# JSS 3 FIRST TERM REVISION ON BASIC TECHNOLOGY

# WEEK ONE

RESUMPTION TEST EXERCISE

# WEEK TWO

PERSPECTIVE DRAWING

Perspective drawing is a pictorial representation of an object, as seen by an observer through an imaginary plane called **picture plane (PP).**

The observer’s eye is called the **station point** which generates visual rays (projectors) that define the size of an object.

TYPES OF PERSPECTIVE DRAWING

Perspective drawing can be classified according to the number of vanishing points the drawing has. So we have:

1. **One-point perspective drawing:** This is a pictorial representation of an object having one vanishing point.
2. **Two-point perspective drawing:** This is a pictorial representation of an object having two vanishing points.
3. **Three-point perspective drawing:** This is a pictorial representation of an object having three vanishing points.

VANISHING POINT

A vanishing point is the point in a perspective drawing where all the visual rays converge. The number of vanishing points depends on the position of the object with respect to the picture plane.

# WEEK THREE

SCALES AND SCALE DRAWING

SCALES

Scales are series of calibration or division on a material which is used to measure, reduce or enlarge the size of an object.

Scales can also be defined as calibrated materials which are used to measure a given component of a substance.

TYPES OF SCALES

1. **Full scale:** The full scale is used when drawing the actual or real size of an object in all dimensions. The full scale size is **1:1.**
2. **Reduced scale:** A reduced scale is used in reducing the actual or the enlarged size of an object, thus the reduction is done proportionally to the drawing. The reduced scale sizes are: 1:2, 1:5, 1:10, 2:50, etc.
3. **Enlarged scale:** Enlarged scale is used when the object to be drawn is too small to be clearly seen and thus is enlarged proportionally to the drawing. Enlarged scale ratios are: 2:1, 5:1, 10:1, 20:1, 50:2, etc.

SCALE DRAWING

Scale drawing is a drawing of the actual, reduced or an enlarged size of an object. They are usually given as a ratio and are stated in the title block.

# WEEK FOUR

BLUEPRINT READING

Blueprint reading simply put means interpreting ideas expressed by others on drawings.

SOME COMMON BLUEPRINT SYMBOLS (LEGENDS) AND THEIR INTERPRETATION

Common symbols used in building plans or blueprints and their various interpretations can be grouped into:

1. Architectural symbols;
2. Mechanical or Plumbing symbols;
3. Electrical symbols and;
4. General building symbols.

ARCHITECTURAL SYMBOLS

This is majorly concerned with symbols like that of doors, windows, staircase, wardrobe etc.

|  |  |
| --- | --- |
| ARCHITECTURAL SYMBOL | INTERPRETATION/MEANING |
| 1. Door
 |  OR |
| 1. Window
 |  |
| 1. Wardrobe
 |  |
| 1. Wall
 |  |
| 1. Staircase
 |  |

MECHANICAL/PLUMBING SYMBOLS

Mechanical symbols deals with symbols like sinks, bathtub, toilet sitter, wash hand basin, sewage and drainage etc.

|  |  |
| --- | --- |
| MECHANICAL SYMBOL | INTERPRETATION/MEANING |
| 1. Sink
 |  |
| 1. Bathtub
 |  |
| 1. Water cistern/closet
 |  |
| 1. Floor drainage
 |  |
| 1. Wash hand basin
 |  |

ELECTRICAL SYMBOLS

Electrical symbols describe icons like switch, electric meter, gear switch, distribution board, telephone outlet etc.

|  |  |
| --- | --- |
| MECHANICAL SYMBOL | INTERPRETATION/MEANING |
| 1. Switch
 |  |
| 1. Electric meter
 | z |
| 1. Gear switch
 |  |
| 1. Distribution board
 |  |
| 1. Telephone outlet
 |  |

GENERAL SYMBOLS

General building symbols gives the representation of all the blueprints symbols i.e. combination of architectural, mechanical and electrical symbols.

|  |  |
| --- | --- |
| GENERAL SYMBOL | INTERPRETATION/MEANING |
| 1. Door
 |  OR |
| 1. Gear switch
 |  |
| 1. Wardrobe
 |  |
| 1. Switch
 |  |
| 1. Sink
 |  |

BLUEPRINT DRAWING TECHNIQUES

Blueprint drawing technique is concerned with various technical drawing methods which can be applied when drawing a blueprint or a building plan.

