

**Curriculum**  
**Basics of HVACR**  
**GRADE IX**  
**2020**



**GOVERNMENT OF PAKISTAN**  
**Ministry Of Federal Education and Professional Training, ISLAMABAD**  
**in Collaboration with**  
**National Vocational and Technical Training Commission**

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## Introduction

### INTRODUCTION

Pakistan is a developing country with 5th largest population in the world. 64% of our population is below 30 years of age which makes it second youngest country in South Asia. This “youth bulge” provides unique challenges as well as opportunities for the country’s social and economic development. The only remedy is to develop youth of Pakistan through education and training. To control the increasing un-employment, promoting entrepreneurship (self-employment), alleviate poverty and provide skilled manpower for industrial/economic growth, The Govt. of Pakistan has decided to introduce Technical Scheme at Secondary School Certificate (SSC) Level. For this purpose a stream of technical subjects has been selected including HVACR as one of the elective subjects to be taught at that level.

HVACR is a sub discipline of Mechanical Engineering that makes it possible for us to live comfortably in air-conditioned spaces and enjoy a wide variety of foods. HVACR technology is still growing and will continue to grow far into the future. New technicians will need to be aware of the fact that change is inevitable which requires a complete look at the industry.

The curriculum of HVACR is designed to produce middle level human resources in the form of skilled work force equipped with knowledge, skills and attitudes related to the field of HVACR so as to meet the demand of such workforce in the country and abroad to contribute in the national streamline of poverty reduction of Pakistan.

HVACR Technician is a trade person specializing in the installation, repairing and maintenance of Heating Ventilation , Air conditioning and Refrigeration system and the related equipment. HVACR Technician may seek a job or become an entrepreneur. HVACR Technicians work in a variety of settings, including homes, industries, schools, hotels, workshops and hospitals-any type of facility that needs a HVACR system to function.

Working conditions for a HVACR technician may vary by specialization. Generally an HVACR Technician’s work is physically demanding such as climbing ladders and lifting tools and supplies. Occasionally an HVACR technician must work in a cramped space or on scaffolding, and may frequently be bending, or kneeling, to make /connections in awkward locations. He may spend much of their days in outdoor or semi-outdoor noisy and dirty worksites. He may be exposed to the heat, dust, and noise of an industrial plant. He may be called to work in all kinds of adverse weather to make emergency repairs.

## Rationale

The Trade of HVACR is a profession that is increasingly getting attention in Pakistan because of the population growth and the resultant immense opportunities in the field not only among the youth, seeking to enter the industry, but also among the adults who wish to polish their skills to develop a career out of it.

On completing the curriculum/course, students should have acquired a set of knowledge and concepts, and have developed a range of technical, personal, interpersonal, organizational and generic skills, that can be applied in various contexts, both within and related to trade of HVACR. Furthermore, this course will stimulate the learners towards entrepreneurship in the industry.

Within this qualification relating to HVACR Technician's interventions in schools, there are important interventions that integrated within school settings. The purpose of this qualification is to strengthen connections between schools and trade, and drawing on the concept of the socio technical network, theories the interactions between the relevant market and school contexts.

HVACR Technician, Matric Tech (9<sup>th</sup>&10<sup>th</sup>)

## Aims and Objectives

The specific objectives of developing these qualifications are as under:

- Provide students with a smooth transition to work.
- Develops job-readiness & enhance students' trade-specific employable skills and provide opportunities for the development of new skills.
- Provide students with the opportunity to obtain from Level II -IV technical training certification or equivalent in a given trade.
- To set high profile standard professions for the industry to generate standard outputs.
- To validate an individual skill, knowledge and understanding regarding relevant occupations.
- Provide flexible pathways and progressions in training and assessment field.

