DETAILED SYLLABUS FOR THE POST OF MECHANIC CONSUMER ELECTRONIC APPLIANCES IN INDUSTRIAL TRAINING DEPARTMENT – CAT NO : 670/2023

MODULE:1 - 10 MARKS

BASIC WORKSHOP SAFETY, BASIC OF AC AND CABLES: -

Workshop Safety and PPE, First Aid, Fire Extinguishers, Familiarization and uses of Hand Tools, Basic Electrical terms, Types of Electric Supply, Basics of AC Circuits, Classification of Conductors and Cables

SINGLE RANGE METERS, CELLS AND BATTERIES AND MEASURING INSTRUMENTS: -

Meter Scale, Symbols on meters, Various Analog Measuring Instruments, Clamp Meter,
Introduction to Primary and Secondary Cells and Batteries, Charging of Lead Acid cells, Specific gravity of electrolyte, Methods of Battery Charging, Series and Parallel Connection of Batteries, Various types of Secondary Cells, Introduction to AC & DC Measuring Instruments, MI and MC Meters and Calibration, Properties of AC Signal, CRO and Function Generator, LCR Meter and Multi-meter

MODULE:2 - 10 MARKS

SOLDERING/DESOLDERING AND SWITCHES, RESISTORS, CAPACITORS, INDUCTORS, OHM'S LAW AND KIRCHHOFF'S LAWS: -

Introduction Soldering, Soldering tips, Soldering Flux, Soldering methods, Desoldering Tools, Switches, Resistors, Variable Resistors, Ohm's Law, Kirchhoff's Law, Inductors, Capacitors, Various Resonance Circuits, Relays, Series and Parallel Resonant Circuits.

SEMICONDUCTORS, POWER SUPPLY CIRCUITS AND IC BASED VOLGATE REGULATORS: -

Introduction to Semiconductor Materials, Construction of P-N Junction Diode, Biasing of Diodes, Rectifiers, RF filters, Zener and varactor Diode, Transformer, Losses in Transformer, Three-terminal regulator power supply, Op-Amp based voltage regulators

MODULE:3 - 10 MARKS

COMPUTER HARDWARE, WINDOWS OPERATING SYSTEM(OS) MS-OFFICE AND NETWORKING: -

Computer Blocks and Components Working, Peripheral Device and its working, Secondary Storage and printer, Various ports in computers, BIOS and CMOS setup and install Windows OS, Computer Virus and Protection, Computer SMPS, MS paint, Server and PC, MS Word, MS Excel, MS Power Point, Internet, email, Search Engine, Networking topology, Networking Components.

ELECTRONIC CIRCUIT SIMULATOR SOFTWARE: -

Familiarization and Control of electronic simulation software, Component Arranging and wiring, Circuit test and Measurement

MODULE:4 - 10 MARKS

TRANSSISTORS AND ITS APPLICATIONS, AMPLIFIERS, OSCILLATORS, WAVE SHAPING CIRCUITS: -

Transistor Construction and Working, Need for biasing of transistor and significance of α and β, Applications of transistors, Input, Output Characteristics of transistor, transistor power rating and packing style ,Types of biasing and configuration of transistor, Biasing stabilization technique of transistor, Classification of amplifiers, loading effect, Gain, Concept of α and β,Feedback Circuits and Oscillators, Clipper and Clamper Circuits, Modular rectifiers, Transformer less dual power supply, AC/DC voltage Tester

POWER ELECTRONICS COMPONENTS, MOSFET, IGBT AND OPTO-ELECTRONICS: -

Construction of FET, JFET and Working, Working Principle of SCR, TRIAC, DIAC and UJT, Heat sink uses and purpose, Types of MOSFET and IGBT, LRD, IR LED, Photo Diode, Photo Transistor, Optical Sensors, Optical Couplers, Opto-Isolator, Laser Diodes, Application of Opto-electronics Devices.

