

Qualification Pack



Computer Aided Test Executive

QP Code: ASC/Q5102

Version: 1.0

NSQF Level: 6

Automotive Skills Development Council || 153, Gr Floor, Okhla Industrial Area, Phase - III, Leela Building
New Delhi - 110020

Qualification Pack

Contents

ASC/Q5102: Computer Aided Test Executive	3
<i>Brief Job Description</i>	3
Applicable National Occupational Standards (NOS)	3
<i>Compulsory NOS</i>	3
<i>Qualification Pack (QP) Parameters</i>	3
ASC/N0006: Maintain a safe and healthy working environment	5
ASC/N0022: Ensure implementation of 5S activities at the shop floor & the office area	10
ASC/N5104: Conduct testing of vehicles and aggregates using Computer Aided Engineering Aids ...	18
ASC/N5105: Ensure documentation and analysis of various tests conducted	27
Assessment Guidelines and Weightage	34
<i>Assessment Guidelines</i>	34
<i>Assessment Weightage</i>	34
Acronyms	36
Glossary	37

Qualification Pack

ASC/Q5102: Computer Aided Test Executive

Brief Job Description

This role is responsible for organizing various tests on automobile aggregates prototypes in a simulated laboratory environment and presenting first level analysis report to the Engineering Management.

Personal Attributes

The individual should have passions for automobiles and the phenomena connected . The individual should possess coordination and interpersonal skills, demonstrate analytical reasoning, be technology savvy, oral and written communication skills, observations skills, ability to plan and prioritize work, quality consciousness, sensitivity to problem solving, quick decision making, safety orientation and high precision.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [ASC/N0006: Maintain a safe and healthy working environment](#)
2. [ASC/N0022: Ensure implementation of 5S activities at the shop floor & the office area](#)
3. [ASC/N5104: Conduct testing of vehicles and aggregates using Computer Aided Engineering Aids](#)
4. [ASC/N5105: Ensure documentation and analysis of various tests conducted](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Research & Development
Occupation	Testing
Country	India
NSQF Level	6
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2152.0301
Minimum Educational Qualification & Experience	B.E./B.Tech (Mechanical/Automobile/Electrical & Electronics/Instrumentation) with 2-3 years of experience In Automotive testing
Minimum Level of Education for Training in School	

Qualification Pack

Pre-Requisite License or Training	Latest automobile and aggregate testing methods Computer Aided Testing Automotive industry regulations and standards Problem Solving Techniques Quality Management Systems Stress management techniques Team management skills IT and ERP Awareness 5S and Safety aspects
Minimum Job Entry Age	18 Years
Last Reviewed On	30/12/2013
Next Review Date	31/03/2021
Deactivation Date	31/03/2021
NSQC Approval Date	05/08/2015
Version	1.0

Qualification Pack

ASC/N0006: Maintain a safe and healthy working environment

Description

This NOS 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 and training team members on health and safety related issues

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

Elements and Performance Criteria

Identify and report the risks identified

To be competent, the user/individual on the job must be able to:

- 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

Create and sustain a Safe, clean and environment friendly work place

To be competent, the user/individual on the job must be able to:

- PC5..** Follow the instructions given on the equipment manual describing the operating process of the equipments
- PC6..** Follow the Safety, Health and Environment related practices developed by the organization
- PC7.** Operate the machine using the recommended Personal Protective Equipments (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 employees illness of contagious nature so that preventive actions can be planned for others

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

Qualification Pack

- KU1.** relevant standards, procedures and policies related to Health, Safety and Environment followed in the company
- KU2.** basic knowledge of Safety procedures(fire fighting, first aid) within the organization
- KU3.** knowledge of various types of PPEs and their usage
- KU4.** basic knowledge of risks/hazards associated with each occupation in the organization
- KU5.** how to safely operate various tools and machines and risks associated with the tools/ equipment
- KU6.** knowledge of personal hygiene and how an individual can contribute towards creating a highly safe and clean working environment

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** write basic level notes and observations
- GS2.** read safety instructions put up across the plant premises
- GS3.** read safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
- GS4.** effectively communicate information to team members
- GS5.** inform employees in the plant and concerned functions about events, incidents & potential risks observed related to Safety, Health and Environment.
- GS6.** question operator/ supervisor in order to understand the safety related issues
- GS7.** attentively listen with full attention and comprehend the information given by the speaker during safety drills and training programs
- GS8.** use common sense and make judgments during day to day basis
- GS9.** use reasoning skills to identify and resolve basic problems
- GS10.** use common sense and make judgments during day to day basis
- GS11.** use reasoning skills to identify and resolve basic problems

