QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR INSTRUMENTATION AUTOMATION SURVEILLANCE AND COMMUNICATION

What are Occupational Standards (OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack – Programmable Logic Controller (PLC) Programmer and Troubleshooter

SECTOR/S: Instrumentation Automation Surveillance And Communication

SUB SECTOR: Instrumentation and Automation

OCCUPATION: Installation and Commissioning

REFERENCE ID: IAS/Q5609

ALIGNED TO: NCO-2015/8212.2002

Brief Job Description: PLC programmer and troubleshooter is responsible for controlling various processes of industries involving development, testing and commissioning the PLC program, finding errors, if any, and then fixing the errors or faults, during the operation of the plant.

Personal Attributes: The individual must have attention to details, technical know-how, and ability to execute the project. The individual should be able to demonstrate strong technical expertise and possess good oral and written communications skills. The individual should also be comfortable working with deadlines.

Job Details

Qualification Pack Code	**IAS/Q5609**		
Job Role	**Programmable Logic Controller (PLC) Programmer and Troubleshooter** (Applicable for National Scenarios)		
Credits NSQF	**TBD**	**Version number**	**1.0**
Sector	**Instrumentation Automation Surveillance and Communication**	**Drafted on**	**16/09/2019**
Sub-Sector	**Instrumentation and Automation**	**Last reviewed on**	**21/01/2020**
Occupation	**Installation and Commissioning**	**Next review date**	**21/01/2025**
NSQC Clearance On	**NA**		

Job Role	Programmable Logic Controller (PLC) Programmer and Troubleshooter
Role Description	Responsible for programming PLC needed for controlling various processes of industries and finding and fixing errors or faults, if any, during the operation of the plant.
NSQF Level	4
Minimum Educational Qualifications **Maximum Educational Qualifications**	Diploma in Electrical/Electronics/Instrumentation, B.Sc. in Electronic NA
Prerequisite License or Training	NA
Minimum Job Entry Age	19 years
Experience	NA
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. IAS/N5611 Develop PLC program using related software 2. IAS/N5612 Test the PLC program using simulators 3. IAS/N5613 Commission and test the PLC program using trial runs on site 4. IAS/N5614 Troubleshoot faults in the machine or process plant 5. IAS/N9001 Work effectively with teams 6. IAS/N9002 Health and safety in workplace
Performance Criteria	As described in the relevant OS units

Definition

Keywords/Terms	Description
Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance criteria are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OSs, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributed to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.
Knowledge and Understanding	Knowledge and understanding are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual need to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.

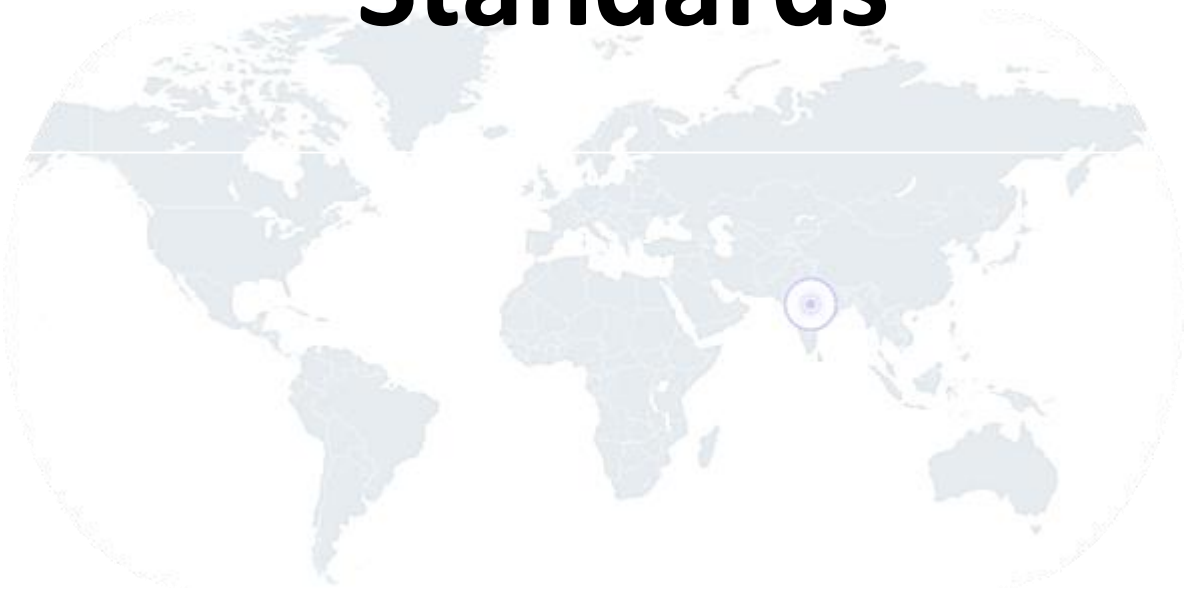
Core Skills/ Generic Skills	Core skills or generic skills are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

Keywords/Terms	Description
FAT	Factory Acceptance Test
PLC	Programmable Logic Controller
DCS	Distributed Control System
HMI	Human Machine Interface
SCADA	Supervisory Control And Data Acquisition
NOS	National Occupational Standard(s)
NVQF	National Vocational Qualifications Framework
NSQF	National Skill Qualifications Framework
NVEQF	National Vocational Education Qualifications Framework
QP	Qualification Pack
ESD	Electro Static Discharge
IO	Input Output
DI	Digital Input
DO	Digital Output
AI	Analog Input
AO	Analog Output

IAS/N5611 Develop PLC program using related software

National Occupational Standards



Overview

This unit is about developing the PLC program using the related programming software.

