



Automotive Service Technician Level 6

QP Code: ASC/Q1404

Version: 1.0

NSQF Level: 6

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Contents

ASC/Q1404: Automotive Service Technician Level 6	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/N0001: Plan and organise work to meet expected outcomes	5
ASC/N0002: Work effectively in a team	9
ASC/N0003: Maintain a healthy, safe and secure working environment	13
ASC/N1407: Carry out advanced diagnosis of vehicle for engine and other mechanical repairs requirement	17
ASC/N1408: Carry out complete and advanced level diagnosis of vehicle for electrical and electronic repairs requirements	23
ASC/N1409: Carry out servicing, repairs and overhauling of a vehicle (Advanced)	32
ASC/N1410: Carry out electrical and electronic repairs and overhauling of a vehicle (Advanced)	39
ASC/N1411: Liaise with external automotive stakeholders	49
Assessment Guidelines and Weightage	53
<i>Assessment Guidelines</i>	53
<i>Assessment Weightage</i>	53
Acronyms	55
Glossary	56

ASC/Q1404: Automotive Service Technician Level 6

Brief Job Description

An Auto Service Technician Level 6 is responsible for managing advanced diagnosis and repairs. The individual carries out all types of diagnosis of faults and repairs and is responsible for supervising work of other technicians/senior technicians.

Personal Attributes

An individual on this job must have good communication and interpersonal skills in addition to being a team player, as the job requires coordination with other technicians during diagnosis. The individual must have a technical bend of mind to understand the technical aspects related to various aggregates in a vehicle, to assist in the fault diagnosis. The individual should be proactive, process and customer centric with ability to guide junior technicians. Keeping oneself abreast of the latest developments and newer technologies used in the various systems of the vehicle and its aggregates is highly desirable.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [ASC/N0001: Plan and organise work to meet expected outcomes](#)
2. [ASC/N0002: Work effectively in a team](#)
3. [ASC/N0003: Maintain a healthy, safe and secure working environment](#)
4. [ASC/N1407: Carry out advanced diagnosis of vehicle for engine and other mechanical repairs requirement](#)
5. [ASC/N1408: Carry out complete and advanced level diagnosis of vehicle for electrical and electronic repairs requirements](#)
6. [ASC/N1409: Carry out servicing, repairs and overhauling of a vehicle \(Advanced\)](#)
7. [ASC/N1410: Carry out electrical and electronic repairs and overhauling of a vehicle \(Advanced\)](#)
8. [ASC/N1411: Liaise with external automotive stakeholders](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service and Repair
Country	India

NSQF Level	6
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3115.0602
Minimum Educational Qualification & Experience	Diploma (Mechanical/Automobile Engineering) with 5-10 Years of experience For other qualifications
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	On the job training: Desirable for ASDC Auto Service Technician Level 6 Certificate or Bachelors in Mechanical/Electrical/Automobile Engineering Compulsory for all other qualifications
Minimum Job Entry Age	18 Years
Last Reviewed On	12/06/2013
Next Review Date	30/06/2020
Deactivation Date	30/06/2020
NSQC Approval Date	28/09/2015
Version	1.0

ASC/N0001: Plan and organise work to meet expected outcomes

Description

This NOS unit is about planning and organising an individuals work in order to complete it to the required standards on time.

Scope

This unit/task covers the following:

- work requirements including various activities, deliverables or work output required in the given time, maintain set quality standards
- appropriate use of resources (both material / equipment's and manpower)

Elements and Performance Criteria

Work requirements including various activities within the given time and set quality standards

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

- PC1.** keep immediate work area clean and tidy
- PC2.** treat confidential information as per the organisations guidelines
- PC3.** work in line with organisations policies and procedures
- PC4.** work within the limits of job role
- PC5.** obtain guidance from appropriate people, where necessary
- PC6.** ensure work meets the agreed requirements

Appropriate use of resources

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

- PC7.** establish and agree on work requirements with appropriate people
- PC8.** manage time, materials and cost effectively
- PC9.** use resources in a responsible manner

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the organisations policies, procedures and priorities for area of work, role and responsibilities in carrying out that work
- KU2.** the limits of responsibilities and when to involve others
- KU3.** specific work requirements and who these must be agreed with
- KU4.** the importance of having a tidy work area and how to do this
- KU5.** how to prioritize workload according to urgency and importance and the benefits of this
- KU6.** the organisations policies and procedures for dealing with confidential information and the importance of complying with these
- KU7.** the purpose of keeping others updated with the progress of work
- KU8.** who to obtain guidance from and the typical circumstances when this may be required

- KU9.** the purpose and value of being flexible and adapting work plans
- KU10.** how to complete tasks accurately by following standard procedures
- KU11.** technical resources needed for work and how to obtain and use these

Generic Skills (GS)

