Syllabus For Junior RACW Mechanic

Course Name	Junior RACW Mechanic
Sector	ELECTRONICS & HARDWARE
Course Code	STC-ELE/RACW/1010
Level	3
Occupation	Asst. Mechanic / Asst. Technician for Refrigerator / Air-conditioner /Washing machine
Job Description	Servicing / troubleshooting / maintenance of refrigerator / air conditioner / washing machine - work as an Junior Refrigeration and Air Conditioner Mechanic
Anticipated Volume of Training	480 Hrs (Theory- 120 Hrs + Practical- 240 Hrs + Employability Skill : 60 Hrs + OJT- 60 Hrs)
Trainees' Entry Qualification	Grade 10 OR Grade 8 with two years of (NTC/ NAC) after 8th OR Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 8th grade pass with 2 yrs relevant experience OR Previous relevant Qualification of NSQF Level 2 with one yr experience OR Previous relevant Qualification of NSQF Level 2.5 with 6 months experience
Trainers Qualification	B.E/B.TECH IN ELECTRONICS / ELECTRICAL ENGINEERING / MECHANICAL ENGINEERING, DIPLOMA IN ELECTRONICS / ELECTRICAL / MECHANICAL ENGINEERING / ITI IN ELECTRONICS MECHANIC TRADE 2 YEARS FOR BE/B.TECH, 3 YEARS FOR DIPLOMA / ITI

Structure of Course:

Module No.	Outcome	Theory (Hrs)	Practical (Hrs)	OJT (Hrs)	Total (Hrs)
1	Apply safe working practices	10	20		30
2	Describe fundamental principles and concepts of air conditioning and refrigeration systems, including their components, operation, and applications.	20	40		60
3	Identify and describe the essential tools and equipment used in air conditioning and refrigeration work.	20	40		60
4	Install, diagnose and repair of Refrigerator for	20	40		60

Module No.	Outcome	Theory (Hrs)	Practical (Hrs)	OJT (Hrs)	Total (Hrs)
	Domestic purpose				
5	Install, troubleshoot, repair and periodic maintenance of air conditioner for Domestic purpose	15	45		60
6	Install and repair of washing machine for Domestic purpose	20	40		60
7	Identify and address the customer needs, providing timely and personalized solutions	15	15		30
8	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	--	--	60	60
9	As per NCVET guided curriculum (Employability Skill)	60	--		60
	TOTAL :	180	240	60	480

SYLLABUS:

Module No. 1: Trade related general safe working practices

Outcome: Apply safe working practices

Theory Content:

1.1 Personal protection in work place.
1.2 Personal safety and prevention of accident.
1.3 Basic First Aid
1.4 Safety sign for danger, warning, caution and personal safety message
1.5 Use of fire extinguisher
1.6 Electrical safety precautions
1.7 Hazards due to leakage of refrigerant and precautionary measures.
1.8 Hazards due leakage of lubricant and water and precautionary measures.
1.9 Electrical Safety precautions
1.10 Use of PPE's during servicing of Refrigerator.

Practical Content:

1.1 Demonstrate the use of different bandages and medicines commonly present in a first aid box.
1.2 Demonstrate basic first aid and use them under different circumstances.
1.3 Demonstrate Safety sign for Danger, Warning, caution and personal safety message accurately.
1.4 Identify different fire extinguishers and to use the same as per requirement.
1.5 Demonstrate Precautionary measures in case of leakage of refrigerant.
1.6 Demonstration the use PPE's during servicing of Refrigerator.

Module No. 2: Types of Refrigerator and Air Conditioner and related terms

Outcome: Describe fundamental principles and concepts of air conditioning and refrigeration systems, including their components, operation, and applications.

Theory Content:

2.1 Define the basic principles of air conditioning and refrigeration systems.

2.2 Identify the components of typical air conditioning and refrigeration systems and explain their functions.

2.3 Describe the different types of air conditioning systems, such as window units, split systems and central systems and their respective advantages and disadvantages.

