# JSS 2 FIRST TERM REVISION ON BASIC TECHNOLOGY

# WEEK ONE

RESUMPTION TEST EXERCISE

# WEEK TWO

WOODWORK MACHINES

Woodwork machines are those machines which used in woodwork operations to process woods. Those processes are thus: cutting, joining, planning, drilling, boring, tenoning, mortising etc.

TYPES OF WOODWORK MACHINES

There are two types of woodwork machines, they include:

1. Portable power tools/simple devices and;
2. Heavy/complex woodwork machines.

PORTABLE POWER TOOLS

Portable power tools are those woodwork machines which are relatively small and thus, can be carried about easily.

EXAMPLES OF PORTABLE POWER TOOLS

1. Surface planer: This is used for removing marks and twists on the surface of woods.
2. Belt sander: The belt sander is used for giving wood surfaces a smooth fine finish.
3. Portable circular saw: This is used for cutting smaller/simpler (wood) workpieces.
4. Power drill: Power drill is basically used for drilling and boring operations.
5. Jointer: The jointer is used for removing arches and bows in order to deliver an entirely flat surface.

HEAVY WOODWORK MACHINES

Heavy woodwork machines are those woodwork machines which are relatively big and hence, are mounted permanently in the workshop.

EXAMPLES OF HEAVY WOODWORK MACHINES

1. Drill press: The drill press is used for drilling, boring, sanding, shaping and mortising operations.
2. Band saw: The band saw is a versatile woodwork machine which can be adapted to perform operations like cutting, crosscutting, contouring and other wood forms.
3. Thicknesser: This is used for planning wood or timber to a specific suitable thickness/size.
4. Table-type circular saw: The basic operation of the circular saw is cutting operation. Hence, it is used to re-saw or prepare timber into suitable sizes for articles of joinery.
5. Wood lathe: This is employed where there is an amount of turning to be done i.e. turning between centers and turning on the face plate (both inside and outside).

CARE AND MAINTENANCE OF WOODWORK MACHINES

1. Cleaning: They should be cleaned thoroughly before and after use.
2. Lubrication: The moving parts of the machine should be well oiled/lubricated.
3. Repair and replacement: Damaged or worn-out parts should be repaired or replaced when appropriate.
4. Conditioning: They should not be conditioned or used to carry operations other than that which they are made for.

# WEEK THREE

METALWORK MACHINES

Metalwork machines are those machines which used in metalwork operations to process metals. Those processes include: cutting, joining, grinding, drilling, boring, shaping etc.

TYPES OF WOODWORK MACHINES

Just like woodwork machines, there are two types of metalwork machines and they include:

1. Portable power tools/simple devices and;
2. Heavy/complex metalwork machines.

PORTABLE POWER TOOLS

Portable power tools are those metalwork machines which are relatively small and thus, can be carried about easily.

EXAMPLES OF PORTABLE POWER TOOLS

1. Portable electric drill: The portable electric drill is a small-sized device, mainly used for drilling and boring operations.
2. Portable metal punching machine: This is used for punching holes, applying imprints and simple designs on metal workpieces.
3. Portable handheld concrete vibrator: This device is used to eliminate air pockets that remain when pouring concrete which can ruin the integrity of the concrete.

HEAVY WOODWORK MACHINES

Heavy metalwork machines are those metalwork machines which are relatively big and hence, are mounted permanently in the workshop.

EXAMPLES OF HEAVY METALWORK MACHINES

1. The lathe machine: This is used to turn metal workpieces in order to obtain a cylindrical surface.
2. Power hacksaw: The power hacksaw is a metal cutting machine which used for cutting various sizes of metals.
3. Grinders: They are used for grinding surfaces and sharpening tools.
4. Drilling machine: Drilling machines are used for producing cylindrical holes either by drilling or by boring.
5. Milling machine: This also known as the **miller** is a metal cutting machine that uses a multiple-tooth cutting tool called the milling cutter.
6. The shaper: The shaper is a machine that uses a single-point cutting tool that is similar to the bit of the lathe machine.

CARE AND MAINTENANCE OF METALWORK MACHINES

1. Cleaning: They should be cleaned thoroughly before and after use.
2. Lubrication: The moving parts of the machine should be well oiled/lubricated.
3. Repair and replacement: Damaged or worn-out parts should be repaired or replaced when appropriate.
4. Conditioning: They should not be conditioned or used to carry operations other than that which they are made for.

# WEEK FOUR

BELT AND CHAIN DRIVES

Belt and drives can be defined a mechanism of power transmission from one shaft to another separated at a distance through a continuous flexible belt.

TYPES/EXAMPLES OF BELT AND CHAIN DRIVES

1. Open belt drive: An open belt connects two or more pulleys (shafts), making it possible for them to run in the same direction.
2. Crossed belt drive: The crossed belt drive is used to change the running direction of the pulleys in a system (connection).
3. Round belt drive: a round belt is made of rubber which is present in vacuum cleaners and (electric) sewing machine.
4. V-belt drive: A v-belt has a v-shaped cross-section which runs on v-pulleys i.e. both the belt and pulley(s) are v-shaped.
5. Timing belt drive: A timing belt is a type of belt with teeth which is used for power transmission instead of friction.
6. Chain belt drive: A chain belt is a gear type pulley with sprockets (wheels with teeth shaped to mesh with a chain).