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

- GS1.** write in at least one language
- GS2.** read instructions, guidelines/procedures
- GS3.** ask for clarification and advice from appropriate persons
- GS4.** communicate orally with colleagues
- GS5.** make a decision on a suitable course of action appropriate for accurately completing the task within resources
- GS6.** agree objectives and work requirements
- GS7.** plan and organise work to achieve targets and deadlines
- GS8.** deliver consistent and reliable service to customers
- GS9.** check own work and ensure it meets customer requirements
- GS10.** anomalies to the concerned persons
- GS11.** analyse problems and identify work-arounds taking help from
- GS12.** apply own judgement to identify solutions in different situations

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Work requirements including various activities within the given time and set quality standards</i>	16	47	-	-
PC1. keep immediate work area clean and tidy	2	9	-	-
PC2. treat confidential information as per the organisations guidelines	2	6	-	-
PC3. work in line with organisations policies and procedures	3	8	-	-
PC4. work within the limits of job role	3	6	-	-
PC5. obtain guidance from appropriate people, where necessary	3	7	-	-
PC6. ensure work meets the agreed requirements	3	11	-	-
<i>Appropriate use of resources</i>	9	28	-	-
PC7. establish and agree on work requirements with appropriate people	3	9	-	-
PC8. manage time, materials and cost effectively	3	11	-	-
PC9. use resources in a responsible manner	3	8	-	-
NOS Total	25	75	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0001
NOS Name	Plan and organise work to meet expected outcomes
Sector	Automotive
Sub-Sector	Manufacturing and R&D, Sales and Service, Road Transportation
Occupation	Auto Components /Aggregates Repair
NSQF Level	4
Credits	NA
Version	1.0
Last Reviewed Date	10/06/2013
Next Review Date	10/06/2015
NSQC Clearance Date	20/07/2015

ASC/N0002: Work effectively in a team

Description

This NOS unit is about working effectively with colleagues, either in individuals own work group or in other work groups within organisation

Scope

This unit/task covers the following: Colleagues:

- Superiors
- Members of own work group
- People in other work groups within or outside the organisation Communicate:
- Face-to-face
- By telephone
- In writing

Elements and Performance Criteria

Effective communication

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

- PC1.** maintain clear communication with colleagues
- PC2.** work with colleagues
- PC3.** pass on information to colleagues in line with organisational requirements
- PC4..** work in ways that show respect for colleagues
- PC5.** carry out commitments made to colleagues
- PC6.** let colleagues know in good time if cannot carry out commitments, explaining the reasons
- PC7.** identify problems in working with colleagues and take the initiative to solve these problems
- PC8.** follow the organisations policies and procedures for working with colleagues
- PC9.** ability to share resources with other members as per priority of tasks

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the organisations policies and procedures for working with colleagues, role and responsibilities in relation to this
- KU2.** the importance of effective communication and establishing good working relationships with colleagues
- KU3.** different methods of communication and the circumstances in which it is appropriate to use these
- KU4.** benefits of developing productive working relationships with colleagues
- KU5.** the importance of creating an environment of trust and mutual respect
- KU6.** whether not meeting commitments, will have implications on individuals and the organisation

- KU7.** different types of information that colleagues might need and the importance of providing this information when it is required
- KU8.** the importance of problems, from colleagues perspective and how to provide support, where necessary, to resolve these

Generic Skills (GS)

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

- GS1.** complete well written work with attention to detail
- GS2.** read instructions, guidelines/procedures
- GS3.** listen effectively and orally communicate information
- GS4.** make decisions on a suitable course of action or response
- GS5.** plan and organise work to achieve targets and deadlines
- GS6.** check that the work meets customer requirements
- GS7.** deliver consistent and reliable service to customers
- GS8.** apply problem solving approaches in different situations
- GS9.** apply balanced judgements to different situations
- GS10.** apply good attention to detail
- GS11.** check that the work is complete and free from errors
- GS12.** get work checked by peers
- GS13.** work effectively in a team environment

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Effective communication</i>	25	75	-	-
PC1. maintain clear communication with colleagues	4	10	-	-
PC2. work with colleagues	2	7	-	-
PC3. pass on information to colleagues in line with organisational requirements	3	8	-	-
PC4.. work in ways that show respect for colleagues	3	8	-	-
PC5. carry out commitments made to colleagues	2	8	-	-
PC6. let colleagues know in good time if cannot carry out commitments, explaining the reasons	2	8	-	-
PC7. identify problems in working with colleagues and take the initiative to solve these problems	4	9	-	-
PC8. follow the organisations policies and procedures for working with colleagues	3	9	-	-
PC9. ability to share resources with other members as per priority of tasks	2	8	-	-
NOS Total	25	75	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0002
NOS Name	Work effectively in a team
Sector	Automotive
Sub-Sector	Manufacturing and R&D, Sales and Service, Road Transportation
Occupation	Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	23/09/2013
Next Review Date	30/09/2015
NSQC Clearance Date	28/09/2015

ASC/N0003: Maintain a healthy, safe and secure working environment

Description

This NOS unit is about monitoring the working environment and making sure it meets requirements for health, safety and security

Scope

This unit/task covers the following:

- Resources (both material & manpower) needed to maintain a safe working environment as per the prevalent norms & government policies including emergency procedures for illness, accidents, fires or any other reason which may involve evacuation of the premises

