Automotive Skills Development Council

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR AUTOMOTIVE INDUSTRY

Contents

1. Introduction and Contacts.....P.1
2. Qualifications Pack.....P.2
3. Glossary of Key Terms P.3
4. NOS Units.....P.6
5. Assessment Criterion P.26

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

Contact Us:
ASDC, Core 4-B, 5th Floor, India Habitat Centre, Lodhi Road,New Delhi

E-mail:
skc@asdc.org.in

Introduction

Qualifications Pack-Test Technician

SECTOR: AUTOMOTIVE

SUB-SECTOR:R&D

OCCUPATION: TESTING

JOB ROLE: TEST TECHNICIAN

REFERENCE ID: ASC/Q8401

ALIGNED TO : NCO-2004/Nil

Test Technician: This role is also known as the test fitter and is largely responsible setting the testing apparatus and the test vehicle on the test bench, observing the outcomes of the tests .

Brief Job Description: This role is responsible for conducting various types of tests inside the laboratory as well as supporting on road testing. The role holder is responsible for setting the test apparatus on the test bench, connecting the aggregates/ vehicle under test to the test bench, support the engineer in taking readings during tests procedures, making minor modifications to the test setup and keeping the test areas and apparatus in a clean and working condition.

Personal Attributes: The individual should be willing to work in a risky and physically enduring environment of long hours and repetitive work. The role holder should have good physique, dexterity in operating machine tools, ability to fix the right parts at the right places, hand and eye coordination, sense of time management, proper vision and no colour blindness, ability to provide correct feedback, high level of alertness, quick decision making, taking personal responsibility and orientation to safety, quality management and 5S.

Job Details

Qualifications Pack Code	**ASC/Q/8401**		
Job Role	**Test Technician**		
Credits(NSQF)	**TBD**	**Version number**	**1**
Industry	**Automotive**	**Drafted on**	**10/01/2014**
Sub-sector	**R&D**	**Last reviewed on**	**20/1/2014**
Occupation	**Testing**	**Next review date**	**20/1/2016**

Job Role	**Test Technician**
Role Description	This role is responsible for testing the aggregates and the vehicles in indoor system laboratories and on road testing area, arrange the test apparatus and the test product as per the work instructions, support the engineer in recording observations and keeping the test area and apparatus clean and in a working condition
NSQF level	4
Minimum Educational Qualifications	ITI – Mechanical
Maximum Educational Qualifications	BSc
Training (Suggested but not mandatory)	• Fundamentals of automobile working • Testing apparatus and automobile instrumentation • Usage of different tools for assembly operations • Quality, 5S and Safety aspects • Problem solving techniques
Experience	2-3 years in testing/ assembly in the automobile sector
Occupational Standards (OS)	1. ASC/N8401: Understanding the testing requirement for laboratory & on road testing of aggregates and vehicles 2. ASC/N8402: Carry the testing process, note observations and make modifications in the test setup 3. ASC/N0006A:Maintain a safe and healthy working environment at the work place 4. ASC/N0021: Maintaining 5S at the work premises
Performance Criteria	As described in the relevant NOS units

Definitions

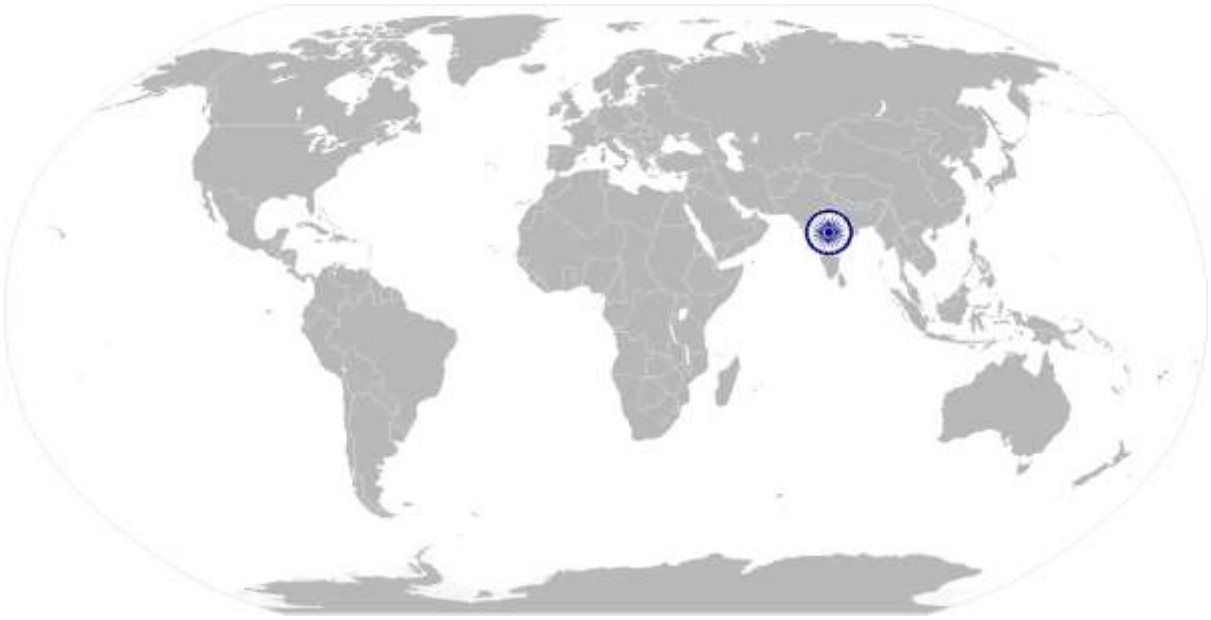
Keywords /Terms	Description
Core Skills/Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
National Occupational Standards (NOS)	NOS are Occupational Standards which apply uniquely in the Indian context
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Organisational Context	Organisational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
Qualifications Pack(QP)	Qualifications Pack comprises the set of NOS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Scope	Scope is the 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 the quality of performance required.
Sector	Sector is a conglomeration of different business operations having similar businesses 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.
Sub-functions	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Unit Code	Unit Code is a unique identifier for a NOS unit, which can be denoted with an '**N**'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Vertical	Vertical may exist within a sub-sector representing different domain areas or the client industries served by the industry.

