

AIR-CONDITIONING & REFRIGERATION (827)
SESSION-2019-20
JOB ROLE: Service Technician

After successfully completing these two years of Senior Secondary skill course, the student would have acquired relevant appropriate and adequate technical knowledge together with the professional skills and competencies in the field of Air conditioning and Refrigeration Technology so that they will be able to properly equipped to take up gainful employment in this sector..

Thus he should have acquired

A. Understanding of

- (a) The relevant basic concepts and principles in basic science subjects (Physics, Chemistry and Mathematics) so that he/she is able to understand the different vocational subjects.
- (b) The basic concepts in engineering drawing.
- (c) The concepts and principles of working of refrigeration and air conditioning equipment.
- (d) The knowledge of testing, faults, identification and repair procedures in respect of refrigeration and air conditioning equipment.
- (e) The knowledge to prepare estimates for cost of repair/installation/maintenance/ overhauling jobs.

B. Adequate Professional Skills and Competencies in

- (a) Testing, fault location and repairing of refrigeration and air conditioning equipment.
- (b) Installing and commissioning of refrigeration and air conditioning equipment.
- (c) Carrying out preventive maintenance of refrigeration and air conditioning equipment.
- (d) Dismantling, overhauling and reassembling of refrigeration and air conditioning equipment.

C. A healthy and Professional Attitudes of that He/She has

- (a) An analytical approach while working on a refrigeration or air conditioning equipment.
- (b) An open mind while locating/rectifying faults in a refrigeration or air conditioning equipment.
- (c) Respect for working with his/her own hands.
- (d) Respect for honesty, punctuality and truthfulness.

Class XI (2019-20)

Total Marks: 100 (Theory-60+Practical-40)

SCHEME OF UNITS

This course is a planned sequence of instructions consisting of units meant for developing employability and vocational competencies of students of Class XI opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for class XI is as follow:

Air-Conditioning & Refrigeration(827) CLASS XI Session 2019-20			
	Units	No. of Hours for Theory and Practical 260	Max.Marks for Theory and Practical 100

Part A	Employability Skills			
	Unit 1 : Communication Skills-III	10		10
	Unit 2 : Self-Management Skills-III	10		
	Unit 3 : Information and Communication Technology Skills-III	10		
	Unit 4 : Entrepreneurial Skills-III	15		
	Unit 5 : Green Skills-III	05		
	Total	50		10
Part B		Theory Periods	Practical Periods	
	Unit 1: Meaning of Air Conditioning and Refrigeration etc.	35	10	07
	Unit 2: Vapour Compression Cycle, Working of a Domestic Refrigerators	30	10	10
	Unit 3: Meaning of Compressors, Compressor construction	27	08	10
	Unit 4: Meaning of Alternating Current etc. , Wiring circuit diagrams	22	08	08
	Unit 5: Psychometrics– Composition of air, Human comfort etc.	24	06	08
	Unit 6: Applications of Air Conditioning, Measurement of air velocity and flow	22	08	07
	Total	160	50	50
Part C	Practical Work			
	Practical Examination			15
	Written Test			10
	Viva Voce			05
	Total			30
Part D	Project Work/Field Visit			
	Practical File/ Student Portfolio			10
	Total			10
	Total	260		100

Note:-Detailed Curriculum/ Topics to be covered under employability skill can be downloaded for CBSE website.

PART B:

1. Introduction

Thermodynamics and Its laws, meaning of Air Conditioning and Refrigeration, Brief history of Air Conditioning and Refrigeration, general safety, Application of Refrigeration, Concept of System, its boundary, and surroundings, Unit of Refrigeration, specification and uses of Refrigeration tools, Equipment, Instruments. Basic knowledge of heat energy. Comparison of heat engine, heat pump and refrigeration machine. Rating of Refrigeration Machines & Co-efficient of performance.(C.O.P)

2. Refrigeration Cycle and Applications:-

- (i) Vapour Compression Cycle, Representation of Vapour Compression Cycle on temperature– entropy and pressure– enthalpy diagram, Effect of sub-cooling, Super heating, change in suction pressure and discharge pressure on coefficient of performance, Deviation of actual cycle from the theoretical cycle.
- (ii) Working of a Domestic Refrigerator, water cooler & Deep Freezer, Refrigeration tools and materials, tubing, cutting, bending, flaring, joining, swaging, instruments and gauges.

3. Compressor:-

- (i) Meaning of Compressors, Types of compressor-reciprocating (semi-hermetic, hermetic and open types), rotary, centrifugal and screwed type, working of compressor.
- (ii) Compressor construction, valves, piston, connecting rods, crankshafts, seals, oil circulation, hermetic and semi-hermetic units, cooling of windings, Mufflers.

4. Basic Electricity:-

- (i) Meaning of Alternating current, D.C.Current and difference between them, Voltage, phase difference. Knowledge of Ohm's law and its representation on V-I graph, Resistance and its unit, measurement of current, voltage and power.
- (ii) Wiring circuit diagrams of Refrigerators and Air-Conditioners.

5. Psychrometry and Human Comfort

- (i) Psychrometry, composition of air, moist air, vapours and gases, specific humidity, absolute humidity, degree of saturation, relative humidity, Dry Bulb Temperature, Wet bulb Temperature, wet bulb depression, Dew point temperature, dew point depression.
- (ii) Human comfort, concept of effective temperature, comfort zone.

6. Application of Air conditioning

- (i) Applications of Air Conditioning, comfort, industrial and process Air Conditioning, study of window type air conditioners, package units, central Air conditioning plants.
- (ii) Measurement of air velocity and flow.

PRACTICALS

Time: 3 Hours

Marks: 40

1. To learn proper techniques of cutting, fitting, reaming, bending, flaring of soft and hard copper Tubing, swaging etc.
2. To learn brazing of copper tubing.
3. To understand the construction and functions of reciprocating compressors, condensers and evaporators.
4. To study a hermetic unit and it's testing.
5. Study of various types of compressors, dismantling and assembling of compressors.
6. Testing of reciprocating compressors.
7. To study Domestic Refrigerator and water cooler.
8. Study of window, split and package type air-conditioner.
9. Charging and testing of Air-Conditioner.
10. Measurement of voltage, current, power etc.
11. Making electric circuit diagrams for refrigerators and Air-conditioner.
12. Study of tools and materials, instruments and gauges.
13. To study the safety measures to be taken in a workshop