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Identify and report the risks identified</i>	8	23	-	-
PC1.. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise	3	6	-	-
PC2. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc	2	6	-	-
PC3. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations	2	6	-	-
PC4. Create awareness amongst other by sharing information on the identified risks	1	5	-	-
<i>Create and sustain a Safe, clean and environment friendly work place</i>	17	52	-	-
PC5.. Follow the instructions given on the equipment manual describing the operating process of the equipments	3	7	-	-
PC6.. Follow the Safety, Health and Environment related practices developed by the organization	3	8	-	-
PC7. Operate the machine using the recommended Personal Protective Equipments (PPE)	3	8	-	-
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	2	8	-	-
PC9. Maintain high standards of personal hygiene at the work place	2	7	-	-
PC10. Ensure that the waste disposal is done in the designated area and manner as per organization SOP.	3	8	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others	1	6	-	-
NOS Total	25	75	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0006
NOS Name	Maintain a safe and healthy working environment
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	15/09/2013
Next Review Date	15/09/2015
NSQC Clearance Date	20/07/2015

Qualification Pack

ASC/N0022: Ensure implementation of 5S activities at the shop floor & the office area

Description

This NOS is about overseeing the implementation of all 5 S activities both at the shop floor and the office area by the team members and training the team in implementation of the 5S principles

Scope

The individual needs to

- Ensure sorting, streamlining/ organizing, storage and documentation, systematic cleaning, standardization and sustenance across the plant and office premises of the organization as given in the organization guidelines

Elements and Performance Criteria

Ensure proper sorting of items at the work place

To be competent, the user/individual on the job must be able to:

- PC1..** ensure all recyclable materials are put in designated containers
- PC2.** ensure no tools, fixtures & jigs are lying on workstations unless in use and no un-necessary items is lying on workbenches or work surfaces unless in use
- PC3.** ensure that the operators and other team members are segregating the waste in hazardous/ non hazardous waste as per the sorting work instructions
- PC4.** ensure that all the operators are following the technique of waste disposal and waste storage in the designated bins
- PC5..** segregate the items which are labelled at red tag items for the process area and keep them in the correct places
- PC6..** ensure that all the tools/ equipment/ fasteners/ spare parts are arranged as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions
- PC7.** check for return of any type of extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area
- PC8. .** oversee removal of unnecessary equipment, storage, furniture, unneeded inventory, supplies, parts and material
- PC9.** ensure that areas of material storage areas are not overflowing
- PC10.** ensure proper stacking and storage of 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

Ensure proper documentation and storage - streamlining & organizing the workplace

To be competent, the user/individual on the job must be able to:

- PC11.** ensure that the team follows the given instructions and checks for labelling of fluids, oils lubricants, solvents, chemicals etc and proper storage of the same to avoid spillage, leakage, fire etc

Qualification Pack

- PC12.** make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions
- PC13.** ensure that organizing the workplace takes place with due considerations to the principles of wasted motions, ergonomics, work & method study .

Ensure cleaning of self and the work place

To be competent, the user/individual on the job must be able to:

- PC14.** ensure that the area has floors swept, machinery clean and is generally neat and tidy in case of cleaning, ensure that correct displays are maintained on the floor which indicate potential safety hazards
- PC15..** ensure workbenches and work surfaces are clean and in good condition
- PC16..** ensure adherence to the cleaning schedule for the lighting system to ensure proper illumination
- PC17..** ensure all recyclable materials are put in designated containers

Ensure standardization

To be competent, the user/individual on the job must be able to:

- PC18.** ensure that daily cleaning standards and schedules to create a clean working environment are followed across the plant
- PC19..** ensure all recyclable materials are put in designated containers
- PC20. .** ensure logical and user friendly documentation and file management for all activities across the plant and create guidelines around standardization of processes
- PC21.** ensure timely creation and sharing of the 5s checklists
- PC22.** ensure that the 5s manual are available as per the timelines

Ensure sustenance

To be competent, the user/individual on the job must be able to:

- PC23.** ensure team cooperation during the audit of 5 s activities
- PC24.** ensure that workmen are periodically trained to address challenges related to 5s
- PC25..** participate actively in employee work groups on 5s and encourage team members for active participation
- PC26..** oversee that the staff/operators are trained and fully understand 5s procedures
- PC27. .** ensure that all the guidelines for what to do and what not to do to build sustainability in 5s are mentioned in the 5s check lists/ work instructions and are easily searchable
- PC28.** ensure continuous training of the team members on 5s in order to increase their awareness and support implementation
- PC29.** ensure that all visual controls, notice boards, symbols etc at the manufacturing place are created, working and are put up as per the requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards, procedures and policies related to 5S followed in the company
- KU2.** have basic knowledge of 5S procedures
- KU3.** know various types 5s practices followed in various areas

Qualification Pack

- KU4.** understand the 5S checklists provided in the department/ team
- KU5.** have skills to identify useful & non useful items
- KU6.** have knowledge of labels , signs & colours used as indicators
- KU7.** Have knowledge on how to sort and store various types of tools,equipment, material etc
- KU8.** know , how to identify various types of waste products
- KU9.** understand the impact of waste/ dirt/ dust/unwantedsubstances on the process/ environment/ machinery/ humanbody
- KU10.** have knowledge of best and environment protective ways ofcleaning & waste disposal
- KU11.** understand the importance of standardization in processes
- KU12.** understand the importance of sustainability in 5S
- KU13.** have knowledge of TQM process
- KU14.** have knowledge of various materials and storage norms
- KU15.** understand visual controls, symbols, graphs etc

