



QUALIFICATION FILE

< Reliability & Quality Control Manager >

Short Term Training (STT) Long Term Training (LTT) Apprenticeship
 Upskilling Dual/Flexi Qualification For ToT For ToA

General Multi-skill (MS) Cross Sectoral (CS) Future Skills OEM

NCrF/NSQF Level: 6

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Section 1: Basic Details

1.	Qualification Name	Reliability & Quality Control Manager																
2.	Sector/s	Telecom																
3.	Type of Qualification: <input checked="" type="checkbox"/> New <input type="checkbox"/> Revised <input type="checkbox"/> Has Electives/Options <input type="checkbox"/> OEM	NQR Code & version of existing/previous qualification: <i>(change to previous, once approved)</i>	Qualification Name of existing/previous version:															
4.	a. OEM Name b. Qualification Name <i>(Wherever applicable)</i>	NA																
5.	National Qualification Register (NQR) Code &Version <i>(Will be issued after NSQC approval)</i>	QG-06-TL-02958-2024-V1-TSSC	6. NCrF/NSQF Level: 6															
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) <i>(Wherever applicable specify multiple entry/exits also & provide details in annexure)</i>	Certificate																
8.	Brief Description of the Qualification	<p>The individual for this job role is responsible to evaluate semiconductor products to ensure long-term reliability and consistent quality. The individual is also responsible to conduct stress tests, analyzes failure points, and implements quality control measures. In addition, he also work closely with design and manufacturing teams to recommend improvements that enhance product robustness and reduce defects.</p>																
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 10%;">S. No.</th> <th style="width: 60%;">Academic/Skill Qualification (with Specialization - if applicable)</th> <th style="width: 30%;">Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.</td> <td>Completed 4 years UG (Electronics/Telecom/IT)</td> <td>1 years of relevant experience</td> </tr> <tr> <td style="text-align: center;">2.</td> <td>Completed 2nd year of diploma (after 12th)</td> <td>4 years of relevant experience</td> </tr> <tr> <td style="text-align: center;">3.</td> <td>Previous relevant Qualification of NSQF Level 5.5</td> <td>1.5 years of relevant experience</td> </tr> <tr> <td style="text-align: center;">4.</td> <td>Previous relevant Qualification of NSQF Level 5</td> <td>3 years of relevant experience</td> </tr> </tbody> </table> <p>b. Age: 18 years</p>		S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1.	Completed 4 years UG (Electronics/Telecom/IT)	1 years of relevant experience	2.	Completed 2nd year of diploma (after 12th)	4 years of relevant experience	3.	Previous relevant Qualification of NSQF Level 5.5	1.5 years of relevant experience	4.	Previous relevant Qualification of NSQF Level 5	3 years of relevant experience
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)																
1.	Completed 4 years UG (Electronics/Telecom/IT)	1 years of relevant experience																
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3.	Previous relevant Qualification of NSQF Level 5.5	1.5 years of relevant experience																
4.	Previous relevant Qualification of NSQF Level 5	3 years of relevant experience																

10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	22	11. Common Cost Norm Category (I/II/III) (wherever applicable): I																				
12.	Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	N.A.																					
13.	Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)	<input checked="" type="checkbox"/> Offline <input type="checkbox"/> Online <input type="checkbox"/> Blended <table border="1" data-bbox="954 352 2051 564"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>270</td> <td>210</td> <td>180</td> <td>-</td> <td>660</td> </tr> <tr> <td>Online</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>(Refer Blended Learning Annexure for details)</p>				Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	270	210	180	-	660	Online					
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																		
Classroom (offline)	270	210	180	-	660																		
Online																							
14.	Aligned to NCO/ISCO Code/s (if no code is available mention the same)	NCO-2015/3522.9900																					
15.	Progression path after attaining the qualification (Please show Professional and Academic progression)	Lead Manager-Packaging (Level-6.5)																					
16.	Other Indian languages in which the Qualification & Model Curriculum are being submitted	Hindi																					
17.	Is similar Qualification(s) available on NQR-if yes, justification for this qualification	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No URLs of similar Qualifications:																					
18.	Is the Job Role Amenable to Persons with Disability	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If "Yes", specify applicable type of Disability:																					
19.	How Participation of Women will be Encouraged	Yes, The Reliability & Quality Control Manager role is well-suited for women workers due to the emphasis on: <ul style="list-style-type: none"> • Dexterity and Attention to Detail: This role requires careful handling of delicate wafers and meticulous attention to detail during inspection and testing procedures. Women are often recognized for possessing strong dexterity and a keen eye for detail, making them well-qualified for this aspect of the job. • Analytic and Problem-Solving Skills: The ability to analyze test data, identify potential issues, and follow established procedures to troubleshoot problems is crucial. Women excel in these areas, bringing valuable analytical and problem-solving skills to the role. • Communication and Teamwork: Effective communication and collaboration with engineers and other technicians are essential for success. Women are known for their strong communication skills and collaborative work style, making them valuable team players in this environment. 																					

