the function of explode command.

Ans: কোনরকম অবজেক্টকে ভাঙতে explode command ব্যবহার করা হয়।

15. Write the function key of ortho commands.

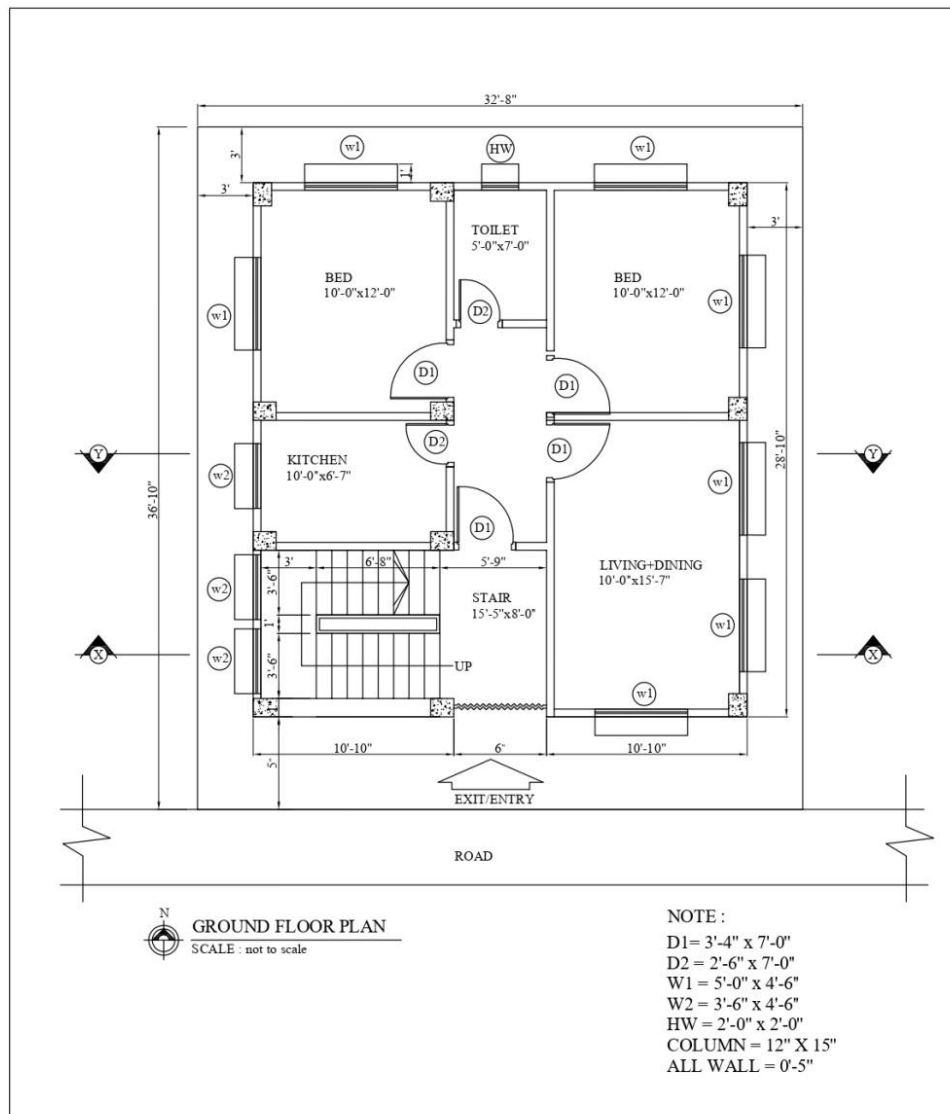
Ans: ortho কমান্ডের সাহায্যে লাইনকে সোজা কিংবা বাকা করা যায়।