IAS/N5611 Develop PLC program using related software

National Occupational Standard

Unit Code	**IAS/N5611**
Unit Title	**Develop PLC program using related software**
Description	This OS unit is about developing the PLC program using the related programming software.
Scope	This unit/task covers the following: • Perform preparatory work • Gather and implement necessary instruction set • Develop the program / logic / code for the PLC
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Perform preparatory work	To be competent, the user/ individual must be able to: PC1. identify the customer requirement for the PLC control panel including the field equipment and size of control panel PC2. examine the onsite location where control panel will be placed PC3. prepare the dimension of the control panel based on requirement PC4. identify the required layout for mounting of components on the mounting plate inside the control panel PC5. examine the panel fabrication drawing and internal mounting layout drawings to ensure these are as per requirement and standards PC6. identify PLC modules used in the control panel PC7. provide instructions to the fabrication team to give cut-outs on the panel door for mounting of panel HMI and fitting of panel switches
Gather and implement necessary instruction set	To be competent, the user/ individual must be able to: PC8. use the organisation/customer approved software and corresponding programming language for developing the process logics PC9. collect information related to pre-requisites for software installation on PC/laptops for programming PC10. check the availability of the communication protocol, to be used for communication between programming software and PLC PC11. get detailed information on communication program blocks used especially for communication between different components in the panel PC12. acquire and collect information of normally open (NO) and normally closed (NC) contacts in field PC13. gather detailed information about bit instructions, mathematical instructions and conversion instructions and compare instructions to be used in the program PC14. identify the timer and counter logics blocks, along with move data blocks, as required in process logics PC15. identify the requirement of special blocks like PID, high speed counters etc.
Design and develop the program / logic / code for the PLC	To be competent, the user/ individual must be able to: PC16. discuss and collect information from customer regarding the equipment and instruments used in the plant PC17. prepare input-output (IO) list and other PLC module from the inputs given by customer and provide instructions to the control panel makers to incorporate accordingly in the panel PC18. communicate problem effectively in order to secure customer's confidence

	PC19. ensure customer satisfaction and positive feedback PC20. record minimum customer complaints post service PC21. avoid occurrence of repetitive problems post service PC22. prepare optimum route plan to complete daily target visits
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the Company/ Organisation and its Processes)	The user/individual on the job needs to know and understand: KA1. company's code of conduct and organisation's culture and reporting structure KA2. company's documentation policy KA3. company's line of business and production policy KA4. departments involved with installation and commissioning KA5. system of quality and standards followed by the company KA6. standard operating procedures (SOP) of the organisation for process automation logic development
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. basics of computer and operating systems KB2. basics of machine safety and normal safety processes KB3. standards and guidelines to be followed during program development KB4. control system module and technologies used in the automation process KB5. PLC programming software KB6. application software, installation and debugging KB7. piping and instrumentation diagram (P and ID) KB8. basics on infrastructure process involved in the industry such as water treatment plant, chilling units, etc. KB9. safety aspects to be inbuilt in the PLC programming as per the process requirement KB10. sources and methods for obtaining required technical information for the PLC program to be developed KB11. IEC standards in PLC programming language KB12. relevant documents to be referred for optimised PLC programming
Skill(s)	
A. Core Skills/Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. compose e-mails, letters and other official documents clearly SA2. write user requirements SA3. write test reports SA4. write technical documentation SA5. write schedules and timelines
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA6. read user requirements SA7. read technical specifications SA8. read standards and regulatory compliance documents SA9. read schedules and timelines SA10. read drawings
	Oral Communication (Listening and Speaking Skills)
	The user/individual on the job needs to know and understand how to: SA11. question customers appropriately in order to understand the application and the requirements SA12. discuss task lists, schedules and work-loads with customers SA13. keep customers informed about the progress of logic development

	SA14. use simple and clear language when communicating with a customer
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. choose appropriate PLC programming software SB2. identify the desired number of input-output in the panel SB3. choose the appropriate programming language to optimise logic development
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB4. plan and organise project related to requirements, design and integration, testing, installation and commissioning, customer acceptance test and customer feedback SB5. anticipate issues and have alternate strategy
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB6. identify needs of the customer and suggest most appropriate solution SB7. manage relationships and maintain good rapport with customers to get detailed inputs on logic
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB8. think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s) SB9. solve issues of co-workers lacking technical know-how SB10. identify immediate or temporary solutions to resolve delays
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB11. use the existing information for improving the PLC program SB12. use the existing information to optimise the logic SB13. analyse problems and identify causes and possible solutions
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB14. analyse and evaluate the information gathered from observation, experience, reasoning or communication as a guide to think and take action SB15. anticipate problems, risks and opportunities and utilise these for optimisation of PLC program

IAS/N5611 **Develop PLC program using related software**

NOS Version Control

NOS Code	IAS/N5611		
Credits NSQF	TBD	Version Number	1.0
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Sub Sector	Instrumentation and Automation	Last reviewed on	25/11/2019
Occupation	Installation and Commissioning	Next review Date	25/11/2022

IAS/N5612 Test the PLC program using simulators

National Occupational Standards

Overview

This unit deals with the testing of PLC program using various simulator options that are available.

IAS/N5612 Test the PLC program using simulators

National Occupational Standard

Unit Code	IAS/N5612
Unit Title	Test the PLC program using simulators
Description	This OS unit is specifically designed to prepare learners with the required learning outcomes needed to test the PLC program using simulator.
Scope	This unit/tasks covers the following: • Download / transfer the PLC program in PC-based software simulators • Test the program using hardware simulators • Develop the error handling program for the PLC and test it
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Download / transfer the PLC program in PC-based software simulators	To be competent, the user/ individual must be able to: PC1. download the compilation error-free program and transfer it to the computer based internal software simulator for further checks PC2. activate the respective inputs in software simulator to check the automation logic and thereby identify any error PC3. modify and edit the logical error, data address overlap and wrong IO address access to maximise program stability
Test the program using hardware simulators	To be competent, the user/ individual must be able to: PC4. download the modified software simulated logic into the PLC hardware available in office test bench PC5. connect actual DI, DO, AI and AO modules to check the hardware loading on PLC PC6. connect hardware toggle switches to test program reaction via virtual field inputs PC7. connect hardware LED/lLamps to check output generated from PLC program PC8. connect hardware analog simulators to check analog behaviour of PLC program
Develop the error handling program for the PLC and test it	To be competent, the user/ individual must be able to: PC9. ensure use of appropriate programming logics to avoid non functionality of CPU due to hardware errors PC10. identify and examine hardware related error which may occur during testing of PLC program PC11. execute these error handling programs by physically creating faults like supply failure, communication break, IO channel error, module failure etc. PC12. generate outputs from error handling PLC program for error monitoring on HMI devices like display panels or SCADA systems PC13. ensure completion of factory acceptance test (FAT) and send report to customer
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the Company/ Organisation and its Processes)	The user/individual on the job needs to know and understand: KA1. organisation's policies on customer care KA2. organisation's departments involved with engineering KA3. organisation's code of conduct KA4. organisation's culture and typical customer profile KA5. organisation's reporting structure KA6. organisation's documentation policy and policies on quality and standards KA7. organisation's escalation matrix and procedures for reporting work and employment related issues