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** write basic level notes and observations
- GS2.** note down observations (if any) related to the process
- GS3.** write information documents to internal departments/ internal teams
- GS4.** read 5S instructions put up across the plant premises
- GS5.** effectively communicate information to team members inform employees in the plant and concerned functions about 5S
- GS6.** question the process head in order to understand the 5S related issues
- GS7.** attentively listen with full attention and comprehend the information given by the speaker during 5S training programs
- GS8.** use common sense and make judgments during day to day basis
- GS9.** use reasoning skills to identify and resolve basic problems using 5S
- GS10.** persuade team members to follow 5 S
- GS11.** ensure that the team members understand the importance of using 5 S tool
- GS12.** use innovative skills to perform and manage 5 S activities at the work desk and the shop floor
- GS13.** exhibit inquisitive behaviour to seek feedback and question on the existing set patterns of work emerge, techniques in CA/CI around 5 S work practices
- GS14.** do what is right, not what is a popular practice
- GS15.** follow shop floor rules& regulations and avoid deviations
- GS16.** lead by example in the plant premises while performing activities related to 5S
- GS17.** ensure self-cleanliness on a daily basis
- GS18.** demonstrate the will to keep the work area in a clean and orderly manner
- GS19.** accept additional responsibility for self and the team
- GS20.** encourage self and other to take greater responsibilities for managing 5S

Qualification Pack

- GS21.** identify obstacles and bottlenecks in the process and find basic level solutions for removing these obstacles
- GS22.** use previous experience in resolving problems and taking decisions
- GS23.** make timely and independent decisions on the line/ shift within the boundaries of the delegation matrix of the organization

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure proper sorting of items at the work place</i>	10	25	-	-
PC1.. ensure all recyclable materials are put in designated containers	1	2.5	-	-
PC2. ensure no tools, fixtures & jigs are lying on workstations unless in use and no un-necessary items is lying on workbenches or work surfaces unless in use	1	2.5	-	-
PC3. ensure that the operators and other team members are segregating the waste in hazardous/ non hazardous waste as per the sorting work instructions	1	2.5	-	-
PC4. ensure that all the operators are following the technique of waste disposal and waste storage in the designated bins	1	2.5	-	-
PC5.. segregate the items which are labelled at red tag items for the process area and keep them in the correct places	1	2.5	-	-
PC6.. ensure that all the tools/ equipment/ fasteners/ spare parts are arranged as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions	1	2.5	-	-
PC7. check for return of any type of extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area	1	2.5	-	-
PC8. . oversee removal of unnecessary equipment, storage, furniture, unneeded inventory, supplies, parts and material	1	2.5	-	-
PC9. ensure that areas of material storage areas are not overflowing	1	2.5	-	-
PC10. ensure proper stacking and storage of 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	1	2.5	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure proper documentation and storage - streamlining & organizing the workplace</i>	3	7.5	-	-
PC11. ensure that the team follows the given instructions and checks for labelling of fluids, oils lubricants, solvents, chemicals etc and proper storage of the same to avoid spillage, leakage, fire etc	1	2.5	-	-
PC12. make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions	1	2.5	-	-
PC13. ensure that organizing the workplace takes place with due considerations to the principles of wasted motions, ergonomics, work & method study .	1	2.5	-	-
<i>Ensure cleaning of self and the work place</i>	4	10	-	-
PC14. ensure that the area has floors swept, machinery clean and is generally neat and tidy in case of cleaning, ensure that correct displays are maintained on the floor which indicate potential safety hazards	1	2.5	-	-
PC15.. ensure workbenches and work surfaces are clean and in good condition	1	2.5	-	-
PC16.. ensure adherence to the cleaning schedule for the lighting system to ensure proper illumination	1	2.5	-	-
PC17.. ensure all recyclable materials are put in designated containers	1	2.5	-	-
<i>Ensure standardization</i>	5	12.5	-	-
PC18. ensure that daily cleaning standards and schedules to create a clean working environment are followed across the plant	1	2.5	-	-
PC19.. ensure all recyclable materials are put in designated containers	1	2.5	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC20. . ensure logical and user friendly documentation and file management for all activities across the plant and create guidelines around standardization of processes	1	2.5	-	-
PC21. ensure timely creation and sharing of the 5s checklists	1	2.5	-	-
PC22. ensure that the 5s manual are available as per the timelines	1	2.5	-	-
<i>Ensure sustenance</i>	7	16	-	-
PC23. ensure team cooperation during the audit of 5 s activities	1	2.5	-	-
PC24. ensure that workmen are periodically trained to address challenges related to 5s	1	2.5	-	-
PC25.. participate actively in employee work groups on 5s and encourage team members for active participation	1	2	-	-
PC26.. oversee that the staff/operators are trained and fully understand 5s procedures	1	2	-	-
PC27. . ensure that all the guidelines for what to do and what not to do to build sustainability in 5s are mentioned in the 5s check lists/ work instructions and are easily searchable	1	2.5	-	-
PC28. ensure continuous training of the team members on 5s in order to increase their awareness and support implementation	1	2	-	-
PC29. ensure that all visual controls, notice boards, symbols etc at the manufacturing place are created, working and are put up as per the requirement	1	2.5	-	-
NOS Total	29	71	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0022
NOS Name	Ensure implementation of 5S activities at the shop floor & the office area
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	15/03/2014
Next Review Date	15/03/2016
NSQC Clearance Date	