Architectural Plan-1.1

Job Sheet: 1.1.1

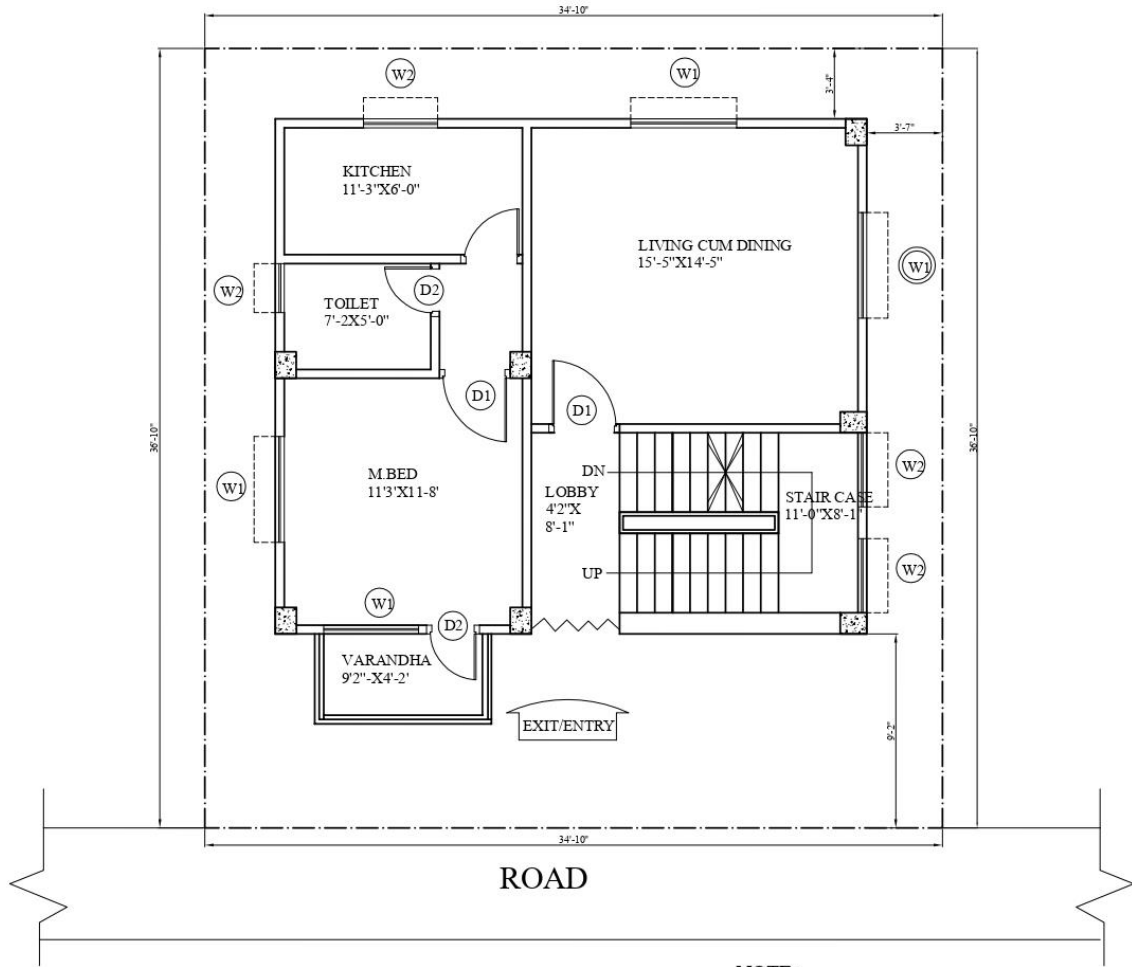
1.1.1 Job Name : Draw floor plan using CAD

QUS :DRAW A FLOOR PLAN AS PER
GIVEN DESIGN & THE INSTRUCTION



Job Sheet: 1.1.2

1.1.2 Job Name : Draw floor plan using CAD



N
 **GROUND FLOOR PLAN**
 SCALE : not to scale

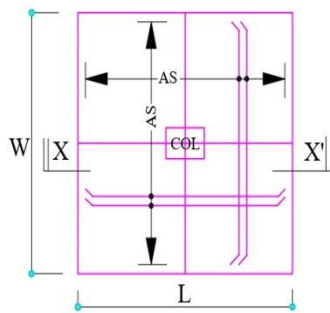
NOTE :
 D1 = 3'-4" x 7'-0"
 D2 = 2'-6" x 7'-0"
 W1 = 5'-0" x 4'-6"
 W2 = 3'-6" x 4'-6"
 HW = 2'-0" x 2'-0"
 COLUMN = 0'-12" X 0'-15"