		<ul style="list-style-type: none"> Cleanliness and Organization: Maintaining a clean and organized work environment is critical for preventing contamination and ensuring accurate test results. Women often excel in maintaining a clean and organized workspace.
20.	Are Greening/ Environment Sustainability Aspects Covered <i>(Specify the NOS/Module which covers it)</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No DGT/VSQ/N0103
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Colleges <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
22.	Name and Contact Details of Submitting / Awarding Body SPOC <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Pankaj Bajaj Email: standards@tsscindia.com Contact No.: 0124-4375891 Website: www.tsscindia.com
23.	Final Approval Date by NSQC: 27.08.2024	24. Validity Duration: 3 year 25. Next Review Date: 27.08.2027

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

Th.-Theory Pr.-Practical OJT-On the Job Man.-Mandatory Training Rec.-Recommended Proj.-Project

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.	Prepare and Assemble Telecom Equipment PCBs	TEL/N7219	Core	6	6	60	60	60	-	180	30	60	-	10	100	20
2.	Conduct and Analyze Stress Tests for Telecom Equipment Reliability	TEL/N7220	Core	6	7	60	90	60	-	210	40	50	-	10	100	25
3.	Implement and Monitor Quality Control	TEL/N7221	Core	6	3	30	30	30	-	90	30	60	-	10	100	25
4.	Analyze Failures and Recommend Improvements	TEL/N7222	Core	6	3	30	30	30	-	90	30	60	-	10	100	20
5.	Employability Skills	DGT/VSQ/N0103	Non-core	6	3	90	00	00	-	90	20	30	-	-	90	10
Duration (in Hours) / Total Marks					22	270	210	180	-	660	150	260	-	40	450	

Elective NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
Duration (in Hours) / Total Marks																

Optional NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/Non-Core	NCrF/NS QF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:

Minimum Pass Percentage – Aggregate at qualification level: 70% (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)

Minimum Pass Percentage – NOS/Module-wise: ___% (Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)

Section 3: Training Related

1.	Trainer’s Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	3 years in Engineering Diploma in (Electronics/Telecom/IT) after 10th with 11 years industrial relevant experience and 8 years of teaching experience OR Graduate (Electrical/Electronics) with 6 years of industry relevant experience and 4 years of teaching experience
2.	Master Trainer’s Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma (Science/Electronics) with 12 years of industrial relevant experience. OR Graduate (Science/Electronics) with 10 years of industry relevant experience.
3.	Tools and Equipment Required for Training	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If “Yes”, details to be provided in Annexure)

4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA
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Section 4: Assessment Related

1.	Assessor’s Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	3 years in Engineering Diploma in (Electronics/Telecom/IT) after 10th with 11 years industrial relevant experience OR Graduate (Electronics/Telecom/IT) with 6 years of industry relevant experience
2.	Proctor’s Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	3 years in Engineering Diploma in (Electronics/Telecom/IT) after 10th with 11 years industrial relevant experience OR Graduate (Electronics/Telecom/IT) with 6 years of industry relevant experience
3.	Lead Assessor’s/Proctor’s Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma (Science/Electronics) with 12 years of industrial relevant experience. OR Graduate (Science/Electronics) with 10 years of industry relevant experience.
4.	Assessment Mode (Specify the assessment mode)	Offline or Blended
5.	Tools and Equipment Required for Assessment	<input checked="" type="checkbox"/> Same as for training <input type="checkbox"/> Yes <input type="checkbox"/> No (details to be provided in Annexure-if it is different for Assessment)

