QUALIFICATION FILE

IIoT SYSTEM ARCHITECTURE ENGINEER

☒ **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: 5.5

Submitted By:

Capital Goods and Strategic Skill Council

39,1st Floor, Samyak Tower, Pusa Rd, Block 9A, WEA, Karol Bagh, New Delhi, Delhi, 110005

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Section 1: Basic Details

1.	**Qualification Name**	IIOT System Architecture Engineer	
2.	**Sector/s**	Capital Goods and Strategic Manufacturing	
3.	**Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐OEM**	**NQR Code & version of existing/previous qualification:** *(change to previous, once approved)* QG-5.5-CG-02039-2024-V1-CGSC	**Qualification Name of existing/previous version:**
4.	**a. OEM Name** **b. Qualification Name** (*Wherever applicable*)		
5.	**National Qualification Register (NQR) Code &Version** (*Will be issued after NSQC approval*)		**6. NCrF/NSQF Level: 5.5**
7.	**Award (Certificate/Diploma/Advance Diploma/ Any Other** *(Wherever applicable specify multiple entry/exits also & provide details in annexure)*	Certificate	
8.	**Brief Description of the Qualification**	Industry 4.0 IIOT System Architecture Engineer plays a vital role in new-age Smart e-factories to achieve desired user-friendly agile, flexible, and cost-effective, sustainable, self-reliance enterprise integrated horizontally and vertically - as well as with vendors, suppliers, and consumers. IIOT Implements the system architecture, performs engineering tasks, reconfigurations, and upgrades. It evangelizes Industry 4.0 cultural ecosystems and helps relevant skill development thereby upskill and reskill.	
9.	**Eligibility Criteria for Entry for Student/Trainee/Learner/Employee**	a. **Entry Qualification & Relevant Experience:**	

S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)
1.	UG Degree in relevant field	3 years of relevant experience
2.	3 Years UG Degree in Science and Technology (B.Sc / BCA) / 4 years BE, B.Tech (Electrical, Electronics, Mechanical, Mechatronics, Instrumentation and Control)*	
3.	10th grade pass +3 years Diploma in relevant field	4 year of relevant experience
4.	Previous NSQC level 5	1.5 years of relevant experience

				*Subject to being offered as 6 months internship/ project
		b. Age: 24		

10	**Credits Assigned to this Qualification, Subject to Assessment** *(as per National Credit Framework (NCrF))*	20	**11. Common Cost Norm Category (I/II/III)** *(wherever applicable)*: **I**
12	**Any Licensing requirements for Undertaking Training on This Qualification** *(wherever applicable)*	NA	

13	**Training Duration by Modes of Training Delivery** *(Specify **Total Duration** as per selected training delivery modes and as per requirement of the qualification)*	☐**Offline** ☐**Online** ☒**Blended**

Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)
Classroom (offline)	90	330	90		600
Online	90				

(Refer Blended Learning Annexure for details)

14	**Aligned to NCO/ISCO Code/s** *(if no code is available mention the same)*	2521.0100
15	**Progression path after attaining the qualification** *(Please show Professional and Academic progression)*	Senior Digital Factory Automation Engineer, Digital Factory Manager
16	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	**No**
17	**Is similar Qualification(s) available on NQR-if yes, justification for this qualification**	☐ **Yes ☒ No URLs of similar Qualifications:**
18	**Is the Job Role Amenable to Persons with Disability**	☐ **Yes ☒ No** **If "Yes", specify applicable type of Disability:**
19	**How Participation of Women will be Encouraged**	**The qualification pack empowers women to participate and thereby creating employment and research openings in different sectors**
20	**Are Greening/ Environment Sustainability Aspects Covered** *(Specify the NOS/Module which covers it)*	☐ **Yes ☒ No**

21	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools** ☒ **Yes** ☐ **No** **Colleges** ☒ **Yes** ☐ **No** **School: Atal Tinkering labs** **College: Atal Incubation, MSME incubation and state incubators**	
22	**Name and Contact Details of Submitting / Awarding Body SPOC** *(In case of CS or MS, provide details of both Lead AB & Supporting ABs)*	**Name: Ms. Shalini Singh** **Email: ceo@cgssc.org** **Website: www.cgsc.in**	**Contact No.: 9654310244**
23	**Final Approval Date by NSQC:** **31st January 2024**	**24. Validity Duration: 3 years**	**25. Next Review Date: 30 January 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/NSQF 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.	Assist in creating a smart e-Factory	CSC/N0428 V1.0	Core	5.5	2	20	40	-	-	60	20	64	-	-	84	13.68
2.	Perform system analysis and assist in design, develop and maximize productivity of machinery	CSC/N0429 V1.0	Core	5.5	3	30	60	-	-	90	24	96	-	-	120	19.54
3.	Execute Process Control automation to achieve improved productivity	CSC/N0430 V1.0	Core	5.5	3	20	40	30	-	90	27	43	-	-	70	11.40
4.	Customize Industrial Internet of Things (IIOT) ecosystem for optimized performance	CSC/N0431 V1.0	Core	5.5	3	20	40	30	-	90	34	66	-	-	100	16.28
5.	Collate data through Sensors and devices, and present it in relevant format for data	CSC/N0432 V1.0	Core	5.5	3	20	40	30	-	90	27	53	-	-	80	13.02

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/NSQF 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)
	analysis and data management															
6.	Assist to achieve the desired Product Life Cycle Management	CSC/N0433 V1.0	Core	5.5	3	40	50	-	-	90	24	51	-	-	75	12.21
7.	Follow health, safety and environment guidelines at workplace	CSC/N505 V1.0	Non-core	5	1	10	20	-	-	30	15	20	-	-	35	5.7
8.	Employability Skills (60hrs)	DGT/VSQ/N 0102 V1.0	Non-Core	4	2	20	40	-	-	60	20	30	-	-	50	8.14
Duration (in Hours) / Total Marks					20	180	330	90	-	600	191	423			614	100

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: 70   % *(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)*	B. Tech in Mechanical/ Electronics/ Mechatronics with 7 years of relevant experience.

2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	B. Tech in Mechanical/ Electronics/ Mechatronics with 10 years of relevant experience.
3.	**Tools and Equipment Required for Training**	☒Yes ☐No *(If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	B. Tech in Mechanical/ Electronics/ Mechatronics with 7 years of relevant experience.
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	B. Tech in Mechanical/ Electronics/ Mechatronics with 7 years of relevant experience.
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	B. Tech in Mechanical/ Electronics/ Mechatronics with 10 years of relevant experience.
4.	**Assessment Mode** *(Specify the assessment mode)*	Offline
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☐ Yes ☐ 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):** No
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** No
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes
4.	**Number of Industry validation provided:** 7
5.	**Estimated nos. of persons to be trained and employed:** 824
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** *Yes* 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 *(Mandatory)*	*Annexure: Evidence of Level*
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	*Annexure: Tools and Equipment (Lab Set-Up)*
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	*Annexure: Detailed Assessment Criteria*
4.	**Annexure:** Assessment Strategy *(Mandatory)*	*Annexure: Assessment Strategy*
5.	**Annexure:** Blended Learning *(Mandatory, in case selected Mode of delivery is "Blended Learning")*	
6.	**Annexure:** Multiple Entry-Exit Details *(Mandatory, in case qualification has multiple Entry-Exit)*	
7.	**Annexure:** Acronym and Glossary *(Optional)*	*Annexure: Acronym and Glossary*
8.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	*MC_CG IIoT Industrial System Architecture Specialist*
9.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	*Summary sheet*
10.	**Supporting Document:** Occupational Map *(Mandatory)*	*Occupational Mapping*
11.	**Supporting Document:** Assessment SOP *(Mandatory)*	*Attached in MC_CG IIoT Industrial System Architecture Specialist*
12.	**Any other document you wish to submit:**	

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
Professional Theoretical Knowledge/Process	•Integrate advanced technologies like IoT, AI, and data analytics to enhance overall efficiency and productivity. •Demonstrate expertise in architecting systems that	As can be inferred from the learning outcomes and performance criteria of the Qualification listed in the adjacent cell, the Industrial System Architecture Specialist requires well developed skill, with clear choice of procedures in familiar context.	5.5

	optimize operational efficiency and reduce downtime. •Monitor and fine-tune automated processes to continuously enhance desired outcomes. •Tailor IIOT solutions to specific industrial needs, optimizing performance and ensuring seamless integration with existing systems. •Develop and implement data collection strategies using sensors and devices to gather relevant information. •Facilitate capacity building programs to ensure the workforce is equipped with the necessary skills to leverage new technologies effectively. •Act as a technology evangelist, promoting the adoption of emerging technologies within the organization. •Implement and enforce robust health, safety, and environmental practices within the workplace.	Hence NSQF level for this descriptor is 5.5 .	
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Industry 4.0 concepts and practices • Global trends in manufacturing, especially relating to the target organization	As can be inferred from the knowledge and understanding related points mentioned in the adjacent cell, which have been taken from the Industrial System Architecture Specialist qualification pack, job role holder must have a knowledge of facts,	5.5