Structural Plan-1.2

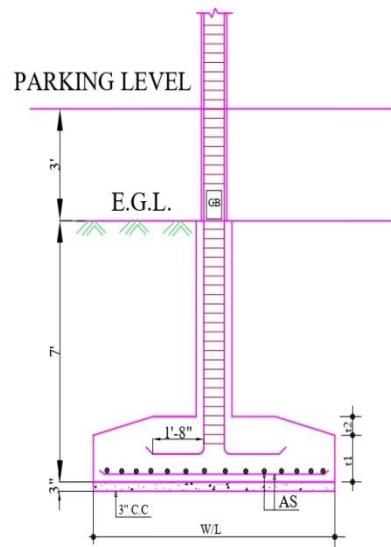
Job Sheet: 1.2.1

1. 2.1 Job Name : Draw a Footing Plan

QUS :DRAW A FOUNDATION PLAN & SECTION ASPER GFIVIN DESIGN & THEINSTRUCTION



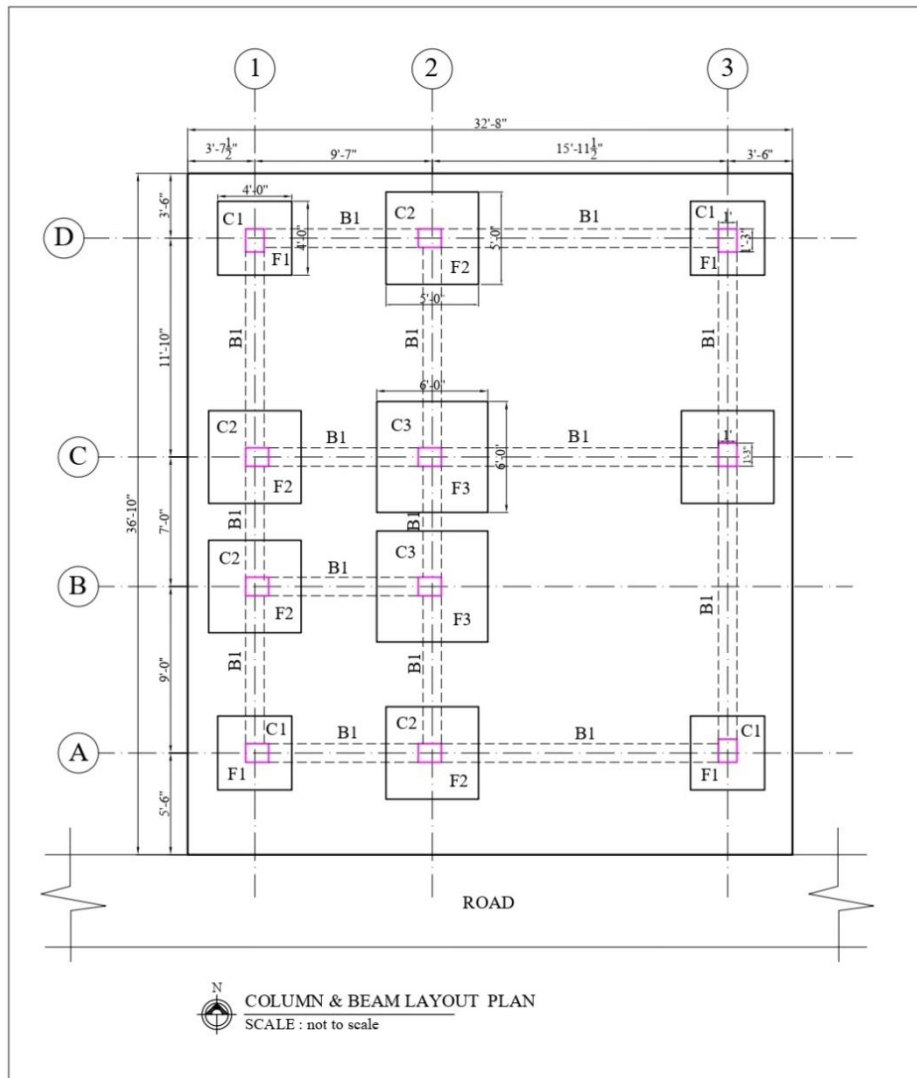
TYPICAL FOOTING PLAN
NOT TO SCALE



TRIPICAL FOOTING SECTION X-X'
NOT TO SCALE

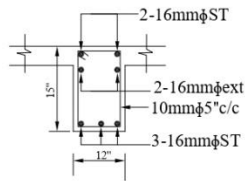
1.2.2 Job Name : Draw a Column & Beam Layout Plan

QUS : DRAW A COLUMN & BEAM LAYOUT PLAN AS PER GIVIN DESIGN & THE INSTRUCTION

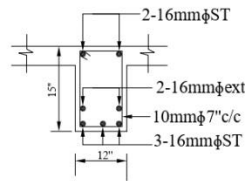


1.2.3 Job Name : Draw a Column & Beam Layout Plan

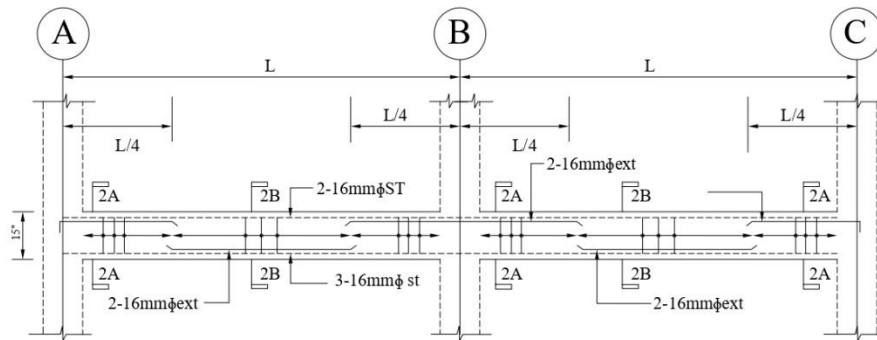
**QUS : DRAW BEAM SECTION AS PER
GIVEN DESIGN & THE INSTRUCTION**



SEC. 2A-2A
(NTS)



SEC. 2B-2B
(NTS)