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): Yes
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 5
5.	Estimated nos. of persons to be trained and employed: 35000
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: If “No”, why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	Annexure: NCrF/NSQF level justification based on NCrF level/NSQF descriptors <i>(Mandatory)</i>	Yes
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	Yes
3.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	Yes
4.	Annexure: Assessment Strategy <i>(Mandatory)</i>	Yes
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is “Blended Learning”)</i>	Yes
6.	Annexure: Multiple Entry-Exit Details <i>(Mandatory, in case qualification has multiple Entry-Exit)</i>	Yes
7.	Annexure: Acronym and Glossary <i>(Optional)</i>	Yes
8.	Supporting Document: Model Curriculum <i>(Mandatory – Public view)</i>	Yes
9.	Supporting Document: Career Progression <i>(Mandatory - Public view)</i>	Yes
10.	Supporting Document: Occupational Map <i>(Mandatory)</i>	Yes
11.	Supporting Document: Assessment SOP <i>(Mandatory)</i>	Yes
12.	Any other document you wish to submit:	No

Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
<p>Professional Theoretical Knowledge/Process</p>	<p>The role of a Reliability & Quality Control Manager requires in-depth knowledge of both the theoretical principles and practical application of assembly processes in the telecommunications equipment industry. This involves:</p> <ul style="list-style-type: none"> • Expertise in examining work instructions, identifying materials and tools, and ensuring that test equipment is properly calibrated. • Capability to create stress test profiles, choose suitable equipment, and carry out stress tests to evaluate the durability of equipment under simulated conditions. • Understanding customer requirements, industry standards (such as IPC standards), and establishing robust quality control procedures. • Proficiency in performing root cause analysis using tools like FMEA and FTA to effectively identify and address failure modes. 	<p>The job role necessitates a high level of theoretical understanding in assembly procedures, reliability engineering, quality control practices, and theories related to failure analysis. Assembly Process Engineer – Reliability, Quality & Failure Analysis at this stage must utilize intricate analytical models such as FMEA and statistical process control to guarantee the integrity and dependability of the product.</p> <p>Hence, this role aligns with NSQF Level 6.</p>	<p style="text-align: center;">6</p>
<p>Professional and Technical Skills/ Expertise/ Professional Knowledge</p>	<p>The job role requires specialized capabilities to ensure the reliability, quality, and failure analysis of telecom equipment:</p> <ul style="list-style-type: none"> • Proficient in PCB assembly, soldering (wave soldering, hand soldering), and detailed scrutiny for identifying and rectifying flaws. • Specialized in creating stress test profiles, setting up testing tools, and interpreting test results to improve product dependability. • Capable of establishing inspection checkpoints, outlining acceptance standards, and executing corrective measures, backed by statistical process control (SPC). • Adept at conducting comprehensive failure analysis, pinpointing underlying reasons, suggesting corrective measures, and assessing their practicality and consequences. 	<p>Reliability & Quality Control Manager demonstrates skill in overseeing assembly operations, performing thorough quality evaluations, and carrying out in-depth failure analyses. The individual in this job role has proficiency in utilizing advanced instruments like X-ray inspection and stress testing gear to accurately diagnose and tackle technical difficulties.</p> <p>Hence, this role aligns with NSQF Level 6.</p>	<p style="text-align: center;">6</p>