B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. basics of computer and operating systems KB2. standard operating procedure (SOP) of the organisation for process automation logic testing in stimulation KB3. safety aspects to be inbuilt in the PLC program testing as per the process requirement KB4. testing process and parameters involved in the testing KB5. sources and methods for obtaining required technical information for the PLC program to be tested KB6. IEC standards in PLC programming language KB7. relevant documents to be referred for testing PLC program
Skill(s) [Optional]	
A. Core Skills/Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. complete forms such as work orders, invoices, maintenance records, etc. SA2. note problems on job sheet and details of work done SA3. create test reports and other technical documentation SA4. maintain schedules and time charts
	Reading Skills
	The user/ individual on the job needs to know and understand how to: SA5. read warnings, instructions and other text material on product labels, components, etc. SA6. read work orders/ schedules SA7. read user requirements SA8. read technical specifications SA9. read standards and regulatory compliance documents
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA10. convey and share technical information clearly using appropriate language and terminology SA11. check and clarify task-related information SA12. discuss task lists, schedules and workloads with colleagues SA13. keep colleagues /superiors informed about progress of logic testing SA14. ask questions and discuss problems with colleagues/superiors appropriately to understand the nature of the problem and make a diagnosis SA15. report issues and problems to superiors in clear terms
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. select appropriate solution for the faults in hardware SB2. choose appropriate solution for the faults in programming SB3. select appropriate error handling program
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB4. plan, prioritise and organise work related to requirements, design and integration, testing, installation and commissioning SB5. organise and collate customer acceptance reports and feedback SB6. maintain productivity by applying time management and efficient resource utilisation
	Customer Centricity

	The user/individual on the job needs to know and understand how to: SB1. maintain personal hygiene and be well groomed SB2. be polite, patient and courteous under all circumstances and with all types of customers SB3. decide on the spot on whether interaction of customer with superior is necessary or not SB4. maintain proper etiquette such as keeping appropriate physical distance from the customer during conversation, not entering bedroom without permission, etc. SB5. identify needs of the customer and explain the most appropriate solution SB6. build good relationships and rapport with customers to facilitate getting inputs related to program testing from them
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB7. work on problems to be able to suggest the best solution SB8. solve issues of co-workers lacking technical know-how SB9. identify immediate or temporary solutions to resolve issues causing delays
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB10. use existing information for improving the testing of the program SB11. use existing information to optimise the test cases SB12. analyse issues, identify causes and suggest possible resolutions
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB13. analyse and evaluate the information gathered from observation, experience, reasoning or communication as a guide to think and take action SB14. anticipate problems, risks and opportunities and utilise these for optimisation of PLC program

NOS Version Control

NOS Code	IAS/N5612		
Credits NSQF	TBD	Version Number	1.0
Sector	Instrumentation Automation Surveillance and Communication	Drafted on	16/09/2019
Sub Sector	Instrumentation and Automation	Last reviewed on	25/11/2019
Occupation	Installation and Commissioning	Next review Date	25/11/2022

IAS/N5613 Commission and test the PLC program using trial runs onsite

National Occupational Standards

Overview

This unit is about commissioning and testing the PLC program using trial runs onsite.

IAS/N5613 Commission and test the PLC program using trial runs onsite

National Occupational Standard

Unit Code	IAS/N5613
Unit Title	Commission and test the PLC program using trial runs onsite
Description	This OS unit is specifically designed to prepare learners with the required learning outcomes needed for commissioning and testing the PLC program using trial runs onsite.
Scope	This unit/tasks covers the following: • Test the functionality of physical inputs and outputs • Download / transfer the tested program to the PLC • Commission the program using trial runs • Achieve productivity and quality
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Test the functionality of physical inputs and outputs	To be competent, the user/ individual must be able to: PC1. collect information from customer about the availability of resources, tools for installation of PLC control panel and time period for completion of the task PC2. check if the wiring between the terminal base of PLC panel and the field devices is completed PC3. check the cable numbering and continuity test report PC4. examine the power supply input to PLC panel and turn it on PC5. activate the field sensors and limit switches, etc. to verify them on input module PC6. activate the PLC outputs to check working of field outputs like actuators, contactors, relays etc. PC7. identify if there are any issues in physical IO check and inform customer
Download / transfer the tested program to the PLC	To be competent, the user/ individual must be able to: PC8. discuss and get permission from customer for downloading the program into the PLC PC9. transfer the PLC program into the CPU at the customer's site PC10. check the PLC program by activating sensors, switches or push buttons and examine the function of outputs
Commission the program using trial runs	To be competent, the user/ individual must be able to: PC11. get permissions from customer for execution of process through PLC program and execute the same PC12. identify errors in program and redo the logic after customer's feedback and maintain the standards PC13. check if the trial runs' error handling program works correctly in order to avoid sudden loss of productivity and attain smooth shutdown
Achieve productivity and quality	To be competent, the user/ individual must be able to: PC14. ensure damage free handling of the equipment PC15. diagnose the problem accurately and within assigned time PC16. ensure 100% customer satisfaction
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the Company/ Organisation and its	The user/individual on the job needs to know and understand: KA1. organisation's policies on customer care KA2. organisation's departments involved with installation and commissioning KA3. organisation's code of conduct KA4. organisation's culture and typical customer profile KA5. organisation's reporting structure