MODULE:5 - 10 MARKS

DIGITAL ELECTRONICS: -

Introduction to Analog and Digital Circuits, Logic Families, Number System, Logic gates and Truth tables, Combinational logic circuit, Magnitude comparators, Encoder and Decoder, MUX and DE-MUX, Introduction to Flip-Flops, Master slave flip-flop and Applications, Basics of counters, Synchronous and Asynchronous counters, Seven Segment Display and BCD Decoder, BCD to Seven Segment Display, Basics of Registers and Applications

OP-AMP, IC 555: -

Block diagram and working of Op-Amp, Characteristics and application of Op-Amp, IC741, Inverting and Non-Inverting amplifier, Summing and comparator, Instrumentation Amplifier,Zero cross detectors, Block Diagram and Working of IC 555, Monostable and Astable Multivibrator using 555 IC

MODULE:6 - 10 MARKS

DIGITAL STORAGE OSCILLOSCOPE(DSO), ELECTRONIC CABLES AND CONNECTORS

Block diagram of DSO, Advantage and features of DSO, Block Diagram of Function Generator, Differentiate CRO with DSO, Function generator using IC 8038, Types of Audio and Video connectors, Audio and Video Cables, DB Connector, LAN cables and connectors, RF Cables, Cables and Connectors of a PC System.

BASIC SMD SOLDERING, DESOLDERING: -

Introduction to SMD technologies, Classification of SMD IC package, Soldering guns and its types, Tools and equipment for SMD soldering & Desoldering, Surface mount technology, Introduction to various ESD

MODULE:7 - 10 MARKS

OPTICAL FIBER AND OTHER COMMUNICATION ELECTRONICS: -

Optical Fiber Communication, Losses in optical Fiber, Encoding and Decoding of Light, Pulse Modulation Technique, Optical Splicing, Testing of Optical Fiber, Radio wave Propagation, Types of Modulation, Fundamentals of antenna, parameters, Modulation and Demodulation techniques, AM-FM transmitter, Types of radio receiver, Digital Modulation and Demodulation techniques.

MICROCONTROLLER 8051: -

Architecture of 8051, Pin Details of 8051, SFR and On-Chip Features, Instruction set of 8051, Arithmetic and Logic function, Instruction set of 8051 Branch, Control and Jump instruction,

Application of 8051, Difference between Microcontroller and Microprocessor, I/O ports pin configuration of 8051

CCTV: -
Introduction to CCTV, Types of Cameras, CCTV setup and its Components, Digital Video Recorders (DVR), Types of DVR

MODULE:8 - 10 MARKS

SENSORS, TRANSDUCERS AND APPLICATIONS: -
Transducers, Thermistors, Resistance temperature Detectors (RTD), Thermocouple, Strain Gauge/Load Cell, Proximity Sensors (Capacitive, Inductive), LVDT

PROTECTION DEVICES AND ELECTRICAL CONTROL CIRCUITS: -
Fuses, Types and Uses, Miniature Circuit Breaker (MCB), ELCB Types, Contactors, Relay and Working, Single Phase Induction motor, Speed-Torque Characteristics of Induction Motor, Starter for Induction motor, Three-Phase Induction motor.

MODULE:9 - 10 MARKS

SMPS, INVERTER AND UPS: -
Stabilizer, Switched Mode Power Supply (SMPS) Working, DC to DC Converter, Inverter Working, SMPS used in Personal Computer, Uninterrupted Power supply (UPS), Difference Between UPS and Inverter, Types of UPS, UPS Working, Single phase and three phase UPS.

LCD AND LED TV: -
CTV System, Working of LCD TV, LED TV and 3D TV, IPS panel and interfacing, Comparison of CTV and LED/LCD TV, TV Remote, Cable used in LCD/LED TV, TV transmitter/Receiver.

DOMESTIC APPLIANCES: -
Working and Principle of Microwave Oven, Induction Cooktop, Washing Machine, Vacuum Cleaner, Mixer/Grinder, Electric Iron, and Immersion Heater.

MODULE:10 - 10 MARKS

LED/LCD PROJECTOR: -
Difference between LCD & LED Projector, Working Principle of LED Projector, LED projector panel Controls

PRINTER: -
Laser Printer, Inkjet Printer, Dot matrix Printer, Difference between impact and Non-Impact Printers, Cables and Connectors used in Projectors and Printers

DTH SYSTEM AND HOME THEATRE: -
Basic Satellite Communication, Application of satellite communication, Satellite Frequency bands, Components and Cables used in DTH System, Multi-dwelling, Introduction to Home Theatre, Surround Sound System, Basic Components of Home Theatre, Block Diagram of Home Theatre and Working.

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.