APPLICATION OF BELT AND CHAIN DRIVES

1. Transmission of power from one shaft to another.
2. Running of various industrial and agricultural machineries.
3. It is also used in electricity generators.
4. Conveying of materials from one point to another e.g. cloth making and newspaper printing press.

# WEEK FIVE

HYDRAULIC DEVICES AND MACHINES

Hydraulic devices and machines are those machineries and tools that use liquid fluid power to do work and are operated by the use of hydraulics.

TYPES/EXAMPLES OF HYDRAULIC MACHINES

1. Hydraulic jack: The hydraulic jack is a type of jack that uses hydraulic power system to lift heavy loads/objects such as cars, tractors etc.
2. Hydraulic pumps: Hydraulic pumps supply fluid to the components in the system and is used in gear pumps, centrifugal pump, etc.
3. Garden sprinkler: A garden sprinkler consists of one or more water jets which can revolve about the center as it sprinkles water in a lawn or garden.
4. Reaction turbines: This works by directing a jet of water running at a high velocity on a row of movable blades on a wheel. They are found in power/electricity generating dams.
5. The waterwheel: Unlike the windmill which rotates as a result of air or wind movement, the waterwheel moves because of water movement; hence generating energy in the process.
6. Hydraulic press and hammer: They are used for forging red-hot steel, car brakes, lift pumps etc.

# WEEK SIX

PNEUMATIC DEVICES AND MACHINES

Pneumatic devices and machines are those machineries and tools that use pressurized air/gaseous fluid power to do work and operated by the use of pneumatics.

TYPES/EXAMPLES OF PNEUMATIC MACHINES

1. Pneumatic force pumps: Pneumatic force pumps are used to move gases and liquids by applying forces greater than those of the gases or liquids.
2. Pneumatic car brakes: Unlike the hydraulic motorcycle or car brake that make use of hydraulics (liquid fluids), the pneumatic car brake operates using pneumatics (gaseous fluids).

# WEEK SEVEN

MID-TERM TEST EXERCISE AND BREAK

# WEEK EIGHT

GEARS

Gears are metallic wheels with teeth which are used to transmit power or energy from one shaft to another.

TYPES/EXAMPLES OF

There are various types of gears, viz:

1. Spur gears: Spur gears are used for transmitting drive between parallel shafts.
2. Bevel gears: They are used for transmitting power or drive between shafts at angles. Bevel gears have conical cross-sections to help them achieve their purpose.
3. Rack and pinion gears: Rack and pinion gears are used for converting rotary motion of the pinion to linear motion of the rack.

APPLICATION OF GEARS

1. They are used to transmit power or energy from one shaft to another.
2. They are used to change speed of shafts to either high or low speed.
3. They also can be used to change the running direction of a shaft either to a forward or to a backward (reverse) direction.

# WEEK NINE

SITE PREPARATION

Site preparation involves the demolition of buildings and other structures, sale of materials from demolished structures, clearing of building sites, earth-moving, land fill, leveling, land drainage and other land preparation activities.

TYPICAL HANDTOOLS USED IN SITE PREPARATION

1. Spade: This is used for digging usually relatively loose or soft earth.
2. Shovel: The shovel is used for lifting and throwing loose materials (aggregates) or soft earth into another position and for spreading and leveling earth.
3. Chain saw: This is a portable diesel or petrol-operated motorized chain saw used in felling trees and for cutting the tree trunk into smaller lengths.
4. Matchet: This is used for cutting grasses, tree branches and shrubs.
5. Hoe: This is used for digging usually about the surface of ground.
6. Axe: The axe is used for cutting bigger branches.

TYPICAL MECHANICAL TOOLS USED IN SITE PREPARATION

1. Bulldozer: This machine is used to push down almost any obstacle marked to be removed, such as wall, buildings, trees etc. and clear them off from site.
2. Tractor shovel (Pay loader): It is used for lifting large quantities of loose materials at a time and loading them into trucks or tippers.
3. Grader: The grader is mainly used for grading, that is, for leveling of excavated areas and also for trimming of edges or banks of roads, ditches, rivers etc.

SITE PREPARATION PROCEDURES

1. **Removal of vegetable soil, small trees and shrubs:** This is the act of removing of the top soil to a depth of about 150mm-300mm, thereby getting rid of small trees and shrubs in the process.
2. **Grubbing out of roots and stumps:** It is act of removing roots and stumps of big trees.
3. **Extermination of termites and their nests:** When termites’ nest and anthill are found on the construction site, they should be destroyed and also some poisonous chemicals like Gamaline should be poured into the nest to kill the termites.
4. **Levelling the site:** Here, earth is cut from the higher ground and moved down to fill valleys, holes and gullies so as to obtain a leveled surface.

**Keywords**

1. Motorized: A machine operated by petrol or a diesel engine.
2. Excavate: To dig up earth to a required depth, width and length.
3. Back fill: The process of filling the trench when the foundation footing has been cast and the wall erected up to and above the ground level. Earth fill is the loose earth used for filling the trench.
4. Debris: The ruins or heap of materials gathered when old structures are demolished the process of clearing a building site.
5. Aggregates: A term used to refer to materials other than cement and water, used in the production of concrete. Fine aggregate refers to sand, while coarse aggregate refers to broken stones or granite pieces.