Processes)	KA6. organisation's documentation policy and policies on quality and standards KA7. standard operating procedures (SOP) of the organisation for commissioning of process plant
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. electrical concepts, electronics and instrumentation KB2. basics of machine safety and normal safety processes KB3. quality, standards and guidelines to be followed during installation and commissioning KB4. PLC module and technologies used in the automation process KB5. instrumentation used in the factory and its wiring concept KB6. testing process and parameters involved in the testing KB7. how to communicate with shop floor technicians in order to resolve any discrepancies during commissioning KB8. basic power systems, motor fundamentals, drive systems fundamentals KB9. relevant documents and documentation procedures used in the process
Skill(s) [Optional]	
A. Core Skills/Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. fill appropriate forms, activity logs, attendance sheets as per the organisation's format in English and/or local language SA2. write email to communicate within and outside the organisation as per the organisation's guidelines SA3. create test reports and other documentation
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA4. read work orders / schedules SA5. read user requirements SA6. read technical specifications SA7. read standards and regulatory compliance documents SA8. read schedules, time charts and drawings
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA9. convey and share technical information clearly, using appropriate language and terminology SA10. check and clarify task-related information SA11. discuss task lists, schedules and workloads with colleagues SA12. keep colleagues / superiors informed about progress of logic testing SA13. ask questions and discuss problems with colleagues / superiors appropriately to understand the nature of the problem and make a diagnosis SA14. report issues and problems to superiors in clear terms
	Team Work and Multi-tasking
	The user/individual on the job needs to know and understand how to : SA15. work in teams to devise creative solutions SA16. plan and organise own tasks SA17. multi-task, handle additional responsibility and adapt quickly to changing priorities
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. select appropriate solution for faults in the hardware SB2. decide whether the customer site is ready for commissioning and testing

	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB3. plan, prioritise and organise work related to requirements, design and integration, testing, installation and commissioning SB4. organise and collate customer acceptance reports and feedback SB5. maintain productivity by applying time management and efficient resource utilisation
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB6. identify customer needs and suggest the best solution SB7. support customer when they need help SB8. ensure customer satisfaction after job completion SB9. build customer relationships and rapport to ensure smooth commissioning
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB10. identify the problem, evaluate the possible solution(s) and suggest an optimum/best possible solution(s) SB11. solve problems of co-workers during commissioning SB12. identify immediate or temporary solutions to resolve issues causing delays and implement the proper solution when possible
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB13. analyse and evaluate the information gathered from observation, experience, reasoning, or communication as a guide for thought and action SB14. anticipate problems, risks and opportunities and utilise these for optimising the commissioning

IAS/N5613 Commission and test the PLC program using trial runs onsite

NOS Version Control

NOS Code	**IAS/N5613**		
Credits NSQF	TBD	Version Number	1.0
Sector	Instrumentation Automation Surveillance and Communication	Drafted on	16/09/2019
Sub Sector	Instrumentation and Automation	Last reviewed on	25/11/2019
Occupation	Installation and Commissioning	Next review Date	25/11/2022

National Occupational Standards

Overview

This unit is about troubleshooting of faults in a machine or process plant.

National Occupational Standard

IAS/N5614 Troubleshoot faults in the machine or process plant

Unit Code	IAS/N5614
Unit Title	Troubleshoot faults in the machine or process plant
Description	This OS unit is specifically designed to prepare learners with the required learning outcomes needed for troubleshooting of faults in a machine or process plant.
Scope	This unit/tasks covers the following: • Gather information about products, hardware and software support • Test working of machine and the process plant • Install replaced products and schedule tasks
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Gather information about products, hardware and software support	To be competent, the user/ individual must be able to: PC1. collect information from customer about the availability of resources, tools for installation of PLC control panel and time period for completion of the task PC2. identify problem in the machine/plant by asking the supervisor/engineer PC3. obtain the control drawing of the machine/plant connected with the PLC and the different modules PC4. check if the modules, equipment and electrical components are available onsite PC5. check if the installation has been done as per installation guidelines PC6. ensure that the software and program backup are available in the plant
Test working of machine and the process plant	To be competent, the user/ individual must be able to: PC7. prepare a flow chart for troubleshooting any machine/plant PC8. test the panel and modules for proper functioning as recommended PC9. check earthing and power supply for proper functioning before troubleshooting PC10. cross-check whether the PLC and its module is attached at right place PC11. verify whether the communication cable is supporting the protocol or not PC12. make changes in running project if it is required to rectify the faults PC13. check if the connected devices are in operation or have stopped at the time of troubleshooting PC14. enter parameter of the connected load accurately in PLC PC15. get the parameter reading according to schedule PC16. prepare a site report after troubleshooting and mention the remedy
Install replaced products and schedule tasks	To be competent, the user/ individual must be able to: PC17. match the product according to the catalogue number with the drawing and material list PC18. take a program backup before and after troubleshooting PC19. replace the module/equipment if it is found faulty and provide the module replacement to the customer according to PLC
Knowledge and Understanding (K)	
C. Organisational Context (Knowledge of the Company/ Organisation and its Processes)	The user/individual on the job needs to know and understand: KA1. organisation's policies on customer care KA2. organisation's departments involved with troubleshooting KA3. organisation's code of conduct KA4. organisation's culture and typical customer profile KA5. organisation's reporting structure KA6. organisation's documentation policy and policies on quality and standards KA7. standard operating procedure (SOP) of the organisation for commissioning of process plant

D. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. electrical concepts, electronics and instrumentation KB2. basics of machine safety and normal safety processes KB3. basics of computer and operating systems KB4. quality, standards and guidelines to be followed during troubleshooting KB5. PLC module and equipment used in the automation process KB6. PLC programming software KB7. application software, installation and debugging KB8. general arrangement drawing KB9. piping and instrumentation diagram (P and ID) KB10. instrumentation used in the factory and its wiring concept KB11. electrical panel and wiring KB12. testing process and parameters involved in the testing KB13. electronics indicators, switchgear and panel accessories KB14. relevant regulations, standards and codes of practice and their implications on the troubleshooting KB15. how to communicate with shop floor technicians in order to resolve any discrepancies during troubleshooting KB16. basic power systems, motor fundamentals and drive system fundamentals
Skill(s) [Optional]	
C. Core Skills/Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. fill appropriate forms, logs and attendance sheets as per the organisation's format SA2. write email to communicate within and outside the organisation as per the organisation's guidelines SA3. create test reports and other documentation
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA4. read work orders / schedules SA5. read user requirements SA6. read technical specifications SA7. read standards and regulatory compliance documents SA8. read schedules, time charts and drawings
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA9. convey and share technical information clearly using appropriate language and terminology SA10. check and clarify task-related information SA11. discuss task lists, schedules and workloads with colleagues SA12. keep colleagues / superiors informed about progress of logic testing SA13. ask questions and discuss problems with colleagues / superiors appropriately to understand the nature of the problem and make a diagnosis SA14. report issues and problems to superiors in clear terms
D. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. decide whether the customer's site is ready for troubleshooting
	Plan and Organise
	The user/individual on the job needs to know and understand how to:

