

Syllabus for Written Examination for Recruitment of Vocational Instructor.

Trade:- Welder

Syllabus:-

- Arc and Gas Welding terms and definitions, Arc and Gas Welding Equipments, tools and accessories,
- Welding process and its applications.
- Types of welding joints and its applications. Edge preparation and fit up for different thickness. Surface Cleaning
- Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc.

- Arc Welding** - Electrical terms & definitions in arc welding.
- Principle of arc welding and characteristics of arc.
 - Heat Temperature and its terms related to welding.
 - Arc welding power sources: Transformer, Motor Generator set, Rectifier and Inverter type welding machines and its care & maintenance.
 - Advantages and disadvantages of A.C. and D.C. welding machines.
 - Welding positions as per EN & ASME : flat, horizontal, vertical and over head position.
 - Weld slope and rotation.
 - Welding symbols as per BIS & AWS
 - Arc length – types – effects of arc length.
 - Polarity: Types and applications.
 - Arc Welding defects, causes and Remedies.

- Gas Welding** - Common gases used for welding & cutting, flame temperatures and uses.
- Chemistry of oxy-acetylene flame.
 - Types of oxy-acetylene flames and uses.
 - Oxy-Acetylene Cutting Equipment principle, parameters and application.
 - Calcium carbide properties and uses.
 - Acetylene gas properties and generating methods.
 - Acetylene gas Purifier, Hydraulic back pressure valve and Flash back arrestor
 - Oxygen gas and its properties
 - Production of oxygen by Air liquefaction .
 - Charging process of oxygen and acetylene gases - Oxygen and Dissolved Acetylene gas cylinders and Color coding for different gas cylinders.
 - Gas regulators, types and uses.



- Oxy acetylene gas welding Systems (Low pressure and High pressure). Difference between gas welding blow pipe(LP & HP) and gas cutting blow pipe
- Gas welding techniques. Rightward and Leftward techniques.
- Gas welding filler rods, specifications and sizes.
- Gas welding fluxes – types and functions.
- Gas Brazing & Soldering : principles, types fluxes & uses
- Gas welding defects, causes and remedies

Electrode - Types of electrode, functions of flux, coating factor, sizes of electrode
Coding of electrode as per BIS, AWS,

- Effects of moisture pick up.
- Storage and baking of electrodes.
- Special purpose electrodes and their applications

- Weldability of metals, importance of pre heating, post heating and maintenance of inter pass temperature. Classification of steel. - Welding of low, medium and high carbon steel and alloy steels. Effects of alloying elements on steel - Stainless steel : types- weld decay and weldability.
- Types of Brass, properties and welding methods.
- Types of Copper, properties and welding methods.
- Aluminium and its alloys, properties and weldability, Welding methods, Arc cutting & gouging,
- Types of Cast iron, properties, Welding methods of cast iron.

Gas Metal Arc Welding (GMAW)- Equipment and Accessories, Welding wires used in GMAW, standard diameter and codification as per American Welding Society (AWS), Wire feed system – types – care and maintenance, Types of shielding gases and gas mixtures used in GMAW and its applications. - Flux cored arc welding – description, advantage, welding wires, coding as per AWS. Edge preparation of various thicknesses of metals for GMAW. - GMAW defects, causes and remedies.

- Submerged arc welding process – principles, equipment, advantages and limitations
- Electro slag and Electro gas welding processes–principles, equipments, advantages and limitations
- Thermit welding process- types, principles, equipments, thermit mixture types and applications. - Use of backing strips and backing bars

Gas Tungsten Arc Welding (GTAW)- GTAW process - brief description Difference between AC and DC welding, equipments , polarities and applications. - Various other names of the process (TIG, Argonarc) - Power sources for

GTAW - AC & DC, Tungsten electrodes -types & uses, sizes and preparation
- GTAW Torches- types, parts and their functions - GTAW filler rods and selection criteria, Edge preparation and fit up. - GTAW parameters for welding of different thickness of metals - Pulsed TIG welding - brief description, pulse parameters slope up and slope down. Argon / Helium gas properties - uses. - GTAW-Defects, causes and remedy.

- **Laser beam welding (LBW) and Electron beam welding(EBW)**- Friction welding process- equipment and application.
- **Plasma Arc Welding (PAW) and cutting (PAC) process** - equipments and principles of operation. - Types of Plasma arc, advantages and applications. Resistance welding process -types, principles, power sources and welding parameters. Applications and limitations.