### **Objectives**

After completing this, the students will be able to:

- Perform routine skilled and semi-skilled tasks to carry out a variety of HVACR installations
- Repair of equipment, facilities and system.
- Perform maintenance jobs and assist other team members in the assigned preventive maintenance.
- Perform their duties in an efficient manner
- Establish a standardized and sustainable system of Refrigeration and Air conditioning training in the institutes / colleges / schools of Pakistan
- Improve the professional competence of Refrigeration and Air conditioning industry

# GRADE IX

Chapter No. 1					
01 Occupational Health, Safety and Environment 42 Periods 14 =(T), 28 = (P)					
Theme/Content	Student Learning Outcome	Activities/Practical	Duration	Tools	Workplace
Importance of Health and Safety, Hazards, Risk Assessment and PPE'S	The Student will be able to: <ul style="list-style-type: none"> <li>• identify the Hazards</li> <li>• define who might be harmed and why?</li> <li>• evaluate the risk and decide on the precautions</li> <li>• record your findings and implement them</li> <li>• review your assessment and update if necessary.</li> <li>• explain PPE's</li> </ul>	<ul style="list-style-type: none"> <li>• Visit Power lab of your institute, identify potential hazards. List PPE available and required to work there.</li> <li>• Recognize the required tools, equipment, PPE' and consumable materials</li> <li>• Check working /functioning of the tools/equipment ,PPE' sand materials for insulation</li> <li>• Use Personal protective Equipment (PPE) and Ensure safe handling of Equipment</li> <li>• Identify any potential hazards and take appropriate action to minimize the risk.</li> </ul>	Periods(T) Periods(P)	ICT Resources Computer, printer, Stationary, PPE's, Screw driver set. Multi meter	Classroom/ Labs
<b>Observing Occupational Safety and Health (OSH)</b>	The Student will be able to: <ul style="list-style-type: none"> <li>• describe health and safety regulations</li> <li>• explain health and safety precautions, regulations/guidelines</li> <li>• deal with problems and ensure in time reporting of the problems to the concerned authority.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate working on 400V live circuit using appropriate PPE.</li> <li>• Demonstrate first aid procedure for any victim of electric current</li> <li>• Perform cleaning and storing of tools/equipment after use.</li> <li>• Demonstrate the use of Personal Protective Equipment .</li> <li>• Keep work area clean and clear of obstructions.</li> <li>• Perform cleaning and storing of tools/equipment after use.</li> </ul>	Periods(T) Periods(P)	ICT Resources Computer, printer, Stationary, PPE's, Screw driver set. Multi meter,	Class room/Lab

Fire Extinguisher	<ul style="list-style-type: none"> <li>define Fire extinguisher</li> <li>explain the types of Fire extinguisher and their uses</li> </ul>	<ul style="list-style-type: none"> <li>Check the expiry date</li> <li>Operate Fire Extinguisher</li> <li>Perform cleaning / storing of tools/equipment</li> </ul>	Periods(T) Periods(P)	Fire Extinguisher	
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<b>Chapter 2</b>					
<b>Communication Skills</b>					
<b>36 Periods 12 =(T), 25 = (P)</b>					
<b>Theme/Content</b>	<b>Student Learning Outcome</b>	<b>Activities/Practical</b>	<b>Duration</b>	<b>Tools</b>	<b>Workplace</b>
<b>Working in Team</b>	The Student will be able to: <ul style="list-style-type: none"> <li>Treat team members with respect and maintain positive relationships to achieve common organizational goals</li> <li>provide work related information to team members and identify interrelated work activities to avoid confusion</li> <li>adopt communication skills appropriate to work activities and company procedures</li> </ul>	<ul style="list-style-type: none"> <li>Make a team of 5 students; check the wiring of class room and lab. Discuss the problems in team. Make a report for the in charge maintenance.</li> <li>Identify problems and resolve them through discussion and mutual agreement</li> </ul>	Periods(T) Periods(P)	ICT Resources Computer, printer, Stationary	Classroom/ Lab
<b>Dealing with Clients</b>	The Student will be able to: <ul style="list-style-type: none"> <li>collect and confirm work requirements from clients using appropriate communication procedures</li> <li>provide clear information to clients about work requirements including costs and time needed to accomplish the task</li> <li>negotiate with clients regarding wages, time, labor requirements etc.</li> </ul>	<ul style="list-style-type: none"> <li>Make a team of five members, two of them are service provider and remaining three are clients.</li> <li>Client requires some wiring in his office. The service provider should discuss about the types of cable, cost and quality. Service provider and client should negotiate on the cost.</li> </ul>	Periods(T) Periods(P)	ICT Resources Computer, printer, Stationary	Class room/lab
<b>Basic IT Skills</b>	<ul style="list-style-type: none"> <li>create folders and files and learn major commands of operating system/windows</li> </ul>	<ul style="list-style-type: none"> <li>Client has demanded some electrical work through email from you. Make a detail invoice for client and send it to him</li> </ul>	Periods(T) Periods(P)	ICT Resources Computer, printer, Stationary	Classroom/ Labs