<p>Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill</p>	<p>In the job role of Reliability & Quality Control Manager, the individual must exhibit the following:</p> <ul style="list-style-type: none"> • Proficiency in breaking down intricate issues during failure analysis and stress testing, utilizing logical reasoning and insights driven by data. • Thorough attention to detail in quality control and assembly processes to guarantee compliance with standards and specifications. • Strong communication skills for collaborating with teams (design, manufacturing) and communicating technical findings and improvement strategies effectively. • Adaptability to modify testing methodologies and procedures in accordance with changing industry standards and technological advancements. 	<p>The job role of Reliability & Quality Control Manager requires the individual to be a proactive thinker, who excels at solving problems and comes up with new ideas in the areas of assembly and quality. The individual in this job role demonstrates leadership by driving efforts to constantly improve and by encouraging collaborations across different functions to improve product reliability.</p> <p>Hence, this role aligns with NSQF Level 6.</p>	<p>6</p>
<p>Broad Learning Outcomes/Core Skill</p>	<ul style="list-style-type: none"> • The core skills developed in this role encompass: • Extensive expertise and practical familiarity with the assembly, testing, and validation of telecommunications equipment. • Proficiency in creating and executing quality assurance protocols to adhere to strict industry standards. • Capability to methodically analyze malfunctions, suggest impactful remedies, and improve product dependability. • Aptitude in documenting discoveries, delivering technical data proficiently, and participating in ongoing enhancement efforts. 	<p>The job role highlights the need for critical thinking, strategic decision-making, and accurate documentation skills to oversee intricate assembly processes and effectively reduce quality risks. The individuals in this job role also develop resilience and adaptability in ever-changing manufacturing environments.</p> <p>Hence, this role aligns with NSQF Level 6.</p>	<p>6</p>
<p>Responsibility</p>	<ul style="list-style-type: none"> • The Reliability & Quality Control Manager holds significant responsibilities: • Assuring that telecom equipment meets rigorous testing and failure analysis criteria for high reliability and quality. • Ensuring meticulous execution of all processes, from assembly to quality control, in adherence to industry regulations and standards. • Implementing improvements in assembly processes and product reliability based on data- 	<p>The Reliability & Quality Control Manager assumes significant responsibility for ensuring the reliability and quality of telecom equipment through meticulous process oversight, failure analysis, and proactive quality control measures. The individual in this job role leads initiatives to implement corrective actions based on thorough root cause analyses, driving continual improvements in product performance and customer satisfaction.</p> <p>Hence, this role aligns with NSQF Level 6.</p>	<p>6</p>

	<p>driven insights from failure analysis and quality audits.</p> <ul style="list-style-type: none"> Working with diverse teams to put into effect corrective actions and preventive measures that improve overall product performance and customer satisfaction. 		
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Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30 Candidate

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Soldering iron (or soldering station)		10
2	Solder		10
3	Solder paste (if applicable)		10
4	Stencil (if using solder paste)		10
5	Tweezers		30
6	Component cutters		10
7	Magnifying glass		10
8	Multimeter (or other test equipment)		10
9	ESD workstation (or grounding equipment)		10
10	Cleaning tools (e.g., flux cleaner, isopropyl alcohol)		10
11	Workbench with proper lighting		10
12	Data acquisition software		5
13	Statistical analysis software (e.g., Weibull analysis tools)		5
14	Stress test simulation software		5
15	Telecom equipment samples		10
16	Environmental stress chambers		2
17	Vibration test equipment		2
18	Electrical stress testers		5
19	Data logging equipment		5
20	Test fixtures and adapters		5
21	Reference materials		30
22	Personal protective equipment (PPE)		30

23	Component placement tools		10
24	Torque wrenches		10
25	Inspection gauges (various types)		10
26	Microscopes		5
27	Hand tools (e.g., screwdrivers, pliers)		10
28	Calipers		10
29	X-ray machines		1
30	Specialized software for specific analysis techniques		5
31	Computers with data analysis and report writing software		10
32	Presentation software		5

Classroom Aids

The aids required to conduct sessions in the classroom are:

- 1.
- 2.

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
23-24	300	3500	1000	700	00	00
24-25	300	5000	3000	1500	00	00
25-26	400	8000	4000	2500	00	00

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented: NA

- 1.
- 2.

