Cochin Shipyard Ltd.

Annexure I

DETAILED SYLLABUS OF PART A

Particulars	Syllabus - General (Part A)
General Knowledge	• Facts about India and other countries: Basic facts / Geography / Tourism / Transport systems / Personalities / Places / History / Constitution / Economy / Writers / Literatures / Indian States & Union Territories / International Organizations. • General Science : Branches of studies / Scientific instruments and appliances / Physics / Chemistry / Biology • Sports & Games • Important Events/ Movements / Leaders / Places / Years • Writers – Authors – Biography - Autobiography • Abbreviations
Quantitative Aptitude	• Number system / Fraction and Decimals / Simplification / Volume and surface areas / Square roots and Cube roots / Problems based on numbers, Speed, Time and Distance, Simple Interest / Compound Interest / Boats and Streams / Problems on Trains / Percentage - Interest / HCF and LCM / Average / Ratio and Proportion / Time and Work / Problems based on ages / Profit, Loss and Discount, Statistics / Permutations & Combinations / Probability.

Cochin Shipyard Ltd.

DETAILED SYLLABUS OF PART B

Sl No	Name of Post	Syllabus –Trade related (Part B)
1.	**Welder Cum Fitter (Welder/Welder (Gas& Electric))**	**Theoretical and application knowledge on** • Principle of welding • Welding positions & WPS/PQR/WPQ • Weld joint nomenclature and welding symbols • Welding and cutting tools • Welding techniques • Welding defects and remedial actions • Specification of Welding rods as per AWS • Gouging methods • Welding of Carbon steel/Al/Austenetic SS/High strength low alloys • Pipe welding – Cu, Ni and SS material • Modern welding procedures – SAW/ TIG/ CO2/ Electro gas welding • FCAW process with ceramic backing • One side welding for panel welding • Testing of weld joints • Safety procedures/First aid • Types of material handling equipments
2.	**Welder Cum Fitter (Sheet Metal Worker)**	**Theoretical and application knowledge on** • Sheet metal terms like folding/bending/seaming etc • Steel plates and its grades • Welding- types of welding - distortion and remedies • Line heating • Metals and alloys- Characteristics • SM methods/tools/ usage • Types of Sheet Metal joints and specific usage • Methods of laying out pattern/Development • Alignment and fit up of plates/blocks using plates of various thicknesses • Oxy acetylene / plasma cutting • Plate/pipe weld joint configuration • Safety procedures/First aid • Types of material handling equipments
3.	**Welder Cum Fitter (Fitter)**	**Theoretical and application knowledge on** • Tools Bench wise/Files etc • Marking and measuring tools • Limit/Fits/Tolerance • Numerical ability – Mass/Volume/density/unit conversion/unit system • Physical properties of metals and specific usage • Methods for removing the broken nuts • Drilling /reaming/horning/Counter sunking • Types of nuts and locking devices • Types of valves and maintenance • Bearings and pulleys • Overhauling of machineries • Types of maintenance • Shaft alignment and shaft sighting • Bedding or Chocking of machinery foundations • Safety procedures /First aid • Types of material handling equipments
4.	**Welder Cum Fitter (Plumber)**	**Theoretical and application knowledge on** • Tools -Marking /Fitting / Fastening • Marking and developing • Method of joining - Welding/Soldering/Brazing • Pipe fittings/joints and their usage • Pipe Classes and Grades