Acronyms

Keywords /Terms	Description
NOS	National Occupational Standard(s)
NVEQF	National Vocational Education Qualifications Framework
NVQF	National Vocational Qualifications Framework
NSQF	National Skills Qualifications Framework
OEM	Original Equipment Manufacturer
OS	Occupational Standard(s)
QP	Qualifications Pack
NVH	Noise, Vibrations and Harshness

National Occupational Standards



Overview

This unit is about understanding the testing requirements for conducting various laboratory and on road tests to validate the performance of the prototype vehicle/ aggregate

ASC/N8401: Understanding the testing requirement for laboratory & on road testing of aggregates and vehicles

National Occupational Standard

Unit Code	ASC/N8401
Unit Title (Task)	**Understanding the testing requirements for laboratory & on road testing of aggregates and vehicles**
Description	This NOS is about understanding the various tests which need to be undertaken to complete the testing of aggregates and vehicles in various system evaluation laboratories and on road testing of vehicles
Scope	The role holder will be responsible for: • understanding the testing requirement and the process • escalation of the queries to relevant stakeholders
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Understand the testing requirements, test equipment and parameters to be checked during the test procedure	PC1. Understand the type of test which needs to be conducted on the component or the vehicle PC2. Clearly understanding the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors PC3. Ensure understanding of the type and specification of the component or the prototype vehicle under test procedure so that the correct test equipment/ test bench can be arranged PC4. Understand from the testing engineer the parameters which need to be measured during the test procedure PC5. Understand the material required and the equipment availability for executing the activity PC6. Ensure that the required material is procured from the store before starting the testing process – availability of greases, lubricant oil, adhesives, marking equipment, ID stickers/ labels PC7. Ensure that the correct equipment is selected by the technician as per the specification and testing sheet shared by the testing engineer PC8. Ensure availability of tools required for the assembly process as per the components to be assembled. Tool sizes as mentioned in the Work Instructions/ SOPs for assembly PC9. Understand key joining activities like welding and soldering which may be required during the test procedure PC10. Understand the various assembling process parameters like cycle time, pressure, torque etc. before starting the test apparatus assembling process, as mentioned in the Work Instructions/ SOP manual PC11. Understand the right assembling methodology and process(Bolting, tightening, riveting, fastening, adhesive clamping, crimping etc.) for arranging the test assembly through discussions with the testing engineer and also by reading the process manuals/ Work Instructions/Standard Operating

ASC/N8401: Understanding the testing requirement for laboratory & on road testing of aggregates and vehicles

	Procedures available PC12. Understand 5 S and Safety related aspects related to the testing process
Escalations of queries on the given job	PC13. Refer the queries to a competent internal specialist/ testing engineer if they cannot be resolved by the technician on own PC14. Obtain help or advice from specialist if the problem is outside his/her area of competence or experience PC15. Confirm self-understanding with the specialist holding discussions so that all doubts & queries can be resolved before the actual process execution
Knowledge and Understanding (K)w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. products manufactured by the company KA2. internal product standards finalized within the organization KA3. quality norms and standards prescribed in the Quality Manual by the organization KA4. 5S and Safety norms practiced in the organization
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. the working of the internal combustion engine (Petrol/ Diesel)/ CNG engines KB2. different parts of the automobile and basic working principle of automobile aggregates KB3. different parameters used to evaluate the performance of the automobile KB4. process for setting up of test benches, test platforms and test apparatus KB5. basic laws of physics, chemistry, metallurgy & mathematics KB6. basic laws of geometry and product design KB7. the methods of using instruments like Vernier callipers, micrometres, rulers and other inspection tools KB8. how to read and interpret sketches and engineering drawings KB9. different types of assembling and joining processes and associated equipment KB10. the method of reading and interpreting the various gauges KB11. how to visualize the final product output KB12. the impact of various physical parameters like torqueing and tightening on the properties of final output product like durability, surface finish, part movement, aesthetics etc. KB13. various defects related to running automobiles and potential impact on the working of the final vehicle KB14. various sources of noise and vibrations in the vehicle and potential causes of the noise and vibrations KB15. mandatory checks which need to be conducted on the vehicle before trial run

ASC/N8401: Understanding the testing requirement for laboratory & on road testing of aggregates and vehicles

	KB16. potential health and safety hazards and related safety precautions
Skills (S)w.r.t. the scope	
Elements	**Skills**
A. Core Skills/ Generic Skills	**Writing and reading skills**
	The user/ individual on the job needs to know and understand how to: SA1. document information from the manuals, discussion notes, process charts etc. SA2. create small notes/ work documents/ diagrams/ maps for self-help to understand the process SA3. read equipment manuals and process documents to understand the equipment and processes better SA4. read internal information memos sent by internal customers (other functions within the organization)
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA5. discuss task lists, schedules, and work-loads with the test engineer SA6. answer the queries raised by the engineer as well as intercompany departments SA7. attentively listen with full attention to the speaker and comprehend the information given by the speaker
B. Professional Skills	**Analytical Thinking**
	The user/individual on the job needs to know and understand how to: SB1. break the problem into smaller issues and tasks to arrive at a solution SB2. understand inter process relationship and establish relationship between various parts of the problem SB3. leverage experience to find effective solutions to problems SB4. use basic analytical tools to arrive at solutions
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB5. plan and organize the work order and jobs received from the Operator SB6. organize all process/ equipment manuals so that sorting/ accessing information is easy SB7. keep fixtures, tools, drawings, Work Instructions, SOP manuals as per the part number, colour codes etc as defined under the 5S systems SB8. validate all process/ equipment manuals so that the final process selected is correct
	Judgment and Critical Thinking