Content availability for previous versions of qualifications: NA

Participant Handbook Facilitator Guide Digital Content Qualification Handbook Any Other:

Languages in which Content is available: NA

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools: NA

Refer NCVET “Guidelines for Blended Learning for Vocational Education, Training & Skilling” available on:

<https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf>

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	<input type="checkbox"/> Theory/ Lectures - Imparting theoretical and conceptual knowledge		
2	<input type="checkbox"/> Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners		
3	<input type="checkbox"/> Showing Practical Demonstrations to the learners		
4	<input type="checkbox"/> Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	<input type="checkbox"/> Tutorials/ Assignments/ Drill/ Practice		
6	<input type="checkbox"/> Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	<input type="checkbox"/> On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
TEL/N7219: Prepare and Assemble Telecom Equipment PCBs	<i>Prepare & Assemble PCBs</i>	18	30	-	5
	PC1. review work instructions and process documentation for the specific assembly operation	2	2	-	-
	PC2. identify required materials, components, and tools	2	3	-	1
	PC3. verify the functionality and calibration of test equipment	2	3	-	-
	PC4. prepare the workstation for assembly, ensuring a clean and organized environment	1	2	-	-

PC5. pre-heat soldering equipment to the appropriate temperature (if applicable)	1	2	-	-
PC6. retrieve components, verifying their part numbers and specifications against the bill of materials (BOM)	1	2	-	-
PC7. apply solder paste to designated pads on the PCB using a stencil or dispenser (if applicable)	1	2	-	-
PC8. place electronic components onto the PCB accurately and according to the assembly drawing	2	3	-	1
PC9. soldering components using appropriate techniques (e.g., wave soldering, hand soldering)	2	3	-	1
PC10. clean any soldering flux residue from the PCB	1	2	-	-
PC11. visually inspect assembled PCBs for defects such as missing components, misaligned components, or poor soldering joints	1	2	-	1
PC12. perform any required rework procedures to rectify identified defects	2	4	-	1
<i>Inspect, Test, and Document PCBs</i>	<i>12</i>	<i>30</i>	<i>-</i>	<i>5</i>
PC13. retrieve components, verifying their part numbers and specifications against the bill of materials (BOM)	1	3	-	1
PC14. apply solder paste to designated pads on the PCB using a stencil or dispenser (if applicable)	1	3	-	-
PC15. place electronic components onto the PCB accurately and according to the assembly drawing	1	5	-	1
PC16. soldering components using appropriate techniques (e.g., wave soldering, hand soldering)	3	5	-	1
PC17. clean any soldering flux residue from the PCB	2	3	-	-
PC18. visually inspect assembled PCBs for defects such as missing components, misaligned components, or poor soldering joints	1	3	-	1

	PC19. record assembly activities in accordance with company procedures (e.g., completing assembly logs, updating production control systems)	1	3	-	-
	PC20. maintain accurate records of materials used, test results, and any non-conformances encountered	1	3	-	1
	PC21. file completed documentation according to established filing systems	1	2	-	-
	Total Marks	30	60	-	10
	<i>Design and Prepare for Stress Testing</i>	<i>12</i>	<i>16</i>	<i>-</i>	<i>5</i>
TEL/N7220: Conduct and Analyze Stress Tests for Telecom Equipment Reliability	PC1. review product specifications and identify critical performance parameters (e.g., power consumption, signal integrity, data throughput)	2	2	-	1
	PC2. research industry standards and regulations relevant to telecom equipment reliability testing (e.g., Telcordia GR series)	1	1	-	-
	PC3. analyze typical environmental and operational conditions for targeted telecom applications (e.g., temperature range, humidity levels, vibration profiles)	1	1	-	-
	PC4. design stress test profiles that simulate combinations of these conditions, exceeding expected operational limits to induce failures	2	2	-	2
	PC5. select appropriate stress test equipment based on the designed profiles (e.g., temperature chambers, vibration tables, electrical stress testers)	1	2	-	-
	PC6. configure the chosen test equipment according to the specific stress test profile requirements	2	3	-	1
	PC7. prepare test fixtures and adapters to securely hold and interface with telecom equipment samples during testing	2	3	-	-
	PC8. develop data acquisition plans for capturing and recording relevant test parameters throughout the stress test process	1	2	-	1