	<ul style="list-style-type: none"> <li>• type text and use major commands such as printing, editing, creating tables, header footer, footnotes, table of contents and page number etc.</li> <li>• generate reports for clients using appropriate computer applications</li> <li>• use internet for sending/receiving emails and connecting through social or other media</li> </ul>	<p>along with your company profile made in PowerPoint, by email as per instructions.</p> <ul style="list-style-type: none"> <li>• Invoice should be saved in separate folder in your PC for further work.</li> <li>• Prepare invoice in excel and word both formats.</li> <li>• Make the document as per work specifications and client's requirements.</li> <li>• Send a small presentation (PowerPoint) of your company along with this invoice.</li> </ul>			
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<b>Chapter 3</b>					
<b>Technical Drawing</b>					
<b>36= Periods 12=(T), 24= (P)</b>					
<b>Theme/Content</b>	<b>Student Learning Outcome</b>	<b>Activities/Practical</b>	<b>Duration</b>	<b>Tools</b>	<b>Workplace</b>
Introduction of Drawing, Drawing Instrument, Basic Alphabets and Lines	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• understand meaning, importance and uses of technical drawing</li> <li>• understand drawing instruments, their uses and cares</li> <li>• understand the various types of basic lines</li> <li>• describe the types of alphabet with their weight and shape</li> <li>• learn the construction of alphabet.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify drawing instruments</li> <li>• Draw basic lines</li> <li>• Draw basic alphabets</li> </ul>	Periods(T) Periods(P)	<ul style="list-style-type: none"> <li>• Drawing table/board</li> <li>• Drawing instruments</li> <li>• Pencils</li> <li>• Rubber</li> <li>• sharpener</li> </ul>	Classroom/ Labs
Geometrical Construction and Free Hand sketching	<ul style="list-style-type: none"> <li>• define angles, triangles, quadrilateral, polygons, circle and circle elements</li> </ul>	<ul style="list-style-type: none"> <li>• Draw different types of angles, triangles, quadrilaterals, circles and polygons</li> </ul>	Periods(T) Periods(P)	<ul style="list-style-type: none"> <li>• Drawing table/board</li> <li>• Drawing instruments</li> <li>• Pencils</li> <li>• Rubber</li> </ul>	

	<ul style="list-style-type: none"> <li>understand the importance of sketching</li> <li>describe sketching techniques of geometric figures, shapes and models</li> </ul>	<ul style="list-style-type: none"> <li>Sketch geometrical shapes and models</li> </ul>		<ul style="list-style-type: none"> <li>sharpener</li> </ul>	
Multi View Drawing and Pictorial Drawing	<ul style="list-style-type: none"> <li>understand the procedure to draw the Front, side and top view.</li> <li>understand the procedure to draw the Isometric and pictorial drawings of simple shape and models.</li> </ul>	<ul style="list-style-type: none"> <li>Draw front, side and top view of simple model.</li> <li>Draw simple isometric/ Pictorial drawing</li> </ul>	Periods(T) Periods(P)	<ul style="list-style-type: none"> <li>Drawing table/board</li> <li>Drawing instruments</li> <li>Pencils</li> <li>Rubber sharpener</li> </ul>	