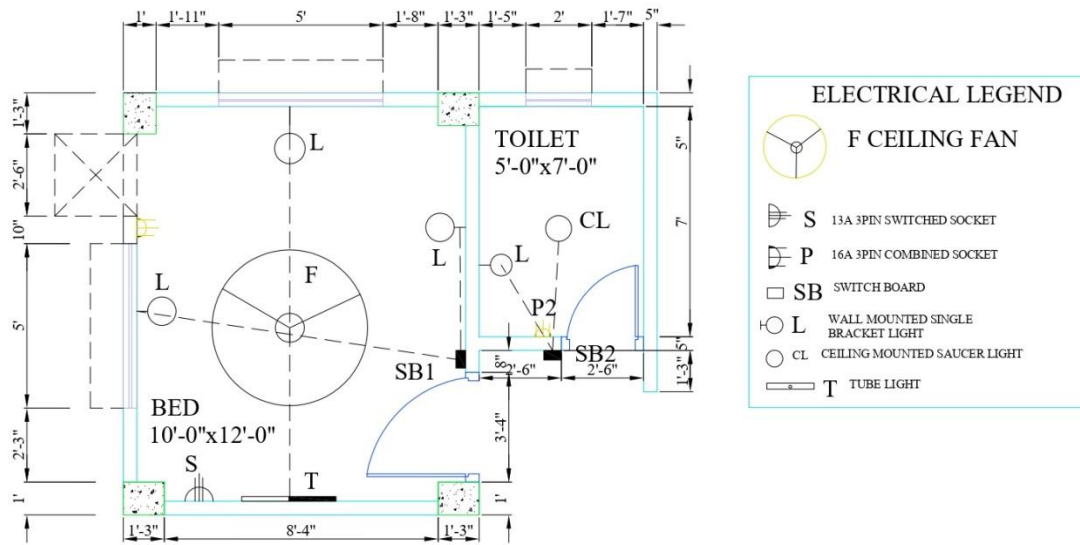


LONG SEC. OF FLOOR BEAM-2 (12"x15")
NOT TO SCALE

Electrical Plan-1.3

Job Sheet: 1.3.1

1.3.1 Job Name : Draw a Electrical Room Layout Plan



ELECTRICAL ROOM LAYOUT PLAN

SCALE : not to scale

Information Sheet No: 02

Create 3D Interface, Orbit and Navigate Model

Elements of Competency	Performance Criteria Bold & Underlined terms are elaborated in the Range of Variables
1. Develop basic 3D interface	1.1 Modeling tool bar commands are applied 1.2 Solid editing tool bar command is applied
2. Introduce values for thickness and elevation	2.1 View tool bar commands are applied 2.2 Thickness command at command prompt with different values is applied
3. Visualize model	3.1 Visual styles tool bar commands are applied 3.2 Different visual functions are applied 3.3 Models are visualized in required styles
4. Draw coordinates	4.1 Basic terminologies of Z coordinates are explained. 4.2 User Coordinates System (UCS) command with multiple switches is applied. 4.3 3D user and Z Cartesian (X,Y,Z) coordinates system is drawn
5. Develop familiarity with 3D orbit	5.1 3D orbit in various command is defined 5.2 Different visual aids are selected. 5.3 3D view while in the orbit command using pre- set views is set 5.4 Free and Continuous orbit is differentiated highlighting the use of "Esc" key

	5.5 Other navigational modes is discovered
6. Perform 3D dimensional navigation	<p>6.1 Functions of camera is dealt with.</p> <p>6.2 Parallel projection or perspective views is performed by using a camera and target with the help of "DVIEW" command.</p> <p>6.3 Walking and flying through a 3D drawing and their setting is Simulated.</p> <p>6.4 "ANIPATH" command for animation paths executed.</p>
7. Operate 3D object	<p>7.1 Wireframe models is created by positioning 2D objects anywhere in 3D space.</p> <p>7.2 Faceted surfaces is drawn using a polygonal mesh.</p> <p>33 7.3 Different simple shapes are combined to create more complex solids by joining or subtracting them or finding their intersecting (over- lapping) volume</p>

Range of Variables	
Variables	Range (may include but not limited to):
1. Modelling tool bar commands	1.1 Box 1.2 Wedge 1.3 Cone 1.4 Sphere 1.5 Cylinder 1.6 Polysolid 1.7 Torus 1.8 Pyramid 1.9 Helix 1.10 Planer surface 1.11 Extrude 1.12 Press pulls 1.13 Sweep 1.14 Revolve 1.15 Loft union 1.16 Subtract 1.17 Intersect 1.18 3D Move 1.19 3D Rotate 1.20 3D Align
2. Solid editing tool bar command	2.1 Union 2.2 Subtract 2.3 Intersect 2.4 Exclude faces 2.5 Move faces 2.6 Offset faces 2.7 Relate faces Rotate faces 2.8 Taper faces 2.9 Copy faces 2.10 Color faces

	<ul style="list-style-type: none"> 2.11 Copy edges Color edges 2.12 Imprint 2.13 Clean 2.14 Separate 2.15 Shell 2.16 Check
3. View tool bar commands	<ul style="list-style-type: none"> 3.1 Name view 3.2 Top view 3.3 Bottom view 3.4 Left view 3.5 Right view 3.6 Front view 3.7 Back view 3.8 South West (SW) Isometric 3.9 South East (SE) Isometric 3.10 North East (NE) Isometric 3.11 North West (NW) Isometric 3.12 Create camera
4. Visual styles tool bar commands	<ul style="list-style-type: none"> 4.1 2D Wireframe 4.2 3D Wireframe visual style 4.3 3D hidden visual style 4.4 Realistic visual style 4.5 Conceptual visual style 4.6 Mange visual style
5. Visual functions	<ul style="list-style-type: none"> 5.1 Regenerate a three-dimensional model with hidden lines using HIDE command. 5.2 Set the grid with DSETTINGS command
6. User Coordinates System (UCS)	<ul style="list-style-type: none"> 6.1 Create UCS 6.2 Face 6.3 Named 6.4 Object 6.5 Previous

	6.6 New 6.7 View 6.8 World 6.9 X/Y/Z.
7. Various command	7.1 "3D orbit" for constrained orbit on selected object 7.2 Developing zoom 7.3 Pan facility 7.4 Projection mode by selecting "Perspective" 7.5 Select different visual styles i.e. 3D Hidden, 3D 7.6 Wireframe, Conceptual, and Realistic.
8. Visual aids	8.1 Compass 8.2 Grid and 8.3 UCS Icon
9. Other navigational modes	9.1 Walk, 9.2 Fly 9.3 Swivel 9.4 Adjust distance
10. Functions of camera	10.1 Creation 10.2 View 10.3 Preview 10.4 Properties 10.5 Plotting 10.6 Display 10.7 Adjust 10.8 Swiveling 10.9 Distance

Self-Check 02

Q. 1 In AutoCAD what is the keyboard shortcut to activate the orbit command for rotating the 3Dview.

- a. O b. R c. V d. N

Q. 2 A Boolean operation that is used to select interfering region between solids

- a. Union
- b. Intersect
- c. Subtract
- d. None of the above

Q. 3 Which is means by interface in AutoCAD?

- a. Creates new 3D solids and surfaces by slicing, or dividing, existing objects.
- b. Converts a surface into a 3D solid with a specified thickness.
- c. 2D geometry on a 3D solid or surface, creating additional edges on planar faces
- d. The main working environment where we interactively locate and use the needed 3D tools

