

SYLLABUS FOR DEMONSTRATOR IN CARPENTRY (DIPLOMA)

PAPER-I

BASIC ENGINEERING SCIENCE

Heat and temperature units, difference between heat and temperature, boiling point, melting point, scale of temperature, relation between different scale of temperature, Thermometer, pyrometer, Expansion of solids, liquids and gases due to heat, co-efficient of expansion. Electricity and its various effects. Electric current-positive and negative terminals, use of switches and fuses. Types of current- AC, DC, Units of current, resistance and voltage; Simple electric circuit-Ohm's law-simple calculation. Conductor, insulator, Types of connections – series, parallel, electric power, Horse power, energy, unit of electrical energy. Concept of earthing.

Levers and Simple Machines: levers and its types. Simple Machines, Effort and Load, Mechanical Advantage, Velocity Ratio, Efficiency of machine.

OCCUPATIONAL SAFETY AND HEALTH EDUCATION

Safety & Health- Introduction to Occupational Safety and Health importance of safety and health at workplace.

Occupational Hazards- Basic Hazards, Chemical Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards.

Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.

Accident & safety- Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.

ENVIRONMENTAL EDUCATION

Pollution- Pollution and pollutants including liquid, gaseous, solid and hazardous waste.

Energy Conservation- Conservation of Energy, re-use and recycle.

Global warming- Global warming, climate change and Ozone layer depletion.

Environment- Right attitude towards environment, Maintenance of in -house environment.

ENGINEERING MECHANICS

Mass, Weight and Density: Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals. Centre of gravity and its practical application.

Forces definition: - Stress, strain and modules of elasticity, ultimate, strength, factor of safety and different types of stresses

Definition and example of compressive, tensile, shear forces, axial and tangential forces.

Elementary principle of triangle of forces and parallelogram of forces. Resolution and composition of forces. Moment of a force-couples simple problems. Example in simply supported and loaded beams- General conditions of equilibrium for a series of forces acting on a body. Stable, non-stable and neutral equilibrium of bodies-simple explanation.

Work, Power and Energy: work, unit of work, power, unit of power, Horse power, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy.

Friction – Limiting friction – measuring of friction – examples. Simple problems on straight and bell crank levers. Laws of friction, co-efficient of friction and angle of friction. Problems on inclined plane.

MATERIAL SCIENCE

Properties of Material: Properties Physical & Mechanical, Types –Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous Alloys.

Introduction of timber, growth of timber trees, cross-section of exogenous tree trunk, types of tree, different part of a tree, Soft & hard wood, their differences.

Common Indian timbers, Defects in timber, diseases of timber, knots, shakes, grains etc.

Seasoning of timber - Definition, advantage and disadvantage of seasoning. Moisture content in timber and its effect on timber. Characteristics of wood, physical and mechanical properties of wood

PAPER-II

CARPENTRY TOOLS

Introduction of carpentry hand tools, classification and uses of marking, work holding devices, Measuring & testing tools. Type of bench vice and their uses, different saw and their uses, introduction of power circular saw and its use, type of special saw and its uses i.e. -compass saw, coping saw, bow saw, fret saw. Saw sharpening and sharpening tools. Boring tools - Types, Parts, functions, size and application. Description of portable electrical drill machine. Drill bits, types, sizes etc. Hand augers description, sizes of augers, application of hand augers.

Type of different planers and their proper uses in wood work - Description, function and its size, setting, knowledge of sharpening and uses etc. Knowledge of using marking gauges. Important instruments necessary for checking flatness and twistiness of surface. Sharpening and grinding angle of cutter. Portable power planer - useful in modern wood work and new technology design.

Different type chisels - Definition, identification, their uses. Necessity of grinding and sharpening. Striking tools- Definition, types, application. Files - Types, uses. Care & maintenance of files. Function of work bench, bench vice, bench hook, etc.

WOOD WORKING MACHINES:

Description, types, sizes, parts, functions, operations. Safety precautions, care and maintenance. Oiling, greasing etc. of the following machines:

A) Band Saw B) Circular saw C) Planing machine D) Wood Turning Lathe with Turning tools.

Market form of timber. Conversion of timber method, advantages, disadvantages.

Description, types, sizes, parts, functions, operations, safety precautions, care and maintenance etc. of the following machines- A) Drilling Machine B) Grinding Machine C) Mortiser Machine.

D) Universal wood working Machine. Calculation of timber – weight, area, volume etc

ENGINEERING DRAWING:

Drawing of Solid figures (Cube, Cuboids, Cone and Frustum of Cone) with dimensions.

Symbolic Representation (as per BIS SP:46 2003) of : - Fastener (Rivets, Bolts and Nuts) - Bars and profile sections - Weld brazed and soldered joints. Electrical and electronics element - Piping joints and fittings

Riveted joints, different types of threads, bolts, nuts, locking devices, keys, cotters, couplings, bearings, pulleys cotters screw joint, knuckle joint etc. Lap and butt and single or double strap riveted joints.

Simple curves of interpretation-simple exercises. - Development of surfaces of prism, cylinders, pyramids and cones. Reading of advanced blue prints including structural drawings and other allied items such as materials, list. Fabricated channels or I section Girders. - Fabricated channels simple roof trusses, purlins, braced columns glazing or window frames and welded girders. Fabricated jobs like brackets, bed plates.

MANUFACTURING PROCESS:

Introduction to pattern making Hand tools. Contraction rule and different allowances. Shrinkage, drafting, machine allowances. Different types of timbers used in pattern making. Reading of blue print. Layout board and its use. Types of pattern and their uses. Split patterns -Types and uses. Dowel- types, size and uses in pattern making work.

Core and core prints: Types & uses. Colour code as per IS specifications. Use of paints on pattern core, core box, core prints etc. Estimate volume of wood and other requirements for pattern making box.

Classify various types of joints- Single Mortise and tenon Joint, Double tenon & mortise joint, Plain hunched tenon and mortise joint, Mitre corner tenon & mortise joint, Task tenon mortise joint, Bare faced tenon joint, Full housing joint, Bridle joint, Stopped housing joint, Dovetail joints

CARPENTRY BUILDING WORK

Introduction about carpentry work involved in building construction. Types of doorframes, door shutters- description, sizes, uses, advantages and disadvantages etc. Fittings used in door. Types of panels used in panel shutter, glazed shutter. Familiarization with the materials which is used in industries as substitute of wood. Characteristics of material, Mechanical properties, durability, Applications, etc.

Types of window frame and window shutters. Protection bars: types and uses. Roof trusses: King post, queen post etc. related terms, sizes construction etc.

Basic principle of repairing work and repairing technique of furniture, door, window, rack etc. Use of Nails, screws angle plate, bracket, nuts, bolts etc. for repairing work. Packing case:-Types, material and tools used. Types of hanging plates, corner plates etc. used in carpentry work. Economical factors and material estimate.