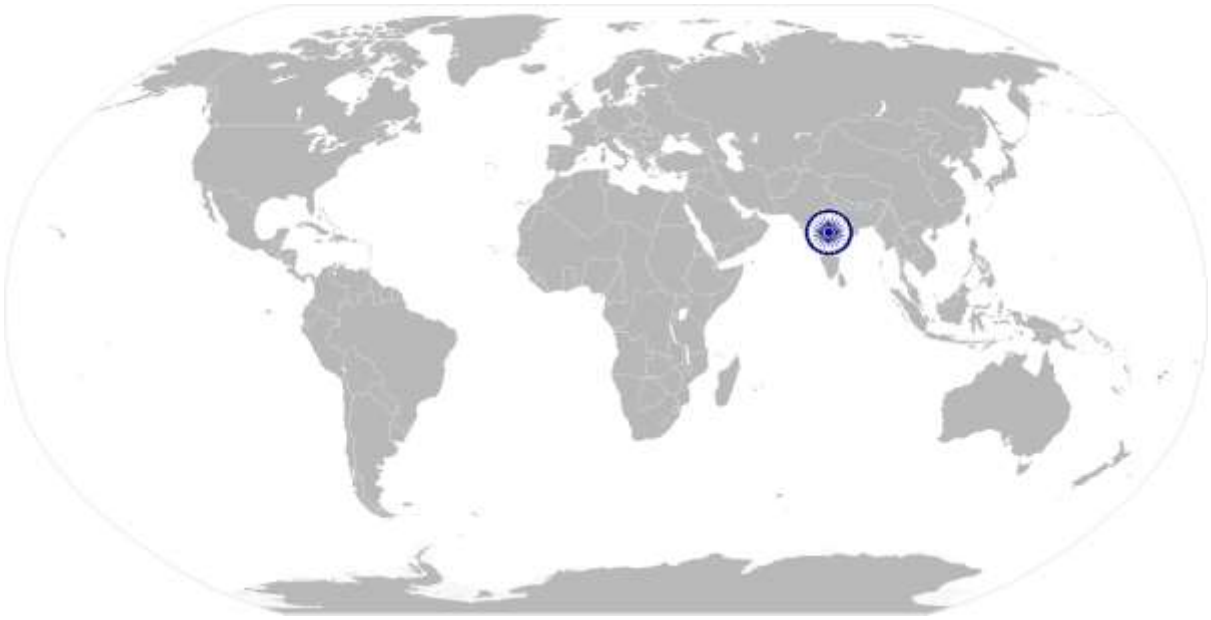
ASC/N8401: Understanding the testing requirement for laboratory & on road testing of aggregates and vehicles

	The user/individual on the job needs to know and understand how to: SB9. use common sense and make judgments during day to day basis SB10. use reasoning skills to identify and resolve basic problems SB11. use intuition and keen observation skills to detect any potential problems which could arise during operations
	Quality Consciousness
	The user/individual on the job needs to know and understand how to: SB12. identify faulty / flawed part and processes during the process and highlight the same to the concerned persons with the required time framework SB13. link the fault observed with the overall impact on the performance of the component/ automobile SB14. support and contribute in monitoring and delivering high quality output from self and others
	Problem solving and decision making
	The user/individual on the job needs to know and understand how to: SB15. gather information skilfully from multiple sources SB16. analyse information in depth and identifies the problem in a timely manner SB17. Work tireless in spite of repeat activities in a diligent manner to resolve problems on a day to day basis SB18. use previous experience in resolving problems and taking decisions
	Team work and collaboration
	The user/ individual on the job needs to know and understand how to: SB19. contribute to building a positive team spirit SB20. exhibit objectivity & openness to others' views SB21. collaborate with stakeholders to achieve the desired state of final result
	Out of Box thinking
	The user/ individual on the job needs to know and understand how to: SB22. familiarise with leading practices available in the market SB23. think independently on new approaches to manufacturing process, material management, data management and team management SB24. represent any new ideas/ approaches on process improvement and productivity improvement to the seniors in the team

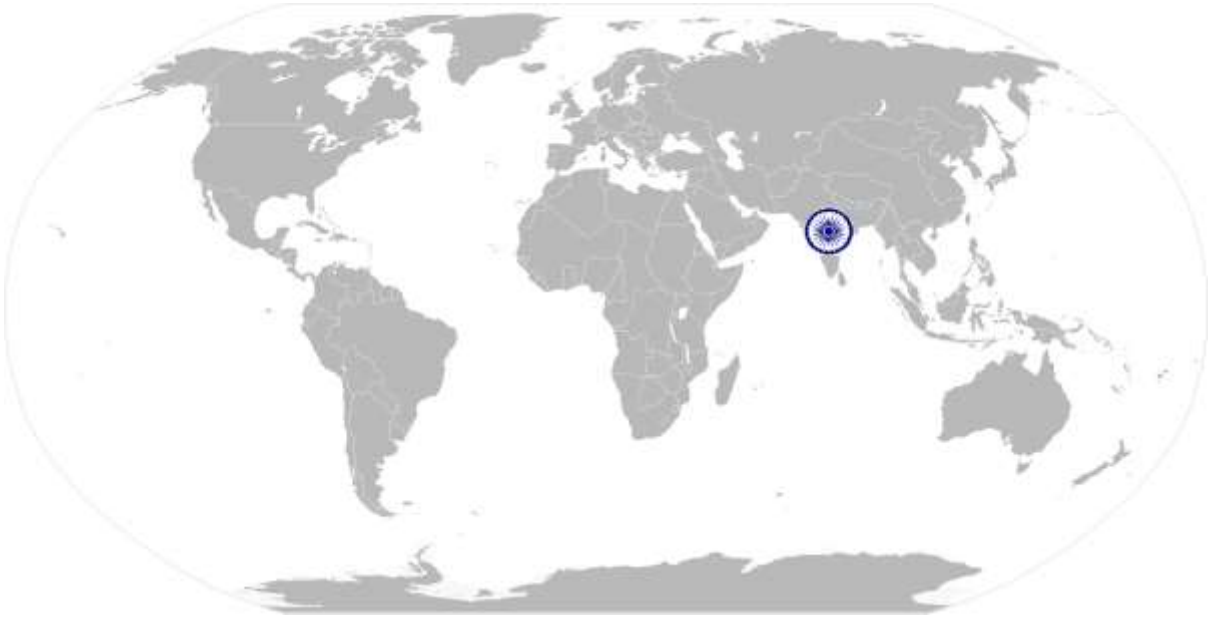
ASC/N8401: Understanding the testing requirement for laboratory & on road testing of aggregates and vehicles

NOS Version Control

NOS Code	ASC/N8401		
Credits(NSQF)	TBD	Version number	1
Industry	Automotive	Drafted on	10/01/2014
Industry Sub-sector	R & D	Last reviewed on	20/1/2014
Occupation	Testing	Next review date	20/1/2016



National Occupational Standard



Overview

This unit is about conducting the actual testing process, taking note of the observations and making minor modifications to the test setup as per requirements

ASC/N8402: Carry the testing process, note observations and make modifications in the test setup