Answer Key 02

Q. 1 In AutoCAD what is the keyboard shortcut to activate the orbit command for rotating the 3Dview.

Ans : a. O

Q. 2 A Boolean operation that is used to select interfering region between solids

Ans : b. Intersect

Q. 3 Which is means by interface in AutoCAD?

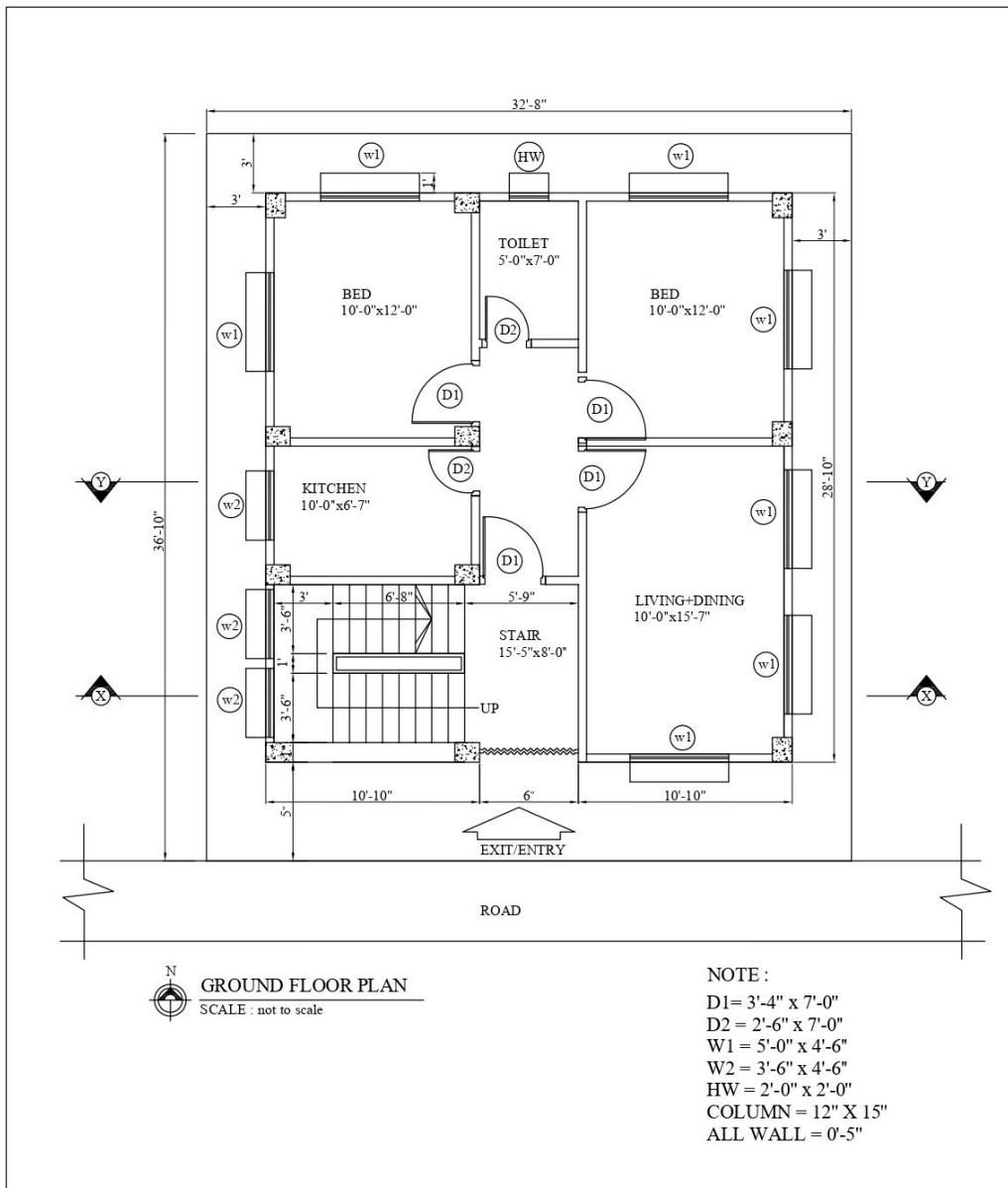
Ans : d. The main working environment where we interactively locate and use the needed 3D