Elements and Performance Criteria

Resources needed to maintain a safe, secure working environment

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

- PC1.** comply with organisations current health, safety and security policies and procedures
- PC2.** report any identified breaches in health, safety, and security policies and procedures to the designated person
- PC3..** Coordinate with other resources at the workplace to achieve the healthy, safe and secure environment for all incorporating all government norms esp. for emergency situations like fires, earthquakes etc.
- PC4.** identify and correct any hazards like illness, accidents, fires or any other natural calamity safely and within the limits of individuals authority
- PC5.** report any hazards outside the individuals authority to the relevant person in line with organisational procedures and warn other people who may be affected
- PC6.** follow organisations emergency procedures for accidents, fires or any other natural calamity
- PC7.** identify and recommend opportunities for improving health, safety, and security to the designated person
- PC8.** complete all health and safety records are updates and procedures well defined

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** legislative requirements and organisations procedures for health, safety and security and individuals role and responsibilities in relation to this
- KU2.** what is meant by a hazard, including the different types of health and safety hazards that can be found in the workplace
- KU3.** how and when to report hazards
- KU4.** the limits of responsibility for dealing with hazards
- KU5.** the organisations emergency procedures for different emergency situations and the importance of following these

- KU6.** the importance of maintaining high standards of health, safety and security
- KU7.** implications that any non-compliance with health, safety and security may have on individuals and the organisation
- KU8.** different types of breaches in health, safety and security and how and when to report these
- KU9.** evacuation procedures for workers and visitors
- KU10.** how to summon medical assistance and the emergency services, where necessary
- KU11.** how to use the health, safety and accident reporting procedures and the importance of these

Generic Skills (GS)

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

- GS1.** complete accurate, well written work with attention to detail
- GS2.** read instructions, guidelines/procedures/rules
- GS3.** listen and orally communicate information
- GS4.** make decisions on a suitable course of action or response
- GS5.** plan and organise work to achieve targets and deadlines
- GS6.** build and maintain positive and effective relationships with colleagues and customers
- GS7.** apply problem solving approaches in different situations
- GS8.** analyse data and activities
- GS9.** apply balanced judgements to different situations
- GS10.** apply good attention to detail
- GS11.** check that the work is complete and free from errors
- GS12.** get work checked by peers
- GS13.** work effectively in a team environment

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Resources needed to maintain a safe, secure working environment</i>	25	75	-	-
PC1. comply with organisations current health,safety and security policies and procedures	3	9	-	-
PC2. report any identified breaches in health,safety, and security policies and procedures to the designated person	3	10	-	-
PC3.. Coordinate with other resources at the workplace to achieve the healthy, safe and secure environment for all incorporating all government norms esp. for emergency situations like fires,earthquakes etc.	3	10	-	-
PC4. identify and correct any hazards like illness, accidents, fires or any other natural calamity safely and within the limits of individuals authority	5	10	-	-
PC5. report any hazards outside the individuals authority to the relevant person in line with organisational procedures and warn other people who may be affected	3	9	-	-
PC6. follow organisations emergency procedures for accidents, fires or any other natural calamity	3	10	-	-
PC7. identify and recommend opportunities for improving health,safety, and security to the designated person	3	8	-	-
PC8. complete all health and safety records are updates and procedures well defined	2	9	-	-
NOS Total	25	75	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0003
NOS Name	Maintain a healthy, safe and secure working environment
Sector	Automotive
Sub-Sector	Manufacturing and R&D, Sales and Service, Road Transportation
Occupation	Auto Components/Aggregates Repair
NSQF Level	4
Credits	NA
Version	1.0
Last Reviewed Date	10/06/2013
Next Review Date	10/06/2015
NSQF Clearance Date	20/07/2015

ASC/N1407: Carry out advanced diagnosis of vehicle for engine and other mechanical repairs requirement

Description

This NOS unit is about diagnosing advanced faults in vehicle and troubleshooting problems.

Scope

This unit/task covers the following:

- identify various operational faults in the mechanical systems of the vehicle
- complete diagnosing & repair requirements in the engine and other mechanical aggregates

Elements and Performance Criteria

Carry out advance diagnosis for operational faults in the mechanical aggregates

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

- PC1..** identify and explain the functioning of each system, component and aggregate of a vehicle
- PC2. .** obtain sufficient information from the job card and customer/ service advisor to make an assessment of service and repair needs of the vehicle
- PC3. .** review the job card and develop clear and complete understanding of customer complaints
- PC4. .** use checklists and standard OEM operating procedures as per the vehicle service manual to confirm need for servicing, replacement of oils, filters and other parts etc.
- PC5..** conduct routine and non-routine inspections for vehicle fitness assessment, emission testing, safety assessment, post-accident diagnostic assessment, postrepairserviceability assessment and manufacturer recall assessment
- PC6. .** ensure any additional malfunctions or repair requirements observed in the vehicle are reported to the service advisor and discussed with the customer
- PC7..** follow standard operating procedures as prescribed by the suppliers in the user manuals of workshop tools and equipment
- PC8. .** ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary
- PC9..** ensure any malfunctions observed in tools and equipment are reported to the concerned persons
- PC10. .** conduct inspection of the engine and all other mechanical parts & aggregates to diagnose need for repairs or adjustment
- PC11. .** conduct test drives to assess need for repairs, calibration or adjustment
- PC12..** supervise dismantling and reassembly of aggregates of a vehicle for the purpose of diagnosing faults
- PC13. .** compare results of diagnostic inspections and tests against vehicle specifications and any regulatory requirements
- PC14. .** utilise various tools including computer-based diagnostic tools for accurate assessment of vehicles operating parts and systems
- PC15..** prepare a list of all the service, repair and replacement requirements of the vehicle