Qualification Pack

ASC/N5104: Conduct testing of vehicles and aggregates using Computer Aided Engineering Aids

Description

This NOS is about conducting various types of CAE tests to check and validate vehicle and aggregate design in a non-laboratory and without building the actual prototype for conducting an on road test

Scope

The role holder will be responsible for:

- understanding the testing requirement and the process
- using various software based CAE aid to test aggregates and vehicles This NOS will be applicable to all types of automobiles i.e. 2 wheelers, 3 wheelers , 4 wheelers and heavy vehicles and their aggregates

Elements and Performance Criteria

Understanding the testing requirement and the process and establish parameters for comparison

To be competent, the user/individual on the job must be able to:

- PC1..** understand the type of vehicle under test along with detailed understanding of the vehicle specifications
- PC2..** understand the various organizational, domestic and international regulations impacting the performance of the vehicle under test
- PC3..** understand the type of tests to be performed in the computer simulated environment by using the test checklist provided by the cross functional team
- PC4..** understand various types of software modules like pro mechanics, nast ran, matlab, simi link etc. and their utility to conduct various cae based component and vehicle tests
- PC5..** understand the testing methodology, process and test parameters required as per the work instructions/standard operating procedures. establish various data parameters for test results to enable comparison / simulation of performance.

Conduct CAE tests for assessing vehicle performance and durability

To be competent, the user/individual on the job must be able to:

- PC6..** ensure selection of specified software program for testing the given component/ vehicle
- PC7..** ensure selection of correct testing and simulation parameters as per the testing instruction manual provided by the team
- PC8..** conduct the structural analysis of the test prototype and measure fatigue strength, body structure strength, chassis strength, vehicle door and window framework strength and metal fatigue analysis by selecting the correct testing parameters in the structural analysis program
- PC9..** calculate the bending stiffness and torsional stiffness values for the vehicle components under testing
- PC10..** conduct cae enabled motion tests for checking complex mechanical systems as engine, gearbox, powertrain and note down observations

Qualification Pack

- PC11..** conduct cae simulated time motion based vehicle crash tests as per the testing instructions mentioned in the testing manual and note observations
- PC12..** conduct front, side and rear crash impact testing and note observations of crash impact on vehicle structure and vehicle inhabitants (through biomechanics and cae dummies)
- PC13..** plot graphs for force vs. deformation and time vs. deformation and conduct first level analysis of impact
- PC14..** using the recommended software programs, conduct the metal fatigue and stress strain analysis on vehicles and components
- PC15..** conduct the cae simulated drop test to understand stress and shock bearing strength of the vehicle and the components
- PC16..** conduct cfd (computational fluid dynamics) to test the flow of fuel, lubricants, oil and water in the vehicle piping system
- PC17..** ensure testing of thermal flow including exhaust gases through the thermal flow analysis module
- PC18..** conduct non-linear analysis of rubber, plastic and metallic components to understand denting impact, cross movement, compression and expansion of components
- PC19..** using cae enabled modules, test the outer body of vehicles to understand the vibrational behaviour of vehicle body and frames
- PC20..** using digital electrical and electronic simulation program, test the working and performance of the vehicle electrical, electronics, telematics, instrumentation and navigation systems to ensure error free communication and decision making
- PC21..** carry transfer path analysis, acoustic testing and component frequency analysis using relevant nvh testing modules
- PC22..** conduct ergonomics testing using cae enabled modules to test vehicle design, rider comfort, seating comfort, braking process, steering movement process and overall vehicle dimensions
- PC23..** carry out the vehicle dynamics tests as per the testing instruction to validate the vehicle manoeuvrability and vehicle performance through simulated obstacle testing tracks and proving tracks
- PC24..** conduct cae enabled virtual driving test to validate the vehicle performance from a drivers point of view and measure driving comfort, manoeuvrability, vehicle handling and comfort level similar to an on road condition
- PC25..** collate the test results and compare them with the internal/ external benchmarking standards and actual testing data parameters shared by the cross functional design team.
- PC26..** prepare simulation & test result comparison for engineering cft /management team.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant manufacturing and testing standards and procedures followed in the company
- KU2.** new products manufactured by the company
- KU3.** internal product standards finalized within the organization
- KU4.** functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution

Qualification Pack

- KU5.** quality norms and standards prescribed in the Quality Manual by the organization
- KU6.** 5S and Safety norms practiced in the organization
- KU7.** the working of various automobile components
- KU8.** general working of automobiles and linkage & impact of one parameter to another
- KU9.** various types of software testing programs like Pro Mechanical, Nast ran, Mat lab, Similinketc available in the market
- KU10.** impact of wind, water flow, hot & cold conditions, pressure on the performance of the vehicle
- KU11.** impact of various mechanical and thermal stresses on the external frame of the vehicle and overall vehicle performance
- KU12.** various national and international regulations, norms and standards on vehicles and engine performance regulations related to noise, vibrations, durability, reliability factors for 2 wheeler, 3 wheeler and 4 wheelers under normal and difficult environmental conditions
- KU13.** various defects related to reliability and durability of the component and impact of the defect on the final component and vehicle performance
- KU14.** probable sources of vehicle noise and possible impacts
- KU15.** analytical tools like Histogram analysis, Pareto Analysis, Why analysis, Process Mapping, Ishikawa (Fishbone) analysis
- KU16.** basic human anatomy and impact of vehicle performance on human body
- KU17.** basic laws of physics, chemistry. metallurgy and mathematics
- KU18.** basic laws of geometry and product design
- KU19.** the methods of using instruments like Vernier callipers, micrometres, rulers and other inspection tools
- KU20.** how to read and interpret sketches and engineering drawings
- KU21.** potential health and safety hazards and related safety precautions during driving

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** document information from the manuals, discussion notes, process charts etc
- GS2.** create small notes/ work documents/ diagrams for operators and helpers to help them understand the process
- GS3.** write inter departmental notes/ memos or make suitable entries in the online system
- GS4.** use emails and other business correspondence methods (internal memos, circular etc.) for communicating with other team members/ vendors/ suppliers etc.
- GS5.** read equipment manuals and process documents to understand the equipment and processes better
- GS6.** read internal information memos send by internal customers (other functions within the organization)
- GS7.** discuss task lists, schedules, and work-loads with the operative team members
- GS8.** answer the queries raised by the operative team as well as intercompany departments
- GS9.** effectively communicate with the operators and helpers and make them aware of work expectations, targets, policies, processes etc

Qualification Pack

- GS10.** attentively listen with full attention the queries and grievances raised by the operative team and comprehend the information given by the speaker
- GS11.** communicate effectively to the team members
- GS12.** identify conflicts in the team and try to resolve them at the earliest
- GS13.** interact and engage with the team members on a day to day basis
- GS14.** counsel and coach the operators and help them resolve issues
- GS15.** timely highlight to the management about any good work/ achievement by the operators and helpers
- GS16.** break the problem into smaller issues and tasks to arrive at a solution
- GS17.** understand inter process relationship and establish relationship between various parts of the problem
- GS18.** leverage experience to find effective solutions to problems
- GS19.** use basic analytical tools to arrive at solutions
- GS20.** plan, organize and prioritize the work order and jobs received from the production manager
- GS21.** manage the schedule plan for the operators and helpers on the line/shift
- GS22.** validate all process/ equipment manuals so that the final process selected is correct
- GS23.** organize information, tools, manuals etc. on the shop floor so that sorting becomes easy
- GS24.** reorganize resources on the line/ shift in case of change of plans
- GS25.** use common sense and make judgments during day to day basis
- GS26.** use reasoning skills to identify and resolve problems
- GS27.** use intuition to detect any potential problems which could arise during operations
- GS28.** accept additional responsibility for self and the team
- GS29.** encourage self and other to take greater responsibilities
- GS30.** ensure that the work allocated to the team is completed as per timelines and quality norms
- GS31.** identify obstacles and bottlenecks in the process and on own find basic level solutions for removing these obstacles
- GS32.** motivate and provide support for the team on the shop floor
- GS33.** encourage collaboration between team members
- GS34.** resolve team issues and grievances to manage conflicts within the team
- GS35.** create an environment of approachability, trust and openness within the team
- GS36.** ensure role clarity for all operators and helpers on the line/ shift
- GS37.** escalate any team related issues to the concerned person at the right time
- GS38.** identify defective parts in the manufacturing line by comparing manufactured pieces with the work standard
- GS39.** link the defect observed with the overall impact on the performance of the component/ automobile
- GS40.** support and contribute in monitoring and delivering high quality output from self and others
- GS41.** train team members on maintaining quality standards set by the organization
- GS42.** gather information skilfully from multiple sources
- GS43.** analyse information in depth and identifies the problem in a timely manner
- GS44.** develop alternate solutions and resolves problems in early stages

Qualification Pack

- GS45.** work tirelessly in spite of repeat activities in a diligent manner to resolve problems on a day to day basis
- GS46.** use previous experience in resolving problems and taking decisions
- GS47.** make timely and independent decisions on the line/ shift within the boundaries of the delegation matrix of the organization
- GS48.** exhibit objectivity & openness to others views
- GS49.** collaborate with stakeholders to achieve the desired state of final result
- GS50.** familiarise with leading practices available in the market
- GS51.** think independently on new approaches to manufacturing process, material management, data management and team management
- GS52.** represent any new ideas/ approaches on process improvement and productivity improvement to the seniors in the team

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Understanding the testing requirement and the process and establish parameters for comparison</i>	10	5	-	-
PC1.. understand the type of vehicle under test along with detailed understanding of the vehicle specifications	2	1	-	-
PC2.. understand the various organizational, domestic and international regulations impacting the performance of the vehicle under test	2	1	-	-
PC3.. understand the type of tests to be performed in the computer simulated environment by using the test checklist provided by the cross functional team	2	1	-	-
PC4.. understand various types of software modules like pro mechanics, nast ran, matlab, simi link etc. and their utility to conduct various cae based component and vehicle tests	2	1	-	-
PC5.. understand the testing methodology, process and test parameters required as per the work instructions/standard operating procedures. establish various data parameters for test results to enable comparison / simulation of performance.	2	1	-	-
<i>Conduct CAE tests for assessing vehicle performance and durability</i>	25	60	-	-
PC6.. ensure selection of specified software program for testing the given component/ vehicle	1	3	-	-
PC7.. ensure selection of correct testing and simulation parameters as per the testing instruction manual provided by the team	1	3	-	-
PC8.. conduct the structural analysis of the test prototype and measure fatigue strength, body structure strength, chassis strength, vehicle door and window framework strength and metal fatigue analysis by selecting the correct testing parameters in the structural analysis program	2	3	-	-
PC9.. calculate the bending stiffness and torsional stiffness values for the vehicle components under testing	2	3	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10.. conduct cae enabled motion tests for checking complex mechanical systems as engine, gearbox, powertrain and note down observations	1	3	-	-
PC11.. conduct cae simulated time motion based vehicle crash tests as per the testing instructions mentioned in the testing manual and note observations	1	3	-	-
PC12.. conduct front, side and rear crash impact testing and note observations of crash impact on vehicle structure and vehicle inhabitants (through biomechanics and cae dummies)	1	3	-	-
PC13.. plot graphs for force vs. deformation and time vs. deformation and conduct first level analysis of impact	2	2	-	-
PC14.. using the recommended software programs, conduct the metal fatigue and stress strain analysis on vehicles and components	2	2	-	-
PC15.. conduct the cae simulated drop test to understand stress and shock bearing strength of the vehicle and the components	1	3	-	-
PC16.. conduct cfd (computational fluid dynamics) to test the flow of fuel, lubricants, oil and water in the vehicle piping system	1	3	-	-
PC17.. ensure testing of thermal flow including exhaust gases through the thermal flow analysis module	1	3	-	-
PC18.. conduct non-linear analysis of rubber, plastic and metallic components to understand denting impact, cross movement, compression and expansion of components	1	3	-	-
PC19.. using cae enabled modules, test the outer body of vehicles to understand the vibrational behaviour of vehicle body and frames	1	3	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC20.. using digital electrical and electronic simulation program, test the working and performance of the vehicle electrical, electronics, telematics, instrumentation and navigation systems to ensure error free communication and decision making	1	3	-	-
PC21.. carry transfer path analysis, acoustic testing and component frequency analysis using relevant nvh testing modules	1	2	-	-
PC22.. conduct ergonomics testing using cae enabled modules to test vehicle design, rider comfort, seating comfort, braking process, steering movement process and overall vehicle dimensions	1	3	-	-
PC23.. carry out the vehicle dynamics tests as per the testing instruction to validate the vehicle manoeuvrability and vehicle performance through simulated obstacle testing tracks and proving tracks	1	3	-	-
PC24.. conduct cae enabled virtual driving test to validate the vehicle performance from a drivers point of view and measure driving comfort, manoeuvrability, vehicle handling and comfort level similar to an on road condition	1	3	-	-
PC25.. collate the test results and compare them with the internal/ external benchmarking standards and actual testing data parameters shared by the cross functional design team.	1	3	-	-
PC26.. prepare simulation & test result comparison for engineering cft /management team.	1	3	-	-
NOS Total	35	65	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N5104
NOS Name	Conduct testing of vehicles and aggregates using Computer Aided Engineering Aids
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	testing
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	30/12/2013
Next Review Date	30/12/2015
NSQC Clearance Date	

Qualification Pack

ASC/N5105: Ensure documentation and analysis of various tests conducted

Description

This NOS is about documenting the test resulting in the given format, analysing the test results and creating a first level assessment report

Scope

The role holder will be responsible for:

- understanding the testing requirement and the process
- documentation of test result
- analysis of the test results and preparation of first level assessment report This NOS will be applicable to all types of automobiles i.e. 2 wheelers, 3 wheelers , 4 wheelers and heavy vehicles and their aggregates

Elements and Performance Criteria

Understanding the testing requirement and the process

To be competent, the user/individual on the job must be able to:

- PC1..** understand the vehicle testing requirements (based on the type of vehicle to be tested) as mentioned in the testing instructions sheets/ work instructions/ testing control plan
- PC2..** understand the testing methodology, equipment and process required as per the process manuals/ work instructions/standard operating procedures
- PC3..** ensure that the correct testing document containing the specified setup drawing, testing schedules, testing parameters, test specifications and test outcome ranges are mentioned

Documentation of the test outcomes

To be competent, the user/individual on the job must be able to:

- PC4..** ensure observation of the various digital and graphical displays of the testing equipment
- PC5..** note down the observations in the hard copy/ soft copy format as provided by the organization
- PC6..** maintain records of all versions of testing conducted for a particular component/ vehicle along with the date, time, testing setup and testing environment information
- PC7..** maintain records of any previous remarks mentioned by the testing team for a particular component/vehicle
- PC8..** maintain records of comparison between the test outcomes and internal/ external benchmarks and government regulations

Analysis of test outcomes and modifications to the prototype

To be competent, the user/individual on the job must be able to:

- PC9..** conduct a first level analysis of the test outcomes
- PC10..** ensure reference to previous test results and benchmarks during the analysis phase
- PC11..** use analytical tools like why analysis, 7 qc tools, brain storming and other methodology to systematically analyse the observations of the test results

Qualification Pack

- PC12..** check for any gaps in design of the component/ vehicle prototype leading to the test failures
- PC13..** share the first level draft test assessment report with the testing manager
- PC14..** in case need arises, conduct required tests similar to the one already conducted in the presence of the testing manager to confirm the test results
- PC15..** support the test manager in creating presentations and dockets for cross functional team meeting
- PC16..** collaborate with the cross functional design team, prototyping team and manufacturing team and ensure required modification in vehicle and aggregate design take place
- PC17..** conduct tests on the modified version of the prototype based on the testing results shared in the version 1 of the testing process
- PC18..** maintain records/ version control documents of all changes done during testing of each version of the prototype in the format shared by the cross functional team

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant manufacturing and testing standards and procedures followed in the company
- KU2.** new products manufactured by the company
- KU3.** internal product standards finalized within the organization
- KU4.** functional processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution
- KU5.** quality norms and standards prescribed in the Quality Manual by the organization
- KU6.** 5S and Safety norms practiced in the organization
- KU7.** the working of various automobile components
- KU8.** general working of automobiles and linkage & impact of one parameter to another
- KU9.** various national and international regulations, norms and standards on vehicles and engine performance regulations related to noise, vibrations, durability, reliability factors for 2 wheeler, 3 wheeler and 4 wheelers under normal and difficult environmental conditions
- KU10.** various defects related to reliability and durability of the component and impact of the defect on the final component and vehicle performance
- KU11.** analytical tools like Histogram analysis, Pareto Analysis, Why Why analysis, Process Mapping, Ishikawa (Fishbone) analysis
- KU12.** basic laws of physics, chemistry, metallurgy and mathematics
- KU13.** basic laws of geometry and product design
- KU14.** how to read and interpret sketches and engineering drawings
- KU15.** basic documentation rules and procedures
- KU16.** usage of graphs and pictorial data representation techniques for presentations
- KU17.** process for filing and storage of reports

Generic Skills (GS)

User/individual on the job needs to know how to:

Qualification Pack

- GS1.** document information from the manuals, discussion notes, process charts etc.
- GS2.** create small notes/ work documents/ diagrams for operators and helpers to help them understand the process
- GS3.** write inter departmental notes/ memos or make suitable entries in the online system
- GS4.** read equipment manuals and process documents to understand the equipment and processes better
- GS5.** read internal information memos send by internal customers (other functions within the organization)
- GS6.** discuss task lists, schedules, and work-loads with the operative team members
- GS7.** answer the queries raised by the operative team as well as intercompany departments
- GS8.** effectively communicate with the operators and helpers and make them aware of work expectations, targets, policies, processes etc.
- GS9.** attentively listen with full attention the queries and grievances raised by the operative team and comprehend the information given by the speaker
- GS10.** communicate effectively to the team members
- GS11.** identify conflicts in the team and try to resolve them at the earliest
- GS12.** interact and engage with the team members on a day to day basis
- GS13.** counsel and coach the operators and help them resolve issues
- GS14.** timely highlight to the management about any good work/ achievement by the operators and helpers
- GS15.** break the problem into smaller issues and tasks to arrive at a solution
- GS16.** understand inter process relationship and establish relationship between various parts of the problem
- GS17.** leverage experience to find effective solutions to problems
- GS18.** use basic analytical tools to arrive at solutions
- GS19.** plan, organize and prioritize the work order and jobs received from the production manager
- GS20.** manage the schedule plan for the operators and helpers on the line/shift
- GS21.** validate all process/ equipment manuals so that the final process selected is correct
- GS22.** organize information, tools, manuals etc. on the shop floor so that sorting becomes easy
- GS23.** reorganize resources on the line/ shift in case of change of plans
- GS24.** use common sense and make judgments during day to day basis
- GS25.** use reasoning skills to identify and resolve problems
- GS26.** use intuition to detect any potential problems which could arise during operations
- GS27.** accept additional responsibility for self and the team
- GS28.** encourage self and other to take greater responsibilities
- GS29.** ensure that the work allocated to the team is completed as per timelines and quality norms
- GS30.** identify obstacles and bottlenecks in the process and on own find basic level solutions for removing these obstacles
- GS31.** motivate and provide support for the team on the shop floor
- GS32.** encourage collaboration between team members
- GS33.** resolve team issues and grievances to manage conflicts within the team
- GS34.** create an environment of approachability, trust and openness within the team