	SB2. plan, prioritise and organise work related to requirements, design and integration, testing, installation and commissioning SB3. organise and collate customer acceptance reports and feedback SB4. maintain productivity by applying time management and efficient resource utilisation
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB5. identify customer needs and suggest the best solution SB6. support customer when they need help SB7. ensure customer satisfaction after job completion SB8. build customer relationships and rapport to help the customer in self-troubleshooting the plant by availing online assistance
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB9. identify the problem, evaluate the possible solution(s) and suggest an optimum/best possible solution(s) SB10. solve problems of co-workers during commissioning SB11. identify immediate or temporary solutions to resolve issues causing delays and implement the proper solution when possible
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB12. use existing information to arrive at course of actions SB13. use existing information for improving the customer satisfaction SB14. use existing information to optimise solution and bring machine/plant in running state SB15. analyse problems and identify causes and possible solutions
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB16. analyse and evaluate the information gathered from observation, experience, reasoning, or communication as a guide for thought and action SB17. anticipate problems, risks and opportunities and utilise these for optimising the commissioning

NOS Version Control

NOS Code	**IAS/N5614**		
Credits NSQF	TBD	Version Number	1.0
Sector	Instrumentation Automation Surveillance and Communication	Drafted on	16/09/2019
Sub Sector	Instrumentation and Automation	Last reviewed on	25/11/2019
Occupation	Installation and Commissioning	Next review Date	25/11/2022

National Occupational Standards

Overview

This unit is about communicating and managing work effectively while working in a team, taking appropriate measures to enhance own competence and working in a disciplined and ethical manner.

IAS/N9001 Work effectively with teams

National Occupational Standard

Unit Code	IAS/N9001
Unit Title	**Work effectively with teams**
Description	This NOS unit is about building relationships and working with people and groups inside and outside the organisation, using skills and habits to achieve the team goals and objectives.
Scope	This unit/ task covers the following: • Create team environment • Communicate - give and receive • Work cooperatively • Participate in team decision making • Demonstrate Sense of Responsibility • Show respect for opinions, customs and preferences
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Create team Environment	To be competent, the user/ individual must be able to: PC1. know and understand the team objectives and goals PC2. know team members by name, greet them appropriately and respond to their greetings PC3. know the roles and responsibilities of team members and ensure others know about you and your role in the team PC4. learn about the culture and preferences of team members, especially if they belong to other organisations or nationalities PC5. follow organisation's policies and procedures for working with team members within and outside the organisation—especially related to privacy, confidentiality and security PC6. create an environment of trust and mutual respect
Communicate – give and receive	To be competent, the user/ individual must be able to: PC7. use appropriate mode of communication —verbal, written, mail, phone or text—and clearly articulate the message to ensure that the receiver understands the message PC8. listen to team members and try to understand what they want to say and seek or provide clarifications if any gap in understanding is seen PC9. communicate professionally, follow organisation's protocols and refrain from overloading the team members with unnecessary and unsolicited information PC10. share important information with the team timely PC11. respond to communications promptly
Work co-operatively	To be competent, the user/ individual must be able to: PC12. perform own role and produce output in time for other team members to follow PC13. receive inputs from others and work upon it as per role requirement PC14. make adjustments within the permissible rules so that work flows smoothly PC15. help team members to perform their role effectively and provide any clarifications and support they need PC16. share tools and common resources fairly, taking cognizance of others'

	needs and schedules PC17. resolve any contentious issues amicably, involving the team lead or the supervisor if needed PC18. let team members know in good time if commitments cannot be carried out, explaining the reasons, and provide alternate solutions, if any; let the team lead know about this
Participate in team decision making	To be competent, the user/ individual must be able to: PC19. think positively and make constructive suggestions to meet the goals PC20. accept and give suggestions with open mind PC21. take initiatives and volunteer to contribute PC22. help team members with facts and figures to arrive at workable decisions PC23. accept decisions professionally and support these, even if these do not match your suggestions and personal views
Demonstrate sense of responsibility	To be competent, the user/ individual must be able to: PC24. act in the interest of the team and the organisation to ensure that things do not 'fall through the gap' and team goals are achieved PC25. take initiative to correct the situation if something seems to be going wrong PC26. seek help or escalate if the situation demands
Show respect for opinions, customs and preferences	To be competent, the user/ individual must be able to: PC27. follow organisation's policies and statutory guidelines while making references or comments on social customs or preferences PC28. refrain from making any comments to hurt sentiments PC29. accommodate team members' preferences to the extent feasible if these come in the way of fulfilling team goals, discuss with the supervisor/ team leader PC30. seek information and clarifications from others if you do not understand any customs
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the Company/ Organisation and its Processes)	The user/individual on the job needs to know and understand: KA1. organisation's policies on dress code, workplace timings, workplace behaviour, performance management, incentives, delivery standards, information security, etc. KA2. organisation's hierarchy and escalation matrix KA3. importance of the individual's role in the workflow KA4. organisation's health safety and environment KA5. work area inspection procedures and practices
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. different types of information that colleagues might need and the importance of providing this information when it is required KB2. the importance of helping colleagues with problems in order to meet quality and time standards as a team
A. Core Skills/Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. complete forms such as work orders, invoices and maintenance records SA2. fill up appropriate forms, activity logs and attendance sheets as per the

	organisation's format in English and/or local language SA3. write basic accident or incident report as witnessed in an appropriate format to the relevant authority
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA4. read warnings, instructions and other text material on product labels, components, etc. SA5. read relevant signage, warnings, labels or descriptions on equipment, etc. while carrying out work activities
	Communication Skills
	The user/individual on the job needs to know and understand how to: SA6. listen effectively and orally communicate information SA7. ask for clarification and advice from the concerned person
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions on a suitable course of action or response keeping in view resource utilisation while meeting
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB2. plan and organise work to achieve targets and deadlines
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB3. understand real needs of the customer and suggest most appropriate solution SB4. support customer when needed
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB5. match symptoms of the fault noticed to the cause of the problem SB6. anticipate and avoid hazards that may occur during repairs because of tools, materials used or repair processes SB7. spot process disruptions and delays