- PC16.** . finalise the list of all the service, repair and replacement requirements of the vehicle in consultation with service advisor
- PC17..** ensure safe movement and parking of the vehicle in the workshop
- PC18..** supervise junior technicians in their work
- PC19.** . ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)
- PC20.** . drive a relevant 2/3/4 wheeler vehicle which is an important part of the diagnosis of the type of vehicle that is dealt by the relevant OEM

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** standard operating procedures of the organisation/ dealership for inspection and diagnosis of faults in a vehicle
- KU2.** standard operating procedures recommended by the dealership/ suppliers/OEM for using tools and equipment
- KU3.** safety requirements for equipment and components (e.g. preventing/ dealing with oil spillage and inflammable materials)
- KU4.** documentation requirements for each procedure carried out
- KU5.** organizational and professional code of ethics and standards of practice
- KU6.** safety, health, environmental policies and regulations for the workplace as well as for automotive trade in general (e.g. safe practices while working in pits/ under vehicles)
- KU7.** the basic technology used in and functioning of various components and aggregates of the vehicle including: engine and fuel system (diesel, petrol, electrical, gas, hybrid etc.) cooling system air supply systems emission and exhaust system ignition systems clutch assembly clutch operating system gearbox (manual and automatic) drivelines and hubs drive-train assembly and transmission systems (manual, automatic etc.) steering system suspension system brake system (including regenerative braking systems) tyres and wheels (including wheel alignment) radiator batteries and power storage system power-generating systems (including charging systems especially for electrical and hybrid vehicles) electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. energy recuperation systems, if applicable (e.g. in electric, gas and hybrid vehicles) electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit hydraulic and pneumatic system various lubrication systems
- KU8.** the tools used to assess and confirm technical faults that cannot be determined through a visual inspection, including use of: organic light emitting displays anti-lock braking system abs/air bag scan tools, automotive scanners, graphing scanners, modular diagnostic information systems pressure indicators: fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges measuring equipment: Vernier callipers, micrometre, feeler gauges, spanner, compression gauge, brake fluid tester, brake fluid bleeding equipment, refractometer, radiator pressure gauge, hydrometer, thermometer, strut compressor, bearing installer, installer and puller for bearings, oil seal installer and mandrel, AC manifold gauge, multi-metre, flow metre, temp gauge, dial gauge etc. other tools: laptops
- KU9.** the various sources of information available for assessing service and repair requirements of the vehicle including: diagnostic displays visual inspections test drives vehicle/equipment manufacturer specifications standard operating procedures for diagnosis

- KU10.** typical symptoms of common technical faults in a vehicle including fluid levels, leaks, wear and tear, damage to a part/ aggregate and need for adjustments
- KU11.** basic computer skills including the following: OEM specific computer applications basic computer based tasks (e.g. use of productivity tools such as word, excel etc.) basic internet based tasks (e.g. accessing and responding to emails etc.)

Generic Skills (GS)

