

**INDIRA TECHNICAL EDUCATION SOCIETY,
NASHIK**

**CERTIFICATE COURSE
AIR-CONDITIONING & REFRIGERATION MECHANIC
(ACRM)**

**EXAM SCHEME: THEORY PAPER – I - 100 MARKS – 3 HRS.
PRACTICAL 100 MARKS – 2 HRS.**

[ACRM / ACRT – I / DACRES – I / ADACRES – I]

THEORY SYLLABUS

1. INTRODUCTION:

Basic principal of Refrigeration & Air-conditioning working of Refrigeration & Air-conditioning cycle.
Introduction of Refrigerator & Air-conditioner & their parts.

2. STUDY OF TOOLS:

- A) General workshop Tools : Hammer, Pliers, Spanner set, Screw Driver Set etc.
- B) Special Tools : Flaring Bar, Flaring Yoke, Swedging Punch, Tube Cutter, Tube Bender (Spring Type & Mechanical Type) Pinching Tool, Pressure Gauge, Compound Gauge, Series Test Lamp, Neon Tester, Different Types Of Thermometers Etc.

3. COMPRESSOR :

- Introduction & working principle of compressor.
- Need of Compressor in Mechanical refrigeration System, and their application in Refrigerator and Domestic Air-conditioner.
- Hermetically sealed reciprocating compressors. a) Scotch yoke type b) Connecting rod Type c) Rotary type sealed compressor

4. CONDENSERS:

Introduction & Working Principal and application of condensers.
1) Natural Air Cooled 2) Forced Type Air Cooled 3) Skin Type (Serpentine condenser)
2) Maintenance and repairing of above condensers.

5. DEHYDRATORS:

Effect of Moisture & Contaminants on the Sealed system. Method of Cleaning & Flushing the system.
Construction & Application of I) Drier II) Strainer III) Filter.

6. REFRIGERANT CONTROLLING DIVICES:

Introduction & Working Principal application & repairing of following.
i) Hand Valve ii) Capillary Tube iii) Service Valve.

7. EVAPORATORS:

Introduction & Working Principal and maintenance of Evaporator.
i) Box Type ii) Tube Type iii) Plate Type iv) Fin Type.

8. REFRIGERANTS & LUBRICANTS:

- What is refrigerant? Importance of refrigerants in Domestic Refrigerator & A/C.
- Functions & Properties of R-12, R-22 and R-131A.
- What is lubricant? And why it is necessary.
- Importance of lubricants in compressor.

- Types of Lubrication Systems.
a) Natural Lubrication b) Flash Lubrication.
- Properties of a good Lubricant.

9. EVAPORATOR DEFROSTING:

- Necessity and importance of Defrosting.
- Manual defrosting and automatic defrosting.
- Advantages and disadvantages of Frost free refrigerator over conventional (old) Refrigerator.

10. INSULATION:

- Necessity and importance of insulation in domestic refrigerator
- Properties of good insulator type.
Types: 1) Glass wool 2) Hermocol 3) PUF etc.

11. BASIC ELECTRICITY, ELECTRICAL COMPONENTS & WIRING

- Electrical terminologies, Ohm's law, Series Parallel circuit's Electrical Energy consumption, H.P.
- Study, Principles, and working of single phase Motor
a) Split phase 2) Permanent Capacitor 3) Capacitor Start Capacitor run motor.
- Relay: Current relay (Refrigerator), Voltage relay (for A/C) LMS, Box Type relays, PTC Voltage relay. Overload protector three pins and two pins Thermostatic Temperature control.
- Frost Free refrigerator – electrical components such as
1) Timer 2) Bimetal 3) Heater Fan etc.

12. GAS CHARGING:

Types of various gases used in refrigerator & Air-conditioner. Method of gas charging, Pressure charging & leak testing. I) Leak test by soap bubble. II) Leak test by oil traces. III) Leak test by pressure gauge observation. IV) Leak test under vacuum. Flushing & Cleaning of refrigeration & air conditioning system using dry air / carbon di-oxide / Nitrogen Gas. Vacuuming & gas charging of domestic refrigerator & Air conditioner.

13. SERVICING:

Tools & equipments required servicing of refrigerator & air conditioner. Procedure for Servicing of refrigerator & air conditioner. Electrical & Mechanical faults, possible Troubles, causes & remedies in domestic refrigerator & air conditioner.

14. REMOTE CONTROL : For window A/c and split unit A/c

Introduction of operational principle of remote control
Convert without – remote A/c to with remote
Various features of remote control
Fault Finding

SCHEME OF EXAMINATION :

Theory One Paper	3 hours	100 Marks
Practical	2 hours	75 Marks
Journal		15 Marks
Oral		10 Marks
	Total	200 Marks

GUIDELINE FOR PAPER SETTER (THEORY)

Q. 1 Compulsory Objective 20 Marks.
To set Q. 2 to Q. 8 Each 16 Marks
To solve any five questions