<i>Conduct and Monitor Stress Tests</i>	13	16	-	1
PC9. calibrate and verify the functionality of stress test equipment before use	2	2	-	1
PC10. prepare and pre-condition telecom equipment samples for stress testing according to established procedures	2	2	-	-
PC11. integrate the telecom equipment samples into the designed test setup using prepared fixtures and adapters	2	2	-	-
PC12. initiate and execute stress tests following defined protocols and safety guidelines	1	2	-	-
PC13. review test outcomes and other related factors in the appropriate forms or electronic documentation tools	1	1	-	-
PC14. ensure data accuracy and completeness as per established procedures	2	2	-	-
PC15. identify passing and failing wafers based on defined criteria	1	2	-	-
PC16. mark any irregularities or concerns that would need more research	2	2	-	-
PC17. store the test data either in electronic or hard copy format depending on the company policy	-	1	-	-
<i>Analyze Failure Data and Recommend Improvements</i>	15	18	-	4
PC18. compile and organize failure data from completed stress tests (e.g., time-to-failure, failure modes, operating conditions at failure)	2	2	-	1
PC19. apply statistical techniques (e.g., Weibull analysis, Pareto charts) to analyze failure data and identify trends or patterns in failure occurrences	2	2	-	-

	PC20. perform root cause analysis to determine the underlying reasons for equipment failures, considering design weaknesses, material deficiencies, or manufacturing defects	2	3	-	1
	PC21. utilize various tools and techniques (e.g., FMEA, FTA) to identify potential failure mechanisms that could be triggered under different stress conditions	2	2	-	-
	PC22. based on the root cause analysis, propose corrective actions to address identified weaknesses and prevent similar failures in future product revisions	2	3	-	-
	PC23. evaluate the feasibility and cost-effectiveness of potential corrective actions considering design changes, material selection, or manufacturing process modifications	1	2	-	-
	PC24. recommend preventive actions to be implemented in the design or manufacturing process to minimize future failures (e.g., derating components, adding thermal management features)	1	1	-	2
	PC25. document recommendations for corrective and preventive actions in a clear and concise report with supporting data and analysis results	1	1	-	-
	PC26. collaborate with design and manufacturing teams to present findings and discuss the implementation of agreed-upon corrective and preventive actions to enhance product reliability	1	2	-	-
	Total Marks	40	50	-	10
	<i>Develop, Implement, and Manage Quality Control Systems</i>	<i>18</i>	<i>30</i>	<i>-</i>	<i>5</i>
TEL/N7221: Implement and Monitor Quality Control	PC1. analyze customer specifications to identify quality requirements for assembled telecom equipment (e.g., functionality, performance, materials)	1	2	-	1
	PC2. research and identify relevant industry standards for telecom equipment quality control (e.g., IPC standards for soldering)	1	2	-	-

PC3. develop inspection points throughout the assembly process that focus on critical quality characteristics of the equipment	1	2	-	-
PC4. define clear acceptance criteria for each inspection point, specifying the acceptable range for parameters like component placement or soldering quality	1	2	-	1
PC5. establish corrective action procedures for identified non-conformances, outlining steps to resolve issues and prevent recurrence	1	2	-	-
PC6. select appropriate quality control tools and techniques based on the assembly process and identified risks (e.g., checklists for visual inspections, control charts for monitoring process parameters)	1	2	-	-
PC7. develop clear and concise documentation of the chosen quality control procedures, ensuring easy understanding and consistent application	1	2	-	-
PC8. train assembly personnel on the established quality control plans, procedures, and associated tools	1	2	-	-
PC9. conduct periodic refresher training to ensure ongoing knowledge and proper implementation of quality control procedures	2	3	-	1
PC10. identify critical process parameters for each stage of the telecom equipment assembly process (e.g., soldering temperature, component placement accuracy, torque applied to fasteners)	2	2	-	1
PC11. develop data collection plans that specify the frequency and method of collecting data for these critical process parameters	1	2	-	-
PC12. implement data collection procedures, ensuring accurate and reliable data gathering throughout production	1	2	-	-