National Occupational Standard

Unit Code	ASC/N8402
Unit Title (Task)	**Carry the testing process, note observations and make modifications in the test setup**
Description	This NOS is about conducting the test procedure as per the instructions given by the testing engineer and the work instructions, supporting the engineer in noting observations and make modifications to the set up to accommodate the various testing scenario and arrive at the final outcomes.
Scope	The role holder will be responsible for: • set up the test apparatus and test vehicles for the testing procedure • conduct the actual testing process as per the given instructions • noting the observations and make minor modifications in the setup
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Setup the test apparatus and test vehicle or component for the testing process	PC1. Conduct a thorough check up of the testing equipment and the external connections for the test apparatus PC2. Setup the test apparatus as per the selected testing process and the internal SOPs/ Work Instructions and the setting standards for the testing machine PC3. Ensure that the surface of the assembling gun/ Bolting gun is cleaned to remove dust and any other impurities PC4. Ensure that the hoists & cranes for lifting the parts are working in order as per the process requirement PC5. Ensure drop of sub-assemblies like frame , gear box, axles, car frame, etc. at the respective testing platforms/ benches without damaging the components PC6. Ensure that hoists are used to lift the right material from the conveyors, bins, part trolleys etc. PC7. Ensure part clearances as specified in the Work Instructions/ Standard Operating Processes PC8. Pick the right fastening part and right tightening tool from the right tray/ kit trolley as identified in the Drawing/ Standard Operating Procedure/ Work Instruction and is correctly placed in the designated slot/ space as indicated in the Work Instructions/ SOP to fastening the component/ vehicle under test PC9. Conduct design and fabrication of the fixtures for conducting the durability tests PC10. Conduct test setup for components undergoing repeated vibrations and subjecting to frequent stresses like fuel tank, fuel system, crankshaft, connecting rods, suspension, powertrain and axle system PC11. Conduct proper connection of instruments like strain gauge, load cell and other servo hydraulics machines to induce and measure stress levels on the components PC12. Make required connections of data logger/ Data Acquisition System as mentioned in the Standard Operating Procedure manual/ Work

ASC/N8402: Carry the testing process, note observations and make modifications in the test setup

	Instructions PC13. Conduct visual inspection of the bundled electrical and electronics \ wiring, Circuits and harness PC14. Check for orientation of terminals and connectors used for connecting the testing process PC15. Test for any short circuit/ open circuit for the electrical/ electronic connections in the test apparatus PC16. Check the working of the test apparatus post connecting the test component/ vehicle to ensure error free testing activity PC17. Ensure regular cleaning and maintenance of Fatigue Lab equipment like Fatigue Testing Machines, Servo Hydraulic Actuators, Material testing machine, impact testing machine, bending machines, torsional machines
Conduct actual test procedure under supervision of the test engineer	PC18. Ensure development of the test bogey for conducting the structural durability tests/ fatigue test/ stress test to be conducted in the Structure Durability Laboratory PC19. Start/ stop the test activity as per the instructions given by the test engineer and the steps mentioned in the testing manual/ Work Instructions PC20. Support the testing engineer in taking different observations/ readings as per the parameters mentioned in the testing manual/ Work Instructions PC21. Under supervision of the test engineer, make minor modification in the test setup/ vehicle/ component under testing to take reading under different scenarios PC22. Observe any deviations during the test process. Observe any noise or vibrations during the testing process. Inform the testing engineer of any deviations observed PC23. Change parts as directed by the testing engineer, fit new parts and continue the testing process under the supervision of the testing engineer PC24. Note the modifications which have been made to the original setup in order to derive comparisons between test scenarios PC25. Make connections of the various data capturing meters and instrumentation such as load cells, pneumatic/ PLC testing gauges, strain gauges, displacement transducers, accelerometers, GPS data collection devices and data loggers to capture the data points during the vehicle running condition PC26. Check all the safety features required for the vehicle under running condition are working and are checked as per the vehicle safety check list provided as per the checklist given in the testing manual PC27. Check the fuel level, oil/ lubricant level, cooling water level, tyre pressure etc. are checked before starting the on road testing of the vehicle prototype as per the checklist given in the testing manual PC28. Check for all system warning indicators showing system failures, loose connections, malfunctioning etc. are addressed before

ASC/N8402: Carry the testing process, note observations and make modifications in the test setup

	starting the various types of tests as per the checklist given in the testing manual. PC29. tabulate and record observations of phenomena, test results, data log etc.
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. new products manufactured by the company KA2. internal product standards finalized within the organization KA3. 5S and Safety norms practiced in the organization
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. the working of the internal combustion engine (Petrol/ Diesel)/ CNG engines KB2. different parts of the automobile and basic working principle of automobile aggregates KB3. different parameters used to evaluate the performance of the automobile KB4. process for setting up of test benches, test platforms and test apparatus KB5. basic laws of physics, chemistry. metallurgy & mathematics KB6. basic laws of geometry and product design KB7. the methods of using instruments like Vernier callipers, micrometres, rulers and other inspection tools KB8. how to read and interpret sketches and engineering drawings KB9. different types of assembling and joining processes and associated equipment KB10. fundamentals of servo hydraulics, acoustics holography, sound meters, vibration meters KB11. working of load cells and strain gauges and connecting them for test process KB12. fundamental structure and working of anechoic chambers and reverberation chambers KB13. fundamentals of instrumentation and usage of flow meters for checking fuel and lubrication flow, smoke meters, power transducers, temperature sensors, particle sensors process for setting up of test KB14. benches, test platforms and test apparatus various types of tests used to KB15. evaluate the design and performance of various automotive components different parameters used to evaluate the performance of the components KB16. the method of reading and interpreting the various gauges KB17. how to visualize the final product output KB18. the impact of various physical parameters like torqueing and tightening on the properties of final output product like durability, surface finish, part movement, aesthetics etc.

ASC/N8402: Carry the testing process, note observations and make modifications in the test setup

	KB19. various defects related to running automobiles and potential impact on the working of the final vehicle KB20. various sources of noise and vibrations in the vehicle and potential causes of the noise and vibrations KB21. basic road driving skills and fundamentals of vehicle movement in various conditions KB22. mandatory checks which need to be conducted on the vehicle before trial run KB23. potential health and safety hazards and related safety precautions
Skills (s) [optional]	
A. Core Skills/ Generic Skills	**Writing and reading skills**
	The user/ individual on the job needs to know and understand how to: SA1. document information from the manuals, discussion notes, process charts etc. SA2. create small notes/ work documents/ diagrams/ maps for self-help to understand the process SA3. read equipment manuals and process documents to understand the equipment and processes better SA4. read internal information memos send by internal customers (other functions within the organization)
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA5. discuss task lists, schedules, and work-loads with the testing engineer SA6. answer the queries raised by the engineer as well as intercompany departments SA7. attentively listen with full attention to the speaker and comprehend the information given by the speaker
B. Core Skills/ Generic Skills	**Analytical Thinking**
	The user/individual on the job needs to know and understand how to: SB1. break the problem into smaller issues and tasks to arrive at a solution SB2. understand inter process relationship and establish relationship between various parts of the problem SB3. leverage experience to find effective solutions to problems SB4. use basic analytical tools to arrive at solutions
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB5. plan and organize the work order and jobs received from the Operator SB6. organize all process/ equipment manuals so that sorting/ accessing information is easy SB7. keep fixtures, tools, drawings, Work Instructions, SOP manuals as per the part number, colour codes etc as defined under the 5S systems SB8. validate all process/ equipment manuals so that the final process selected is correct