#### Chapter 4

#### Measuring Instruments 24= Periods 8=(T), 16= (P)

Theme/Content	Student Learning Outcome	Activities/Practical	Duration	Tools	Workplace
Introduction to Measuring system	Students will be able to: <ul style="list-style-type: none"> <li>learn the measuring systems with its units               <ul style="list-style-type: none"> <li>length</li> <li>area</li> <li>volume</li> <li>force</li> <li>pressure</li> <li>density</li> <li>current</li> <li>voltage</li> <li>power</li> <li>temperature</li> </ul> </li> <li>use measuring instruments to calculate for area, volume, force, pressure power and temperature</li> <li>learn conversion of temperature (degree centigrade C<sup>0</sup>- degree Fahrenheit F<sup>0</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>Measure length to calculate area, volume, and density</li> <li>Calculate force, pressure and power</li> <li>Measure temperature with thermometer</li> <li>Convert degree centigrade C<sup>0</sup> to degree Fahrenheit F<sup>0</sup> and vice versa</li> </ul>	Periods(T) Periods(P)	Measuring tape, Steel foot, Vernier Caliper, and micro meter, thermometer	



**Chapter 5**

**Welding**

**35= Periods 10=(T), 25= (P)**

Theme/Content	Student Learning Outcome	Activities/Practical	Duration	Tools	Workplace
Introduction to Gas Welding	The Students will be able to: <ul style="list-style-type: none"> <li>• define welding</li> <li>• describe types of welding</li> <li>• learn construction of flame for gas fold welding</li> <li>• learn principles of gas manifold</li> <li>• understand safety precautions for welding</li> </ul>	<ul style="list-style-type: none"> <li>• Make simple joints of gas welding</li> <li>• Make connections of gauge manifold</li> <li>• Measure pressure of refrigerant by gauge manifold</li> <li>• Measure temperature by thermometer</li> </ul>	Periods(T) Periods(P)	Gas Welding Set, Welding Table Welding PPE`s	Classroom/ Labs
Soldering	<ul style="list-style-type: none"> <li>• define soldering</li> <li>• learn soldering process</li> <li>• understand solder material</li> <li>• learn applications of soldering</li> </ul>	<ul style="list-style-type: none"> <li>• Make simple soldering joint of copper tube</li> </ul>	Periods(T) Periods(P)	Welding Table Soldering Rod, Welding PPE`s	
Brazing	<ul style="list-style-type: none"> <li>• define brazing</li> <li>• learn brazing process</li> <li>• understand brazing material</li> <li>• Learn applications of brazing</li> </ul>	<ul style="list-style-type: none"> <li>• Make simple brazing joint of copper tube</li> </ul>	Periods(T) Periods(P)	Welding Table Brazing Rod, Welding PPE`s	

## Assessment and Evaluation

Assessment is the practice of collecting evidence of student learning. It aims at improving learning and teaching as well as recognizing the achievement of students. It determines students' progression through their learning experiences and enables them to demonstrate that they have achieved the intended learning outcomes. The assessment is aligned with curriculum aims, design and learning processes.

Evaluation is an integral part of teaching-learning process. It involves gathering information through various assessment techniques, making valuable judgment and sound decisions. Assessment provides information and teaching about students' achievement in relation to learning objectives. With this information, the teacher makes informed decisions about what should be done to enhance the learning of students or to improve teaching methods. Assessment must be:

- mainly open-ended, allowing for discussion and revision of new understanding.
- tolerant of divergent thinking of students and promote the notion of no 'one right answer'.
- presented in alternative mode, not just paper-and-pencil responses to limiting questions.
- designed to foster analysis, comparison, generalization, prediction, and modification according to the grade and development level.
- capable of promoting collaboration and team effort in demonstration of competence.
- ongoing and cumulative, showing growth over time.