TYPES OF BLEUPRINT DRAWONG TECHNIQUES

There are various known blueprint drawing techniques, but the two main techniques are:

1. Simple Technical Drawing Technique (STDT) and;
2. Detailed Technical Drawing Technique (DTDT).

SIMPLE TECHNICAL DRAWING TECHNIQUE

This is a simple sketch of a building plan that gives an insight to the main idea with little or no symbols.

DETAILED TECHNICAL DRAWING TECHNIQUE

Detailed technical drawing gives a full description of the plan under consideration with all the needed symbols and their interpretation.

# WEEK FIVE

WOODWORK PROJECTS

Woodwork project entails the activity or skill of making items from wood and is also called **woodworking.**

PROCEDURES FOR MAKING A WOODWORK PROJECT

Before attempting to construct a project of your own design, you should plan/prepare the project. This is also referred to as **job planning**. A job plan generally includes the following items:

1. Design stage;
2. Preparation of a simple working drawing/working drawing stage;
3. Bill of materials;
4. List of tools and equipments;
5. Preparation of cutting lists;
6. Fabrication/production or construction stage.

DESIGN STAGE

An article is made for a particular purpose, so should the features of the project on under consideration be made to reflect this purpose.

WORKING DRAWING STAGE

A working drawing is a detailed is a detailed hand sketched or actual finished drawing of the product to be made.

B­ILL OF MATERIALS

A bill of materials is a comprehensive list of all the materials needed to begin and complete a particular project.

LIST OF TOOLS AND EQUIPMENT

This is an overall list of the necessary tools and equipment needed carry out the all operations involved in making a particular project.

PREPARATION OF CUTTING LISTS

This is a detailed and tabled list for the construction of a given item which is comprised of the description, quantity, length, width, height, and remarks (i.e. the type of materials to be used e.g.: plywood etc).

|  |
| --- |
| CUTTING LIST FOR A DINNING TABLE |
| ITEM | DESCRIPTION | QTY | LENGTH (mm) | WIDTH (mm) | HEIGHT (mm) | REMARKS |
|  | Top | 1 | 930 | 470 | 18 | Lipped plywood |
|  | Side rails | 2 | 550 | 125 | 18 | Mahogany |
|  | Back rails | 1 | 1,000 | 125 | 18 | ″ |
|  | Drawer rails | 2 | 1,000 | 75 | 18 | ″ |
|  | Kickers | 2 | 550 | 50 | 18 | ″ |
|  | Drawer rail bracket | 2 | 200 | 50 | 18 | ″ |
|  | Legs | 4 | 420 | 50 | 18 | ″ |
|  | Buttons | 2 | 50 | 50 | 18 | ″ |
|  | Drawer front | 1 | 1,000 | 125 | 18 | Solid wood |
|  | Drawer sides | 2 | 550 | 125 | 12 | Mahogany |
|  | Drawer back | 1 | 1,000 | 125 | 12 | ″ |
|  | Drawer button | 1 | 1,000 | 550 | 6 | Plywood |
|  | Drawer runners | 2 | 550 | 50 | 50 | Mahogany |
|  | Handles | 2 | 200 | 50 | 50 | ″ |
|  | Nails/screws | 10 | ­- | - | - | 32 x 10 for top |
|  | Nails/screws | 10 | - | - | - | 50 x 12 for kickers & runners |
|  | Lipping | 1 | 2,800 | 25 | 25 | Mahogany |
|  | Lacquering | 1 | - | - | - | Gallon (glossy) |

FABRICATION/CONSTRUCTION STAGE

The fabrication stage is the last or final stage in woodwork project and is defined as the act of constructing an object to a given specification.