	• Digital manufacturing concepts and practices • Architectures of digital factory • Role of customers and vendors in a connected factory • Importance of Cyber Security in Industry 4.0 and how it is implemented • Workforce needed in Industry 4.0 organizations • Vision and goals of the organization • Products and services of the organization • Production design methodology and product lifecycle • Production planning methods and tools used in the organization • Knowledge of tools and application relevant for digital manufacturing • Technical skills relating to all the technologies relating to the organization • Hands on skills in tools and applications used in digital manufacturing	principles, processes and general concepts, in a field of work or study Hence NSQF level for this descriptor is 5.5.	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Communication Skill • Administrative skills • Decision Making	As can be inferred from the knowledge and understanding related points mentioned in the	5.5

	• Planning • Mathematical Skills • Supervisory skills • Coordinating skills • Digital skills	adjacent cell, which have been taken from the Industrial System Architecture Specialist qualification pack, job role holder must have a knowledge of facts, principles, processes and general concepts, in a field of work or study Hence NSQF level for this descriptor is 5.5.	
Broad Learning Outcomes/Core Skill	• Communication Skills • Decision Making • Planning • Mathematical Skills • Digital skills	As can be inferred from the knowledge and understanding related points mentioned in the adjacent cell, which have been taken from the Industrial System Architecture Specialist qualification pack, job role holder must have a knowledge of facts, principles, processes, and general concepts, in a field of work or study.	5.5
Responsibility	• Contribute to creating a Smart e-factory • Perform architecting, design, develop and maximize productivity of machinery • Execute Process control automation to enhance desired results • Customize Industrial Internet of Things (IIOT) for Optimize performance • Collecting and Sampling data through Sensors and	As can be inferred from the knowledge and understanding related points mentioned in the adjacent cell, the Industrial System Architecture Specialist must take responsibility for own work and learning and some responsibility for others' works and learning. Hence NSQF level for this descriptor is 5.5.	5.5

	devices, analysis and data management • Achieve desired Product Life Cycle Management through selectivity Design approach • Modernize and upgrade the Technology Intervention through ICT Projects and Capacity building		

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment
Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1.	Raspberry Pi 4	Quad-core ARM Cortex-A72, 4GB RAM, GPIO pins for sensor integration	15
2.	Arduino Boards	Arduino Uno or Arduino Mega	15
3.	Sensors	IoT-specific sensors like DHT22, HC-SR04, MPU6050	15
4.	Motors, servos, LEDs, relays	Sets of Motors, servos, LEDs, relays	15 each
5.	Communication Modules	WiFi modules (ESP8266 or ESP32), Bluetooth modules	15
6.	Edge Computing Device	NVIDIA Jetson Nano	15
7.	Industrial PLCs	Siemens, Allen-Bradley, or similar PLCs	20
8.	IoT Platforms	AWS IoT, Azure IoT, or Google Cloud IoT for cloud-based IoT solutions. Open-source platforms like Eclipse IoT, ThingsBoard, or Node-RED for local deployments.	15
9.	Programming Languages	Python for scripting and data analysis. C/C++ for microcontroller programming. JavaScript for web-based IoT interfaces.	15
10.	Simulation Software	MATLAB/Simulink, LabVIEW, or IoT simulator tools	15
11.	Data Analytics Tools	Jupyter Notebooks, TensorFlow	15
12.	Industrial Automation Software	SCADA, Siemens TIA Portal, Allen-Bradley Studio 5000	15
13.	Router, switches, access points	As per requirement	15 each
14.	Breadboards, jumper wires, soldering irons	As per requirement	15 each
15.	Safety glasses, gloves, and other safety equipment	As per requirement	15

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Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Laptop
2. Projector
3. Cloud access
4. Learning management system

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)
1.	Maxbyte Technologies Private Limited	Mr. Sabarinathan D	Chief Innovation & Products	4th Floor, No – 218, Cowley Brown Road, R.S Puram, Coimbatore– Tamil Nadu, India	9786422542	dss@maxbytetech.com	
2.	JBM Auto Limited	Mr. Rajeev Kumar Sharma	AVP-Head Skill Development	Plot No. 16, Sector 20B, Faridabad – 121007	8860281177	rajeev.sharma@jbmgroup.com	
3.	Indian Machine Tool Manufacturers' Association	Mr. P. J. Mohanram	Principal Advisors	10th Mile, Tumkur Road, Madavara Post, Bangalore – 562123	8066246600	Imtma@imtma.in	
4.	Indian Textile Accessories & Machinery Manufacturers' Association	Mr. N D Mhatre	Director General (Tech)	Bhogilal Hargovindas Bldg., 4th Floor, 18/20, K. Subhash Marg, Kala Ghoda,	02222844350	Info@itamma.org	

			Mumbai – 400001			
5.	Plastics Machinery Manufacturers' Association of India	Mr. Mahendra Patel	Chairman	New Delhi YMCA Tourist Hotel, Gate No.1, 1st Floor, Jai Singh Road, Delhi – 110001	01143586061	Info@pmmai.org
6.	Parametric Technology (India) Pvt. Ltd.	Mr. Rajkiran C	Senior Director (IIoT & AR technologies)	Level 6, Nitesh Timesquare. #8 MG Road, Bengaluru – 560001	8066734300	amarathe@ptc.com
7.	TVS Motor Company	Dr. S. Devarajan	Sr. Vice President (Advanced Manufacturing)	P.B. No. 4, Harita, Hosur - 635109	+91 (4344) 276780	Contactus@tvsmotor.com

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
2023	254	179	85	55	6	4
2024	273	191	90	59	8	6
2025	288	206	143	93	11	8

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
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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:

1.
2.

Content availability for previous versions of qualifications:

☐ Participant Handbook   ☐ Facilitator Guide ☐ Digital Content   ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available:

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

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	☐Theory/ Lectures - Imparting theoretical and conceptual knowledge	Laptop, Projector, Projecting Screen, LMS.	1:1
2	☐Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Laptop, Projector, Projecting Screen, LMS.	1:1
3	☐Showing Practical Demonstrations to the learners	As per attached tool list.	NA
4	☐Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	As per attached tool list.	NA
5	☐Tutorials/ Assignments/ Drill/ Practice	As per attached tool list.	NA
6	☐Proctored Monitoring/ Assessment/ Evaluation/ Examinations	As per attached tool list.	NA
7	☐On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	As per attached tool list.	NA

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
Assist in creating a smart e-Factory **CSC/N0428 V1.0**	*Provide desired inputs for architecting and implementing Industry 4.0 disruptive ready smartfactory*	6	21	-	-
	PC1. consolidate and provide the set of existing orplanned processes to produce the desired end products	-	1	-	-
	PC2. consolidate and provide the set of existing or planned sensors, devices, actuators, controllers, andrelated equipment (used or planned to be used), to monitor and control the processes in the smart factory	-	1	-	-

	PC3. provide details of new-age technologies usedor proposed, to implement the processes, with justifications	1	1	-	-
	PC4. provide details of disruptive technologies usedor proposed to implement the process control systems, with list of vendors and justifications	1	1	-	-
	PC5. provide the current architecture of the processes and control systems, showing modularity,reuse, and extensibility	1	1	-	-
	PC6. consolidate the list of products, sub-assemblies and components that will be produced in the factorytogether with volumes and the future road map	-	1	-	-
	PC7. identify the list of sub-assemblies and components that will be sourced from vendors	-	1	-	-
	PC8. identify the list of qualified vendors that can bepotential partners, with details of their capabilities,capacities, technologies, and processes used by them	-	1	-	-
	PC9. identify for each prospective vendor, the levelof automation used, their main applications and interfaces exposed by them for integration and Cyber Security related standards, policies and toolsused	-	1	-	-
	PC10. identify the quality goals and the candidatequality management systems to be followed	-	1	-	-
	PC11. identify the kind and the level of customization that will be offered to general and special category of customers for each end-product	-	1	-	-
	PC12. identify the data that is expected from customers in different contexts, such as order, customization, schedule, quality, inspection, testreports, shipment, routing, payment, financing, contracts, etc.	-	1	-	-
	PC13. identify volumes and expected responsetimes of data from customers	-	1	-	-
	PC14. identify the data that is expected to flow toand from vendors in different contexts	-	1	-	-
	PC15. identify volumes and expected responsetimes of data flow from vendors	-	1	-	-
	PC16. identify all third-party services that will berequired and the candidate interfaces	-	1	-	-
	PC17. identify all human interfaces that are requiredin the target system	1	1	-	-