Qualification Pack

- GS35.** ensure role clarity for all operators and helpers on the line/ shift
- GS36.** escalate any team related issues to the concerned person at the right time
- GS37.** identify defective parts in the manufacturing line by comparing manufactured pieces with the work standard
- GS38.** link the defect observed with the overall impact on the performance of the component/ automobile
- GS39.** support and contribute in monitoring and delivering high quality output from self and others
- GS40.** train team members on maintaining quality standards set by the organization
- GS41.** exhibit objectivity & openness to others views
- GS42.** collaborate with stakeholders to achieve the desired state of final result

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Understanding the testing requirement and the process</i>	10	8	-	-
PC1.. understand the vehicle testing requirements (based on the type of vehicle to be tested) as mentioned in the testing instructions sheets/ work instructions/ testing control plan	4	2	-	-
PC2.. understand the testing methodology, equipment and process required as per the process manuals/ work instructions/standard operating procedures	4	2	-	-
PC3.. ensure that the correct testing document containing the specified setup drawing, testing schedules, testing parameters, test specifications and test outcome ranges are mentioned	2	4	-	-
<i>Documentation of the test outcomes</i>	6	15	-	-
PC4.. ensure observation of the various digital and graphical displays of the testing equipment	2	4	-	-
PC5.. note down the observations in the hard copy/ soft copy format as provided by the organization	1	2	-	-
PC6.. maintain records of all versions of testing conducted for a particular component/ vehicle along with the date, time, testing setup and testing environment information	1	3	-	-
PC7.. maintain records of any previous remarks mentioned by the testing team for a particular component/vehicle	1	3	-	-
PC8.. maintain records of comparison between the test outcomes and internal/ external benchmarks and government regulations	1	3	-	-
<i>Analysis of test outcomes and modifications to the prototype</i>	19	42	-	-
PC9.. conduct a first level analysis of the test outcomes	4	7	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10.. ensure reference to previous test results and benchmarks during the analysis phase	1	4	-	-
PC11.. use analytical tools like why analysis, 7 qc tools, brain storming and other methodology to systematically analyse the observations of the test results	4	7	-	-
PC12.. check for any gaps in design of the component/ vehicle prototype leading to the test failures	2	5	-	-
PC13.. share the first level draft test assessment report with the testing manager	1	3	-	-
PC14.. in case need arises, conduct required tests similar to the one already conducted in the presence of the testing manager to confirm the test results	1	2	-	-
PC15.. support the test manager in creating presentations and dockets for cross functional team meeting	1	3	-	-
PC16.. collaborate with the cross functional design team, prototyping team and manufacturing team and ensure required modification in vehicle and aggregate design take place	2	3	-	-
PC17.. conduct tests on the modified version of the prototype based on the testing results shared in the version 1 of the testing process	2	5	-	-
PC18.. maintain records/ version control documents of all changes done during testing of each version of the prototype in the format shared by the cross functional team	1	3	-	-
NOS Total	35	65	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N5105
NOS Name	Ensure documentation and analysis of various tests conducted
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Testing
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	30/12/2013
Next Review Date	30/12/2015
NSQC Clearance Date	

Qualification Pack

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ 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 Element/ 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 center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 75

(Please note: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0006.Maintain a safe and healthy working environment	25	75	-	-	100	15
ASC/N0022.Ensure implementation of 5S activities at the shop floor & the office area	29	71	-	-	100	15

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N5104. Conduct testing of vehicles and aggregates using Computer Aided Engineering Aids	35	65	-	-	100	40
ASC/N5105. Ensure documentation and analysis of various tests conducted	35	65	-	-	100	30
Total	124	276	-	-	400	100

Qualification Pack

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Qualification Pack

Glossary

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 (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) 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 OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
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.

Qualification Pack

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order 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 (GS)	Core skills or Generic Skills (GS) 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. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive 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.