### Formative (Internal) Assessment

Internal assessment refers to the assessment practices employed as part of the learning and teaching process. It is an ongoing process throughout the session and uses Test — Feedback — Adjust cycle repeatedly to improve students' performance and efficiency in learning and teaching. In designing internal assessment for the subject, teachers should maintain a proper balance between the formative and summative functions of assessment. It should be comprehensive to cover all the objectives as per curriculum. A diversity of assessment modes should be adopted so that students are given opportunities to develop and demonstrate the full range of learning outcomes of the curriculum, including those of knowledge, skills, values and attitudes.

### Methods for Internal/Formative Assessment

Following tasks can help in formative assessment.

- Assignments
- Quizzes
- Tests
- Group discussions
- Oral/multimedia presentations
- Worksheets
- Online interactive activities
- Role play
- Demonstration
- Practical exercises

Feedback on students' work in all the above tasks must be prompt, effective, and efficient assessment should have questions setting that specifically help in finding out knowledge, understanding and skills.

### **Summative /External Assessment**

Summative assessment will be managed by concerned Board of Intermediate and Secondary Education. It will be composed of two parts.

**1) Theory Assessment /Written examination:** The theory examination is suggested to consist of a wide variety of questions. Its overall weight age should be 40 %. It should be based on the curriculum rather than textbook. The assessment should be designed to examine the candidate's understanding of the whole syllabus and should test the range of abilities according to Bloom Taxonomy.

**2) Practical Assessment/Practical examination:** This is designed to test Practical skills of students. Its overall weight age should be 60%. It will comprise of written exam (10%), practical (70 %) and viva/oral exam (20%).

A standards-referenced approach will be adopted for grading and reporting student performance. The purpose of this approach is to recognize what each student can do in the subject at the end of the 2-year secondary school level education. The performance of each student will be matched against a set of performance standards, rather than comparing to the performance of other students. It makes the implicit standards explicit by providing specific indication of individual student performance. Descriptions will be provided for the set of standards.

### **Guidelines for Writing a Textbook**

A textbook is an important teaching and learning resource and one of the most extensively used resources in classrooms. To reflect national needs and aspirations the needs and aspirations, the textbooks should be written in accordance with this curriculum. This curriculum meets not only the general aims and objectives but also fulfills the specific requirements of the individual subject. As the textbook serves as a framework for teaching, the author/authors should consider the following features:

- A textbook must include an introduction to the textbook, explaining how to use the textbook
- The textbook must be in line with the National Curriculum, covering all SLOs of each theme or concept.
- Content and illustrations must be culturally, contextually and age appropriate.
- All text and material must be accurate, up-to-date and error-free.
- The continuity of the concepts, their integration and logical development should be ensured.
- Horizontal and vertical overlapping of the concepts should be avoided.
- The textbook should be informative and interactive with questions to be put at suitable intervals to provoke the students to think.
- The language used should be simple, clear, straight forward, unambiguous, and easily comprehensible by the students of the level.

- Simple questions may be asked within the chapter, which requires students to recall, think, and apply what they have just learnt as well as to reinforce the learning of the concepts and principle.
- The examples and applications should be from everyday life and be supportive of our cultural values.
- Photographs and illustrations should be clear, labeled, and supportive of the text. Tables, flow charts and graph may be given wherever needed.
- Key points at the end of each chapter should provide a summary of the important concepts and principles discussed in the chapter.
- End-of-the-Chapter exercises must include a variety of assessment styles based on levels of Bloom's Taxonomy. These should encourage students to think, develop skills, and use information for a variety of purposes.
- Textbooks should be free from all kinds of biases including, gender, religion, occupation, social background etc.
- To make the students self-learner use of IT based resources may be encouraged. Relevant internet links and other online resources may be included.
- Glossary of the new vocabulary must be included.

#### **Guideline for planning and writing a chapter**

The textbook author may decide the titles of each chapter and can choose to cover students' learning outcomes (SLOs) from any themes in developing the content of the chapter. The textbook author must also keep in mind that a number of SLOs cannot be addressed in the text (as if this is done it would lead students to simply memorize the text and not serve the realization of the curriculum). These SLOs could be realized through questions and practical activities within and at the end of the chapter exercises.