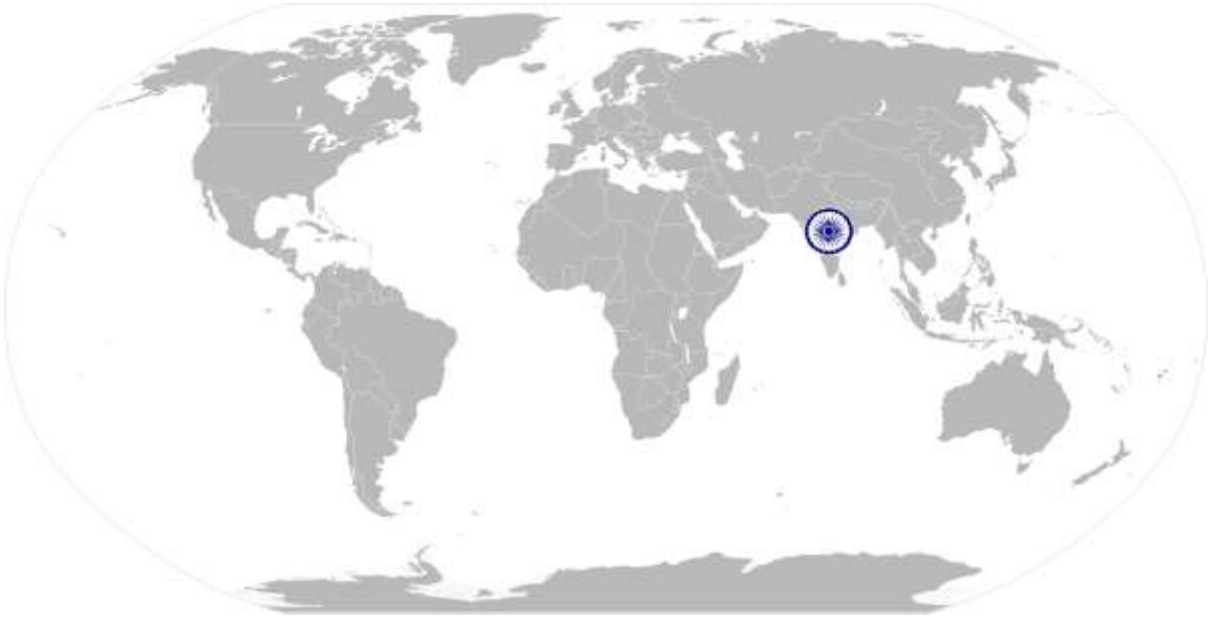
ASC/N8402: Carry the testing process, note observations and make modifications in the test setup

	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB9. use common sense and make judgments during day to day basis SB10. use reasoning skills to identify and resolve problems SB11. use intuition to detect any potential problems which could arise during operations
	Problem solving and decision making
	The user/individual on the job needs to know and understand how to: SB12. gather information skilfully from multiple sources SB13. analyse information in depth and identifies the problem in a timely manner SB14. develop alternate solutions and resolves problems in early stages SB15. work tireless in spite of repeat activities in a diligent manner to resolve problems on a day to day basis SB16. use previous experience in resolving problems and taking decisions
	Out of Box thinking
	The user/ individual on the job needs to know and understand how to: SB17. familiarise with leading practices available in the market SB18. represent any new ideas/ approaches on process improvement and productivity improvement to the seniors in the team
	Collaboration
	The user/ individual on the job needs to know and understand how to: SB19. exhibit objectivity & openness to others' views SB20. collaborate with stakeholders to achieve the desired state of final result

NOS Version Control

NOS Code	**ASC/N8402**		
Credits(NSQF)	**TBD**	**Version number**	**1**
Industry	**Automotive**	**Drafted on**	**10/01/2014**
Industry Sub-sector	**R &D**	**Last reviewed on**	**20/1/2014**
Occupation	**Testing**	**Next review date**	**20/1/2016**

National Occupational Standards



Overview

This unit is about maintaining a Safe and Healthy working environment

National Occupational Standard

ASC/N0006A: Maintain a safe and healthy working environment at the work place

Unit Code	ASC/N0006A
Unit Title (Task)	**Maintain a safe and healthy working environment at the work place**
Description	This NOS unit is about creating a Safe and Healthy work place, adhering to the safety guidelines in the working area, following practices which are not impacting the environment in a negative manner
Scope	The role holder will be responsible for • identifying and reporting of risks • creating and sustaining a safe, clean and environment friendly work place This NOS will be applicable to all Automotive sector manufacturing job roles
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Identify and report the risks identified	PC1. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise PC2. Identify areas in the plant which are potentially hazardous/ unhygienic in nature PC3. Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine PC4. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc. PC5. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations PC6. Create awareness amongst other by sharing information on the identified risks
Create and sustain a Safe, clean and environment friendly work place	PC7. Support the Safety team and the supervisor in creating the risk mitigation plan PC8. Follow the instructions given on the equipment manual describing the operating process of the equipment. PC9. Follow the Safety, Health and Environment related practices developed by the organization PC10. Ensure relevant safety boards/ signs are placed on the shop floor PC11. Operate the machine using the recommended Personal Protective Equipment (PPE) and ensure team members also use the related PPEs at the workplace PC12. Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc. PC13. Attend all safety and fire drills to be self aware of safety hazards and preventive techniques

ASC/N0006A: Maintain a safe and healthy working environment at the work place

	PC14. Maintain high standards of personal hygiene at the work place PC15. Ensure that the waste disposal is done in the designated area and manner as per organization SOP. PC16. Inform appropriately the medical officer/ HR in case of self or an employee's illness of contagious nature so that preventive actions can be planned for others
Knowledge and Understanding (K)w.r.t. the scope	
Element	**Knowledge and Understanding**
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. relevant standards, procedures and policies related to Health, Safety and Environment followed in the company KA2. emergency handling procedures & hierarchy for escalation
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. basic knowledge of Safety procedures(fire fighting, first aid) within the organization KB2. knowledge of various types of PPEs and their usage KB3. basic knowledge of risks/hazards associated with each occupation in the organization KB4. how to safely operate various tools and machines and risks associated with the tools/ equipment KB5. knowledge of personal hygiene and how an individual an contribute towards creating a highly safe and clean working environment
Skills (S)w.r.t. the scope	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. write basic level notes and observations
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA2. read safety instructions put up across the plant premises SA3. read safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA4. effectively communicate information to team members SA5. Inform employees in the plant and concerned functions about events, incidents & potential risks observed related to Safety, Health and Environment. SA6. question operator/ supervisor in order to understand the safety related issues SA7. attentively listen with full attention and comprehend the information given by the speaker during safety drills and training