NOS Version Control

NOS Code	**IAS/N9001**		
Credits NSQF	TBD	Version Number	1.0
Sector	Instrumentation Automation Surveillance and Communication	Drafted on	16/09/2019
Sub Sector	Instrumentation and Automation	Last reviewed on	25/11/2019
Occupation	Installation and Commissioning	Next review Date	25/11/2022

IAS/N9002 Health and safety in workplace

National Occupational Standards

Overview

This unit covers health, safety and security practices. This includes procedures and practices that candidates need to follow to help maintain a healthy, safe and secure work environment in a given work site.

National Occupational Standard

IAS/N9002 Health and safety in workplace

Unit Code	IAS/N9002
Unit Title	**Health and safety in workplace**
Description	This OS unit is about following adequate safety procedures to make work environment safe
Scope	This unit/tasks covers the following: • Follow standard safety procedures of the company • Maintain good health and posture

Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Follow standard safety procedures of the company	To be competent, the user/ individual must be able to: PC1. comply with general safety procedures followed in the company PC2. follow standard safety procedures while handling an equipment, hazardous material or tool PC3. remove finger rings or any other metal objects which may interfere with the work before working on the unit PC4. use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc. PC5. escalate the issue about any hazardous materials or things found in the premises PC6. report about any breach of safety procedure in the company PC7. ensure zero accidents at work PC8. avoid damage of components due to negligence in ESD procedures PC9. participate regularly in fire drills or other safety related workshops organised by the company PC10. ensure no loss to the company occurs due to safety negligence
Maintain good health and posture	To be competent, the user/ individual must be able to: PC11. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials PC12. participate in company organised health sessions such as yoga, physiotherapy or games PC13. handle heavy and hazardous materials with care and with appropriate tools and handling equipment such as trolleys, jacks and ladders

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the Company/ Organisation and its Processes)	The user/individual on the job needs to know and understand: KA1. company's policies on incentives, delivery standards, and personnel management KA2. company occupational safety and health policy KA3. company emergency evacuation procedure KA4. company's medical policy
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. how to maintain the work area safe and secure KB2. how to handle hazardous materials, tools and equipment KB3. procedures to be followed during emergencies such as fire accidents, electrocution, etc. KB4. long term value of good posture and use of appropriate handling equipment KB5. safety regulations and standards and how to apply these

	KB6. electrical grounding practices
Skill(s) [Optional]	
A. Core Skills/Generic Skills	**Writing Skills**
	The user/individual on the job needs to know and understand how to: SA1. fill up appropriate forms, activity logs and attendance sheets as per organisation's format in English and/or local language SA2. write basic accident or incident report as witnessed in appropriate format to relevant authority
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. read/listen and interpret information correctly from relevant instruction documents, manuals, health and safety instructions, memos, etc. applicable to the job, in English and/or local language SA4. read relevant signage, warnings, labels or descriptions on equipment, etc. while carrying out work activities
	Communication Skills
	The user/individual on the job needs to know and understand how to: SA5. question co-workers in order to understand the safety and health issues SA6. inform co-workers about safety and health issues SA7. report issues and problems relating to safety and health to managers in clear terms
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. make decisions pertaining to safety and health issues at workplace SB2. make decisions about escalating safety and health issues at workplace to managers
	Plan and Organise
	The user/individual on the job needs to know and understand how to: SB3. plan and organise work conforming to the safety and health norms of the company
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB4. discuss problems related to safety and health, evaluate the possible solution(s) and arrive at optimum /best possible solution(s) in consultation with concerned people
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB5. use the existing information to arrive at actionable decision points SB6. use the existing information for improving customer satisfaction SB7. use the existing information to optimise solution and company business SB8. analyse problems and identify causes and possible solutions
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB9. apply, analyse and evaluate the information gathered from observation, experience, reasoning, or communication as a guide to thought and action SB10. anticipate problems, risks and opportunities and utilise these for mitigation and business optimisation

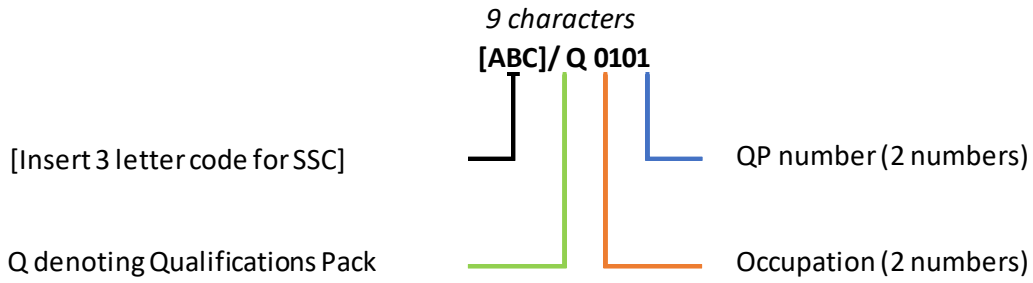
NOS Version Control

NOS Code	**IAS/N9002**		
Credits NSQF	TBD	Version Number	1.0
Sector	Instrumentation Automation Surveillance and Communication	Drafted on	16/09/2019
Sub Sector	Instrumentation and Automation	Last reviewed on	25/11/2019
Occupation	Installation and Commissioning	Next review Date	25/11/2022

