

PHASE II - SYLLABUS FOR WRITTEN TEST (Objective Type) & SKILL TEST

NAME OF THE POST:

Technician (Information Technology / Computer Science / Mechanical / Refrigeration & Air Conditioning / Electrical / Civil & Plumbing)

1. Branch: Information Technology / Computer Science Engg.

SYLLABUS FOR WRITTEN TEST (Objective Type) & SKILL TEST

- **Introduction to Computer Systems:** History of computers, computer architecture, operating systems, and computer hardware.
- **Computer Components:** Motherboard, CPU, RAM, Hard Drive, Optical Drive, Power Supply Unit, and other peripheral devices.
- **Troubleshooting and Repair:** Identifying hardware and software problems, common computer errors, resolving software issues, replacing hardware components, and preventive maintenance.
- **Networking:** Network protocols, network types, network topologies, network hardware, and network security.
- **Security:** Cybersecurity threats, network security, data encryption, antivirus software, and firewalls.
- **Operating Systems:** Windows, Linux, and Mac operating systems, installation, configuration, updates, and maintenance.
- **Software Applications:** Common applications such as Microsoft Office Suite.
- **Internet and Web Technologies:** Web technologies such as HTML, CSS, JavaScript – Server Maintenance – Hardware and Installation

2. Branch: Mechanical / Refrigeration & Air Conditioning:

SYLLABUS FOR WRITTEN TEST (Objective Type)

1. **Refrigerator & Air-Conditioners:** Fundamentals and different terminology of R&AC machineries. Laws of Thermodynamics -Types of refrigeration systems and cycles. Capacity of R&AC machineries, applications in domestic – commercial and industrial fields - Description of major components used in R&AC systems. Function, construction, application of domestic and commercial applications - Types of compressors used in domestic appliances Reciprocating Rotary Scroll screw ...etc - Types of condenser used in domestic appliances Water cooled, Air cooled Evaporative etc.
2. **Primary & Secondary Refrigerants:** Refrigerants, description, Function, Composition Application & Types Environmental impact of different refrigerants - Alternatives of CFCs - Thermodynamic properties & characteristics of ideal refrigerants - Secondary Refrigerants - Properties of brines & glycols - Application of various brines - Inhibitor & other secondary refrigerants.
3. **Commercial Compressor & Capacity Control:** Compressors - Digital Scroll Compressor - Centrifugal Compressor - Capacity control of commercially used compressor.
4. **Gas Charging, Testing & Faults Diagnosis and Thermal insulation:** Conventional Refrigerator, frost free refrigerator, Water cooler, Deep Freezer...etc. - Window AC, Split, & Package AC description Advantage & application. - Thermal insulation types, Selection of insulating material, Duct insulation & Properties of insulating materials.
5. **Erection of plants, Ducts, HVAC, VAV system:** Cassette Type Systems, Inverter A/C's Ductable Package - Ceiling Suspended split A/C, Floor standing Types - Panel A/C - Precision Air Conditioning System - Comfort Air Conditioning System - Hospital Air Conditioning system and Unitary systems - Central Air Conditioning Plants - Starting and stopping procedure of central air conditioning plant.

SYLLABUS FOR SKILL TEST

1. Installation procedure: Assembling & performance checking, Technical specification of all the Refrigeration & Air Conditioning systems.
 2. Dismantling, Servicing & Assembling of Window and Split Air-Conditioners.
 3. Identification of parts and Service methodology for Refrigerators.
 4. Demonstration of electrical circuits in Refrigeration and Air-conditioning systems.
 5. Methodology for cleaning of Refrigerant coils and Refrigerant charging procedures of Refrigeration & Air Conditioning systems.
 6. The Basic safety measures adopting in Refrigeration & Air-Conditioning systems maintenance.
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3. Branch: Electrical Engg.