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PC18. identify data/information flow for each humaninterface	1	1	-	-
PC19. identify locations of all facilities of the enterprise, their capabilities, capacities, installedsystems, level of automation, workforce, warehouses, attached vendors and customers, logistics support and other relevant details	-	1	-	-
PC20. identify all data processing, analysis, forecasting and Cyber Security requirements for thetarget systems to meet the expected business volumes and profitability with the promised quality of service	1	2	-	-
Support and execute the intelligent implementation ofthe Industry 4.0 plan for the Industry	**2**	**7**	**-**	**-**
PC21. create collaboratively, a modular partition ofwhole system as a system-of-systems, and further drill down to sub-systems (to required depth of details)	1	1	-	-
PC22. derive functional specifications and performance parameters for each system and sub-system involved in the plan – considering the organization goals and KPIs	1	1	-	-
PC23. list technology options for each system and sub-system in the plan, identifying the already installed legacy systems, with their advantages and downsides	-	1	-	-
PC24. participate in collaborative finalization of theoptimum technology mix – considering the overall business vision, costs, knowledge base, expertise and connected ecosystem	-	1	-	-
PC25. ensure that Cyber Security is built into eachlayer – device, connections, data, cloud, HMIs, controllers, applications, analytics, access control,physical security, partner connections and data sharing	-	1	-	-
PC26. include Cyber Security Risk Management Plan,together with Data Backup and Recovery, and Business Continuity Plan	-	1	-	-
PC27. get the finalized Blueprint of Industry 4.0 Planfor the organization, with clearly marked phases, timelines and capabilities added in each phase	-	1	-	-
Lead or participate in designing and developing detailed engineering support documentation for thesmart plan	**4**	**7**	**-**	**-**
PC28. prepare detailed drawings and specificationsof the system, drilling down to subsystems and components	1	1	-	-

PC29. prepare Bill of Materials (BOM) listing all equipment, controllers, drives, sensors, actuators,cables, accessories, and consumables	1	1	-	-
PC30. prepare process flow diagrams	1	1	-	-
PC31. prepare data flow diagrams and datastructures	1	1	-	-
PC32. prepare list of vendors for different categoryof components	-	1	-	-
PC33. prepare list of third-party services for connectivity, messaging, data, and computing	-	1	-	-
PC34. prepare list of applications, software andCyber Security tools needed	-	1	-	-
Collectively Collaborate in Smart Planning, Design andExecution of manufacturing production plan	4	20	-	-
PC35. participate in preparation of production plan following the organization goals and KPIs, using theorganization specified application and tools. Ensurethat all production facilities in a multifacility organization are involved in preparation of the plan	-	1	-	-
PC36. ensure that the plan includes Cyber Securityand is consistent with the plant capacity and capability	-	1	-	-
PC37. ensure that customer inputs and requirements are included in the plan. Consult withcustomers if required	-	1	-	-
PC38. ensure that vendor capacities and capabilitiesare included in the plan	-	1	-	-
PC39. derive plan for each vendor and discuss withthem to ensure viability	-	1	-	-
PC40. review plans and rework if required	-	1	-	-
PC41. confirm that the plan is adopted by the management and communicated to all concerned	-	1	-	-
PC42. ensure that the procurement plan is alignedwith the production plan	-	1	-	-
PC43. participate in scheduling the production plan,using organization specified tools and applications	1	1	-	-
PC44. verify that the schedules generated for each line, system and equipment is consistent with theircapacity				

		-	1	-	-
	PC45. verify that the utilities and consumables areadequate for the product plan and schedule	-	1	-	-
	PC46. verify that the workforce capacity and skillsare adequate for the product plan and schedule	-	1	-	-
	PC47. create Maintenance Plans (Predictive, Preventive) and Schedule for all critical systems andequipment	1	1	-	-
	PC48. ensure availability of spares for criticalsystems and equipment	-	1	-	-
	PC49. prepare skill development and training plan for the workforce to align with the production planand available workforce	1	1	-	-
	PC50. ensure adequate capacity for storage of in- process goods, finished goods, dispatch and logistics	-	1	-	-
	PC51. ensure that the Quality Plan is consistent withthe production plan	-	1	-	-
	PC52. ensure that the Quality checks are built intothe line and equipment schedules	-	1	-	-
	PC53. ensure that Cyber Security checks are performed by experts and designed level of securityis achieved	1	1	-	-
	PC54. keep product design and PLM teams engagedin and provide feedback about the production and quality issues	-	1	-	-
	Conduct one-to-one interactions with different stake holders of the organization with the pre-defined goals,roles and responsibilities	2	6	-	-
	PC55. create daily, weekly, and periodic schedules of interaction with various teams that fall within therole definition in the organization as well as recommended by Industry 4.0 practices	1	1	-	-
	PC56. respond to any query related to customer orvendor with priority	-	1	-	-
	PC57. conduct regular rounds of production facilityand ensure systems are running smoothly	-	1	-	-
	PC58. watch for any signs of inefficiencies in equipment, operation or processes and identifypossible causes	-	1	-	-

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	PC59. discuss issues with the production line withconcerned people and find resolutions	-	1	-	-
	PC60. review Cyber Security status and addressissues, if any	1	1	-	-
	Help the team understand the entrepreneurial spirit ofIndustry 4.0 and adopt the systems	2	3	-	-
	PC61. keep the team engaged and ensure that they see the key features of Industry 4.0 and its value. Stress on utmost need for Cyber Security and their role in it	1	1	-	-
	PC62. conduct regular talks, events, digital communications involving targeted / all workforceand management to highlight the success of Industry 4.0 adoption	1	1	-	-
	PC63. identify any areas of the plant that are findingit difficult to adapt to Industry 4.0 culture and help to overcome it	-	1	-	-
	Total Marks	**20**	**64**	**-**	**-**
Perform system analysis and assist in design, develop and maximize productivity of machinery CSC/N0429 V1.0	*Contribute to Production Planning, Scheduling,Monitoring and Project Management*	-	12	-	-
	PC1. perform the assigned role using organizationspecific production processes and tools	-	1	-	-
	PC2. use approved and licensed applications andtools for Planning, Scheduling and Monitoring production - including existing ERP, SCM etc.	-	1	-	-
	PC3. ensure that all required data is available andvalidated by data owners	-	1	-	-
	PC4. ensure all stakeholders are involved in the process and have access to the applications andtools	-	1	-	-
	PC5. ensure Cyber Security compliance and audit forall devices, data, connections, and applications - including connections and data shared with partners, vendors, and customers	-	1	-	-
	PC6. explore Open Source platform and tools foradoption, in consultation with IT department	-	1	-	-
	PC7. collaborate for creation of Production Planaligned with the organization goals and KPIs	-	1	-	-
	PC8. ensure that the plan conforms with thecapacity of the plant and partners' capacity	-	1	-	-
	PC9. ensure that the plan conforms with thecapacity of the plant and partners' capacity	-	1	-	-

PC10. ensure that the production plan and scheduleis synchronized with the Project Management tools and machine schedulers	-	1	-	-
PC11. ensure that the plan and schedule is communicated to all stakeholders, including vendor	-	1	-	-
PC12. ensure that appropriate Monitoring and Notifications Systems are in place and programmedwith alerts so that any deviations are immediately communicated	-	1	-	-
Use appropriate tools and methods for Agile / Flexible /Lean manufacturing	3	5	-	-
PC13. apply Modular Product Design concept andtools for fast and easy variation	1	1	-	-
PC14. apply Information Technology to enable collaboration among planners, designers, procurers,and producers for fast response to orders and customizations	-	1	-	-
PC15. leverage Corporate Partners (sister organizations, vendors, strategic alliances with other companies) to improve time-to-market for keyproduct areas	-	1	-	-
PC16. promote Knowledge Culture and employee training to facilitate rapid change and continuousadaptation	1	1	-	-
PC17. leverage use of Lean Processes – such as running small batches, customized one-offs using 3- D Printing, fast changeovers of models/versions, and a culture of continuous improvement rather than big-bang changes	1	1	-	-
Contribute to Quality Management systems followed inthe organization	1	7	-	-
PC18. contribute to Quality Management systems and Standards such as ISO900X, Six Sigma, Lean SixSigma, TQM, SPC, Kaizen etc. followed in the organization	1	3	-	-
PC19. participate in quality reviews and work withthe teams on solving issues identified	-	1	-	-
PC20. ensure that quality systems are integrated inthe production planning and monitoring plans	-	1	-	-
PC21. ensure that the quality system is integratedwith those of vendors and partners	-	1	-	-
PC22. ensure that the organization has required visibility into the quality data and events generatedby vendors' and partners' systems	-	1	-	-

