



# केन्द्रीय शैक्षणिक एवम् तांत्रिक माहिती संशोधन समीती

CENTRAL EDUCATION & INFORMATION TECHNOLOGY RESEARCH COMMITTEE

AN AUTONOMOUS INSTITUTION REGD. BY THE GOVT. OF NCT OF DELHI UNDER ITA 1882 GOVT. OF INDIA

REGD. BY NCS-MINISTRY OF LABOUR AND EMPLOYMENT GOVT. OF INDIA

REGD. AT MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES (MSME), GOVT. OF INDIA

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REGD. NO.: S14K81-1040424644087

## Advance Diploma in AC/Refrigeration Maintenance

Mechanic Refrigeration and Air Conditioning is an AC repairing mechanical vocational trade. The duration of trade is two years with four semesters of six months each. During the trade, students are told about skills like repairing and servicing in refrigerator, water cooler, bottle cooler, deep freezer, visi cooler, walk in cooler, ice candy plant, cold storage, ice plant, split air conditioner, package air conditioner, central air conditioner, auto mobile air conditioner, transport refrigeration, air craft air conditioning, rail way air conditioning, ship refrigeration and air conditioning and other many aspects attached to these services. Trade is good and career orienting in character as it given job surety after passing it successfully.

### Mechanic Refrigeration and Air Conditioning Trade Syllabus

Syllabus of Mechanic Refrigeration and Air Conditioning trade as prescribed by various ITIs.

Sem. I		
Sr. No.	Subjects of Study	
	Trade Practical	Trade Theory
1	Familiarization with workshop & machineries. Safety precautions. Familiarization of refrigeration tools, instruments & equipments. Care and maintenance of tool, instruments and equipments	Introduction to trade, general safety precautions and first aids, history of Refrigeration and Air conditioning. Function, working, use, specifications of

		refrigeration tools, instruments and equipment.
2	Fitting: Familiarization of tools, instruments and machines used in fitting. Marking/Layout practice as per Blue Print. Cutting, filing, drilling, grinding & Chipping by using hand tools and power tools.	Fitting: Study the different types of Fitting hand tools, power tools, precision measuring instruments & their use. Equipments used in fittings like drilling machines, grinding machines, types, specifications and care and maintenance.
3	Fitting: Filing flat, square & curved surfaces. Slots, grooves angular profile, Drilling clear and blind hole, Threading & Tapping, Counter sinking, counter boring, drill bit grinding and reaming. Use of Hand and Power drills	Fitting: Study the function, construction, working of fitting hand tools, precision measuring instruments & their use. Specification & their application.
4	Sheet Metal: Familiarization of tools, instruments and machines used in sheet metal. Marking, measuring, cutting, bending, folding, riveting, joints, soldering in sheet metal.	Sheet metal: Study the function, construction, working, use, and application, specification of Sheet metal tools, instruments and equipment. Care and maintenance of tools.
5	Electrical: Familiarization of Electrical tools. Wire joint practice, Soldering and Brazing practice. Verification of Ohm's	Electrical: Electrical terms such as AC and DC supply, Voltage, Current, Resistance, Power, Energy, Frequency etc.

	law. Identification of phase and neutral of AC supply.	Safety precautions to be observed while working on electricity.
6	Construction of RL, RC and RLC circuits, measurement of electrical parameters and calculation of impedance and power factor.	Inductors and capacitors. Effects of inductor and capacitors in an AC circuit. Inductive reactance, capacitive reactance, Impedance and power factor. Lagging and leading power factors.
7	Familiarization with split phase AC motors and identification of the terminals. Identification of starting and running coil. Resistance measurements of windings.	AC motors and their types. Advantages of AC motor over DC motor. Revolving field theory. Phase splitting theory. Capacitor method and inductor method used to split the single phase.
8	Starting of capacitor start capacitor run motor through DOL starter, measurement of starting current and running current and changing of DOR.	Capacitor starts capacitor run motor working principle and construction. Starting capacitor and running capacitor Shaded pole motors, working principle and construction
9	Electronics: Identification of Electronic components and tools & instruments, colour coding of resistors, verification of ohms law, use of voltmeter,	Electronics: Introduction to Electronics. Basic Principles of semiconductors, Principles and application of Diodes



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	ammeter, multi meter, Practice of soldering & de soldering	
10	Identification of transistors, resistors, capacitors, diodes, S.C.R, U.J.T, I.Cs. used in refrigeration & AC, Full wave and bridge rectifier circuit, voltage regulators.	Rectification, Zener diode as voltage regulator – transistors parameters- CB, CE, CC, configuration, amplification. SCR
11	Multi-vibrator circuits and RC wave shaping circuits. Wiring of SCR, UJT for power control circuits, applications of OP – AMP, Applications of photo transistor	Photo diodes, photo transistors, multi – vibrator, CR & LR circuit. SCRs, UJTs, ICs.
12	Welding: Identification of gas welding equipments & accessories, setting up of--- a) AIR-LPG, b) O <sub>2</sub> -LPG c) O <sub>2</sub> -C <sub>2</sub> H <sub>2</sub> .	Welding: Introduction to basic principles of commonly used Welding processes, Arc welding, oxy fuel gas welding /cutting, brazing & soldering
13	Welding tools and equipment care and safety. Setting oxy- acetylene plant, lighting and adjustment of flame-simple joint on M.S.	Welding tools and equipment type specification and use. Safety method in welding. Method of gas welding, gas used and flames adjustment.
14	Basic refrigeration. Familiarization & use of	Basic Refrigeration: Study the function, working, use, specifications of refrigeration

	general and special tools used in refrigeration work practice.	tools, instruments and equipment.
15	Identification of various Refrigeration equipments, components of vapour compression system like compressor, condenser, expansion valve and evaporator etc.	Science related to refrigeration, work, power, energy, force, Heat and Temperature, Different temperature scales, Thermometers, Units of heat, sensible heat, latent heat, super heating and sub-cooling, saturation temperature , pressure, types, units
16	Working on soft copper tubing like, cutting, bending, flaring, swaging, pinching, brazing.	Types of Refrigeration systems, Ton of Refrigeration, Study the construction and working of vapor compression cycle, low side & high side of vapour compression system.
17	Brazing of tube joints (Cu to Cu, Cu to Steel, Cu to Brass) using-- (i) Air-LPG (ii) O2-LPG (iii) O2-C2 H2 set up & use of the above gases with the right torches, Brazing Filler Rods	Construction and working of V.C Cycle, fundamental operations, sub cooling and super heating.
18	Refrigerator (Single Door) Familiarization of electrical	Refrigerator ( Single Door) Function, construction ,working of single door



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	and mechanical components of refrigerator.	refrigerator, specifications, trouble shooting, care and maintenance
19	Refrigerator. ( single door) Familiarization of electrical and mechanical components of single door refrigerator.	Refrigerator (Single Door) Study the construction & working of single door Refrigerator. Study the electrical components of refrigerator.
20	Testing of compressor, Identification of motor terminals, Starting of compressor without relay & starting with Relay, testing OLP and other electric safety devices. Reassembly the components & Test performance	Importance of flushing in evaporator and condenser, necessity of replacing capillary and drier. Evacuation, leak testing, gas charging method in refrigerator, Refrigerants used in Refrigerators and its properties.
21	Frost free refrigerator: Tracing Electrical circuit, checking and testing of electrical accessories like, thermostat, Timer, Defrost Heaters, Bimetal etc., checking air distribution system, servicing of refrigerator, testing of components. Test the performance of refrigerator.	Frost Free Refrigerator: Study the construction and working of Frost Free (2 or 3 door) Refrigerator parts particularly, the forced draft cooling, Air Duct circuit, temperature control in Freezer & cabinet of Refrigerator, the automatic defrost system.
22	Identify three and four door no frost refrigerators, Stripping	Study the construction and its working of two and three door



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	<p>of components. Tracing electric circuit, Installation, testing components, evacuation, leak testing, gas charging, testing, fault finding, rectifications, evacuation and gas charging.</p>	<p>frost free refrigerator. Care and maintenance, installation method.</p>
	<p>Project Work</p>	