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

- GS1.** complete and maintain workplace record on inspection, diagnosis and repair activities
- GS2.** maintain all office records required on the job (e.g. stock records, job cards, repair quotations, personnel records, time sheets, meeting notes etc.)
- GS3.** record all diagnostic inspections and tests carried out on a vehicle
- GS4.** write in at least one language
- GS5.** read and interpret workplace related documentation
- GS6.** clearly communicate workplace information and ideas with workplace colleagues (verbal and non-verbal)
- GS7.** use terms, names, grades, and other nomenclature pertaining to the automotive trade, tools, specific workshop equipment etc.
- GS8.** communicate with colleagues to handle verbal enquiries, such as clarifying instructions and responding to requests for information
- GS9.** determine the nature and objective of the analysis and evaluation required and decide on the diagnostic techniques to be applied
- GS10.** plan work assigned on a daily basis and provide estimates of time required for each piece of work(e.g. by evaluating work assigned on a job card and providing time estimates for each service/ repair activity)
- GS11.** organise the workplace and work according to the principles of 5S
- GS12.** prioritise actions to achieve required outcomes
- GS13.** interpret the needs of customers by evaluating job cards and talking to service advisor and superiors
- GS14.** ensure that customer needs are assessed and satisfactory service is provided
- GS15.** follow up with the service advisor on any unfavourable feedback received from customer
- GS16.** recognise a workplace problem or a potential problem and take action
- GS17.** determine problems needing priority action
- GS18.** refer problems outside area of responsibility to concerned person(e.g. unavailability of required spare parts or materials in the workshop)
- GS19.** gather information and provide assistance as required to solve problems
- GS20.** analyse the complexity of work to determine if it can be successfully carried out
- GS21.** analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Carry out advance diagnosis for operational faults in the mechanical aggregates</i>	30	70	-	-
PC1.. identify and explain the functioning of each system, component and aggregate of a vehicle	2	3	-	-
PC2. . obtain sufficient information from the job card and customer/ service advisor to make an assessment of service and repair needs of the vehicle	2	3	-	-
PC3. . review the job card and develop clear and complete understanding of customer complaints	2	3	-	-
PC4. . use checklists and standard OEM operating procedures as per the vehicle service manual to confirm need for servicing, replacement of oils, filters and other parts etc.	2	3	-	-
PC5.. conduct routine and non-routine inspections for vehicle fitness assessment, emission testing, safety assessment, post-accident diagnostic assessment, postrepairserviceability assessment and manufacturer recall assessment	2	6	-	-
PC6. . ensure any additional malfunctions or repair requirements observed in the vehicle are reported to the service advisor and discussed with the customer	1	4	-	-
PC7.. follow standard operating procedures as prescribed by the suppliers in the user manuals of workshop tools and equipment	1	3	-	-
PC8. . ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary	1	3	-	-
PC9.. ensure any malfunctions observed in tools and equipment are reported to the concerned persons	1	3	-	-
PC10. . conduct inspection of the engine and all other mechanical parts & aggregates to diagnose need for repairs or adjustment	2	6	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. . conduct test drives to assess need for repairs, calibration or adjustment	2	4	-	-
PC12.. supervise dismantling and reassembly of aggregates of a vehicle for the purpose of diagnosing faults	2	4	-	-
PC13. . compare results of diagnostic inspections and tests against vehicle specifications and any regulatory requirements	2	6	-	-
PC14. . utilise various tools including computer-based diagnostic tools for accurate assessment of vehicles operating parts and systems	2	5	-	-
PC15.. prepare a list of all the service, repair and replacement requirements of the vehicle	1	2	-	-
PC16. . finalise the list of all the service, repair and replacement requirements of the vehicle in consultation with service advisor	1	2	-	-
PC17.. ensure safe movement and parking of the vehicle in the workshop	1	2	-	-
PC18.. supervise junior technicians in their work	1	3	-	-
PC19. . ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)	1	2	-	-
PC20. . drive a relevant 2/3/4 wheeler vehicle which is an important part of the diagnosis of the type of vehicle that is dealt by the relevant OEM	1	3	-	-
NOS Total	30	70	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1407
NOS Name	Carry out advanced diagnosis of vehicle for engine and other mechanical repairs requirement
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	12/06/2013
Next Review Date	12/06/2013
NSQF Clearance Date	28/09/2015

ASC/N1408: Carry out complete and advanced level diagnosis of vehicle for electrical and electronic repairs requirements

Description

This NOS unit is about diagnosing advanced faults in vehicle and troubleshooting problems.

Scope

This unit/task covers the following:

- identify and diagnose advanced electrical and electronic faults in a vehicle

Elements and Performance Criteria

Carry out advance diagnosis for faults in the electrical and electronic aggregates

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

- PC1..** identify and explain the functioning of various electrical systems, components and aggregates of a vehicle
- PC2..** obtain sufficient information from customer/ service advisor to make an assessment of service and repair needs of the vehicle
- PC3..** review the job card and understand customer complaints
- PC4. .** use checklists and standard OEM operating procedures to confirm need for servicing, replacement of oils, filters and other parts etc.
- PC5. .** follow standard operating procedures for using workshop tools and equipment
- PC6. .** ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary
- PC7. .** ensure any additional malfunctions or repair requirements observed in are reported to the service advisor and discussed with the customer
- PC8. .** ensure any malfunctions observed in tools and equipment are reported to the concerned persons
- PC9. .** conduct routine and non-routine inspections for pre-purchase assessment, vehicle fitness assessment, emission testing, safety assessment, post-accident diagnostic assessment, post-repair serviceability assessment and manufacturer recall assessment
- PC10. .** select the most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment
- PC11..** identify, select and prepare tools and material required for the specific diagnostic process
- PC12..** prepare system components for the diagnostic process including park-up, isolation and cleaning requirements

- PC13.** . conduct inspection of electrical and electronic systems including: stability/steering/suspension systems (including electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems) electric over hydraulic systems (including garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control etc.) engine management systems (including fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop diesel engine management systems) transmission/driveline systems (including clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials, mechatronic modules and multi-class Bus systems) braking systems (including ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems) safety systems (including fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting and windscreen wipers control) monitoring/protection systems (including display types such as LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems) convenience and entertainment systems (including audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems) theft deterrent systems (including remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems) electric and hybrid vehicle systems (including battery technology, motor drive systems, motor controllers, air conditioning systems, electronic protection systems and multi-class Bus systems) climate control systems (including air conditioning, heating, blending systems and multi-class Bus systems)
- PC14.** diagnose need for repairs, adjustment or part replacement in electrical and electronic systems
- PC15.** conduct test drives to assess need for repairs, calibration or adjustment
- PC16.** compare results of diagnostic inspections and tests against vehicle specifications and any regulatory requirements
- PC17.** prepare a list of all the service, repair and replacement requirements of the vehicle
- PC18.** finalise the list of all the service, repair and replacement requirements of the vehicle in consultation with service advisor
- PC19.** ensure safe movement and parking of the vehicle in the workshop
- PC20.** assist junior technicians in their work
- PC21.** utilise any computer-based diagnostic applications
- PC22.** ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)
- PC23.** drive a relevant 2/3/4 wheeler vehicle which is an important part of the diagnosis of the type of vehicle that is dealt by the relevant OEM