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Perform Plant Health Monitoring and Management	**9**	**18**	-	-
PC23. plan and schedule Preventive Maintenance ofall equipment and lines	1	3	-	-
PC24. use captured data and data analysis tools toperform Predictive Maintenance	-	1	-	-
PC25. minimize impact of breakdown maintenanceand unscheduled shutdowns by rescheduling and leveraging of unused machines and resources	-	1	-	-
PC26. explore use of Machine Learning tools tounderstand the failure mechanisms and dependencies	-	1	-	-
PC27. ensure that fire safety and personnel protection systems are in place and these systemsare integrated into overall monitoring system	1	1	-	-
PC28. ensure that personnel safety barriers and interlocks are built into every area having automated machines, robotic systems, automatedlines, and automated material handling systems	1	1	-	-
PC29. ensure that chemicals and gas handling and protection systems are in place and these systems are integrated into overall monitoring system	1	1	-	-
PC30. ensure that all regulatory requirements arecomplied	-	1	-	-
PC31. ensure that all regulatory inspections are performed timely and all certificates / licenses arecurrent	-	1	-	-
PC32. ensure that all fire escapes and emergencyexits are visibly marked and are unhindered	1	1	-	-
PC33. ensure that there is adequate marking of hazardous areas and there are audio visual alarmsautomatically triggered by any violations	1	1	-	-
PC34. ensure that events relating to fire, chemicalhazards, and other disaster situations are immediately communicated to the concerned authorities inside and outside the organization	-	1	-	-
PC35. ensure that there are well known and understood SOPs for dealing with emergencysituations	1	1	-	-
PC36. ensure that medical aid and emergency health services are planned and available at allhours when the plant runs	1	1	-	-

PC37. ensure adequate safety and health facilitiesfor female employees	-	1	-	-
PC38. ensure adequate cleanliness, lighting, ventilation, temperature control, dust and other pollution, and acceptable noise levels throughoutthe plant	1	1	-	-
Optimize production performance utilizing Tool Room	**5**	**17**	**-**	**-**
PC39. plan Tool Room services to support the digitalmanufacturing lines and equipment, the maintenance, customization, and prototyping needs	1	3	-	-
PC40. get corporate approval and funds for the toolroom plan and personnel	-	1	-	-
PC41. implement the tool room facilities	-	1	-	-
PC42. utilize tool room facilities to ensureperformance of plant and equipment	-	1	-	-
PC43. utilize tool room to quickly turn around customized tools, jigs, fixtures, and accessories toenhance productivity	1	2	-	-
PC44. utilize tool room to quickly turn around emergency spare parts to minimize productiondowntimes	1	1	-	-
PC45. utilize tool room for rapid production ofcustomized parts needed for customers	1	3	-	-
PC46. utilize tool room for rapid prototyping of newdesign ideas	1	5	-	-
Perform optimal scheduling and programming ofrobotic tools and production line	-	**5**	-	-
PC47. ensure that adequate numbers of trained workforce is available for programming, modifyingand repurposing robotic tools	-	1	-	-
PC48. ensure that programming applications and tools are up-to-date and are linked to the schedulingsystem	-	1	-	-
PC49. include partner and vendor machines intoscheduling algorithm, where applicable	-	1	-	-
PC50. prepare alternate schedules if partner orvendor machines become available	-	1	-	-
PC51. ensure that all scheduling constraints andconflicts are resolved	-	1	-	-
Respond to issues on production line and provideresolution involving stakeholders				

Description				
	-	5	-	-
PC52. consider if manual mode can be used safely to temporarily get around any inconsistencies on production lines and ensure it is disabled automatically by timeout or manually on completionof exception	-	1	-	-
PC53. ensure local manual override is disabled bydefault for safety, except in emergency condition	-	1	-	-
PC54. ensure all enable, disable, overrides andinconsistency events are logged and analyzed	-	1	-	-
PC55. reschedule machines and jobs in case of a breakdown of any robotic or automated machine,and include any unused resources to optimize disruption	-	1	-	-
PC56. resolve conflicts relating to parts availability,scheduling, quality, line blockage or breakdown by collaborating with all stakeholders	-	1	-	-
Proactively monitor production line for performanceand early signs of failure using data analysis tools	**2**	**8**	-	-
PC57. collect real time machine data regarding partsprocessed, machine speed and other settings, processing times, setup times, environmental data, machine temperature, pressure, vibrations etc., consumables utilized, power consumption, and other relevant parameters	-	1	-	-
PC58. analyse the real time data to derive statisticsabout productivity, utilization, down times, power and utility consumption, and variation of these parameters with time and processing speeds	-	1	-	-
PC59. derive and compile data about performance,reliability, cost, and processing times of different machine for different parts, over the period	-	1	-	-
PC60. compare the observed performance of machines with specifications and understand thecause for any significant variations – resolve withvendor or take corrective action	-	1	-	-
PC61. use the compiled data to analyse and find patterns of performance degradation which can belinked to early signs of failure	1	2	-	-
PC62. use the results for Predictive Maintenancescheduling	1	1	-	-
PC63. create bench-mark parameter settings foreach machine for optimal performance and minimized maintenance. Use this for machine scheduling	-	1	-	-
Communicate with stakeholders and seek inputs forproduction line performance				

		1	8	-	-
	PC64. seek inputs proactively feedback on plant performance from operators, quality personnel,sales and marketing	-	1	-	-
	PC65. communicate with stakeholders about plant health and performance and share specific actionstaken to address any reported issues	-	1	-	-
	PC66. seek inputs and feedback on product featuresand quality from customers and their voice - sales and marketing	-	1	-	-
	PC67. analyse the inputs and categorize these forimmediate and future considerations	-	1	-	-
	PC68. determine the type of issue for inputs requiring immediate attention - quality, specifications, delivery, or support. Address in consultation with relevant groups and determineaction plan and response	-	1	-	-
	PC69. consult with design and PLM groups for inputs product features and customizations, and determinesuitable action plan and response	-	1	-	-
	PC70. maintain a log of all issues raised, change requests and action taken. Use this for finalizingproduct enhancement plans	1	2	-	-
	Communicate deviations from plan to all concernedand help in restoring normalcy	3	8	-	-
	PC71. analyse all deviations and perform root causeanalysis (RCA) involving all groups	-	1	-	-
	PC72. use data analysis to arrive at the origin ofproblem, time, and sequence of progression	1	1	-	-
	PC73. determine the root cause being - machine design or specs, machine setting, machine operation, state of maintenance, programming fault,hardware fault, communication error, scheduling issue, other issue, or a combination	-	1	-	-
	PC74. look for patterns of behaviour and eventrelationships	1	1	-	-
	PC75. classify the patterns and determine the bestapproach for dealing with these situations	1	1	-	-
	PC76. make required changes in machine usage, settings, programming, and scheduling to rectify theerrors logged	-	1	-	-

	PC77. verify that the changes work - and get concurrent of involved stakeholders. Finalize thechanges as part of machine setup instructions orSOPs	-	1	-	-
	PC78. document and communicate the action takenand recommendations for correct operation to all stakeholders	-	1	-	-
	Identify areas for improvement and communicate withmanagement for adoption	-	3	-	-
	PC79. consolidate the observations and actions taken and determine if there are any candidates forfollow-up as proposals for product enhancement, change, reconfiguration or for any change or upgrade of equipment or production line	-	1	-	-
	PC80. create for each candidate proposal, a detailedreport with analysis, impact, and business case and share with the management	-	1	-	-
	PC81. follow-up on the proposals and provideadditional inputs for decision making	-	1	-	-
	Total Marks	**24**	**96**		
Execute Process Control automation to achieve improved productivity CSC/N0430 V1.0	*Capture the distributed plant layout of systemsparticipating in the plant operation*	2	4	-	-
	PC1. capture the distributed plant layout andlocation of all systems and subsystems	1	1	-	-
	PC2. capture details of other facilities and vendorsystems participating in the operation	-	1	-	-
	PC3. consider use of geotagging for locatingresources and material flow	1	1	-	-
	PC4. include provisions for implementing CyberSecurity at all layers	-	1	-	-
	Architect the distributed plant operation and controlsystem	8	10	-	-
	PC5. acquire complete documentation and history of existing installed systems and completely understand the design and the state of the plant andequipment	1	1	-	-
	PC6. investigate and fill the gaps, in case of missinginformation	1	1	-	-
	PC7. include provisions for Cyber Security at eachlayer	1	1	-	-