EXAMPLES OF WOODWORK PROJECTS

Examples of woodwork projects include:

1. Wood carving;
2. Joinery;
3. Carpentry;
4. Woodturning;
5. Cabinetry;
6. Furniture and etc.

# WEEK SIX

METALWORK PROJECTS

Metalwork project as a term covers a wide and diverse range of processes, skills, and tools for producing objects on every scale and is also known as **metalworking**.

PROCEDURES FOR MAKING A METALWORK PROJECT

Just like we have in woodwork project, it can also be applied in metalwork project that before attempting to construct a project of your own design, you should plan/prepare the project. This is also referred to as **job planning**. A job plan generally includes the following items:

1. Design stage;
2. Preparation of a simple working drawing/working drawing stage;
3. Bill of materials;
4. List of tools and equipments;
5. Preparation of cutting lists;
6. Fabrication/production or construction stage.

DESIGN STAGE

An article is made for a particular purpose, so should the features of the project on under consideration be made to reflect this purpose.

WORKING DRAWING STAGE

A working drawing is a detailed is a detailed hand sketched or actual finished drawing of the product to be made.

B­ILL OF MATERIALS

A bill of materials is a comprehensive list of all the materials needed to begin and complete a particular project.

LIST OF TOOLS AND EQUIPMENT

This is an overall list of the necessary tools and equipment needed carry out the all operations involved in making a particular project.

PREPARATION OF CUTTING LISTS

This is a detailed and tabled list for the construction of a given item which is comprised of the description, quantity, length, width, height, and remarks (i.e. the type of materials to be used e.g.: plywood etc).

|  |
| --- |
| CUTTING LIST FOR A DINNING TABLE |
| ITEM | DESCRIPTION | QTY | LENGTH (mm) | WIDTH (mm) | HEIGHT (mm) | REMARKS |
|  | Top | 1 | 930 | 470 | 18 | Aluminium plysheet |
|  | Side rails | 2 | 550 | 125 | 18 | Stainless steel |
|  | Back rails | 1 | 1,000 | 125 | 18 | ″ |
|  | Drawer rails | 2 | 1,000 | 75 | 18 | ″ |
|  | Kickers | 2 | 550 | 50 | 18 | ″ |
|  | Drawer rail bracket | 2 | 200 | 50 | 18 | ″ |
|  | Legs | 4 | 420 | 50 | 18 | ″ |
|  | Buttons | 2 | 50 | 50 | 18 | ″ |
|  | Drawer front | 1 | 1,000 | 125 | 18 | Thick aluminium sheet |
|  | Drawer sides | 2 | 550 | 125 | 12 | Stainless steel |
|  | Drawer back | 1 | 1,000 | 125 | 12 | ″ |
|  | Drawer button | 1 | 1,000 | 550 | 6 | Aluminium plysheet |
|  | Drawer runners | 2 | 550 | 50 | 50 | Stainless steel |
|  | Handles | 2 | 200 | 50 | 50 | ″ |
|  | Nails/screws | 10 | ­- | - | - | 32 x 10 for top |
|  | Nails/screws | 10 | - | - | - | 50 x 12 for kickers & runners |
|  | Lipping | 1 | 2,800 | 25 | 25 | Stainless steel |
|  | Lacquering | 1 | - | - | - | Gallon (glossy) |

FABRICATION/CONSTRUCTION STAGE

The fabrication stage is the last or final stage in woodwork project and is also defined as the act of constructing an object to a given specification.

EXAMPLES OF METALWORK PROJECTS

Examples of metalwork projects include:

1. Ship building;
2. Bridge construction;
3. Engine parts manufacturing and assembling;
4. Delicate jewelry making and etc.

# WEEK SEVEN

MID-TERM TEST EXERCISE AND BREAK

# WEEK EIGHT

SOLDERING AND BRAZING

SOLDERING

Soldering is the process of joining metal surfaces or edges with solder.