SYLLABUS FOR WRITTEN TEST (Objective Type)

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| 1. Basic Electrical Engineering: | Concept of currents, voltage, resistance, power & energy, their units, Ohm's law, electrical symbols. |
| 2. Circuit Laws: | Kirchhoff's law, Superposition, Thevenin, Norton, Star- delta network theorems with simple numerical. |
| 3. Magnetic Circuit: | Concept of flux, EMF, inductance, different kind of magnetic materials, Electro-magnetic induction-Self & Mutual inductance. |
| 4. A.C fundamentals: | Instantaneous, peak, RMS and average values of alternating waves, Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of RL and C, Resonance, Tank Circuit Poly Phase system – star and delta connection, 3 phase power, DC and sinusoidal response of RL and R-C circuit |
| 5. Electrical Machines: | (a) DC Machine – Construction, Basic Principles of DC motors and generators, their characteristics, speed control and starting of DC Motors Method of braking motor, Losses and efficiency of DC Machines (b) 1 phase and 3 phase transformers – Construction, Principles of operation, equivalent circuit, voltage regulation, OC and SC Tests, Losses and efficiency Effect of voltage, frequency and wave form on losses Parallel operation of 1 phase /3 phase transformers Auto transformers (c) 3 phase induction motors, rotating magnetic field, principle of operation, equivalent circuit, torque speed characteristics, starting and speed control of 3 phase induction motors Methods of braking, effect of voltage and frequency variation on torque speed characteristics Fractional Kilowatt Motors and Single Phase Induction Motors: Characteristics and applications-Synchronous machines: Generation of 3-phase emf armature reaction, voltage regulation, basic knowledge of AC alternators, synchronizing, control of active and reactive power Starting and applications of synchronous motors |
| 6. Wiring, Estimation and costing: | Electric wirings, importance, I.E.E. rules. Types of wirings both domestic & industrial - Specifications for wiring – Grading of cables and current ratings. Principle of laying out in domestic wiring-testing by meggar-Estimation of lighting scheme (domestic as well as industrial wiring), electric installation of machines and relevant IE rules Earthing practices and IE Rules, load calculation. |
| 7. Utilization of electrical energy | Illumination, different type of light fittings, White light-illumination factors, intensity of light –importance of light, human eye factor units. Types illumination & lamps -Neon sign, LED Lamps, Mercury vapour, sodium vapour, Fluorescent tube CFL, Solar lamp applications -Electric heating, Electric welding, Electroplating, Electric drives and motors (three phase and single phase), Basic knowledge of lift and escalators. |
| 8. Generation, Transmission and Distribution | Different types of power stations, Load factor, diversity factor, demand factor, cost of generation, inter-connection of power stations Power factor improvement, various types of tariffs, types of faults, short circuit current for symmetrical faults, Miniature circuit breakers, Switchgears – rating of circuit breakers, Principles of arc extinction by oil and air, HRC Fuses, |

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| | Protection against earth leakage / over current, etc Buchholtz relay, Merz-Price system of protection of generators & transformers, protection of feeders and bus bars Lightning arresters, various transmission and distribution system, comparison of conductor materials, efficiency of different system Cable – Different type of cables, cable rating and derating factor |
| 9. Renewable Energy: | Solar Energy – Direct Uses, concept, working principle and application of solar thermal systems, Power Generation (On grid & Off Grid System) with simple numerical, Solar Photovoltaic System (SPV) Applications- Solar Lantern, Solar Home System, SPV Street Light, SPV Pumping systems-wind energy systems-mechanical timers- Batteries, battery capacity & ratings. Battery tests Charging System- Uses, |
| 10. Electrical measuring Instruments | Deflecting torque, Controlling torque & Damping torque , - Moving coil permanent magnet -Moving iron -Range extension, Multimeter -Wattmeter - P.F. meter -Intergrading type, Digital Energy meter – megger. -Energy meter -Frequency meter - Tri vector meter -Max Demand meter -Phase Sequence indicator - Multimeter –Analog and Digital - C.R.O |
| 11. Basic Electronics | Semi-Conductor Physics, Semi-conductor Bonds in semiconductor-commonly use semiconductors, energy band description of semiconductors-intrinsic semiconductor-extrinsic semiconductor-properties of p-n junction, Semi-conductor diode, logic gates, half wave rectifier-full wave rectifier, zener diode, special diodes, LEDs, optical diodes. Transistors: Field effect transistors, Uni-junction Transistor (UJT): Construction, working principle, advantage & application Rectifiers: Silicon Controlled Rectifier (SCR), Triac: Construction, working principle, advantage & application. |