PC8. use appropriate Sensors, Signal Conditioners, Counters, Signal Transformers, and interface deviceswith digital, standard based interfaces - commonly known as 'Smart Sensors'	1	1	-	-
PC9. use appropriate Actuators for control elements - these can be of type pneumatic, hydraulic, vacuum, electromechanical, electromagnetic, mechanical or of a mixed type - to control the processes	1	1	-	-
PC10. use Digital Controllers (PLC etc.) with industrystandard I/O interfaces and protocols to connect to sensors and actuators	1	1	-	-
PC11. use appropriate cables and cabling accessories (including fiberoptic devices and cables)and environmentally protected junction boxes with clearly legible markings, ferruling, and numbering	-	1	-	-
PC12. use appropriate power supplies and power control devices (such as PWM controller, Phase Angle Controller, VFD, PID Controllers etc.) to drivethe control elements	1	1	-	-
PC13. use appropriate HMI devices for UserInteraction	1	1	-	-
PC14. own the design and be responsible for itsupkeep and upgradation	-	1	-	-
Implement plant control with PLC, HMI, SCADA, andother control systems	**7**	**15**	**-**	**-**
PC15. refer to the interconnection documentationand verify that all devices and controllers are connected using specified cables and following recommended interconnection practices	-	1	-	-
PC16. ensure all interlocks and emergency devicesare connected	-	1	-	-
PC17. use appropriate signal levels, communicationprotocols and software stacks to connect devices with controllers	1	1	-	-
PC18. ensure cyber security requirements are setup	1	1	-	-
PC19. verify integrity of all wiring, interconnections,signal handling and ensure that all inputs/outputs are functional and comply with specified limits	-	1	-	-
PC20. identify all PID loops and other control loops inthe system and mark their criticality, interdependence, priority, settings, and performancetuning procedures	1	1	-	-
PC21. capture all Motor Control loops as independent loops or part of larger loops				

		1	1	-	-
	PC22. perform loop testing and confirm integrity	1	1	-	-
	PC23. document all safety interlocks, emergencycontrols and ensure that these are programmed correctly	-	1	-	-
	PC24. document and share start-up, shutdown, and emergency procedures. Ensure that these are visiblydisplayed at appropriate places	-	1	-	-
	PC25. capture connections, control procedures and programming of all material handling and material movement systems	-	1	-	-
	PC26. initiate performance tuning, involving processes personnel and other stakeholders. Frequently, the performance tuning request mayoriginate from the process personnel	1	1	-	-
	PC27. address all issues observed during the tuningprocess and resolve to closure involving all stakeholder	-	1	-	-
	PC28. document the results of performance tuningand the settings of all devices, controllers, and actuators - along with the limits and alarms. Sharethis information with all stakeholders	-	1	-	-
	PC29. test for Cyber Security, using recommended tools and involving experts. Document results alongwith complete configuration	1	1	-	-
	Utilize different types of computer aided machining forachieving the planned outputs	6	8	-	-
	PC30. utilize appropriate technologies such as - computer aided machining (CAM), computerized numerical control machining (CNC), 3-D Printing etc.to perform the necessary operations of the production process	1	1	-	-
	PC31. identify and document different kinds of robots and automation tools used in the plant, theirspecifications and roles in manufacturing – for example Robotic Welding, Robotic Pick and Place, Robotic Assembly, Robotic Painting, Robotic Inspection etc.	1	1	-	-
	PC32. leverage machines and manufacturingprocesses available in the vendors' plants	-	1	-	-
	PC33. connect various CAM, CNC and other machines with the DCS or other controllers using appropriate cables and interfaces and verify correcthandshake	1	1	-	-

PC34. identify the architecture and location of Datacommunication and Security devices and integrate securely the automation systems with the production management systems using specifies data flows, data formats, and protocols	1	1	-	-
PC35. identify the architecture and location of Datacommunication and Security devices and integrate securely the automation systems with the production management systems using specifies data flows, data formats, and protocols	-	1	-	-
PC36. train workforce in robot programming tools and processes. Ensure they know how to load programs, modify, and create new programs, test programs; decommission, relocate, and repurposerobots - following safety and Cyber Security norms	1	1	-	-
PC37. integrate and apply robotic and personnelsafety systems, interlocks, and emergency procedures	1	1	-	-
Integrate HVAC systems, ACCESS control systems, RFID based material movement systems in the plant	4	3	-	-
PC38. integrate HVAC systems with the DCS and production management systems for maintainingthe plant environment for optimal performance. Verify the climatic conditions and control actions	1	1	-	-
PC39. integrate RFID based material inflow / outflowsystems in the plant with the DCS and production management systems	1	1	-	-
PC40. integrate all Access Control and Surveillance Systems and Attendance Systems with the DCS andproduction management systems and Cyber Security systems in the plant	1	1	-	-
PC41. test all integrated systems according toorganization SOPs and document results	1	-	-	-
Establish rapport with vendor ecosystems forresponsive service	-	3	-	-
PC42. prepare a list of all equipment vendors, theircontact persons, warranty, and details of contractswith them. This includes plant and equipment vendors as well as material suppliers for product plans	-	1	-	-
PC43. establish contact with the representatives of the companies and ensure that they are familiar with the contracts and understand the part designs,schedules, quality, SLAs, and communication requirements	-	1	-	-

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	PC44. periodically connect with the vendors and ensure that there are no unknown factors or production issues at their ends - if not, address theissues on priority in consultation with other stakeholders	-	1	-	-
	Total Marks	27	43		
	Take lead to discuss the scope of IIoT for theorganization involving all stakeholders	1	5	-	-
	PC1. take the lead to discuss in the organization the role of IIoT in the industry and its relevance for the organization. Emphasize on the cultural and technological changes necessary, and the associated costs for adoption of IIoT and Industry 4.0factory	-	1	-	-
	PC2. help evolve a consensus about the value proposition of IIoT for the organization and define itsscope - in the short and long terms	-	1	-	-
	PC3. estimate the effort and cost of implementingIIoT with the defined scope and roadmap	-	1	-	-
	PC4. document the expectations and goals of IIoTand roadmap for implementation	1	-	-	-
	PC5. communicate this understanding across theorganization so that there are common shared expectations from the system	-	1	-	-
Customize Industrial Internet of Things (IIOT) ecosystem for optimized performance CSC/N0431 V1.0	**PC6.** get management commitment for funds, people resources and support for the defined scope	-	1	-	-
	Apply IIoT standards and practices for creating IIoTarchitecture of the organization	9	23	-	-
	PC7. evaluate IIoT standards such as XMPP, REST,MTQQ, Node-RED, OPC and others, as well as the Industrial Internet Consortium's (IIC) Industrial Internet Reference Architecture (IIRA)	1	3	-	-
	PC8. identify IIoT standards relevant for the organization and use these for creating the IIoTarchitecture	1	2	-	-
	PC9. investigate IIoT expertise of the DCS vendors and their support for IIoT in their offerings. Use thisas selection criteria for DCS	1	1	-	-
	PC10. design and document the Architecture, Layers(Content layer, Service layer, Network layer, Devicelayer) and contents of each layer with mapping to physical devices and systems. All required network and application services must be identified	1	3	-	-

PC11. ensure required infrastructure is available for the desired goals. The infrastructure includes physical devices, computers, network connections and services, cloud services and applications (including data mining, analytics and machine learning) running on the cloud and on the local computers (Cyber Physical Systems – CPS). The IT organization is likely to be the owner or subscriber ofsome of these resources	-	1	-	-
PC12. leverage DCS vendor's expertise in IIoT toimplement the organization IIoT plan	-	1	-	-
PC13. define concrete IIoT Architecture involving appropriate sensors, connections, aggregators and controllers, connectivity devices and protocols suchas Wi-Fi, WirelessHART, Bluetooth, BT-LE, Ethernetetc.	1	3	-	-
PC14. specify appropriate Edge and Cloudconnectivity devices and services	1	1	-	-
PC15. define Cyber Security standards andimplementations in all layers	1	3	-	-
PC16. identify the potential for exploiting analytics and machine learning to produce actionable outputssuch as for Fault analysis and localization, Predictive Maintenance, Market Analysis and Predictive Scheduling etc.	1	2	-	-
PC17. explore if data or result validators can be designed to automatically check the data and analysis results - if yes, then define and design these	-	1	-	-
PC18. identify applications and tools to support datacleansing and normalization, data mining, data visualization, analytics, 'What-If' analysis and machine learning to support automatic tuning etc.	1	2	-	-
Design and implement IIoT realization collaborativelyusing appropriate devices, connections, protocols, services, applications, and Cyber Security standards	5	14	-	-
PC19. implement the IIoT Architecture using appropriate sensors, connections, controllers,connectivity devices, edge devices, cloud connectivity and services	1	3	-	-
PC20. use appropriate protocols such as Wi-Fi,WirelessHART, Bluetooth, BT-LE, Ethernet etc.	1	2	-	-
PC21. collaborate with IT organization to install, configure, connect, integrate, secure, manage andtroubleshoot applications and services	1	2	-	-
PC22. implement any defined data validators usingavailable software and applications	1	1	-	-