- Learning outcomes must be given at beginning of each chapter.
- Decide on key ideas, facts, concepts, skills, and values that can be developed.
- Illustrations must clearly convey the desired concept.
- Activities must demand from students to do inquiry and problem solving according to grade level.
- Ensure that the content is up to date, accurate and developmentally appropriate.
- Contents must be in line with chapter outcomes.
- Language must be consistent, culturally appropriate, and grammatically correct (as if talking to a group).
- Language must engage and hold reader's attention.
- Recall previous learning, where possible.
- Structure the writing so that the sentence is simple, paragraphs deal with single ideas etc.
- Interesting information in the form of tidbits, fact file, point to ponder etc. must be given.
- Write a summary/concept map at end of each chapter, reviewing key knowledge and skills.
- End-of-chapter exercises
- Recall and integrate previous learning
- Engage students and develop their creativity
- Move from lower to higher order thinking
- Focus on multiple intelligences
- Keep the text contextually relevant in line with local teaching and learning.

- Provide website links for further research

### **Guidelines for Writing Learner Workbook**

Workbooks are books that contain writing activities and exercises that build upon each chapter in the textbook. Workbook exercises help students to develop conceptual understanding of the concepts dealt with in the text, to develop skills and to apply knowledge to new situations. Basic features of a workbook A workbook should have:

- Various exercises and activities for each chapter, topic, subtopic.
- Exercises and activities that will enable student to develop and practice the content knowledge, skills and higher order thinking.
- Accurate and variety of exercises.
- Clear illustrations/ examples/ explanations to show what students are supposed to do, and/or what product looks like.
- Exercises and activities with a variety of purposeful, stimulating, challenging and innovative items to encourage students to review and practice the knowledge and skills they have learnt.
- Exercises that include both constructed and restricted response items.
- Activities, which requires readily available, acceptable, and affordable materials and resources.

### **Basic Requirements for Lab (Tools/Equipment)**

Trade: - HVACR (40 Trainee)

1. Gloves
2. Masks
3. Goggles
4. Ear muffs/plugs
5. Shoes
6. Measuring tape
7. Hand drilling machine
8. Extension chords
9. Hand Hacksaw with blades
10. Adjustable screw, wrench,
11. Air Conditioner and its parts,
12. AVO meter, Tool kit
13. Battery,
14. Box spanner screw drivers,
15. Capacitor,
16. Clamp meter, Tool kit.
17. Compressor,
18. Condenser,
19. Copper Tubes,
20. Deep Freezer and its parts,
21. Digital Air Flow / Velocity meter
22. Digital Capacitor analyser,

23. Digital Clamp-on Ampere Meter,
24. Digital Optical Tacho meter,
25. Digital pressure gauges set,
26. Electric Screw driver set,
27. Electronic leak detector,
28. Evaporator,
29. Flaring and swaging tool kit,
30. Flaring Tool,
31. Hammer,
32. Laser temperature measuring device,
33. Leak testing equipment,
34. Locking pliers
35. Manifold,
36. Multi meter
37. Pressure Gauges,
38. Ratchet wrench Open ended spanner set,
39. Reamer,
40. Recovery cylinder,
41. Recovery unit,
42. Refrigerant control Valves
43. Refrigerants Chart
44. Refrigerants,
45. Refrigeration system,
46. Refrigerator
47. Refrigerator and its parts,
48. Resistor,
49. Spirit level,
50. Swaging Tool,
51. Thermometer,
52. Tube Bender,
53. Tube Cutter,
54. Tube Vice
55. Water Cooler and its parts,

### **Consumable or Training Materials**

<b>S.No</b>	<b>Specification</b>	<b>Quantity</b>
1	Filling of oxygen Gas cylinder	3 Cylinder
2	Filling of fan Gas cylinder	28 kg
3	Silver soldering Road (chandi Rod)	02 kg
4	Brass Rod (Petal Rod)	02 kg
5	Copper Tube dia 1"/4 (50 feet / Coil)	04 koil
6	Copper Tube dia 5"/16 (50 feet / Coil)	04 koil