TYPES OF SOLDERING

There are three types of soldering, namely:

1. Soft soldering;
2. Hard soldering and;
3. Sweat soldering.

SOFT SOLDERING

Soft soldering is the type of soldering operation which is done below the red hot temperature of the soldering iron and used where a stronger joint is not needed.

HARD SOLDERING

Hard soldering is the type of soldering operation that is done at or above the red hot temperature of the soldering iron and is used where a stronger joint is needed.

SWEAT SOLDERING

Sweat soldering is used when it is not convenient to use the soldering bit. In sweat soldering, heat is applied to the pieces to be joined, and the solder is melted by this heat.

TOOLS AND MATERIALS NEEDED FOR SOFT SOLDERING

1. Soldering (copper) bit;
2. Soft solder;
3. Flux and;
4. Heat source.

SOLDERING (COPPER) BIT

The soldering bit, sometimes called soldering iron is a square or round piece of copper pointed at one end and is fastened to a steel bar with a wooden handle on the other end.

**NB:** The bit of the soldering iron is made from copper for two reasons:

1. Copper is an excellent conductor of heat.
2. Solder and copper have a great affinity when the solder is in its molten state.

TYPES OF SOLDERING BITS

There are two common patterns of soldering bits:

1. **Straight soldering bit**: Thestraight soldering bit is used for general work, and for getting into restricted places.
2. **Hatchet soldering bit:** The hatchet soldering bit is used for making long joints because of its blade-like edge. It is also used for soldering in grooves.

SOFT SOLDER

A solder is a material used in its molten state for joining of metals. It is usually made of one-half lead and one-half tin.

A soft solder is a type of solder that melts usually melts below the red hot temperature of the soldering iron. There is also a form of solder known as special solder which is used for soldering aluminium.

FLUX

Flux is a substance applied on metals to be joined so that the surfaces of the metal can be cleaned. It cleanses the metal and helps the solder to flow.

HEAT SOURCE

There are mainly two sources for heating the soldering bit. One is to heat it electrically by plugging the bit cable into an electricity socket and allow it to heat up for some time. Another source of heat is from blow lamps.

PROCEDURE FOR SOLDERING

1. Cleaning the bit of the soldering iron. This is also known as **tinning the bit**.
2. Application of flux to clean the metals to be soldered.
3. Arranging the materials to be soldered.
4. Holding the materials to be soldered properly.
5. Tacking a seam with drops of solder.

BRAZING

Brazing is a type of hard soldering which uses filler rods to join the metals together. Brazing is done at a higher temperature than that of soft soldering.

PROCEDURE FOR BRAZING

1. Select and clean the materials or join to be brazed.
2. Apply flux on the surfaces to be joined with the correct flux.
3. Arrange the surfaces to be joined, with a reasonable gap allowed.
4. Apply a rod to the work and heat with the acetylene tank nozzle until the rod melts flush into the joint and fastens to the parts.

# WEEK NINE

MACHINE MOTION

Machine motion deals with motion (i.e. movement) and its types.

MOTION

Motion basically means movement.

TYPES OF MOTION

There are various types of motion and can either be:

1. Linear motion (i.e. motion in a straight path or;
2. Rotary motion (i.e. motion in a circular path).

LINEAR MOTION

Linear motion could be horizontal or vertical and can either be forward or backward. Linear motion can be achieved through the use of slots, slides, levers and linkages.

ROTARY MOTION

Rotary motion, unlike linear motion is a kind of motion that takes place in a circular or round form (i.e. 360⁰). However in some cases, rotary motion is not completely 360⁰, but can be 90⁰ or more, but less than 360⁰. There are mainly two types of rotary motion, namely:

1. **One-way rotary motion:** Mechanisms or components that rotate in one direction, either clockwise or anticlockwise are regarded as **one-way rotary motion components.** E.g.: motion of an electric fan, clock, grinding machines etc.
2. **Reversible rotary motion:** Mechanisms or components that can rotate both in a clockwise direction and anticlockwise direction carry out reversible motion. E.g.: audio and video cassettes and tapes, vehicles (e.g. cars) etc.