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PC23. ensure all applications are configured to use appropriate data inputs and produce outputs in thedesired formats	-	1	-	-
PC24. define if the analytics and machine learningapplications will run in on-line or batch mode anddesign appropriate data feed, data extractors andaggregators, and batch processors	-	1	-	-
PC25. apply 'ZERO-TRUST' principle for security – meaning only authorized and authenticated users, devices and applications can access the system, forthe purpose defined by their roles	-	1	-	-
PC26. define and design 'Trust' systems and therequired infrastructure	1	2	-	-
PC27. apply Cyber Security standards at all layersand across all organizations connected to the system	-	1	-	-
Verify correct implementation of IIoT and validate data,processed information, and analysis for correctness	**12**	**12**	-	-
PC28. collaborate with IT to ensure that the devices,applications, and data sources are programmed to acquire and process the data correctly	1	1	-	-
PC29. verify the range, units, and conversion factorsof raw data	1	1	-	-
PC30. verify that the frequency of data acquisition isappropriate	1	1	-	-
PC31. verify that the raw data is stable within the limits of process dynamics. If the data is inherentlynoisy, consider using hardware or software filteringbefore consumption	1	1	-	-
PC32. verify that statistical processing of raw data (averaging, minima, maxima, median, standard deviation etc.) are appropriate for each sensor - whether the processing is done within the device orelsewhere	1	1	-	-
PC33. verify that the limits and alarms for processparameters and variables use appropriate type of data - raw or processed	1	1	-	-
PC34. verify the latency of data at consumption points (for example in process loops and alarm processors) and ensure that its impact on controlloops is within acceptable limits	1	1	-	-
PC35. test and verify the performance of validatorsusing simulated data	1	1	-	-

PC36. verify that each data mining and analysis application receives correct data and produces correct outputs - which are validated by experts andby specifically designed validator programs	1	1	-	-
PC37. ensure that the processed data and analysis results are available to consuming applications andusers online	1	1	-	-
PC38. validate with the users that the processed information and analysis they receive are correctand discuss any anomalies with stakeholders to resolve the issue	1	1	-	-
PC39. ensure that applications and users receive messages, alerts and alarms as programmed andthat they respond to the communication in the correct manner	1	1	-	-
Verify Cyber Security compliance	**6**	**6**	**-**	**-**
PC40. set up the 'Trust' infrastructure for testing	1	1	-	-
PC41. test for 'ZERO-TRUST' compliance usingdefined scenarios and test cases and verify compliance	1	1	-	-
PC42. test Cyber Security compliance in all layers –using appropriate tools and experts and involving required stakeholders	1	1	-	-
PC43. collaborate with partners to set up and test for'ZERO-TRUST' compliance of the connected system and verify compliance	1	1	-	-
PC44. reprogram the 'Trust' infrastructure for normaloperation with organization roles, authorizations, and authentication mechanisms	1	1	-	-
PC45. verify that the user and applications access perform as designed and security is complied with	1	1	-	-
Respond to requests from stakeholders regarding production line performance, quality, customization, orscheduling issues	**1**	**6**	**-**	**-**
PC46. analyse requests from stakeholders (such aspurchase, vendor management, service organizations, customers, and supply chain partners) regarding data quality and accessibility	-	1	-	-
PC47. check the trust system and organization datain case of any accessibility issues, to resolve any missing information or inconsistency – involving required stakeholders	-	1	-	-
PC48. confirm the key issue in case of any data quality related request, and verify the facts in thesystem at appropriate layer	-	1	-	-

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	PC49. identify for valid data quality request, the chain of components involved – from sensors to processing applications – and locate the sources oferror. Rectify these involving stakeholders	-	1	-	-
	PC50. perform validation at system level for issuesrelating to quality, customization, and scheduling -and further collaborate with the stakeholders to resolve the issue	-	1	-	-
	PC51. consolidate all requests and analysis andutilize these for creating knowledgebase for production line and operations improvement	1	1	-	-
	Total Marks	**27**	**43**		
Collate data through Sensors and devices, and present it in relevant format for data analysis and data management CSC/N0432 V1.0	*Capture information requirements at various decision-making points*	**12**	**12**	-	-
	PC1. capture key information needed for decision making and identify what primary data is needed tosupport this	1	1	-	-
	PC2. confirm that the data acquisition systems aredesigned to capture the required primary data	1	1	-	-
	PC3. identify secondary information required and itssources - whether internal to the organization or external	1	1	-	-
	PC4. capture all sources and destinations of digital data in the organization, their formats, and interfaces - such as sensors, devices, controllers, and software applications that produce raw data orprocessed information	1	1	-	-
	PC5. identify formats, interfaces, volume, andlatency of secondary data	1	1	-	-
	PC6. identify data aggregation and pre-processing requirements for all data - primary and secondary -accounting for maximum latency of real time and critical data	1	1	-	-
	PC7. capture the need for data processing to extractor develop the identified key information	1	1	-	-
	PC8. capture all data/information consuming applications - software for plant control, productionmanagement and planning, predictive maintenance,data visualization, what-if analysis, pattern recognition and machine learning systems of the 'cognitive' nature	1	1	-	-
	PC9. determine the volume of data, need forstorage, type and location of storage	1	1	-	-

PC10. determine requirements for real-time, on-demand and offline/batch processing	1	1	-	-
PC11. include considerations of data security at allinterfaces and in all processing and consuming applications	1	1	-	-
PC12. capture requirements for Disaster Management and Business Process Continuity tosupport the organization goals	1	1	-	-
Determine capability and flexibility required in theanalysis software	**7**	**11**	-	-
PC13. capture detailed functionality of each analysis software and one or more datasets needed. Functionality must be governed by some organization KPIs to ensure its use and value	1	3	-	-
PC14. define the processing in terms of aggregations, filtering, transformations, interpolations, intermediate storage, combining anditerations to be performed on the datasets and the resultant outputs	1	2	-	-
PC15. determine if multilevel processing is needed on same or differing datasets with different values ofcomputation variables and derived parameters	1	1	-	-
PC16. define if the processing logic required for eachanalytic function is fixed, flexible, customizable, or self-learning	1	1	-	-
PC17. define the functional variability, flexibility, orself-learning requirements clearly in detail, with examples if possible	1	1	-	-
PC18. create use cases and sample scenarios fordiscussion within and outside the organization	1	2	-	-
PC19. identify users and stakeholders for the analytic functions and get their inputs and concurrence for the defined and planned functions	1	1	-	-
Identify and implement suitable software for analysisand decision-making	**2**	**13**	-	-
PC20. explore the available open source and commercial software that match the functional requirements and use cases defined. Involve IT department and other experts in the organization	1	2	-	-
PC21. compare with practices in other industries in the domain and consult experts within and outside the organization - including partners and applicationvendors	-	1	-	-

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PC22. brainstorm and estimate the time and effortneeded to achieve the desired expertise using anyproven open source software or platforms, with available experience in the organization, and its impact on time to market	-	1	-	-
PC23. create inhouse team for viable open source route, involving IT department and other experts in the organization to develop expertise in the platformand demonstrate the use cases defined	-	1	-	-
PC24. consider engaging professionals with expertise in the candidate open source platform fordevelopment and support	-	1	-	-
PC25. evaluate the performance of open source implementation and perform deep technical assessment of security, usability, accuracy, reliability, and supportability of the application –considering its potential use for critical decisionmaking	-	1	-	-
PC26. prepare business case for acquisition of opensource and commercial software applications and present to management	1	1	-	-
PC27. share the results of the open source evaluation, with value and risk assessment, to management and get their decision on open sourcevs commercial	-	1	-	-
PC28. get management approval for personnel and resources, and formalize the development team forapproved open source platform, part of or completesolution	-	1	-	-
PC29. get approved software from vendors andschedule training program by the vendors	-	1	-	-
PC30. get hands on training in using the software, along with other users in the organization, in all aspects of the software – installation, configuration, programming, data import and export, visualization,validation, access control, cyber security, locks, advanced features, plug-ins etc.	-	1	-	-
PC31. perform development and implementation onthe approved platforms and do pilot runs	-	1	-	-
Test and verify correct processing and analysis of data	6	12	-	-
PC32. disable any automatic actions based onanalytics use in the testing phase	1	1	-	-
PC33. integrate the analysis software with the plantautomation system and ensure that all devices, applications, and data sources are programmed to generate the required data feeds for analysis	1	3	-	-
PC34. perform test runs and visualize the results. Perform any reconfigurations and tuning needed toget the desired outputs	1	1	-	-