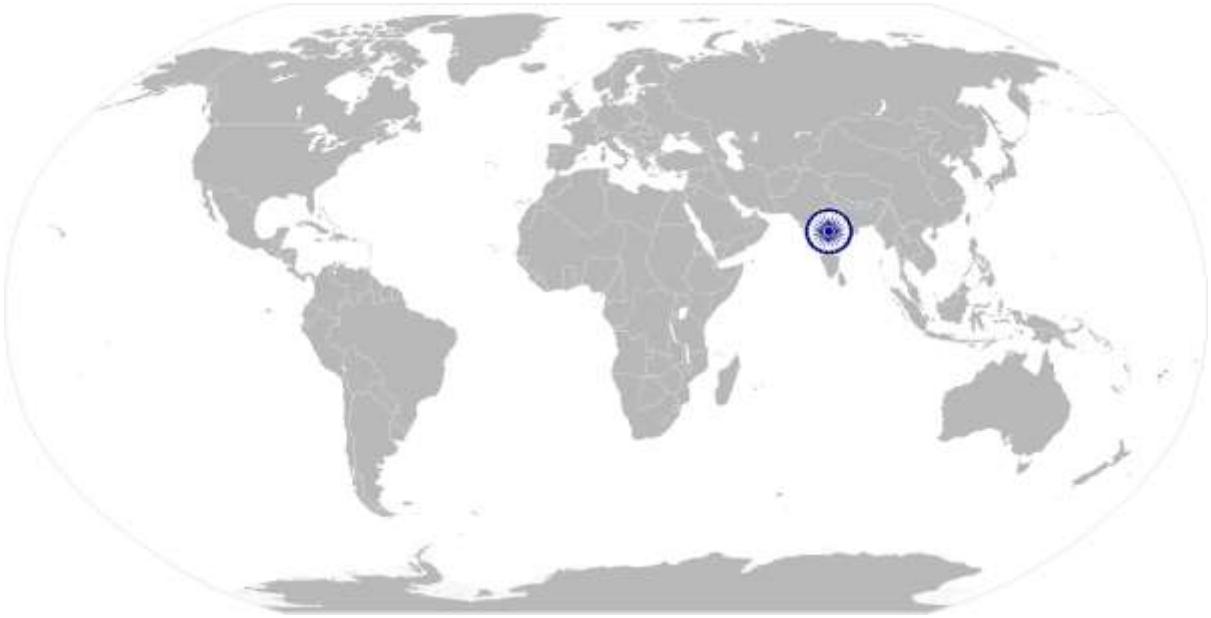
ASC/N0006A: Maintain a safe and healthy working environment at the work place

	programs
B. Professional Skills	**Judgmental Thinking**
	The user/individual on the job needs to know and understand how to: SB1. use common sense and make judgments during day to day basis SB2. use reasoning skills to identify and resolve basic problems

NOS Version Control

NOS Code	**ASC/N0006A**		
Credits(NSQF)	**TBD**	**Version number**	**1**
Industry	**Automotive**	**Drafted on**	**15/8/2013**
Industry Sub-sector	**R & D**	**Last reviewed on**	**25/8/2013**
Occupation	**All**	**Next review date**	**25/8/2013**

National Occupational Standard



Overview

This unit is about the understanding all principles of 5S and follow the given guidelines to ensure a clean and efficient working environment in the organization

National Occupational Standard

ASC/N0021: Maintaining 5S at the work premises

Unit Code	ASC/N0021
Unit Title (Task)	**Maintaining 5S in the work premises**
Description	This NOS is about ensuring all 5 S activities both at the shop floor and the office area to facilitate increase in work productivity
Scope	The individual needs to • Ensure sorting, streamlining & organizing, storage and documentation, cleaning, standardization and sustenance across the plant and office premises of the organization
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Ensure sorting	PC1. Follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and un-necessary items are not cluttering the workbenches or work surfaces. PC2. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions PC3. Follow the technique of waste disposal and waste storage in the proper bins as per SOP PC4. Segregate the items which are labelled as red tag items for the process area and keep them in the correct places PC5. Sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/ work instructions PC6. Ensure that areas of material storage areas are not overflowing PC7. Properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required PC8. Return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area PC9. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards
Ensure proper documentation and storage (organizing , streamlining)	PC10. Follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists PC11. Check that the items in the respective areas have been identified as broken or damaged PC12. Follow the given instructions and check for labelling of fluids, oils. lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc. PC13. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions

ASC/N0021: Maintaining 5S at the work premises

Ensure cleaning of self and the work place	PC14. Check whether safety glasses are clean and in good condition PC15. Keep all outside surfaces of recycling containers are clean PC16. Ensure that the area has floors swept, machinery clean and generally clean. In case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards PC17. Check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up PC18. Ensure workbenches and work surfaces are clean and in good condition PC19. Follow the cleaning schedule for the lighting system to ensure proper illumination PC20. Store the cleaning material and equipment in the correct location and in good condition PC21. Ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene
Ensure sustenance	PC1. Follow the daily cleaning standards and schedules to create a clean working environment PC2. Attend all training programs for employees on 5 S PC3. Support the team during the audit of 5 S PC4. Participate actively in employee work groups on 5S and encourage team members for active participation PC5. Follow the guidelines for What to do and What not to do to build sustainability in 5S as mentioned in the 5S check lists/ work instructions
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
C. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA3. relevant standards, procedures and policies related to 5S followed in the company
D. Technical Knowledge	The user/individual on the job needs to : KB6. have basic knowledge of 5S procedures KB7. know various types 5s practices followed in various areas KB8. understand the 5S checklists provided in the department/ team KB9. have skills to identify useful & non useful items KB10. have knowledge of labels , signs & colours used as indicators KB11. Have knowledge on how to sort and store various types of tools, equipment, material etc. KB12. know , how to identify various types of waste products KB13. understand the impact of waste/ dirt/ dust/unwanted substances on the process/ environment/ machinery/ human body KB14. have knowledge of best ways of cleaning & waste disposal