Sl No	Name of Post	Syllabus –Trade related (Part B)
		• Properties of Steel/Alloys • Numerical ability - Mass/Volume/Density/unit conversion/unit system/ Ratio/ Proportion/ Mensuration • Material estimation for the piping layout • Piping symbols • Template and their preparation • Hydrostatic/hydraulic testing of Piping systems • Erection of piping systems and valves • Pipe fastening methods and bending of pipes • Safety procedures /First aid • Types of material handling equipments
5.	**Welder Cum Fitter (Mechanic Motor Vehicle)**	**Theoretical and application knowledge on** • Tools - Bench wise/Files etc • Marking and measuring tools • Limits/Fits/Tolerance • Numerical ability – Mass/Volume/Density/unit conversion/unit system • Shaft alignment • Erection & commissioning of equipments • Valve timing/Tappet clearance • Decarbonising • Fasteners and torque tightening • Engine systems • Engine type and functions • I/C Engines and its parts • Types of bearings and its uses • Safety procedures /First aid • Types of material handling equipments
6.	**Welder Cum Fitter (Mechanic Diesel)**	**Theoretical and application knowledge on** • Tools - Bench wise/Files etc • Marking and measuring tools • Limits/Fits/Tolerance • Numerical ability – Mass/Volume/Density/unit conversion/unit system • Shaft alignment • Erection & commissioning of equipments • Valve timing/Tappet clearance • Decarbonising • Fasteners and torque tightening • Engine systems • Engine type and functions • I/C Engines and its parts • Types of bearings and its uses • Safety procedures /First aid • Types of material handling equipments
7.	**Machinist**	• Theoretical and application knowledge on • Measurement tools- Vernier calipers/ dial gauges etc. • Lathe, Drilling & Milling machines • Tools nomenclature • Bench tools • Drawings and standards- Limits / fit / clearances etc. • Types of Materials related to ship Building • Industrial safety
8.	**Fitter (Electrical)**	**Theoretical and application knowledge on** **Fundamentals of electricity:** various laws of electricity and its applications, Basic electrostatics & electro dynamics, primary and secondary cells, magnetic and capacitive circuits, power and power factor, polyphase system,

Sl No	Name of Post	Syllabus –Trade related (Part B)
		measuring instruments, measurement of power and energy. **Electrical appliances and wiring:** • domestic appliances- lighting, various types of lamps, wiring circuits. • domestic and industrial, earthing, regulated power supply, maintenance of domestic appliances, IEE rules. **Electrical machines:** D.C generators & DC motors characteristics and applications, speed control and testing, transformers& autotransformers-losses and testing, alternators, single phase& 3 phase motors, starter and internal connection diagrams. **Basic electronics:** active and passive electronic components, rectifier circuits, characteristics of transistors, amplifiers, OPAMP, oscillators, types and application of SCR,UJT, TRIAC, DIAC, microprocessor etc, digital electronics. **Winding of machines:** fundamental terms used in windings, winding of transformers, motors, armature winding, material used, and method of connection. **Electrical Switchgear**: principle, operation & application of Fuses, MCCB, Protective relays, ELCB. • safety for handling electrical equipments/ wiring/ applications • Statutory requirements while handling electrical applications.
9.	**Fitter (Electronics)**	**<u>Theoretical and application knowledge on</u>** • Difference between conductor, insulator and semiconductor • RC, LC and RLC circuits. • Symbols, working principle and applications of various electronic components like diode, transistor, zener diode, SCR, UJT, FET, Diac, Triac, MOSFET, IGBT. • Half wave and full wave rectifier circuit, Filter circuits and Ripple factor. • Single stage and multi stage amplifier and types of signal. • Boolean Algebra, Logic Gates, Truth tables and Flip Flops • Fundamentals of DC motor, slip ring and squirrel cage induction motor • Speed control of AC/ DC Motors • DOL ,star delta and Soft starters • Concept of DC drives and AC drive(VFD) • PLC and ladder logic basics, Microprocessor controls & I/O Devices • Concept of CCTV and Networking • Power supply, SMPS and UPS • Navigation and Communication Equipments: ➢ GMDSS, Gyro compass, Radar, Echo sounder, GPS and DGPS, Doppler log, AIS, Steering control (Autopilot), various types of Antennas and Band of Frequencies. ➢ PA system, Talk back system, EPABX • Fire alarm system – Conventional and Addressable types • Testing/Measuring Instruments like Oscilloscope, Function generator ,Spectrum analyzer, Tachometer, Tong Tester and Megger • Calibration of measuring instruments like Voltmeter, Ammeter, KW meter, Power Factor meter, KWH meter, insulation meter • Battery chargers and Batteries, Serviceability checks &Capacity test of batteries.

Sl No	Name of Post	Syllabus –Trade related (Part B)
		• ICCP controls ,Anodes and Reference Electrodes • Dynamic Positioning systems. • DA/AD converters • Different types of Proximity switches ,Level switches, Pressure switches & transmitters • Photo diodes and photo transistors, RTD's and Thermocouples • Tacho generators and Encoders • Need of modulation and de-modulation, Type of modulation ,Radio transmitter and receiver • Advantages of FM over AM • SSB receivers. • Satellite communication and micro-wave communication • Positive and Negative Regulators using IC's • Oscillators, PLL's and Synthesizers • Op-Amps using IC 741 • Timers using IC555 • LCD/LED Displays • TV Receivers and HD systems. • Dish TV systems • Electronics in Welding sets • Various braking systems used in cranes • Speed control of LLTT cranes • Requirement of AVR's in Alternators • Safety measures while handling Electrical and Electronics equipments. • Soldering and De-Soldering Techniques.
10.	**Crane Operator (Electrical)**	**Theoretical and application knowledge on** • **Basic Electrical Practice** - AC & DC Voltage, AC& DC current, Power Factor, DC Circuits, Resistance, Capacitance and Inductance. • **Measuring Technique** - Measuring of Voltage, Current and Resistance, Panel Meters, Multimeters, Tong Tester, Megger, Measuring of Energy, Errors and Corrections. • **Electrical Appliances** - Domestic Appliances , Lighting, Types of Lamps & lamp fittings • **Wiring Practice** - Types of Wiring, Different Types of Cables and End Termination. • **Electrical Machines** - DC Generator , DC Motors , Speed Control of DC Motors, Testing of DC motors , Transformer Losses, Alternators, Induction Motors and Testing , Speed control of Induction Motors, Starters. • **Basic Electronics** - PN Junction Diodes, Zener Diode, LED & Applications , Cathode Ray Oscilloscope, Rectifiers& Regulators, Transistors & Amplifiers , SCR, UJT, Diac, Triac and Flip Flops. • **Winding Practice** -Winding of Transformers and Motors. • **Installation & Maintenance of Electrical Equipment** - Battery Charger & Batteries, Circuit Breaker (MCB, MCCB, ELCB, RCCB), Relays, Voltage Stabilizer, Regulated Power Supply, Bus bar System. • **Cranes (EOT, LLTT & Gantry)-** Basic Rigging , Check and maintenance of Crane ropes, Rope pulleys, Load hooks and end fittings , Standard safety practices while operating Tower

Sl No	Name of Post	Syllabus –Trade related (Part B)
		cranes, Preventive maintenance of LLTT cranes , Various Electrical & Mechanical Braking system in Cranes , Safety devices used in Cranes, Different voltage systems and backup systems, Different types of anchoring, Wind speed measuring & Storm safety devices, Anti-collision devices , Limit switches, Drives and PLC controls, Basics components of computers, Load measuring and indicators, Various communication methods and Hand Signals, Safety codes and standards, Awareness of Industrial Rules and Regulations.
11.	**Instrument Mechanic**	**Theoretical and application knowledge on** • Basic electrical technology • DC and AC circuits • AC & DC machines, theory, speed control • AC & DC instruments, Basic electronics technology including power electronics • Operational amplifiers, Basic digital electronics, Microprocessor • Instrumentation fundamentals & measurement of Motion, Pressure, Flow, Level, Temperature, PH • Process instrumentation & control – Recorders, PID controller • Basic Pneumatic & Hydraulic theory, components & circuits • Basic knowledge on PLC, HART, DCS, SCADA, Computer networking, field bus technology • Basic pneumatics principle • Basic measuring tools & measuring instruments Basics – electricity (Current, Voltage, Resistance) & electrical components
12.	**Shipwright Wood**	**Theoretical and application knowledge on** Wood working terminologies - Wood working machineries (portable & stationary) its application & routine maintenance. Various hand tools-measuring instruments for wood working and its relative advantages - Wood preservation & seasoning- Timber identification - Defects in timber- Understanding measurements & tolerances - Knowledge of various wood working joints, furniture fabrication appropriate application and their relative merits & demerits - Knowledge of laminate material, hardware items, & its relative merits - Application of adhesives & finishing agents - Knowledge of modern modular assembly & interior architects and model developments & docking including block setting in marine field (Both new building projects & repair). • **Industrial Safety** Awareness on Safety & PPEs - Importance of housekeeping.
13.	**Painter**	**Theoretical and application knowledge on** • Types of Surface Preparation and application methods for marine painting. • General awareness of tools & equipment for surface preparation and painting. • Corrosion. • Types of Paints and paint systems • HSE & PPE-Marine paints & Surface preparation. Coating defects – its rectification

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