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	PC35. create variations in data streams by changingprocess variables if possible – otherwise let the analytics run normally for long enough period to experience data variations spanning the entire dynamic range of the control system – or a reasonable subset	1	1	-	-
	PC36. observe and record the analytics outputs and validate its accuracy by manual analysis and experience of the process personnel. Specifically, validate if any control outputs recommended by thesystem are logical and correct	1	1	-	-
	PC37. test the applications thoroughly, involving allstakeholders and to establish the required level of performance over extended time	-	1	-	-
	PC38. perform Cyber Security audit and compliance	1	2	-	-
	PC39. get approval of experts and stakeholders foruse and possible on-line decision making	-	1	-	-
	PC40. document benchmark data, configuration, andresults for later use	-	1	-	-
	Ensure utilization of analyzed information invisualization and decision making	-	5	-	-
	PC41. monitor the performance of analytics andaddress any issues reported relating to interpretation, data errors, accuracy, or inconsistency	-	1	-	-
	PC42. analyse the issue, involving the implementation team and determine the cause	-	1	-	-
	PC43. perform any software reconfigurations orchanges needed or address usage and interpretation issues through appropriate communication and training	-	1	-	-
	PC44. ensure that the analytics results are used fordecision making and the user are satisfied	-	1	-	-
	PC45. seek inputs for further enhancements in analytics and feed these into development cycle	-	1	-	-
	Total Marks	27	43		
Assist to achieve the desired Product Life Cycle Management CSC/N0433 V1.0	*Capture the PLM design process and tools used in theorganization*	6	9	-	-
	PC1. document the PLM lifecycle processes followedin the organization and the level of maturity and automation at each stage	1	1	-	-
	PC2. capture capability for development of smartproducts	1	1	-	-

PC3. help define the context of 'smartness' relevantfor the organization – in terms of intelligence, adaptability for different markets and uses, personalization, connectivity, remote control, programmability, multifunctionality, upgradability, repurposing etc.	1	1	-	-
PC4. capture plan for creation of smart factory andcurrent state of implementation	-	1	-	-
PC5. capture the level of integration and digitalnetworking of processes in the ecosystem	1	1	-	-
PC6. capture capability for designing new business models, especially, new service offerings and pairedproducts and services	-	1	-	-
PC7. document the standards used in the organization and connected ecosystem for designs,drawings, and related engineering activities	1	1	-	-
PC8. identify the set of tools and applications used inthe PLM lifecycle, such as Modelling and Simulation, Computer Aided Design (CAD), Bills of Material, Computer Numerical Control (CNC) machining, RapidPrototyping, 3-D Printing, 3-D master (drawing free production), Versioning, Change Management, ERP, SCM etc.	1	1	-	-
PC9. capture the current range of products and services and plans for new development, including release plans and roadmaps for product support and retirement	-	1	-	-
Enable customer and vendor participation in the designloop	**10**	**19**	**-**	**-**
PC10. enable customers to connect securely and participate in product planning and development process sharing their experience, expectations, usecases and usage plans	1	1	-	-
PC11. enable customers to be part of productpreviews and become early adopters	-	1	-	-
PC12. engage customers in design of new products –such as Smart Service which provides customers with added value as opposed to just the product	1	-	-	-
PC13. engage customers in product testing in real life environments to get actual data and insight intoproduct behavior	1	3	-	-
PC14. engage customers in product testing in real life environments to get actual data and insight intoproduct behavior	1	2	-	-

PC15. create satisfied customers by supporting theirreal needs, so that they can become the product champions and references	1	1	-	-
PC16. educate customers on the impact of customization or product change request on production process, schedule, and lifecycle supportand possibility of using programmable features of existing products to satisfy their needs	1	1	-	-
PC17. enable vendors to connect securely and participate in product planning and development process sharing their experience, capabilities, andknowledge of the market	1	1	-	-
PC18. engage vendors to get their views on feasibility of design, manufacturability, lifecycleissues, cost, and alternative options	1	2	-	-
PC19. engage vendors to understand their production plans and synchronize these withorganization plans	1	1	-	-
PC20. engage vendors to adopt the organizationstandards and tool sets to have a seamless exchange of information	-	1	-	-
PC21. ensure that qualified vendors have secure connections to the organization network to exchangeauthorized data relating to plan, schedule, status, and performance	1	2	-	-
PC22. leverage vendor connectivity to establish a reliable just-in-time inventory management system,and dynamic adjustment of schedules	-	1	-	-
PC23. enable excess inventory liquidation throughvendors by enabling them to have a view of organization inventory	-	1	-	-
PC24. create a 'Trust' system to enable an open butsecure channel of communication with vendors and customers, following Cyber Security norms	-	1	-	-
Propose methods, tools, processes, and applications toimprove product lifecycle efficiency	2	8	-	-
PC25. assess capability gap in development of smartproducts and propose enhancements	-	1	-	-
PC26. assess gaps in the plan for creating a smartfactory and propose enhancements	1	1	-	-
PC27. assess gaps in integration and digital networking of processes in the ecosystem andpropose enhancements	-	1	-	-

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	PC28. identify and propose, with business case, newbusiness models to increase profits and customer retention and reduce warranty costs	1	1	-	-
	PC29. identify new service offerings connected withsmart products	-	1	-	-
	PC30. consider adopting 'After-sales PLM' which ensures integrated development of services and service processes during product development	-	1	-	-
	PC31. enable Mobile online services to enhancelifecycle support experience and efficiency	-	1	-	-
	PC32. establish Field-monitoring of products andutilize the Feedback from the service for development	-	1	-	-
	Analyse and manage the impact of change requests onthe manufacturing process	**6**	**15**	**-**	**-**
	PC33. collaboratively define, communicate, and follow a process of initiating change requests and responding. Request may originate internally – a design or manufacturing flaw of high severity maybe detected, or it may be reported from field	1	3	-	-
	PC34. include classification of change requests basedon their impact on customers, production line, schedule, safety, reliability, isolated or batch issue, regulatory requirement, good to have, and company reputation	1	1	-	-
	PC35. ensure that all change requests are either approved with recommended action plan or rejectedwith reasons	1	1	-	-
	PC36. define a cross cutting team of experts to analyse and decide action plan for management of high impact change requests. This will include stakeholders form design, production, quality, purchase, sales and marketing, service, and management. This team will examine the impact ofchange from all aspects and decide course of action	1	1	-	-
	PC37. analyse a change request and validate its classification. Identify if there are multiple occurrences of the same fault reported from one ormultiple locations	1	-	-	-
	PC38. perform a root cause analysis from availabledata. Seek field samples if relevant. Analyse production line and Quality data and look for any deviations reported. Localise the fault to a batch, machine, operator, line, logistics, design, specifications, usage or unknown	1	2	-	-

	PC39. perform a root cause analysis from availabledata. Seek field samples if relevant. Analyse production line and Quality data and look for any deviations reported. Localise the fault to a batch, machine, operator, line, logistics, design, specifications, usage or unknown	-	1	-	-
	PC40. consider for medium / low impact changes suggesting a viable workaround, repair, retrofittingof affected parts, replacement with tighter performance band, upgrade to higher version etc.	-	1	-	-
	PC41. include all approved change requests in a minor or major product version release plan – and incorporate necessary changes in Design, BOM, Procurement, Production plan and schedule, Qualitydocuments and Test plans	-	1	-	-
	PC42. discuss internally and plan a special versionrelease to accommodate strategic customers and other situations	-	1	-	-
	PC43. leverage agile manufacturing processes and product line customizations to provide a quick response to change requests – that is the promise ofIndustry 4.0	-	1	-	-
	PC44. maintain adequate communications at appropriate levels with the affected customers andinform them of action plan	-	1	-	-
	PC45. consider special service support and provisionof stand-by or alternative product to help in mitigating customer distress and downtime	-	1	-	-
	Total Marks	**24**	**51**		
	Total Marks	**15**	**20**		
Follow safety, health and environment guidelines at workplace CSC/N0505 V1.0	*Adhere to standard safety procedures of theorganisation*	21	21	-	-
	PC1. comply with general safety procedures andthose for handling equipment, tools, chemicals, and hazardous material, as prescribed and followed in the organisation	2	2	-	-
	PC2. remove finger rings or any other metalobjects likely to interfere with the work	1	1	-	-
	PC3. ensure that identification badge or any otherobject worn around the neck or on the clothing does not get caught in any rotating machine, or otherwise interfere with the work	1	1	-	-
	PC4. use appropriate safety devices such as goggles, gloves, ear plugs, caps, ESD pins, covers,shoes, helmets etc. recommended for the work being performed	2	2	-	-