Annexure

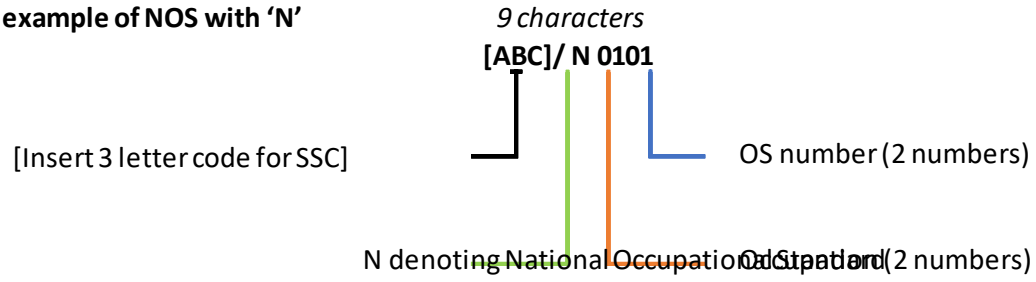
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



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The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Instrumentation & Automation	30-59
Surveillance	60-89
Communication(Broadcast)	01-29
General	90-99

Sequence	Description	Example
Three letters	Industry Name	IAS
Slash	/	/
Next letter	Whether QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

Criteria for Assessment of Trainees

Job Role Programmable Logic Controller (PLC) Programmer and Troubleshooter

Qualification Pack IAS/Q5609

Sector Skill Council Instrumentation Automation Surveillance and Communications

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS **Total Marks: 525**				Marks Allocation	
Assessment Outcomes	**Performance Criteria**	**Total Marks**	**Out of**	**Theory**	**Skills Practical**
IAS/N5611 Develop PLC program using related software	PC1. identify the customer requirement for the PLC control panel including the field equipment and size of control panel	**100**	5	2	3
	PC2. examine the onsite location where control panel will be placed		5	2	3
	PC3. prepare the dimension of the control panel based on requirement		5	2	3
	PC4. identify the required layout for mounting of components on the mounting plate inside the control panel		5	2	3
	PC5. examine the panel fabrication drawing and internal mounting layout drawings to ensure these are as per requirement and standards		5	2	3
	PC6. identify PLC modules used in the control panel		5	2	3
	PC7. provide instructions to the fabrication team to give cut-outs on the		5	2	3

	panel door for mounting of panel HMI and fitting of panel switches				
	PC8. verify that the printer prints the specified material(s) in the format as per acceptable standards including resolution, and there are no discontinuities, jagged edges or undesirable marks or protrusions on the surface		5	2	3
	PC9. collect information related to pre-requisites for software installation on pc/laptops for programming		5	2	3
	PC10. check the availability of the communication protocol, to be used for communication between programming software and PLC		5	2	3
	PC11. get detailed information on communication program blocks used especially for communication between different components in the panel		4	2	2
	PC12. acquire and collect information of normally open (NO) and normally closed (NC) contacts in field		5	2	3
	PC13. gather detailed information about bit instructions, mathematical instructions and conversion instructions and compare instructions to be used in the program		4	2	2
	PC14. identify the timer and counter logics blocks, along with move data blocks, as required in process logics		4	2	2
	PC15. identify the requirement of special blocks like PID, high speed counters etc.		5	2	3
	PC16. discuss and collect information from customer regarding the equipment and instruments used in the plant		4	2	2
	PC17. prepare input-output (IO) list and other PLC module from the inputs given by customer and provide instructions to the control panel makers to incorporate accordingly in the panel		5	2	3
	PC18. communicate problem effectively in order to secure customer's confidence		4	2	2
	PC19. ensure customer satisfaction and positive feedback		4	1	3
	PC20. record minimum customer complaints post service		3	1	2
	PC21. avoid occurrence of repetitive		4	1	3

	problem post service				
	PC22. prepare optimum route plan to complete daily target visits		4	1	3
		Total	**100**	**40**	**60**
IAS/N5612 Test the PLC program using simulators	PC1. download the compilation error-free program and transfer it to the computer based internal software simulator for further checks	**100**	7	3	4
	PC2. activate the respective inputs in software simulator to check the automation logic and thereby identify any error		6	3	3
	PC3. modify and edit the logical error, data address overlap and wrong IO address access to maximise program stability		8	3	5
	PC4. download the modified software simulated logic into PLC hardware available in office test bench		6	3	3
	PC5. connect actual DI, DO, AI and AO modules to check the hardware loading on PLC		7	3	4
	PC6. connect hardware toggle switches to test program reaction via virtual field inputs		7	3	4
	PC7. connect hardware LED/Lamps to check output generated from PLC program		7	3	4
	PC8. connect hardware analog simulators to check analog behaviour of PLC program		7	3	5
	PC9. ensure use of appropriate programming logics to avoid non functionality of CPU due to hardware errors		7	3	4
	PC10. identify and examine hardware related error which may occur during testing of PLC program		10	4	6
	PC11. execute these error handling programs by physically creating faults like supply failure, communication break, IO channel error, module failure etc.		9	3	6
	PC12. generate outputs from error handling PLC program for error monitoring on HMI devices like Display		9	3	6

	Panels or SCADA systems				
	PC13. ensure completion of factory acceptance test (FAT) and send report to customer		9	3	6
	Total		**100**	**40**	**60**
IAS/N5613 Commission and test the PLC program using trial runs onsite	PC1. collect information from customer about the availability of resources, tools for installation of PLC control panel and time period for completion of the task		6	2	4
	PC2. check if the wiring between the terminal base of PLC panel and the field devices is completed		7	3	4
	PC3. check the cable numbering and continuity test report		6	2	4
	PC4. examine the power supply input to PLC panel and turn it on		7	3	4
	PC5. activate the field sensors and limit switches, etc. to verify them on input module		6	2	4
	PC6. activate the PLC outputs to check working of field outputs like actuators, contactors, relays etc.		6	2	4
	PC7. identify if there are any issues in physical IO check and inform customer		7	3	4
	PC8. discuss and get permission from customer for downloading the program into PLC	**100**	6	2	4
	PC9. transfer the PLC program into the CPU at the customer's site		6	2	4
	PC10. check the PLC program by activating sensors, switches or push buttons and examine the function of outputs		7	3	4
	PC11. get permissions from customer for execution of process through PLC program and execute the process		6	2	4
	PC12. identify errors in program and redo the logic after customer's feedback and maintain the standards capabilities		7	3	4
	PC13. check if the trial runs' error handling program works correctly, in order to avoid sudden loss of productivity and attain smooth shutdown		6	3	3