SYLLABUS FOR SKILL TEST

1.Circuits and Principles

- a. Maintain DC circuits
- b. Maintain single-phase AC circuits

2. Installations and Testing

- a. Install single-phase incoming supply system
- b. Install lighting circuits
- c. Install power circuits
- d. Install system wiring in a control panel
- e. Install Earthing System
- f. Maintain safety and health of the individual

3. Machines and Control

- a. Install DC motor and controller
- b. Maintain DC motor installation
- c. Maintain electrical motor starters and control circuits
- d. Maintain electrical drive systems
- e. Install AC motor and motor controller
- f. Maintain AC motor installation

4. Drafting and Design

- a. Electrical diagrams and drawings for residential premises;
- b. Switch-boards/Control Panel drawings

4. Branch: Civil & Plumbing:

SYLLABUS FOR WRITTEN TEST (Objective Type)

- (i) **Building materials:** -Rocks--classification, types, uses, Stones --classification, types, uses, Bricks --.Manufacturing classification, types, uses, Lime--classification, types, uses, Pozzolan, classification, types, uses, Cement --Manufacturing, classification, types, uses, Clay Products -- earthenware, stoneware, porcelain, terracotta, glazing, types, Mortar --. Preparation classification, types, uses Concrete --.Preparation classification, types, uses, Timber - Structure, defect classification, seasoning, uses. Admixtures - for cement mortar & cement concrete, classification, types, Paints, classification, types, uses, varnishes --. Classification, types, uses, Metal--classification, types, uses, Plastics --. Classification, types, uses, road materials.
- (ii) **Building structure treatment:** DPC-Sources and effects of dampness, method. Damp proofing materials --properties, functions, types, Anti-termite treatment objectives &uses, method. Weathering course- purpose, materials required-Fire-proofing. Effect, rules.
- (iii) **Building components:** Doors --Parts, Location, standard sizes, types, Windows-types, Ventilator purpose-types, Floors -- Ground floor & upper floor-Types. Flooring- materials used, types, Stairs- Terms. Requirements. headroom, Types-(Turning. Materials)- Planning, Lift, Escalator, Roofs & Roof coverings --Purposes -Elements-. Types:-Flat & pitched, Truss-king post, queen post, mansard, bel-fast, steel, composite. Shell-types-north-light &double curved. Dome. Components parts. Roof coverings -- objectives, types & uses.
- (iv) **Surveying:** Introduction, History and principle, Objectives. and uses common terms used and definitions, classification, accuracy, types, Main divisions (plane & geodetic), Chaining, bearing & meridian. Speed in field and office work, Planimeter and pantograph, Levelling auto level introduction, definition, levelling principle, Theodolite survey, total station applications and procedure.
- (v) **Plumbing:** Importance of trade, basic bench fitting, methods of using drilling machine, fitter's hand tools, types of pipes, welding types, types of traps, methods of laying out pipes and joining, bending machine and methods of bending, airlock in pipes and its removal, describing of cocks and valves-their types, materials, inspection and testing of water supply system, methods of bending galvanized pipe, domestic drainage system, sensor system for urinals and wash basin, types of pumps, types of locking and fastening devices.

SYLLABUS FOR SKILL TEST

- (i). Free hand sketching of straight-line rectangles, squares, circles, polygons etc. (IS:696)
- (ii). Laying out of hummed and asbestos pipe and joining pipes.
- (iii). Studying the building plan for marking the position of sanitary fittings and draw a longitudinal section of house drain.
- (iv). Repair hand water pumps, trace leakages, and repair the water supply system.
- (v).Prepare a cement mortars in different proportions to suit various purposes
- (vi). Shop problems on calculating the solid bodies' area, volume and weight of solid bodies.
- (vii).Levelling activity using total station and export the levels in auto cad drawing file.
- (viii).Basic laboratory experiment on Cement/Aggregate/Soil.

**--Sd--
DIRECTOR**