PC13. utilize statistical process control (SPC) techniques to analyze collected data (e.g., control charts, histograms) and identify any trends or deviations from established control limits	1	2	-	-
PC14. analyze the root cause of identified process variations and implement corrective actions to bring the process back within control limits	2	2	-	1
PC15. maintain control charts and document any corrective actions taken to address process variations	1	1	-	-
<i>Conduct Audits, Analyze Data, and Report for Improvement</i>	<i>12</i>	<i>30</i>	<i>-</i>	<i>5</i>
PC16. develop and schedule internal quality audits of the telecom equipment assembly process based on a risk assessment, prioritizing areas with higher potential for quality issues	1	3	-	-
PC17. conduct audits according to defined procedures, verifying adherence to established quality control plans and identifying any deviations or non-conformances	1	4	-	1
PC18. perform regular inspections of assembly workstations, equipment, and materials to proactively identify potential quality problems before they occur	1	3	-	-
PC19. document audit and inspection findings, including detailed descriptions of any non-conformances observed	2	4	-	1
PC20. analyze audit and inspection data to identify recurring issues and opportunities for improvement in the quality control system	2	3	-	-
PC21. collect and consolidate quality data from various sources (e.g., inspection records, SPC charts, customer feedback, warranty claims)	1	3	-	-
PC22. analyze trends and patterns in quality data to identify areas for improvement in the assembly process or product design	1	2	-	1
PC23. utilize data visualization techniques (e.g., Pareto charts) to effectively communicate key quality metrics and improvement opportunities	1	3	-	-

	PC24. prepare comprehensive quality reports that summarize key metrics, trends, corrective actions implemented, and recommendations for further improvement	1	2	-	1
	PC25. communicate quality data and findings to relevant personnel (e.g., production supervisors, management, design teams) to facilitate informed decision-making	1	3	-	1
	Total Marks	30	60	-	10
	<i>Perform Failure Analysis and Identify Root Cause</i>	<i>18</i>	<i>34</i>	<i>-</i>	<i>5</i>
TEL/N7222: Analyze Failures and Recommend Improvements	PC1. receive and document failed telecom equipment samples	2	4	-	1
	PC2. conduct visual inspections to identify potential physical defects or anomalies (e.g., burn marks, damaged components)	2	4	-	1
	PC3. utilize X-ray analysis or other non-destructive testing techniques to examine internal structures for hidden defects	3	5	-	1
	PC4. perform electrical testing to assess functionality and identify electrical faults or abnormal parameters	2	6	-	1
	PC5. analyze collected data from various tests to identify the most likely failure mode (e.g., short circuit, overheating)	3	4	-	1
	PC6. employ root cause analysis techniques (e.g., FMEA, FTA) to determine the underlying reasons for the failure mode	3	5	-	-
	PC7. consider factors such as design weaknesses, material deficiencies, or manufacturing process variations during root cause analysis	3	6	-	-
	<i>Recommend Improvements and Communicate Findings</i>	<i>12</i>	<i>26</i>	<i>-</i>	<i>5</i>
	PC8. propose corrective actions to address the identified failure mechanism and prevent similar failures in future product revisions based on the root cause analysis	1	2	-	-
	PC9. evaluate the feasibility and cost-effectiveness of potential corrective actions (e.g., design changes, material selection, process modifications)	2	4	-	1

	PC10. recommend preventive actions to be implemented in the design or manufacturing process to minimize future failures (e.g., adding redundancy, derating components)	1	3	-	-
	PC11. develop a clear and concise report documenting the failure analysis process, findings, root cause, and recommended corrective and preventive actions	2	3	-	1
	PC12. collaborate with design and manufacturing teams to present findings and discuss the implementation of agreed-upon corrective and preventive actions	1	2	-	-
	PC13. develop clear and concise reports or presentations summarizing failure analysis findings, root causes, and recommended corrective/preventive actions	1	2	-	1
	PC14. effectively present failure analysis results to relevant personnel (e.g., design engineers, production supervisors, quality control personnel)	1	3	-	1
	PC15. actively participate in discussions and collaborate with other teams (design, manufacturing) to develop and implement agreed-upon corrective and preventive actions based on the analysis.	1	2	-	-
	PC16. communicate technical information related to failures and improvement opportunities in a way that is understandable to a diverse audience	1	3	-	-
	PC17. document communication activities and progress made towards implementing corrective and preventive actions	1	2	-	1
	Total Marks	30	60	-	10
	<i>Introduction to Employability Skills</i>	<i>1</i>	<i>1</i>	<i>-</i>	<i>-</i>
DGT/VSQ/N0103: Employability Skills	PC1. understand the significance of employability skills in meeting the current job market requirement and future of work	-	-	-	-
	PC2. identify and explore learning and employability relevant portals	-	-	-	-
	PC3. research about the different industries, job market trends, latest skills required and the available opportunities				