2.4 Analyse the energy efficiency and environmental impact of various refrigerants used in air conditioning and refrigeration.

2.5 Evaluate the factors affecting the selection and sizing of air conditioning and refrigeration equipment for specific applications.

Practical Content:

2.1 Identify different Components of Single Door Refrigerator.
2.2 Identify different components of the Double Door Refrigerator.
2.3 Identify different components of Window Air Conditioner.
2.4 Identify of different components of Split Air Conditioner.

Module No. 3: Identification of different tools and electrical instrument required for servicing of Refrigerators and Air conditioner

Outcome:

Identify and describe the essential tools and equipment used in air conditioning and refrigeration work.

Theory Content:

3.1 Name, specification and use of different hand tools like Hand tools-Screw driver, Pliers, Knife, Wrench, Allen key set , Torque wrench Oil can, Soldering iron, Hammer, Hack saw, Files, Engineers' rule, measuring Tape Chisel, Scriber, Divider, Calliper, centre punch, Bench vice.
3.2 Name, Specification and use of different servicing tools required for RAC like Servicing Tools- Flaring tool set, Swaging tool, Bending tool, Pipe Cutter, Ratchet spanner, pinch off tool, Pressure gauge, Serviceman thermometer, Gas leak detector.
3.3 Name, specification and use of different electrical and electronic instrument like Electrical Instrument Voltmeter, Ammeter, Wattmeter, Multi meter, Transistor tester
3.4 Concept of current, voltage, resistance, power, energy, series and parallel connection, AC motor, capacitor, condenser.

Practical Content:

3.1 Identify different hand tools like Hand tools-Screw driver, Pliers, Knife, Wrench, Allen key set , Torque wrench Oil can, Soldering iron, Hammer, Hack saw, Files, Engineers' rule, measuring Tape Chisel, Scriber, Divider, Calliper, centre punch, Bench vice.

3.2 Identify different Servicing tools required for RAC like Servicing Tools- Flaring tool set, Swaging tool, Bending tool, Pipe Cutter, Ratchet spanner, pinch off tool, Pressure gauge, Serviceman thermometer, Gas leak detector.

3.3 Identify different electrical and electronic instrument like Electrical Instrument Voltmeter, Ammeter, Wattmeter, Multimeter, Transistor tester

3.4 Measurement of current, voltage, resistance, electrical power, electrical energy.

Module No. 4: Refrigerator

Outcome: Install, diagnose and repair of Refrigerator for Domestic purpose

Theory Content:

4.1 Describe the full process of Refrigerator installation.

4.2 Some Common problems as listed below in Refrigerators possible causes and remedy

- ✓ Fridge Not Cooling
- ✓ Fridge Not Defrosting
- ✓ Freezer is Cool, but Fridge Stays Warm
- ✓ Fridge Leaking Water
- ✓ Fridge Freezing Food
- ✓ Light Not Working
- ✓ The ice maker isn't working

Practical Content:

4.1 Overhauling, oiling and servicing of components like Cylinder, Piston, piston Ring, Crankshaft, Cylinder head valve plate assembly, Shaft seal, connecting rod etc. and assemble them. Charging of compressor oil

4.2 Testing for leakage through condenser and repairing the leakage.

4.3 Checking of capillary tube, Automatic & Thermostat Expansion Valve, fault detection and repair and replacement of the faulty parts.

4.4 Charging of refrigerant

4.5 Vacuumising, Drying.

4.6 Repairing of copper tube by Cutting, bending and joining, Flaring, Swaging, Silver soldering.

4.7 Servicing of refrigerator cabinet –Checking of door liner and body inside liner, replacement of door liners and door gasket, Adjustment of door liners and door gasket.

Module No. 5: Air Conditioner

Outcome: Install, troubleshoot and repair of air conditioner for Domestic purpose

Theory Content:

5.1 Describe the full process of ac installation.

5.2 Some Common problems as listed below in Window Air conditioner, possible causes and remedy.

- ✓ Water dripping from the front of a window AC
- ✓ Compressor cycles between ON and OFF too frequently
- ✓ Ice formation on window AC

- ✓ Window AC not starting problem
- ✓ Window AC with low cooling performance
- ✓ Compressor switching off too early without cooling

5.3 Common problems of Indoor and outdoor unit of split A.C., possible causes and remedy.

5.4 Classification of refrigerant, Primary Refrigerant and Secondary Refrigerant, CFC, HFC, HCFC, HC, Azeotropic and Zeotropic blend, Importance of Eco friendly refrigerant.

Practical Content:

5.1 Routine maintenance of window and split air conditioner.

5.2 Checking of thermal overload protector, motor starting relays and capacitors and Servicing of the above components.

Module No. 6: Washing Machine

Outcome: Install and repair of washing machine for Domestic purpose

Theory Content:

6.1 Describe the full process of Washing Machine installation.
6.2 Explain the use of test equipment and tools such as multi-meter, oscilloscope etc.
6.3 Explain different cycles in the machine running process and possible symptoms of faults in respective cycles.
6.4 Explain the fundamentals of motors, types of motors and their working methods.
6.5 Some Common problems as listed below in Washing Machine possible causes and remedy

- ✓ Noise
- ✓ Water not filling
- ✓ Water over filling
- ✓ Water not draining

Practical Content:

6.1 Identify the various types of washing machine and demonstrate the components and parts.
6.2 Check the proper electrical and water connections at site
6.3 Check the levelling and balancing of washing machine
6.4 Check the leaks and functions
6.5 Identify common washing machine problems.
6.6 Diagnose for troubleshooting issues
6.7 Check the electrical continuity of different electrical components.
6.8 Clean the drum, lint filter and detergent dispenser
6.9 Check the water inlet valves and hoses. Diagnose and fixing the drainage blockages.
6.10 Overview the electrical systems in washing machine
6.11 Check wiring diagram and schematic interpretation.
6.12 Replace the faulty parts and test for the serviceability.

Module No. 7: Customer Service

Outcome: Identify and address the customer needs, providing timely and personalized solutions

Theory Content:

7.1 Explain company's policies on code of conduct, organization's culture, customer care, reporting structure and documentation policy.
7.2 Describe company's products and recurring problems reported in consumer appliances.
7.3 Explain precautions to be taken while handling field calls and dealing with customers.
7.4 Demonstrate the importance of personal grooming with proper manners at the customer's premises.

Practical Content:

7.1 Demonstrate how to analyze the details of customer complaint registered at customer care or installation schedule.

7.2 Show how to check about warranty status of appliance and annual maintenance contract.

Module No. 8: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module No. 9: Employability Skills **(60 Hrs)**

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per

requirement

29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

LearningOutcome–AssessmentCriteria

Module	Outcome	AssessmentCriteria
1	Apply safe working practices	1.1 Describe the ways of personal protection in work place. 1.2 Describe the procedure of personal safety and prevention of accident. 1.3 Describe electrical safety precautions to be taken prior to servicing of RAC. 1.3 Demonstrate the use of different bandages and medicines commonly present in a first aid box. 1.4 Demonstrate basic first aid and use them under different circumstances. 1.5 Demonstrate Safety sign for Danger, Warning, caution and personal safety message accurately. 1.6 Identify of different fire extinguishers and to use the same as per requirement. 1.7 Demonstrate precautionary measures in case of leakage of refrigerant. 1.8 Demonstrate the use PPE's during servicing of Refrigerator.
2	Describe fundamental principles and concepts of air conditioning and refrigeration systems, including their components, operation, and applications.	2.1 Define Refrigeration, refrigerating effect, COP, Capacity of Refrigeration. 2.2 Define Air Conditioning, Psychometry, DBT, WBT, RH. 2.3 Describe the importance of Refrigeration and Air

Module No.	Outcome	AssessmentCriteria
		conditioning in domestic, commercial and industrial field. 2.4 Draw Labelled Flow diagram of Vapour Compression Refrigeration Cycle and Vapour Absorption Refrigeration System. 2.5 Describe Different systems of Air Conditioning, such as-Summer Air conditioning system, Winter Air Conditioning system, Year Round Air Conditioning System. 2.6 Identify Different components of Single Door Refrigerator and Double Door refrigerator. 2.7 Identify different components of Window Air Conditioner and Split Air conditioner.
3	Identify and describe the essential tools and equipment used in air conditioning and refrigeration work.	3.1 Describe the Name, specification and use of different hand tools and servicing tools required for RAC. 3.2 Describe Name, specification and use of different electrical and electronic instrument like Voltmeter, Ammeter, Wattmeter, Multi meter, Transistor tester. 3.3 Define current, voltage, resistance, power, energy, Equivalent resistance of series and parallel connection 3.4 Describe working principle of A.C. Motor, Capacitor and condenser. 3.5 Identify different hand tools and servicing tools required for RAC. 3.6 Identify different electrical and electronic instrument like Voltmeter, Ammeter, Wattmeter, Multi meter, Transistor tester. 3.7 Measure current, voltage, resistance, electrical power, electrical energy.
4	Install, diagnose and repair of Refrigerator for Domestic purpose	4.1 Demonstrate the process of Refrigerator installation. 4.2 Describe some Common problems, possible causes and remedy in Refrigerators as listed below: ✓ Fridge Not Cooling ✓ Fridge Not Defrosting ✓ Freezer is Cool, but Fridge Stays Warm ✓ Fridge Leaking Water ✓ Fridge Freezing Food ✓ Light Not Working ✓ The ice maker isn't working 4.3 Perform overhauling oiling and servicing of

Module	Outcome	AssessmentCriteria
		components like Cylinder, Piston, piston Ring, Crankshaft, Cylinder head valve plate assembly, Shaft seal, connecting rod etc. and assemble them. Charging of compressor oil. 4.4 Perform testing for leakage through condenser and repairing the leakage. 4.5 Repair/replace the faulty parts like capillary tube, Automatic & Thermostat Expansion Valve. 4.6 Perform Vacuumizing, Drying. 4.7 Perform Charging of refrigerant. 4.8 Repair copper tube by Cutting, bending and joining, Flaring, Swaging, Silver soldering. 4.9 Perform Servicing of refrigerator cabinet – Checking of door liner and body inside liner, replacement of door liners and door gasket, adjustment of door liners and door gasket.
5	Install, troubleshoot and repair of air conditioner for Domestic purpose	5.1 Demonstrate the process of air conditioner installation. 5.2 Describe some Common problems, possible causes and remedy in Air conditioner as listed below: ✓ Water dripping from the front of a window AC ✓ Compressor cycles between ON and OFF too frequently ✓ Ice formation on window AC ✓ Window AC not starting problem ✓ Window AC with low cooling performance ✓ Compressor switching off too early without cooling. 5.3 Describe common problems in Indoor and outdoor unit of split A.C., possible causes and remedy. 5.4 Classify Refrigerant, - Primary Refrigerant and Secondary Refrigerant, CFC, HFC, HCFC, HC, Azeotropic and Zeotropic blend, Importance of Eco friendly refrigerant. 5.5 Perform routine maintenance of window and split air conditioner. 5.6 Perform servicing of thermal overload protector, motor starting relays and capacitors.
6	Install and repair of washing machine for Domestic purpose	6.1 Demonstrate the process of washing machine installation. 6.2 Use of test equipment and tools such as multi-meter, oscilloscope etc.

Module	Outcome	AssessmentCriteria
		6.3 Demonstrate machine running process and possible symptoms of faults in respective cycles. 6.4 Describe the fundamentals of motors, types of motors and their working methods. 6.5 Some Common problems as listed below in Washing Machine possible causes and remedy ✓ Noise ✓ Water not filling ✓ Water over filling ✓ Water not draining
7	Identify and address the customer needs, providing timely and personalized solutions	7.1 Develop the ability to actively listen and comprehend customer inquiries. 7.2 Demonstrate the importance of interacting with customers. 7.2 Analyze complex customer issues and identify root causes. 7.3 Develop time management effectively during customer interactions. 7.4 Explain the need to suggest possible solutions.
8	OJT	Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.)**
9	Employability Skills	As per NCVET guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees:

Sl no.	Name of the Tool & Equipment	Specification	Category	Recommended Quantity
1	Line tester	500 v heavy duty	Common Equipment	5
2	File flat rough double cut	200 mm	AC & Refrigerator	5
3	File, half round, fine double cut	length 150 mm	AC & Refrigerator	5
4	File, round, fine double cut	length 150 mm	AC & Refrigerator	5
5	Hammer ball pane	220 gms	Common Equipment	5

Sl no.	Name of the Tool & Equipment	Specification	Category	Recommended Quantity
6	Tape measuring	10 m graduation in mm	AC & Refrigerator	5
7	Pliers combination insulated	length 200 mm	Common Equipment	5
8	Pliers long nose	200 mm	Common Equipment	5
9	Hack saw tubular metal frame adjustable	300 mm	AC & Refrigerator	5
10	Wooden mallet /Nylon mallet	500 gm good finish	AC & Refrigerator	5
11	Screw driver, plastic handle	6 mm TIP length 100 mm to 150mm	Common Equipment	6
12	Screw driver, plastic handle, Flat tip	10 mm TIP length 200 mm & 250 mm	Common Equipment	6
13	Knife folded stainless steel -	150 mm	Common Equipment	5
14	Pipe cutter miniature for copper pipe	3 mm to 16 mm DIA	AC & Refrigerator	5
15	Multi meter digital type		Common Equipment	5
16	Philips screw driver -	Complete set in leather case	Common Equipment	5
17	Screw driver, plastic handle, Flat tip	handle 3mm TIP length 100 mm to 150 mm insulated	Common Equipment	5
18	Ring spanner	6 -32 mm	Common Equipment	5
19	Spanner double ended	4.7 mm to 16 mm	Common Equipment	5
20	Pipe /Tube bender lever type	3-16 mm	AC & Refrigerator	1
21	Pressure gauge Digital type	diameter 63 mm with recalibration set	AC & Refrigerator	5
22	Adhesive		AC & Refrigerator	5
23	Electrical drill portable drill with chuck and key	capacity 6.4mm	AC	5
24	Flaring tool set, single type for tube	4.7 mm to 16 mm O.D	AC & Refrigerator	5

Sl no.	Name of the Tool & Equipment	Specification	Category	Recommended Quantity
25	Swaging tool, punch type, set of size for tube.	4.7 mm to 16 mm O.D	AC & Refrigerator	5
26	Pinch of tool, for copper tube	6 mm to 18 mm DIA	AC & Refrigerator	5
27	Wrench adjustable	length 150 mm	Common Equipment	5
28	Wrench adjustable	length 200 mm	Common Equipment	5
29	Spirit level precision metallic	200 mm	AC	2
30	Refrigerant cylinder	2.5 Kg	AC & Refrigerator	3
31	Megger	1000 v	Common Equipment	1
32	Gas leak detector for halogen gas		AC & Refrigerator	1
33	Digital thermometer	Graduated disc analogy type	AC & Refrigerator	1
34	Two stage rotary vacuum pump, 3or 4 CFM.	Capacity approx. 60 - 10 rmp capable of evacuating to 50 microns of Hg and fitted with gas ballast, anti-such valve and single phase motor.	AC & Refrigerator	1
35	Window Air Conditioner		AC	2
36	Split Air Conditioner		AC	2
37	Semi-Automatic Washing Machine		Washing Machine	1
38	Double Door Refrigerator		Refrigerator	1