	PC14. ensure damage free handling of the equipment		6	3	3
	PC15.diagnose the problem accurately and within assigned time		6	3	3
	PC16. ensure 100% customer satisfaction		5	2	3
	Total		**100**	**40**	**60**
IAS/N5614 Troubleshoot faults in the machine or process plant	PC1. collect information from customer about the availability of resources, tools for installation of PLC control panel and time period for completion of the task	**100**	6	2	4
	PC2. identify problem in the machine/plant by asking the supervisor/engineer		6	2	4
	PC3. obtain the control drawing of the machine/plant connected with the PLC and the different modules		6	2	4
	PC4. check if the modules, equipment and electrical components are available on site		6	2	4
	PC5. check if the installation has been done as per installation guidelines		6	2	4
	PC6. ensure that the software and program backup is available in the plant		5	2	3
	PC7. prepare a flow chart for troubleshooting any machine/plant		6	2	4
	PC8. test the panel and modules for proper functioning as recommended		6	2	4
	PC9. check earthing and power supply for proper functioning before troubleshooting		6	2	4
	PC10. cross-check whether the PLC and its module is attached at right place		4	2	2
	PC11. verify whether the communication cable is supporting the protocol or not		4	2	2
	PC12. make changes in running project if it is required to rectify the faults		5	2	3
	PC13. check if the connected devices are in operation or have stopped at the time of troubleshooting		5	2	3

	PC14. enter parameter of the connected load accurately in PLC		5	2	3
	PC15. get the parameter reading according to schedule		5	2	3
	PC16. prepare a site report after troubleshooting and mention the remedy		5	3	2
	PC17. match the product according to the catalogue number with the drawing and material list		5	2	3
	PC18. take a program backup before and after troubleshooting		4	2	2
	PC19. replace the module/equipment if it is found faulty and provide the module replacement to the customer according to PLC		5	3	2
	Total		**100**	**40**	**60**
IAS/ N9001 Work effectively with teams	PC1. know and understand the team objectives and goals	**75**	3	1	2
	PC2. know team members by name, greet them appropriately and respond to their greetings		2	1	1
	PC3. know the roles and responsibilities of team members and ensure others know about you and your role in the team		2	1	1
	PC4. learn about the culture and preferences of team members, especially if they belong to other organisations or nationalities		5	1	4
	PC5. follow organisation's policies and procedures for working with team members within and outside the organisation—especially related to privacy, confidentiality and security		2	1	1
	PC6. create an environment of trust and mutual respect		3	1	2
	PC7. use appropriate mode of communication – verbal, written, mail, phone or text and clearly articulate your message to ensure that the recipient understands the message		2	1	1
	PC8. listen to team members and try to understand what they are wanting to say and seek or provide clarifications if you see any gap in understanding		3	1	2
	PC9. communicate professionally and follow organization protocols and do not overload the team members with		4	1	3

	unnecessary and unsolicited information				
	PC10. share important information with the team timely		3	1	2
	PC11. respond to communications promptly		3	1	2
	PC12. perform own role and produce output in time for other team members to follow consume		3	1	2
	PC13. receive inputs from others and work upon it as per role requirement		2	1	1
	PC14. make adjustments within the permissible rules so that work flows smoothly		2	1	1
	PC15. help team members to perform their role effectively and provide any clarifications and support they need		2	1	1
	PC16. share tools and common resources fairly, taking cognizance of others' needs and schedules		2	1	1
	PC17. resolve any contentious issues amicably, involving the team lead or the supervisor if needed		2	1	1
	PC18. let team members know in good time if commitments cannot be carried out, explaining the reasons, and provide alternate solutions, if any; let the team lead know about this		2	1	1
	PC19. think positively and make constructive suggestions to meet the goals		2	1	1
	PC20. accept and give suggestions with open mind		2	1	1
	PC21. take initiatives and volunteer to contribute		2	1	1
	PC22. help team members with facts and figures to arrive at workable decisions		2	1	1
	PC23. accept decisions professionally and support these, even if these do not match own suggestions and personal views		4	1	3
	PC24. act in the interest of the team and the organisation to ensure that things do not 'fall through the gap' and team goals are achieved		4	1	3
	PC25. take initiative to correct the situation if something seems to be going wrong		2	1	1
	PC26. seek help or escalate if the situation demands		2	1	1

	PC27. follow organisation's policies and statutory guidelines while making references or comments on social customs or preferences		2	1	1
	PC28. refrain from making any comments to hurt sentiments		2	1	1
	PC29. accommodate team members' preferences to the extent feasible if these come in the way of fulfilling team goals, discuss with the supervisor/ team leader		2	1	1
	PC30. seek information and clarifications from others if you do not understand any customs		2	1	1
		Total	**75**	**30**	**45**
IAS/N9002 Health and safety in workplace	PC1. comply with general safety procedures followed in the company	**50**	3	2	1
	PC2. follow standard safety procedures while handling an equipment, hazardous material or tool		2	1	1
	PC3. remove finger rings or any other metal objects which may interfere with the work before working on the unit		4	2	2
	PC4. use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.		4	1	3
	PC5. escalate the issue about any hazardous materials or things found in the premises		4	1	3
	PC6. report about any breach of safety procedure in the company		3	1	2
	PC7. ensure zero accidents at work		5	2	3
	PC8. avoid damage of components due to negligence in ESD procedures		4	1	3
	PC9. participate regularly in fire drills or other safety related workshops organised by the company		5	2	3
	PC10. ensure no loss to the company occurs due to safety negligence		4	1	3
	PC11. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials		4	2	2
	PC12. participate in company organised health sessions such as yoga, physiotherapy or games		4	2	2
	PC13. handle heavy and hazardous materials with care and appropriate tools				

	and equipment such as trolleys, jacks and ladders		4	2	2
		Total	**50**	**20**	**30**
		Total	**525**	**210**	**315**