DETAILED SYLLABUS FOR THE POST OF TRAINING INSTRUCTOR (WELDER)
(Scheduled Caste Development Department) - Direct Recruitment

(CAT.NO. : 597/2021)

Module 1 -Hand Tools 5Marks.

Steel rule,scriber,punches,hammers,vices,chisels,clamps,hacksaw frame and blades,tinmans “L” square, straight edge, wing compass, snips, hand lever shear etc.

Module 2 -Gas Welding 15Marks.

Safety precautions, Oxy-acetylene welding equipments ,chemistry of Oxy- acetylene flame, gases used for welding, production of calcium carbide, production of oxygen, generation of acetylene gas (Carbide to water and water to carbide method),Gas welding techniques, filler rod in gas welding, Fluxes,welding blow pipes (high pressure and low pressure), Purifier,HBPV,Gas welding regulators Gas welding defects & Remedies, Welding of various metals like - mild steel, copper, Cast iron, brass, bronze, bronze welding of cast iron ,aluminium, etc..

Module 3 -Thermal Cutting Of Metals 7Marks.

Oxygen cutting, oxy fuel gas flame cutting, metal powder cutting, chemical fuel (injection) cutting, Arc cutting - (metallic arc and carbon arc cutting), Metallic arc and carbon arc gouging, Plasma arc cutting - Principles, Safety, Advantages, Disadvantages, Cutting operations, Defects, Remedies, Applications etc… of the above cutting process.

Module 4 -Arc Welding **15Marks.**

Safety precautions, equipments, basic electricity applied to welding, Weld slope and rotation, Fundamental welded joints, Welding positions, Nomenclature of fillet weld and butt weld, Arc characteristics, Terms and definitions, Welding machines(AC and DC), Polarity, Arc blow, Electrodes - Types coating factor,Various coding(BIS, BS, AWS) standards, Special purpose electrodes, weld defects - causes and remedies, Arc welding of Various metals.

Module 5 -Metallurgy of welding /Joining Process 8Marks.

Soldering, Brazing, Riveting, Seaming, Properties of metals, weldability of carbon steels, Distortion, Stress relieving, Pre heating & post heating, Annealing, Tempering, Hardening, Normalizing, Quenching etc..

Module 6 -GTAW **12Marks.**

Safety, TIG welding process and equipments, setting up of a GTAW plant, principles of GTAW, Advantages of TIG welding over SMAW & OAW. Power sources of TIG welding, HF unit & DC suppressor unit, Properties of shielding gases, Tungsten electrodes - types, uses, condition, Types of polarity and application of TIG, Welding of SS, Aluminium ,MS, Copper, Pipe welding methods, Weld defects & Remedies.

Module 7 -GMAW **12Marks.**

Safety, CO_2 welding process & equipments, Principles of GMAW, Power sources of GMAW, Setting up of a GMAW machine, Advantages of CO_2 welding , Base metal prepration, GMAW Metal Transfers - Spray ,Globular, Pulsed spray, Dip or short circuit transfer, Stick out, welding wires used for CO_2 welding and applications, Wire feed system - difficulties, Shielding gases/Gas mixtures for GMAW, Burn off charecteristics of GMAW, Filler wires in CO_2 welding, Flux cored arc welding, GMAW narrow gap welding, GMAW of different metals, GMAW defects and remedies.

Module 8 -Special Welding Process & Repair and Maintenance Welding 13Marks.

Submerged arc welding, Electro slag welding, Electro gas welding, Radiant energy welding - EBW and LBW , Plasma arc welding, Resistance welding (spot, seam, projection, precussion, upset - butt & flash - butt welding) Solid state welding (Ultrasonic, Friction welding & Forge welding) Under water welding, Welding of plastic, Thermochemical welding process (Thermit welding and Atomic hydrogen welding) Repair and maintenance welding (Hard facing, Stelliting, surfacing/Metal buildup).

Module 9 -Pipe Welding And Plate Welding, Representation of welds 5Marks.

Pipe welding different process, Various pipe joints, Method of pipe welding, Position welding - Roll welding and Fixed position welding(1G, 2G, 5G, 6G)Plate welding (1F, 2F, 3F, 4F) Representation of weld (Weld symbol, Welding symbol, Elementary symbols, Supplementary symbols).

Module 10 -Inspection and testing of welds, WPS & PQR Welding codes and standards, Cost Estimation of Welding.

8Marks.

Various Destructive test and Non destructive tests, WPS & PQR, Different welding codes and standards, Cost estimation of welding (Material cost, Fabrication cost, Finishing cost and Overhead cost etc...)

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper