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
General English	• Spotting Errors / Vocabulary usage / Sentence Completion / Synonyms / Antonyms / Reconstruction of sentences / One word substitution / Idioms & Phrases / Grammar / Correct usage of Articles / Prepositions / Singular and Plural
Reasoning	• Analogy / Classification / Series Completion / Coding-Decoding / Blood Relation / Direction Sense Test / Alphabet Test / Number and Ranking / Puzzle Test / Odd Man out / General Intelligence
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.

DETAILED SYLLABUS OF PART B

Post Code	Name of Post	Syllabus – Trade/Discipline related (Part B)
A1	**Junior Technical Assistant (Mechanical)**	Attached as Annexure II
A2	**Junior Technical Assistant (Electrical)**	
A3	**Junior Technical Assistant (Electronics)**	
A4	**Junior Technical Assistant (Information Technology)**	• Computer Networks • Digital Systems • Operating Systems (Server and Desktops) • Web Technologies • Computer Hardware Design • Client Server Architecture • Web Content Management – HTML5, CSS, Server Side Scripts • Information Security – Basic Systems and Protocols • Database Management • ERP Systems • Smart Technologies, Mobile, IoT, Cloud Computing
A5	**Junior Commercial Assistant**	• Office procedures, office correspondence, • Record keeping and maintenance of files, Act and Regulations, • Use and application of computer in office, Data entry, computer network, computer devices, operating systems, Windows, MS Word, MS Excel, • Computer maintenance, • Office stationery, paperless office, • ERP, • Duties and responsibilities of Commercial Assistants, • E-commerce, • Environment, • Communicative English, • Business Communication, • Accountancy, • Desktop Publishing, • Data storage, • Cyber security
A6	**Welder Cum Fitter (Welder)**	**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

Post Code	Name of Post	Syllabus – Trade/Discipline related (Part B)
		• 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
A7	**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 • 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
A8	**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, 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,

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		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.
A9	**Fitter (Electronics)**	**Theoretical and application knowledge on** • 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.

Post Code	Name of Post	Syllabus – Trade/Discipline 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.
A10	**Shipwright Wood**	**<u>Theoretical and application knowledge on</u>** 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). • **<u>Industrial Safety</u>** Awareness on Safety & PPEs - Importance of housekeeping.

Annexure II - JTA

Syllabus for Junior Technical Assistant (Mechanical)

1.	Manufacturing Processes	(a) Casting (b) Forging (c) Rolling (d) Extrusion (e) Machining including surface finishing
2.	Welding	(a) Types of welding (b) welding defects (c) Testing of welds (d) Brazing and soldering
3.	Theory of Machines and Machine Design	(a) Fundamentals and types of machines (b) Common mechanisms (c) Cams and followers (d) Common transmissions (e) Flywheels and governors (f) Brakes, dynamometers, clutches and bearings (g) Balancing and vibration
4.	Thermal Engineering	Energy sources Fundamentals of thermodynamics Ideal gasses Steam turbines and condensers Heat Transfer
5.	Applied Mechanics	(a) Forces and moments (b) Friction (c) Centroid and Centre of Gravity (d) Simple machines, pulleys, blocks and wheels (e) Kinetics (f) Kinematics (g) Work, power, energy
6.	Metallurgy and Material Properties	(a) Physical, Mechanical, Thermal, Electrical, Magnetic Properties etc (b) Effect of heat treatment (c) Surface hardness and hardening (d) Corrosion (e) Testing of metals (f) Lubricants and their properties
7.	Strength of Materials	(a) Stress and strain (b) Bending and shear forces (c) Bending and shear stress (d) Moment of Inertia (e) Torsion
8.	Fluid Mechanics	(a) Properties of liquids (b) Fluid dynamics (c) Classification of fluids (d) Laws related with fluid flow and dynamics (e) Turbines
9.	Basic Computer Applications	(a) Hardware and software (b) Operating systems and applications (c) Internet

10.	Basics of Electrical Engineering and Power Generation	(a) Electrical power generation, transmission and distribution (b) AC fundamentals (c) Measuring instruments (d) DC motors (e) AC appliances (f) Utilisation of electrical energy (g) Electrical safety
11.	Industrial Management	(a) Management process (b) Organisational Management (c) Human resource management (d) Material Management
12.	Metrology and Instrumentation	(a) Classification of instruments - range and span, accuracy and precision, reliability, calibration, hysterisis and dead zone, drift, sensitivity, threshold and resolution, repeatability and reproducibility, linearity, speed of response, fidelity and dynamic errors, overshoot. (b) Measurement of error- classification of errors, environmental errors, signal transmission errors, observation errors, operational errors. (c) Transducers : Classification of transducers- active and passive, resistive, inductive, capacitive, piezo, resistive, thermo resistive (d) Specification, selection and application for pressure, temperature, flow, humidity, displacement, velocity, force, strain, sound. (e) Control Systems (f) Measurement of displacement, flow, temperature, strain, miscellaneous. (g) Limits, fits, tolerances and gauges (h) Screw thread measurement (i) Surface finish measurement
13.	Construction and functioning of various machines	(a) Pumps (b) Compressors (c) Boilers (d) Turbines (e) IC Engines (f) Purifiers and separators (g) Hydraulic machinery and lifting equipment etc
14.	Refrigeration and Air-conditioning	(a) Basics of refrigeration (b) Refrigeration cycles (c) Refrigerants (d) Components of a refrigeration system (e) Air conditioning (f) Air conditioning Systems (g) Air Distribution Systems

Syllabus for Junior Technical Assistant (Electrical)

1.	Basic electrical engineering	(a) Network theorems and laws (b) Magnetic circuits (c) AC fundamentals (d) RLC circuits
2.	Static and rotating AC&DC machines	(a) DC generators (b) DC motors (c) Transformers (d) Synchronous generators (e) Synchronous motors (f) Induction motors (g) Single phase motors
3.	Power system	(a) Generation of electrical power (b) Transmission and distribution (c) Circuit breakers (d) Cables
4.	Electrical measurements	(a) Moving coil instruments (b) Moving iron instruments (c) Measurement of current, voltage, frequency and energy (d) Bridge circuits
5.	Semiconductor Devices	(a) Semiconductors (b) Diodes and power supplies (c) Transistors
6.	Basic Computer Applications	(a) Hardware and software (b) Operating systems and applications (c) Internet

Syllabus for Junior Technical Assistant (Electronics)

1	Circuit Fundamentals	Passive Circuit elements, Ohm's Law, Energy Sources, DC and AC Fundamentals, Tuning Circuits and Filters, Electrostatics, Faraday's Laws and Lenz's laws
2	Solid State Physics	Conductors, Semiconductors and Insulators
3	Active and Passive Devices in circuits, Switching circuits	Resistors, Capacitors, Diodes, Special Diodes, Transistors, FET, Thyristors, DIAC,TRIAC, Optoelectronics Devices, IGBT, switching applications
4	Amplifiers and Oscillators	Single Stage and Multistage Amplifiers, Feedback amplifier, Sinusoidal and non-sinusoidal Oscillators
5	Integrated Circuits and Logic Gates	Basic gates and equivalent circuits, Adders, Subtractors, Op-Amp, Flip Flops
6	Transducers	Hall Effect, Classification/Types and working- LVDT, proximity sensors, piezoelectric transducers, working of Load cell
7	Electronic Instruments	Analog and Digital Instruments, Multimeter, Voltmeter, Ammeter, CRO
8	Power Supplies	Unregulated and Regulated Power Supply, Rectifiers, SMPS, UPS
9	Number Systems, Boolean Algebra	Decimal and Binary number systems- Conversion problems, Laws of Boolean Algebra
10	Digital Circuits and Microprocessors	Digital logic families:TTL, MOS, Combinational circuits: multiplexer/ demultiplexer, encoder/ decoder, adder/subtractor, comparator, counters and parity generators; Sequential circuits: latches and flip-flops (RS, JK, D, T, and Master Slave); Registers; Counters: ripple, ring, and shift register counters; PLC- working with sensor and actuators, PLC programming, Microprocessors: 8085 and 8086, Ladder Diagram, RAM, ROM, Choppers , Inverters and Cycloconverters.
11	Principles of Communication	Modulation and De-modulation types, FSK, PSK, TDMA, FDMA, CDMA. Electromagnetic Spectra, Basic principles of Fibre Optic communication
12	AV Systems	Microphones, Loudspeakers, Stereo system, Dolby system, Tuners, IF and RF Amplifiers, Digital TV, CCTV, Frequency, Phase and Amplitude Distortion, Mixers, audio-video formats
13	Ship Communication Equipments	GMDSS, marine VHF, RADAR, INMARSAT Equipment, Antennas in ship
14	Basic Electricals	AC and DC fundamentals, Basic working of AC and DC motors-classification, Transformers, AC/ DC motor speed control techniques, Basic working principle of Generators, Alternator, Rectifiers and invertors, Star and delta starters
15	Energy Conservation	Renewable sources of energy, VFD for industrial use
16	Basic Computer Applications	Hardware and software, Operating systems and applications, Internet