7	Capillary Tube dia 0.031"	02 koil
8	Gastric Sheet (4'x6')	02 sheet
9	Seal Threading Tap	10 nos
10	Majic defoxi (small size)	10 nos
11	wooden Board (10"x12" single)	06 doz
12	single way switch (5A open)	10 doz
13	Two Way Switch (5A Open)	08 doz
14	Batten Holder Baculite	12 doz
15	Two Pin socket (5A open)	08 doz
16	Cut out fuse (10 A Porcelain)	08 doz
17	Electric LAMP (Bulb 100 w)	06 doz
18	Electric Lam (Bulb 200w)	02 doz
19	Electric Call bell (Bizzes 220v/5W)	06 doz
20	Push button (5A open)	06 doz
21	Fuse wire (5A)	06 reel
22	P.V.C WIRE (3/.029")	04 coil
23	P.V.C WIRE (1/.044")	04 coil
24	Insulation Tap (Nitto) 3"/4	30 nos
25	Wooden Screw 1"/2, 3"/4	10 pkt / each
26	Hand Hack Saw Blade (Double Edge)	10 doz
27	M.S Flat (64mmx8mm)	100 kg
28	Mobil Oil	10 Litr
29	Cotton Waist Cleaning Cloth	50 kg
30	Detergent Soap	02 doz
31	Thermostat switch cooler water	12 nos
32	Thermostat for Refrigerator	12 nos
33	Thermostat for A.C	12 nos
34	Amperage type relay Cap type 1/4, 1/3, 1/5, 1/6, 1/8 (6 No each )220v	30 nos
35	Overload 1/8, 1/6, 1/5, 1/4, 1/3 (220v)	30 nos
36	Electronic Relay (Denfas)	12
37	Electronic Relay two point	12
38	Current Relay for 110v Refrig	12
39	Over load for 110v = (1/4, 1/3) Refrig	12
40	starting capacitor 80/110 uf	12
41	Starting capacitor 138/182 uf	12
42	Running capacitor 50 uf	12
43	Running capacitor 60 uf	12
44	Timer for Refrigerator 220v	12
45	Bi metal fuse 12 no 220v Elect	24

46	Timer for 110v Refrigerator	6
47	Fan capacitor 2, 2.5, 3, 3.5 $\mu$ F	25
48	copper tub 1 1/2	3 coils (50')
49	Protentional Relay	12
50	Split Control circuit with display	12
51	Sensor for Split A.C	60
52	F-134a Gas cylinder	2 cylinders
53	F-22 Gas	2 Cylinder
54	G-I pipe 1 1/2 dia	4 length
55	G-I pipe 3 3/4 dia	4 length
56	G-I union 1 1/2	12
57	G-I Tee	12
58	G-I Socket	12
59	P.V.C wire 7/044	2 coils
60	Three pin shoe 20 A	12
61	Power Plug 2, A	2 dozen
62	Circuit Breaker 20 A	2 dozen
63	Three Pin Shoe 5A	2 dozen
64	Two Pin Shoe 5A	2 dozen
65	Flair nuts 1/4"	3 nos
66	Union 1/4"	3 nos
67	Flair nuts 5"/16	3 nos
68	union 5/6"	3 nos
69	Flour mint 1 1/2	3 nos
70	union 1/2"	3 nos
71	compressor out 1349	4 lit
72	Kit kat fuse 20 A	2 dozen
73	Liquid service valve 1/4" Split A.C	2 dozen
74	Suction service valve for	2 dozen
75	Filter dryer	3 dozen
76	Nut and Bolt (M10)	2 pkt
77	Nut and Bolt (M12)	3 pkt
78	Nut and Bolt (M14)	3 pkt
79	Flexible cable (copper) wire 110-76	1 coil
80	Arab flax insulation 1 1/4, 1 1/2, 3/8"	3 dozen
81	Arab flax insulation 5/8", 3/4 for tub	3 dozen