	<i>Constitutional values - Citizenship</i>	1	1	-	-
	PC4. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
	PC5. follow environmentally sustainable practices	-	-	-	-
	<i>Becoming a Professional in the 21st Century</i>	2	4	-	-
	PC6. recognize the significance of 21st Century Skills for employment	-	-	-	-
	PC7. practice the 21st Century Skills such as Self- Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
	PC8. adopt a continuous learning mindset for personal and professional development	-	-	-	-
	<i>Basic English Skills</i>	3	4	-	-
	PC9. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
	PC10. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
	PC11. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
	<i>Career Development & Goal Setting</i>	1	2	-	-
	PC12. identify career goals based on the skills, interests, knowledge, and personal attributes	-	-	-	-
	PC13. prepare a career development plan with short- and long-term goals	-	-	-	-
	<i>Communication Skills</i>	2	2	-	-
	PC14. follow verbal and non-verbal communication etiquette while communicating in professional and public settings	-	-	-	-
	PC15. use active listening techniques for effective communication	-	-	-	-
	PC16. communicate in writing using appropriate style and format based on formal or informal requirements	-	-	-	-
	PC17. work collaboratively with others in a team	-	-	-	-
	<i>Diversity & Inclusion</i>	1	1	-	-

PC18. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC19. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	2	3	-	-
PC20. identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc.	-	-	-	-
PC21. carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook	-	-	-	-
PC22. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC23. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	5	-	-
PC24. operate digital devices and use their features and applications securely and safely	-	-	-	-
PC25. carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc.	-	-	-	-
PC26. display responsible online behaviour while using various social media platforms	-	-	-	-
PC27. create a personal email account, send and process received messages as per requirement	-	-	-	-
PC28. carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications	-	-	-	-
PC29. utilize virtual collaboration tools to work effectively	-	-	-	-
<i>Entrepreneurship</i>	2	3	-	-
PC30. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-

PC31. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC32. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	<i>1</i>	<i>2</i>	-	-
PC33. identify different types of customers and ways to communicate with them	-	-	-	-
PC34. identify and respond to customer requests and needs in a professional manner	-	-	-	-
PC35. use appropriate tools to collect customer feedback	-	-	-	-
PC36. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	<i>2</i>	<i>3</i>	-	-
PC37. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC38. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC39. apply to identified job openings using offline/online methods as per requirement	-	-	-	-
PC40. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC41. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
Total Marks	20	30	-	-
Grand Total	120	200	-	30

Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email.
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC.
- The assessment agency deploys the ToA certified Assessor for executing the assessment.
- SSC monitors the assessment process & records.

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP.
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- If the batch size is more than 30, then there should be 1 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME).
- Question papers created by the SME verified by the other subject Matter Experts.
- Questions are mapped with NOS and PC.
- Question papers are prepared considering that level 1 to 3 is for the unskilled & semi- skilled individuals, and level 4 and above are for the skilled, supervisor & higher management.
- An assessor must be ToA certified & the trainer must be ToT Certified.
- The assessment agency must follow the assessment guidelines to conduct the assessment.

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location.
- Center photographs with signboards and scheme-specific branding.
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period.
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

5. Method of verification or validation:

- A surprise visit to the assessment location.
- A random audit of the batch.
- Random audit of any candidate.

6. Method for assessment documentation, archiving, and access:

- Hard copies of the documents are stored.
- Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage.
- Soft copies of the documents & photographs of the assessment are stored in the Hard Drives.

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf