

**INDIRA TECHNICAL EDUCATION SOCIETY,
NASHIK**

**CERTIFICATE COURSE
AIR-CONDITIONING & REFRIGERATION TECHNICIAN
(ACR-T)
PAPER - II**

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

**THEORY PAPER – I - Syllabus for this paper is same as ACR-M .
THEORY PAPER – II - Syllabus for this paper is given below**

[ACRT - II / DACRES – II / ADACRES - II]

THEORY SYLLABUS

1. SCIENCE:

- 1) Units: Definition of units Types of units systems, MKS, GAS, SI systems of units simple conversions of units.
- 2) Definitions & units of Mass, Density, Area, Volume, Heat, Energy, Temperature etc. Introduction to Work, Power energy. Forms of energy – Definition kinetic & potential energy, Heat, Unit of heat, Specific heat Latent heat, Sensible heat, Latent heat of fusion, Vaporization.
- 3) Temperature: Definition, Units various temp, seals, Centigrade Kelvin, Fahrenheit etc. Conversion factor.
- 4) Pressure: Definition, Atmospheric pressure, Vacuum pressure, absolute pressure, Gas laws, Simple problems.
- 5) Power: Definition H. P. & B. H. P. simple problems only.

2. REFRIGERATION:

Principal of Refrigeration, Ton Refrigeration working of I) ICE refrigeration ii) Vapor Compression refrigeration.
Working of I) Ice refrigeration ii) Vapor compression refrigeration iii) Dry ice refrigeration. iv) Vapour absorption system.
Advantages and disadvantages of ice refrigeration and dry ice refrigeration.

3. COMPRESSOR:

Working of Compressors maintenance & repairing of open type compressors.
i) Reciprocating compressor.
ii) Centrifugal compressor.
iii) Screw compressor.
iv) Multi stage case caded types compressor.
Applications of compressors used in domestic & industrial.

4. CONDENSERS:

Introduction of condensers working & applications of condensers maintenance & Construction of I) Water-cooled condensers.
Types of Water-cooled condensers.
a) Shell & Tube type b) Shell & coil type c) coil & coil type.
De-scaling of water-cooled condensers.
ii) Evaporator type condenser.

5. EVAPORATOR:

Meaning of evaporation, Introduction, Working & maintenance of flooded type evaporator, Brine system & secondary evaporator.

6. EXPANSION DEVICES (COMMRCIAL):

Introduction & function of expansion devices. Applications & construction of

- 1) Automatic expansion valve.
- 2) Low side float valve.
- 3) High side float valve.
- 4) Thermostatic expansion valve.

7. REFRIGERANT:

Introduction properties of good refrigerant study of different types of primary refrigerants like R-11, Ammonia, CO₂, Solidum Chloride etc & secondary refrigerants like Brine.

Refrigerant cylinder color code, Handling of refrigerant cylinder, Transfer of refrigerant from Storage cylinder to service cylinder.

8. COMMERCIAL REFRIGERATION:

Introduction to commercial refrigeration, Application , Construction & maintenance of

- 1) Water cooler machine.
- 2) Bottle cooler machine.
- 3) Display refrigerator for soft drinks.
- 4) Deep freezer.

9. AIR-CONDITIONING:

Study of different types of commercial air-conditioning systems like split A/C, Package A/C & central A/C system. Study of servicing procedure fault finding, repairing of above types of units.

10. AUTOMOBILE AIR-CONDITIONING:

Study of car A/C maintenance & trouble shooting of car A/C units various components & their working in Automobile air-conditioning.

Introduction to commercial automobile air-conditioning like Bus, Refrigerated vans, train Coach etc.

SCHEME OF EXAMINATION :

Theory Two Papers	3 hours	100 Marks each
Practical	2 hours	75 Marks
Journal		15 Marks
Oral		10 Marks
Total		300 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