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** standard operating procedures of the organization/ dealership for inspection and diagnosis of faults in a vehicle

- KU2.** standard operating procedures recommended by the dealership/ suppliers/OEM for using tools and equipment
- KU3.** safety requirements for equipment and components (e.g. preventing/ dealing with oil spillage and inflammable materials)
- KU4.** documentation requirements for each procedure carried out
- KU5.** organisational and professional code of ethics and standards of practice
- KU6.** safety, health, environmental policies and regulations for the workplace as well as for automotive trade in general (e.g. safe practices while working in pits/ under vehicles)
- KU7.** the basic technology used in and functioning of various components and aggregates of the vehicle including: engines and fuel system (diesel, petrol, electrical, gas, hybrid etc.) cooling system air supply systems emission and exhaust system ignition systems clutch assembly clutch operating system gearbox (manual and automatic) drivelines and hubs drive-train assembly and transmission systems (manual, automatic etc.) steering system suspension system brake system (including regenerative braking systems) tyres and wheels (including wheel alignment) radiator batteries and power storage system power-generating systems (including charging systems especially for electrical and hybrid vehicles) electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. energy recuperation systems, if applicable (e.g. in electric, gas and hybrid vehicles) electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit hydraulic and pneumatic system various lubrication systems
- KU8.** basic principles of: ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism and electromagnetic induction etc. vehicle earthing and earthing methods vehicle engine systems (e.g. types, applications and operation of sensors, actuators, etc.) types of circuit protection and their use electrical safety procedures the operation of warning, charging and starter circuits symbols, units and terms associated with electric systems and components battery charging electrical/electronic control systems operation of electronic and electric engine systems (including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fiber optics principles) electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- KU9.** the tools used to assess and confirm technical faults that cannot be determined through a visual inspection, including use of: measuring equipment: analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, pulse generators etc. electrical and electronic testing equipment: voltmeters, ammeters, ohmmeters, battery testing equipment, dedicated and computer based diagnostic equipment, oscilloscopes, scanner, battery tester, cell discharge tester, hydrometer, multimeter etc. other tools: laptops
- KU10.** the theory of diagnosis including concept, design and planning
- KU11.** types, functions, operations and limitations of diagnostic testing equipment
- KU12.** methods and processes for recording and reporting diagnostic findings and recommendations
- KU13.** the tests used to assess and confirm technical faults that cannot be determined through a visual inspection, including testing: wiring and connector integrity operator and specification of input and output devices controlling electronic components and computers readings related to direct, indirect and intermittent causes
- KU14.** the various sources of information available for assessing service and repair requirements of the vehicle including: diagnostic displays visual inspections test drives vehicle/equipment manufacturer specifications standard operating procedures for diagnosis

- KU15.** typical symptoms of common technical faults in a vehicle including fluid levels, leaks, wear and tear, damage to a part/ aggregate and need for adjustments
- KU16.** basic computer skills including the following: OEM specific computer applications basic computer based tasks (e.g. use of productivity tools such as word, excel etc.) basic internet based tasks (e.g. accessing and responding to emails etc.)

Generic Skills (GS)