tools

Job Sheet: 2.1

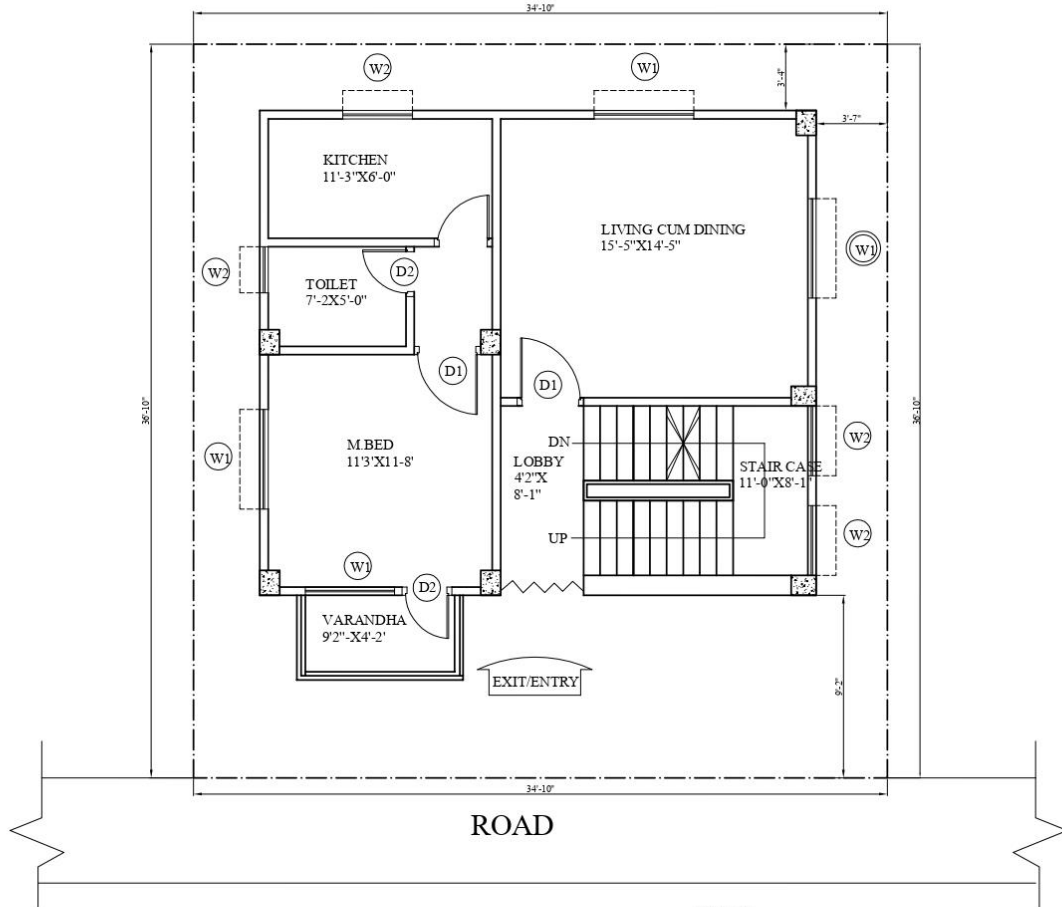
2.1 Job Name : Draw a Convert 2D to 3D Drawing