Sl no.	Name of the Tool & Equipment	Specification	Category	Recommended Quantity
39	Brazing Rod		AC & Refrigerator	2
40	Automatic Washing Machine		Washing Machine	1
41	Fire extinguisher	ABC dry powder type2 kg capacity	Common Equipment	2
42	Ratchet spanner	6.4 sq.mm reversible	Common Equipment	2
43	Valve key handle	4.7 mm & 6.4 mm sq.	AC & Refrigerator	5
44	L-Allen key	set size 1.5 mm to 6.4 mm	AC	5
45	T-Allen key set	size 5/32" to 1/8"	Common Equipment	2
46	Pipe cutter with built in reamer and space cutter, for copper tube	3 mm to 32 mm	AC & Refrigerator	5
47	Hand blower portable complete	1/10 HP	AC & Refrigerator	2
48	Cylinder 134 a	5 kg	Refrigerator	1
49	Tachometer digital, multi range	0 r m p to 3000 r m p. Portablesmall size in leather case	AC	1
50	Compressors testers for small hermetic compressors	Fixed with electrical input/ output indicating facilities	AC & Refrigerator	2
51	Grinding Machine	200 mm,3000 rpm,Double ended ½ HP	AC	1

Sl no.	Name of the Tool & Equipment	Specification	Category	Recommended Quantity
52	Evacuating and refrigerant charging station, consist of a) Rotary two stage vacuum pump and motor (with gas ballast and anti-such back) b) manifold with gauges and valves and capable of pulling vacuum up to 50 microns of Hg and with provision of connecting to a microns level vacuum gauge b) Graduated charging cylinder with provision for temperature correction and all necessary isolating valves	(CAP. 2 kg. In lieu of (b)above and with accuracy of + / - g for charging hydrocarbons)	AC & Refrigerator	1
53	Evacuating and charging station as above but fitted with weighing scale		AC & Refrigerator	1
54	Dry N2 cylinder	2 stage regulator or commercial N^2 in cylinder with drier unit and 2 stage regulator & meter cube	AC & Refrigerator	1
55	Single door direct cool refrigerator, carrying with HFC and HC.	190 L	Refrigerator	1
56	Weighing Scale		AC & Refrigerator	1
57	Oil can	500 ml	Common Equipment	5
58	Fire buckets	10 Litre	Common Equipment	3
59	Ring spanner off set	4.7 mm to 16 mm	Common Equipment	5
60	Spanner double ended	19 mm to 31.8 mm	Common Equipment	5
61	Puller 3 legged with flexible arm	300 mm	Washing Machine	1
62	Tap set with matching drills	3 mm to 16 mm	AC	3

Sl no.	Name of the Tool & Equipment	Specification	Category	Recommended Quantity
63	Tap set with matching drills	V to 5/8"	AC	3
64	Piercing Valve	¼ Inch	AC	2
65	Stop watch		AC & Refrigerator	2
66	Instrumentation screw driver set	100 mm	Common Equipment	5
67	Capacitor start induction motor	1 HP, 230 V	Washing Machine & AC	1
68	Portable air - LPG brazing kit	2 kg. LPG cylinder, torches, houses,stand make	AC & Refrigerator	1
69	Core drill machine.		AC	1

Marks distribution

Outcome	Outcome code	Total Th marks	Total Pr Marks
Apply safe working practices	ELE/1010/OC1	20	80
Describe fundamental principles and concepts of air conditioning and refrigeration systems, including their components, operation, and applications.	ELE/1010/OC2	30	100
Identify and describe the essential tools and equipment used in air conditioning and refrigeration work.	ELE/1010/OC3	20	100
Install, diagnose and repair of Refrigerator for Domestic purpose	ELE/1010/OC4	30	100
Install, troubleshoot, repair and periodic maintenance of air conditioner for Domestic purpose	ELE/1010/OC5	10	110
Install and repair of washing machine for Domestic purpose	ELE/1010/OC6	20	100
Identify and address the customer needs, providing timely and personalized solutions	ELE/1010/OC7	20	60
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	ELE/1010/OC8	0	150
Employability Skill-60 Hrs	DGT/VSQ/N0102	50	0