PC5. inform, escalate, or raise alarm about anysuspicions, unaccounted hazardous material, devices, or other objects found in the premises	1	1	-	-
PC6. inform, escalate, or raise alarm about anybreach of safety or security procedure in the organisation	1	1	-	-
PC7. help achieve zero accidents goals at work	2	2	-	-
PC8. avoid damage to sensitive electronic components due to negligence of ESD procedures	1	1	-	-
PC9. participate regularly in fire drills or othersafety related workshops organised by the organisation	1	1	-	-
PC10. follow strictly all access control and perimeter safety procedures in designated factoryareas such as robotic work stations, automated production lines, automated material movement and other potentially risky operations	2	2	-	-
PC11. ensure that other people follow all access control and perimeter safety procedures in designated factory areas and help avoid accidents	2	2	-	-
PC12. use emergency switches or other mechanisms of stopping a machine immediately incase any emergency situation has developed or about to happen	1	1	-	-
PC13. ensure that electrical equipment areproperly grounded	1	1	-	-
PC14. follow Cyber Security guidelines and bevigilant at workplace	2	2	-	-
PC15. proceed to designated safe assembly areaimmediately on hearing fire alarm	1	1	-	-
Follow healthy practices and posture	**11**	**11**	-	-
PC16. wash hands and use sanitizers as recommended to prevent spread of diseases	1	1	-	-
PC17. follow common personal hygiene practices	1	1	-	-
PC18. maintain appropriate posture, especially inlong hours of sitting or standing position and in handling heavy materials	1	1	-	-
PC19. participate in company organised healthsessions such as exercises, games, yoga, physiotherapy, and other activities	1	1	-	-

	PC20. handle heavy and hazardous materials with care, while maintaining appropriate posture, usingsuitable tools, and handling equipment such as trolleys, jacks, and ladders	2	2	-	-
	PC21. learn and apply first aid devices available inthe workplace	1	1	-	-
	PC22. learn and apply safety and handling procedures for electrical shock and electrocution	1	1	-	-
	PC23. learn and apply emergency medical helpservices	1	1	-	-
	PC24. follow workplace decorum and avoid emotional outbursts or inappropriate language	1	1	-	-
	PC25. prevent any harassment at workplace	1	1	-	-
	Practice waste management and recycling	**5**	**6**	**-**	**-**
	PC26. identify recyclable, non-recyclable, and hazardous waste generated in the workplace andcomply with their disposal procedures	1	2	-	-
	PC27. dispose non-recyclable waste and hazardouswaste following recommended processes	2	2	-	-
	PC28. deposit recyclable and reusable material atidentified locations	1	1	-	-
	PC29. support education and compliance of wastemanagement processes	1	1	-	-
	Conserve material and resources	**11**	**14**	**-**	**-**
	PC30. identify ways to optimize usage of material and resources such as water, electricity, energy invarious tasks, activities, and processes	2	2	-	-
	PC31. check for spills and leakages of material invarious tasks, activities, and processes and plug them	2	2	-	-
	PC32. escalate the leakage issue to appropriateauthority if needed	1	1	-	-
	PC33. carry out routine cleaning of tools, machines, and equipment and maintain them in good working condition to optimize efficiency andwastage	1	2	-	-
	PC34. check if the equipment is functioning normally before commencing work and rectify orreport any malfunctioning to the responsible agency	1	2	-	-

	PC35. check for any odour, sparks, fumes, emission, unusual vibration, noise, or any otherobjectionable presence in the environment andtake immediate corrective action followed by report to responsible agency	2	1	-	-
	PC36. ensure electrical equipment are properly connected for use and are switched off when not inuse	1	2	-	-
	PC37. support education and compliance ofresource conservation processes	1	2	-	-
	Total Marks	**15**	**20**		
Employability Skills (60 Hours) **DGT/VSQ/N0102 V1.0**	*Introduction to Employability Skills*	1	1	-	-
	PC1. identify employability skills required for jobsin various industries	-	-	-	-
	PC2. identify and explore learning andemployability portals	-	-	-	-
	Constitutional values – Citizenship	1	1	-	-
	PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. andpersonal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
	PC4. follow environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	2	4	-	-
	PC5. recognize the significance of 21st CenturySkills for employment	-	-	-	-
	PC6. 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	-	-	-	-
	Basic English Skills	2	3	-	-
	PC7. use basic English for everyday conversationin different contexts, in person and over the telephone	-	-	-	-
	PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
	PC9. write short messages, notes, letters, e-mailsetc. in English	-	-	-	-

	Career Development & Goal Setting	**1**	**2**	-	-
	PC10. understand the difference between job andcareer	-	-	-	-
	PC11. prepare a career development plan withshort- and long-term goals, based on aptitude	-	-	-	-
	Communication Skills	**2**	**2**	-	-
	PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
	PC13. work collaboratively with others in a team	-	-	-	-
	Diversity & Inclusion	**1**	**2**	-	-
	PC14. communicate and behave appropriatelywith all genders and PwD	-	-	-	-
	PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
	Financial and Legal Literacy	**2**	**3**	-	-
	PC16. select financial institutions, products andservices as per requirement	-	-	-	-
	PC17. carry out offline and online financialtransactions, safely and securely	-	-	-	-
	PC18. identify common components of salary andcompute income, expenses, taxes, investments etc	-	-	-	-
	PC19. identify relevant rights and laws and uselegal aids to fight against legal exploitation	-	-	-	-
	Essential Digital Skills	**3**	**4**	-	-
	PC20. operate digital devices and carry out basicinternet operations securely and safely	-	-	-	-
	PC21. use e- mail and social media platforms andvirtual collaboration tools to work effectively	-	-	-	-
	PC22. use basic features of word processor,spreadsheets, and presentations	-	-	-	-
	Entrepreneurship	**2**	**3**	-	-
	PC23. identify different types of Entrepreneurshipand Enterprises and assess opportunities for potential business through research	-	-	-	-

	PC24. develop a business plan and a work model,considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
	PC25. identify sources of funding, anticipate, andmitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
	Customer Service	1	2	-	-
	PC26. identify different types of customers	-	-	-	-
	PC27. identify and respond to customer requestsand needs in a professional manner.	-	-	-	-
	PC28. follow appropriate hygiene and groomingstandards	-	-	-	-
	Getting ready for apprenticeship & Jobs	2	3	-	-
	PC29. create a professional Curriculum vitae(Résumé)	-	-	-	-
	PC30. search for suitable jobs using reliable offlineand online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
	PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
	PC32. answer questions politely, with clarity andconfidence, during recruitment and selection	-	-	-	-
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
	Total Marks	20	30		
	Grand Total	191	423		

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.

Mention the detailed assessment strategy in the provided template.

<1. Assessment System Overview:

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

2. Testing Environment:
- Check the Assessment location, date and time
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.

3. Assessment Quality Assurance levels/Framework:
- Question bank is created by the Subject Matter Experts (SME) are verified by the other SME
- Questions are mapped to the specified assessment criteria
- Assessor must be ToA certified & trainer must be ToT Certified

4. Types of evidence or evidence-gathering protocol:
- Time-stamped & geotagged reporting of the assessor from assessment location
- Centre photographs with signboards and scheme specific branding

5. Method of verification or validation:
- Surprise visit to the assessment location
  6. Method for assessment documentation, archiving, and access
- Hard copies of the documents are stored

On the Job:
1. Each module (which covers the job profile of Automotive Service Assistant Technician) will be assessed separately.
2. The candidate must score 60% in each module to successfully complete the OJT.
3. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and perform Soft Skills effectively:
   • Videos of Trainees during OJT
4. Assessment of each Module will ensure that the candidate is able to:
- Effective engagement with the customers
- Understand the working of various tools and equipment

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

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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