QUS :DRAW A FLOOR PLAN AS PER
GFIVIN DESIGN & THEINSTRUCTION



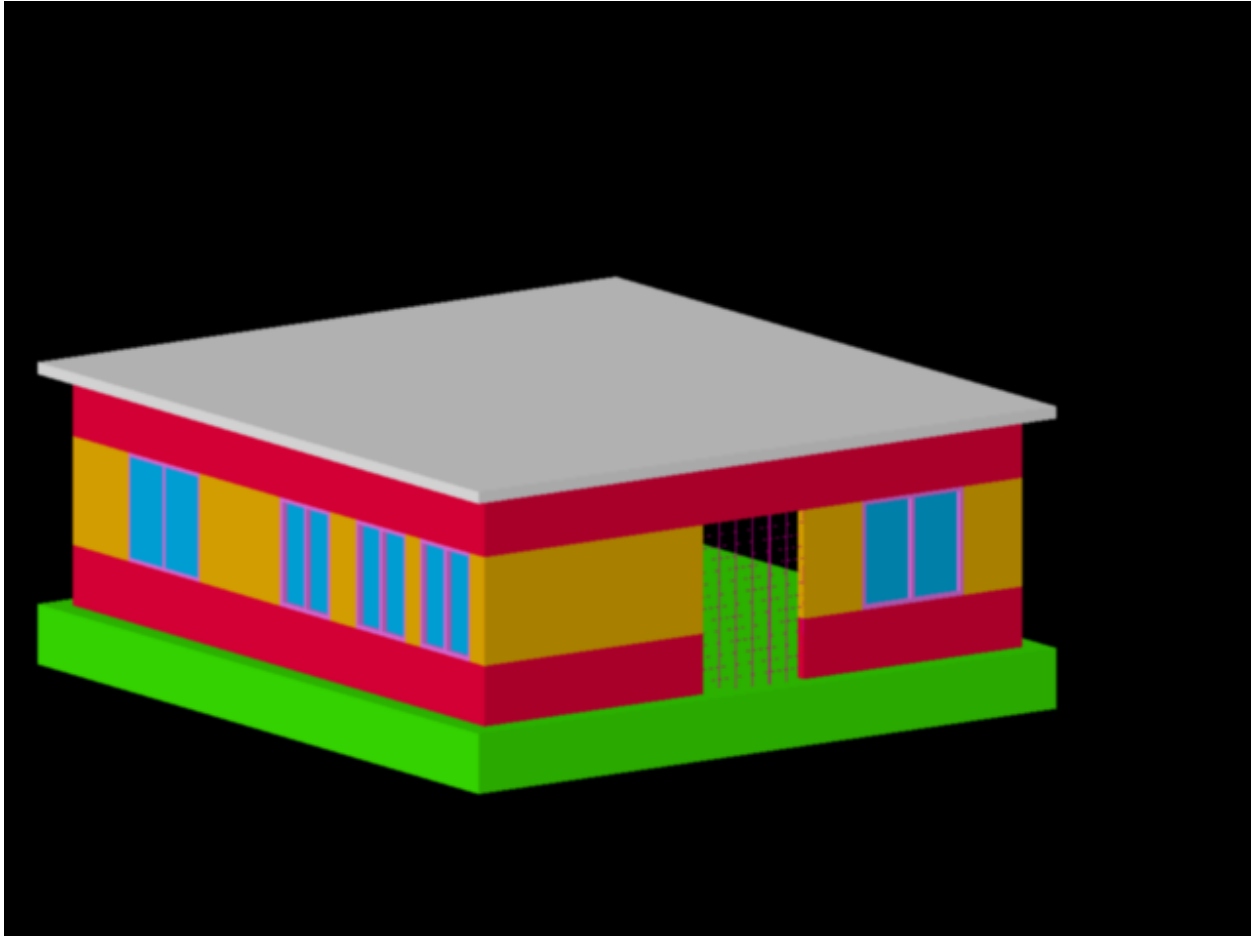
Job Sheet: 2.1

2.1 Job Name : Draw a Convert 2D to 3D Drawing



N
 GROUND FLOOR PLAN
 SCALE : not to scale

NOTE :
 D1 = 3'-4" x 7'-0"
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Information Sheet No: 03

Insert Surface

<p>Elements of Competency</p>	<p><u>Performance Criteria Bold & Underlined</u> terms are elaborated in the Range of Variables</p>
<p>1. Draw basic 3D surface</p>	<p>1.1 Smoothness and refinement are applied using mesh commands</p> <p>1.2 Mesh editing commands are used to enable mesh editing.</p> <p>1.3 CONVOTOSURFACE command is used to convert meshes.</p>

<p>2. Create complex 3D surfaces</p>	<p>2.1 Surfaces are developed using surface commands.</p> <p>2.2 Surface network is built.</p> <p>2.3 Editing commands are used to edit existing surfaces.</p> <p>2.4 Surface analysis tools are used</p> <p>2.5 Surface associativity is developed</p> <p>2.6 Complex 3D surfaces are created</p>
<p>3. Create 3D surface panel</p>	<p>3.1 A blend surface is created between two existing surfaces using "SURFBLEND" command</p> <p>3.2 New surface or cap is created to close an open edge of an existing surface using "SURFPATCH" command</p> <p>3.3 Parallel surface is created at a specified distance from the original surface using "SURFOFFSET" command</p>

Range of Variables	
Variables	Range (may include but not limited to):
1. Mesh editing commands	1. Mesh editing commands 1.1 MESHEXTRUDE 1.2 MESHSPILT (mid point) 1.3 MESHMERGE 1.4 MESHCAP (close hole)
2. Surface commands	2. Surface commands 2.1 Revolved Surface (REVSURF) 2.2 Tabulated Surface (TABSURF) 2.3 Ruled Surface (RULESURF) using "Surftab" variables 2.4 Edge Surface (EDGESURF) 2.5 Plane Surface (PLANESURF) 2.6 Extrude Surface (EXTRUDE)
3. Editing commands	3. Editing commands 3.1 Fillet 3.2 Trim 3.3 Untrim 3.4 Extend 3.5 Sculp
4. Analysis tools	4.1 Analysis Zebra 4.2 Analysis Curvature 4.3 Analysis Draft
5. Complex 3D surfaces	5.1 3d elevation 5.2 Animation 5.3 Rendering 5.4 Clear presentation

Self-Check 03

Q. 1 Why we use Planer Surface?

- a. Creates a surface in the space between several curves in the U and V directions, including surface and solid edge sub objects.
- b. Creates a planar surface.
- c. Creates a continuous blend surface between two existing surfaces.
- d. Creates a new surface by fitting a cap over a surface edge that forms a closed loop. .

Q. 2 What are the function of SURFBLEND?

- a. Creates a surface in the space between several curves in the U and V directions, including surface and solid edge sub objects.
- b. Creates a planar surface.
- c. Creates a continuous blend surface between two existing surfaces.
- d. Creates a new surface by fitting a cap over a surface edge that forms a closed loop.

Q. 3 What is the difference between a blend edge and a fillet edge?

Answer Key 03

Q. 1 Why we use Planer Surface?

Ans : b. Creates a planar surface.

Q. 2 What are the function of SURFBLEND?

Ans : c. Creates a continuous blend surface between two existing surfaces.
.

Q. 3 What is the difference between a blend edge and a fillet edge?

Ans : Blend Edge creates a fillet with variable curvature which is curvature continuous to the adjacent surfaces

Information Sheet No: 04
Develop Solid Images

Elements of Competency	Performance Criteria Bold & Underlined terms are elaborated in the Range of Variables
1. Create images	1.1 Solid primitives tab is launched from 3D Modeling drop down option of solids panel 1.2 Unique solid primitives are created by extruding existing two-dimensional objects using "Extrude" command with taper and path
2. Edit 3D Objects	2.1 Edges of a 3D object using "xedges" command are extracted. 2.2 The smoothness of shaded and rendered objects are adjusted using "FACETRES" command with valid values range. 2.3 "ISOLINES" and "REGEN" command are applied to regenerate the 3D drawing in 3D view.
3. Develop 3D Solid composites	3.1 3D solid is created by thickening a surface using "THICKEN" command. 3.2 3D solids that overlap are highlighted using "INTERFERE" command.
Range of Variables	
Variables	Range (may include but not limited to):
1. Solid	1.1 3D Move 1.2 3D Rotate 1.3 3D Align 1.4 3D Mirror 1.5 3D Rectangular Array 1.6 3D Polar Array

Self-Check 04

Q. 1 A Boolean operation that is used to select interfering region between solids

- a. Union b. Intersect c. Subtract d. None of the above

Q. 2 What are the function of SURFBLEND?

- a. Creates a surface in the space between several curves in the U and V directions, including surface and solid edge sub objects.
- b. Creates a planar surface.
- c. Creates a continuous blend surface between two existing surfaces.
- d. Creates a new surface by fitting a cap over a surface edge that forms a closed loop.