ASC/N0021: Maintaining 5S at the work premises

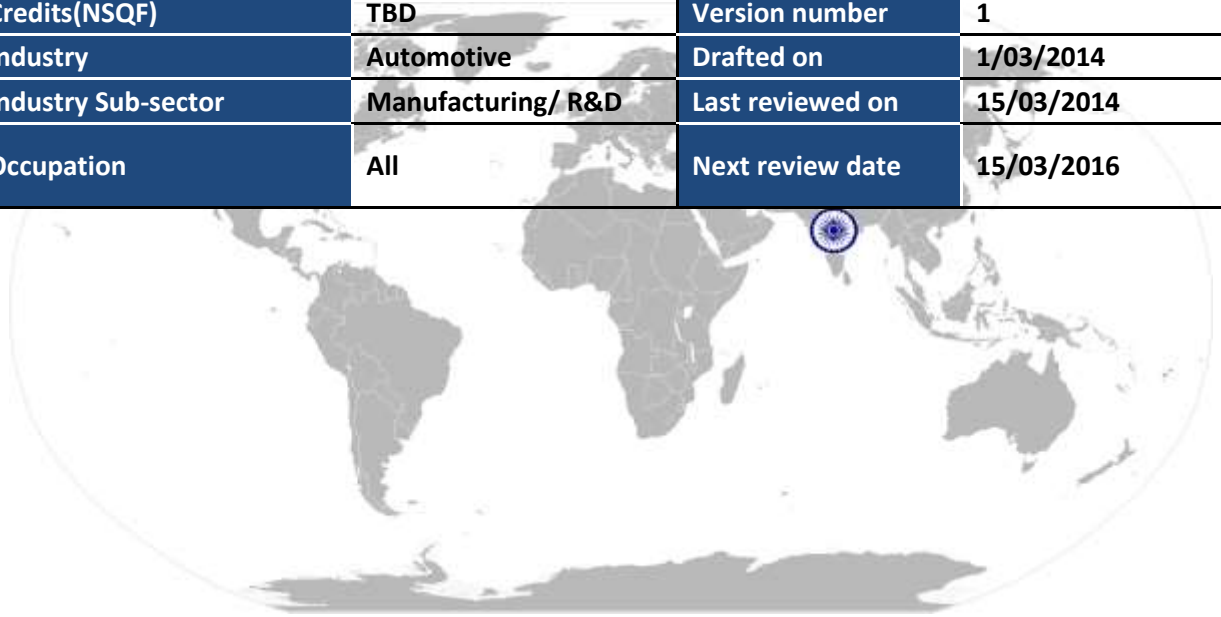
	KB15. understand the importance of standardization in processes KB16. understand the importance of sustainability in 5S KB17. have knowledge of TQM process KB18. have knowledge of various materials and storage norms KB19. understand visual controls, symbols, graphs etc.
Skills (S)w.r.t. the scope	
Element	**Skills**
C. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA8. write basic level notes and observations SA9. note down observations (if any) related to the process SA10. write information documents to internal departments/ internal teams
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA11. read 5S instructions put up across the plant premises
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA12. effectively communicate information to team members inform employees in the plant and concerned functions about 5S SA13. question the process head in order to understand the 5S related issues SA14. attentively listen with full attention and comprehend the information given by the speaker during 5S training programs
D. Professional Skills	**Judgmental Thinking**
	The user/individual on the job needs to know and understand how to: SB3. use common sense and make judgments during day to day basis SB4. use reasoning skills to identify and resolve basic problems using 5S
	Persuasion
	The user/ individual on the jobs needs to know and understand how to: SB5. persuade co team members to follow 5 S SB6. ensure that the co team members understand the importance of using 5 S tool
	Creativity
	The user/individual on the job needs to know and understand how to : SB7. use innovative skills to perform and manage 5 S activities at the work desk and the shop floor SB8. exhibit inquisitive behaviour to seek feedback and question on the existing set patterns of work
	Self –Discipline

ASC/N0021: Maintaining 5S at the work premises

	The user/individual on the job needs to know and understand how to: SB9. do what is right, not what is a popular practices SB10. follow shop floor rules& regulations and avoid deviations; make 5S an integral way of life SB11. ensure self-cleanliness on a daily basis SB12. demonstrate the will to keep the work area in a clean and orderly manner

NOS Version Control

NOS Code	**ASC/N0021**		
Credits(NSQF)	**TBD**	**Version number**	**1**
Industry	**Automotive**	**Drafted on**	**1/03/2014**
Industry Sub-sector	**Manufacturing/ R&D**	**Last reviewed on**	**15/03/2014**
Occupation	**All**	**Next review date**	**15/03/2016**



Criteria for assessment of Trainees

JOB ROLE	Test Technician
Qualification Pack	ASC/Q 8401
No. Of NOS	2 Role specific ,2 generic

NOS Title/ NOS Elements	NOS & Performance Criterion Description	Marks allocation	
ASC/N 8401	**Understand the test requirements for laboratory & on-road testing of aggregates & vehicles**	**Viva**	**Practical**
Understand the testing requirements, test equipment and parameters to be checked during the test procedure	PC1. Understand the type of test which needs to be conducted on the component or the vehicle PC2. Clearly understanding the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors PC3. Ensure understanding of the type and specification of the component or the prototype vehicle under test procedure so that the correct test equipment/ test bench can be arranged PC4. Understand from the testing engineer the parameters which need to be measured during the test procedure PC5. Understand the material required and the equipment availability for executing the activity PC6. Ensure that the required material is procured from the store before starting the testing process – availability of greases, lubricant oil, adhesives, marking equipment, ID stickers/ labels PC7. Ensure that the correct equipment is selected by the technician as per the specification and testing sheet shared by the testing engineer PC8. Ensure availability of tools required for the assembly process as per the components to be assembled. Tool sizes as mentioned in the Work Instructions/ SOPs for assembly PC9. Understand key joining activities like welding and soldering which may be required during the test procedure PC10. Understand the various assembling process parameters like cycle time, pressure, torque etc. before starting the test apparatus assembling process, as mentioned in the Work Instructions/ SOP manual PC11. Understand the right assembling methodology and process(Bolting, tightening, riveting, fastening, adhesive clamping, crimping etc.) for arranging the test assembly through discussions with the testing engineer and also by reading the process manuals/ Work Instructions/Standard Operating Procedures available PC12. Understand 5 S and Safety related aspects related to the	20 30 20	30 50 30