Q. 3 What is thicken in AutoCAD?

- a. Creates new 3D solids and surfaces by slicing, or dividing, existing objects.
- b. Converts a surface into a 3D solid with a specified thickness.
- c. Imprints 2D geometry on a 3D solid or surface, creating additional edges on planar faces
- d. The main working environment where we interactively locate and use the needed 3D tools

Answer Key 04

Q. 1 A Boolean operation that is used to select interfering region between solids

Ans : b. Intersect

Q. 2 What are the function of SURFBLEND?

Ans :c. Creates a continuous blend surface between two existing surfaces.

Q. 3 What is thicken in AutoCAD?

Ans : d. The main working environment where we interactively locate and use the needed 3D tools

Information Sheet No: 05

Merge Flat Objects From 3D Model

Elements of Competency	Performance Criteria Bold & Underlined terms are elaborated in the Range of Variables
1. Navigate sectional objects	<p>1.1 Section object that exposes the interior details of a model is created with 3D objects using "SECTIONPLANE" command.</p> <p>1.2 Options are applied to manipulate Section using Grips.</p> <p>1.3 Different commands are applied on Section.</p> <p>1.4 2D and 3D Sections are generated using option of right click button of mouse.</p> <p>1.5 Intersection of plane and solids is used to create a region using "Section" command.</p> <p>1.6 "Slice" command on the 3D object is applied</p>
2.Merge flat objects	<p>2.1 "SOLVIEW" command is executed.</p> <p>2.2 Generate profiles and sections in viewports are created with SOLVIEW using "SOLDRAW" command. 2.3</p> <p>3D view using UCS is developed</p> <p>2.4 "SOLPROF" command is run</p>

Range of Variables	
Variables	Range (may include but not limited to):
1. Grips	1.1 Base grip 1.2 Directional arrow grip 1.3 Segment end grip 1.4 Menu grip
2. Commands	2.1 Erase 2.2 Move 2.3 Copy 2.4 Scale 2.5 Rotate 2.6 Draw order
3. 3D Sections	3.1 Stair case 3.2 Sunshade 3.3 Beam 3.4 Cornish 3.5 Roof 44 3.6 Column 3.7 Overhead water tank 3.8 Parapet wall 3.9 Floor section 3.10 Water tank section 3.11 Septic tank

Self-Check 05

Q. 1 What is the purpose of the command section plane in AutoCAD?

Q. 2 What is the difference between a blend edge and a fillet edge?

Answer Key 05

Q. 1 What is the purpose of the command section plane in AutoCAD?

Ans : Creates a section object that acts as a cutting plane through 3D objects, and point clouds

Q. 2 What is the difference between a blend edge and a fillet edge?

Ans : Blend Edge creates a fillet with variable curvature which is curvature continuous to the adjacent surfaces

Information Sheet No: 06

Perform 3D Rendering

Elements of Competency	Performance Criteria Bold & Underlined terms are elaborated in the Range of Variables
1. Execute rendering.	<p>1.1 Photorealistic or realistically shaded image of a three-dimensional wireframe or solid model using "Render" commands are Created.</p> <p>1.2 Parts of the model that gets processed during rendering is controlled by following three settings.</p>
2. Apply materials and lights	<p>2.1 Material to drawing is added using "Materials" or "Mar browser open" commands.</p> <p>2.2 Material layers are applied using "MATERIALATTACH".</p> <p>2.3 Own material is create as required</p> <p>2.4 "LIGHTSLIST" command is modified</p> <p>2.5 Sun properties are adjusted used the "SUNPROPERTIES" command</p>
3. Demonstrate presentation	<p>3.1 Drawings are prepared</p> <p>3.2 Setback rules and floor area ration (FAR) calculations are interpreted as per Bangladesh national building codes (BNBC)</p> <p>3.3 Sheet presentation is demonstrated</p> <p>3.4 Documents are printed in various scale as per requirements</p>

Range of Variables	
Variables	Range (may include but not limited to):
1. "Render" commands.	1.1 Destination 1.2 Quality 1.3 Selection 1.4 Crop 1.5 File.
3. Three settings.	2.1 View 2.2 Crop 2.3 Selected
4. Own material	3.1 Photo 3.2 Shapes
5. Drawings	4.1 Plans 4.2 Section 4.3 Elevation 4.4 Isometric vie

Self-Check 06

Q. 1 What is the shortcut command in Render Preferences?

- a) REPEF b) RPREF c) RRPEF d) RFRPE

Q. 2 How to use solview command in AutoCAD?

Answer: SOLVIEW must be run on a layout tab. If the Model tab is current, the last active layout tab is made current. SOLVIEW places the viewport objects on the VPORTS layer

Answer Key 06

Q. 1 What is the shortcut command in Render Preferences?

Ans : b) RPREF

Q. 2 How to use solview command in AutoCAD?

Ans: SOLVIEW must be run on a layout tab. If the Model tab is current, the last active layout tab is made current. SOLVIEW places the viewport objects on the VPORTS layer