	testing process		
Escalations of queries on the given job	PC13. Refer the queries to a competent internal specialist/ testing engineer if they cannot be resolved by the technician on own PC14. Obtain help or advice from specialist if the problem is outside his/her area of competence or experience PC15. Confirm self-understanding with the specialist holding discussions so that all doubts & queries can be resolved before the actual process execution	30	10
	subtotal	**100**	**120**
ASC/N 8402	**Conduct the tests & record observations; make modifications to the test set-up**	**Viva**	**Practical**
Setup the test apparatus and test vehicle or component for the testing process	PC1. Conduct a thorough check up of the testing equipment and the external connections for the test apparatus PC2. Setup the test apparatus as per the selected testing process and the internal SOPs/ Work Instructions and the setting standards for the testing machine PC3. Ensure that the surface of the assembling gun/ Bolting gun is cleaned to remove dust and any other impurities and application of specified tightening torque. PC4. Ensure that the hoists & cranes for lifting the parts are working in order as per the process requirement PC5. Ensure drop of sub-assemblies like frame , gear box, axles, car frame, etc. at the respective testing platforms/ benches without damaging the components PC6. Ensure that hoists are used to lift the right material from the conveyors, bins, part trolleys etc. PC7. Ensure part clearances as specified in the Work Instructions/ Standard Operating Processes PC8. Pick the right fastening part and right tightening tool from the right tray/ kit trolley as identified in the Drawing/ Standard Operating Procedure/ Work Instruction and is correctly placed in the designated slot/ space as indicated in the Work Instructions/ SOP for fastening the component/ vehicle under test PC9. Conduct design and fabrication of the fixtures for conducting the durability tests PC10. Conduct test setup for components undergoing repeated vibrations and subjecting to frequent stresses like fuel tank, fuel system, crankshaft, connecting rods, suspension, powertrain and axle system PC11. Conduct proper connection of instruments like strain gauge, load cell and other servo hydraulics machines to induce and measure stress levels on the components PC12. Make required connections of data logger/ Data Acquisition System as mentioned in the Standard Operating Procedure manual/ Work Instructions	20 50	50 100

	PC13.Conduct visual inspection of the bundled electrical and electronics \wiring, Circuits and harness PC14. Check for orientation of terminals and connectors used for connecting the testing process PC15. Test for any short circuit/ open circuit for the electrical/ electronic connections in the test apparatus PC16. Check the working of the test apparatus post connecting the test component/ vehicle to ensure error free testing activity PC17. Ensure regular cleaning and maintenance of Fatigue Lab equipment like Fatigue Testing Machines, Servo Hydraulic Actuators, Material testing machine, impact testing machine, bending machines, torsional machines	20	40
Conduct actual test procedure under supervision of the test engineer	PC18. Ensure development of the test bogey for conducting the structural durability tests/ fatigue test/ stress test to be conducted in the Structure Durability Laboratory PC19. Start/ stop the test activity as per the instructions given by the test engineer and the steps mentioned in the testing manual/ Work Instructions PC20. Support the testing engineer in taking different observations/ readings as per the parameters mentioned in the testing manual/ Work Instructions PC21. Under supervision of the test engineer, make minor modification in the test setup/ vehicle/ component under testing to take reading under different scenarios PC22. Observe any deviations during the test process. Observe any noise or vibrations during the testing process. Inform the testing engineer of any deviations observed PC23. Change parts as directed by the testing engineer, fit new parts and continue the testing process under the supervision of the testing engineer PC24. Note the modifications which have been made to the original setup in order to derive comparisons between test scenarios PC25. Make connections of the various data capturing meters and instrumentation such as load cells, pneumatic/ PLC testing gauges, strain gauges, displacement transducers, accelerometers, GPS data collection devices and data loggers to capture the data points during the vehicle running condition PC26. Check all the safety features required for the vehicle under running condition are working and are checked as per the vehicle safety check list provided as per the checklist given in the testing manual PC27. Check the fuel level, oil/ lubricant level, cooling water level, tyre pressure etc. are checked before starting the on	10 20	30 50

	road testing of the vehicle prototype as per the checklist given in the testing manual PC28. Check for all system warning indicators showing system failures, loose connections, malfunctioning etc. are addressed before starting the various types of tests as per the checklist given in the testing manual. PC29. tabulate and record observations of phenomena, test results, data log etc.	10	30
	subtotal	**130**	**300**
ASC/N 0006	**Maintain safe , healthy environment friendly workplace**	**Viva**	**Practical**
Identify and report the risks identified	PC1. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise PC2. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc. PC3. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations PC4. Create awareness amongst other by sharing information on the identified risks	20	50
Create and sustain a Safe, clean and environment friendly work place	PC5. Follow the instructions given on the equipment manual describing the operating process of the equipment PC6. Follow the Safety, Health and Environment related practices developed by the organization PC7. Operate the machine using the recommended Personal Protective Equipment (PPE) PC8. Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc. PC9. Maintain high standards of personal hygiene at the work place PC10. Ensure that the waste disposal is done in the designated area and manner as per organization SOP. PC11. Inform appropriately the medical officer/ HR in case of self or an employee's illness of contagious nature so that preventive actions can be planned for others	50	40
	subtotal	**70**	**90**
ASC / N 0021	**Maintain 5 S activities at the workplace**	**Viva**	**practical**
Ensure sorting	PC1. Follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and un-necessary items are not cluttering the workbenches or work surfaces. PC2. Ensure segregation of waste in hazardous/ non Hazardous waste as per the sorting work instructions	10	20

	PC3. Follow the technique of waste disposal and waste storage in the proper bins as per SOP PC4. Segregate the items which are labelled as red tag items for the process area and keep them in the correct places PC5. Sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/ work instructions PC6. Ensure that areas of material storage areas are not overflowing PC7. Properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required PC8. Return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area PC9. Follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards	10	20
Ensure proper documentation and storage (organizing , streamlining)	PC10. Follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists PC11. Check that the items in the respective areas have been identified as broken or damaged PC12. Follow the given instructions and check for labelling of fluids, oils. lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc. PC13. Make sure that all material and tools are stored in the designated places and in the manner indicated in the 5S instructions	10	20
Ensure sustenance	PC14. Follow the daily cleaning standards and schedules to create a clean working environment PC15. Attend all training programs for employees on 5 S PC16. Support the team during the audit of 5 S PC17. Participate actively in employee work groups on 5S and encourage team members for active participation PC18. Follow the guidelines for What to do and What not to do to build sustainability in 5S as mentioned in the 5S check lists/ work instructions	20	30
	Sub total	**60**	**130**
	Total	**360**	**640**