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

- GS1.** complete and maintain workplace record son inspection, diagnosis and repair activities
- GS2.** maintain all office records required on the job (e.g. stock records, job cards, repair quotations, personnel records, time sheets, meeting notes etc.)
- GS3.** record all diagnostic inspections and tests carried out on a vehicle
- GS4.** write in at least one language
- GS5.** read and interpret workplace related documentation (e.g. stock records, job cards, repair quotations, personnel records, time sheets, meeting notes etc.)
- GS6.** clearly communicate workplace information and ideas with workplace colleagues (verbal and non-verbal)
- GS7.** use terms, names, grades, and other nomenclature pertaining to the automotive trade, tools, specific workshop equipment etc.
- GS8.** communicate with colleagues to handle verbal enquiries, such as clarifying instructions and responding to requests for information
- GS9.** determine the nature and objective of the analysis and evaluation required and decide on the diagnostic techniques to be applied
- GS10.** plan work assigned on a daily basis and provide estimates of time required for each piece of work(e.g. by evaluating work assigned on a job card and providing time estimates for each service/ repair activity)
- GS11.** organise the workplace and work according to the principles of 5S
- GS12.** prioritise actions to achieve required outcomes
- GS13.** interpret the needs of customers
- GS14.** ensure that customer needs are assessed and every effort is made to provide satisfactory service
- GS15.** recognise a workplace problem or a potential problem and take action
- GS16.** determine problems needing priority action
- GS17.** refer problems outside area of responsibility to concerned person(e.g. unavailability of required spare parts or materials in the workshop)
- GS18.** gather information and provide assistance as required to solve problems
- GS19.** analyse the complexity of work to determine if it can be successfully carried out
- GS20.** analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Carry out advance diagnosis for faults in the electrical and electronic aggregates</i>	30	70	-	-
PC1.. identify and explain the functioning of various electrical systems, components and aggregates of a vehicle	2	2	-	-
PC2.. obtain sufficient information from customer/ service advisor to make an assessment of service and repair needs of the vehicle	1	2	-	-
PC3.. review the job card and understand customer complaints	1	2	-	-
PC4. . use checklists and standard OEM operating procedures to confirm need for servicing, replacement of oils, filters and other parts etc.	1	2	-	-
PC5. . follow standard operating procedures for using workshop tools and equipment	1	2	-	-
PC6. . ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary	1	3	-	-
PC7. . ensure any additional malfunctions or repair requirements observed in are reported to the service advisor and discussed with the customer	1	3	-	-
PC8. . ensure any malfunctions observed in tools and equipment are reported to the concerned persons	1	3	-	-
PC9. . conduct routine and non-routine inspections for pre-purchase assessment, vehicle fitness assessment, emission testing, safety assessment, post-accident diagnostic assessment, post-repair serviceability assessment and manufacturer recall assessment	2	4	-	-
PC10. . select the most appropriate analytical and evaluative methodology including diagnostic process, sequence, tests and testing equipment	2	4	-	-
PC11.. identify, select and prepare tools and material required for the specific diagnostic process	1	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12.. prepare system components for the diagnostic process including park-up, isolation and cleaning requirements	1	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<p>PC13. . conduct inspection of electrical and electronic systems including: stability/steering/ suspension systems (including electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems) electric over hydraulic systems (including garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control etc.) engine management systems (including fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop diesel engine management systems) transmission/driveline systems (including clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials, mechatronic modules and multi-class Bus systems) braking systems (including ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems) safety systems (including fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting and windscreen wipers control) monitoring/protection systems (including display types such as LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems) convenience and entertainment systems (including audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems) theft deterrent systems (including remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems) electric and hybrid vehicle systems (including battery technology, motor drive systems, motor controllers, air conditioning systems, electronic protection systems and multi-class Bus systems) climate control systems (including air conditioning, heating, blending systems and multi-class Bus systems)</p>	3	6	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. diagnose need for repairs, adjustment or part replacement in electrical and electronic systems	2	5	-	-
PC15. conduct test drives to assess need for repairs, calibration or adjustment	1	4	-	-
PC16. compare results of diagnostic inspections and tests against vehicle specifications and any regulatory requirements	2	4	-	-
PC17. prepare a list of all the service, repair and replacement requirements of the vehicle	1	3	-	-
PC18. finalise the list of all the service, repair and replacement requirements of the vehicle in consultation with service advisor	1	3	-	-
PC19. ensure safe movement and parking of the vehicle in the workshop	1	2	-	-
PC20. assist junior technicians in their work	1	2	-	-
PC21. utilise any computer-based diagnostic applications	1	3	-	-
PC22. ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)	1	1	-	-
PC23. drive a relevant 2/3/4 wheeler vehicle which is an important part of the diagnosis of the type of vehicle that is dealt by the relevant OEM	1	2	-	-
NOS Total	30	70	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1408
NOS Name	Carry out complete and advanced level diagnosis of vehicle for electrical and electronic repairs requirements
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	12/06/2013
Next Review Date	12/06/2013
NSQC Clearance Date	28/09/2015

ASC/N1409: Carry out servicing, repairs and overhauling of a vehicle (Advanced)

Description

This NOS unit is about an individual carrying out repairs and overhauling of mechanical, electrical and electronic systems of a vehicle.

Scope

This unit/task covers the following:

- repair and overhauling of engine and related aggregates
- repair and overhauling of other mechanical aggregates and systems

Elements and Performance Criteria

Advanced repair and overhauling of engine and mechanical aggregates

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

- PC1.** . ensure that the correct spare parts, lubricants, tools and other materials required have been obtained
- PC2.** . service, repair and overhaul: engine and fuel system (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system brake system clutch assembly gearbox, drive-train assembly and transmission systems (manual, automatic etc.) steering system suspension system electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit tyres and wheels cooling system hydraulic and pneumatic system various lubrication systems
- PC3..** carry out service, repair and overhauling activities safely to ensure: no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials
- PC4..** remove, refit and test electrical components for normal operation following body repair activities
- PC5..** dismantle, assess, repair, clean, replace, adjust and reassemble vehicle mechanical, electric and electronic units
- PC6..** ensure all dismantled components are cleaned and conditioned prior to reassembly
- PC7.** . conduct routine and non-routine inspections for vehicle fitness assessment, emission testing, safety assessment and post-repair serviceability assessment
- PC8.** . ensure disposal of materials in accordance with the organisations policies
- PC9.** . ensure, in consultation with the service advisor, approval of the customer on all repairs carried out
- PC10.** . record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure
- PC11..** follow standard operating procedures for using workshop tools and equipment
- PC12.** . ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary

- PC13.** . ensure any malfunctions observed in tools and equipment are reported to the concerned persons
- PC14.** . use resources responsibly (e.g. use of grease and other consumables)
- PC15..** assist junior technicians in their work
- PC16..** inform the relevant persons where repairs are economically or technically infeasible
- PC17.** . utilise any computer-based applications relevant to repairs and installations
- PC18..** ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** standard operating procedures for servicing, repair and replacement of parts
- KU2.** safety requirements for equipment and components prescribed by the OEM (e.g. preventing/ dealing with oil spillage and inflammable materials)
- KU3.** identification codes, nomenclature and grades of lubricants, components and aggregates
- KU4.** standard operating procedures recommended by the dealership/ suppliers/ OEM for using tools and equipment
- KU5.** standard operating procedures for rectification of errors in information (e.g. rectification of job card, reissue of correct tools and equipment etc.)
- KU6.** documentation requirements for each procedure carried out
- KU7.** organisational and professional code of ethics and standards of practice
- KU8.** safety, health and environmental policies and regulations for the workplace and the general automotive trade (e.g. safe working practices inside pits/ under vehicles)
- KU9.** regulatory requirements for vehicles including road safety, refrigerant handling, fuel storage and other requirements
- KU10.** operating specifications provided by the OEM for limits, fits and tolerances relating to engine mechanical, electrical, electronic and hydraulic and fluid systems for the vehicle
- KU11.** the basic technology used in and functioning of various components and aggregates of the vehicle including: engines and fuel system (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system brake system clutch assembly gearbox, drive-train assembly and transmission systems (manual, automatic etc.) steering system suspension system electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit tyres and wheels cooling system hydraulic and pneumatic system various lubrication systems
- KU12.** basic principles of: Ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism and electromagnetic induction etc. vehicle earthing and earthing methods vehicle engine systems (e.g. types, applications and operation of sensors, actuators, etc.) types of circuit protection and their use electrical safety procedures the operation of warning, charging and starter circuits symbols, units and terms associated with electric systems and components battery charging electrical/electronic control systems operation of electronic and electric engine systems (including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics principles)

- KU13.** the tools used to assess and confirm technical faults that cannot be determined through a visual inspection, including use of: organic light emitting displays anti-lock braking system abs/air bag scan tools, automotive scanners, graphing scanners, modular diagnostic information systems pressure indicators: fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges pullers: ball joint separators, bearing pullers, gear puller tools, slide hammers specialty wrenches: alignment wrenches, chain wrenches, locking wrenches, lug wrenches trim or moulding tools: carbon scrapers, gasket scrapers, scrapers, spoons measuring equipment: vernier callipers, micrometer, feeler gauges, multimeter, flow metre, temp gauge, dial gauge etc. other tools: hand tools, power tools, lifting and jacking equipment, tensioning equipment, laptops, brake roller tester, chassis dynamometer, suspension activation, security activator etc. tools for other tasks such as cleaning of vehicles, tools, equipment and workshop
- KU14.** how to select the right materials for the job such as seals, sealants, fittings, gaskets, joints, fasteners etc.
- KU15.** how to carry out routine maintenance including: checking vehicle condition against OEM specifications to identify damage, corrosion, wear and tear, fluid levels, leaks and other problems in serviceability make adjustments to settings, alignment, pressures, tension, speeds and levels relevant to: engine and aggregates (including fuel injection pump, ignition, intake and exhaust systems) steering system clutch and brake assembly transmission system (including gearbox, differential, propeller shaft and axles) electrical and electronic components (including alternator, wiper motor, lights, wire harness etc.) other components (including tyres and body fittings)
- KU16.** the various sources of information available for assessing serviceability of the vehicle including: diagnostic displays visual inspections test drives vehicle/equipment manufacturer specifications standard operating procedures
- KU17.** how to repair and replace engine and its components
- KU18.** how to dismantle, assess, repair, clean, condition, replace, adjust and reassemble and test mechanical, electronic and electric components for correct operation
- KU19.** the method to correctly tag, seal and package checked engine components
- KU20.** how to troubleshoot faults and document the causes in engines and components
- KU21.** how to dispose of replaced components in accordance with safety, health and environmental policies and regulations
- KU22.** precautions to be taken to ensure the following while working (including specific precautions to be taken when working with alternative fuel/ hybrid vehicles): no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials

Generic Skills (GS)

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

- GS1.** complete and maintain workplace records
- GS2.** write in at least one language
- GS3.** read and interpret workplace related documentation
- GS4.** clearly communicate workplace information and ideas with workplace colleagues, including use of automotive terms
- GS5.** communicate with colleagues and customers to handle verbal enquiries, such as clarifying instructions and responding to requests for information

- GS6.** be proactive and creative in responding to workplace problems, changes and challenges
- GS7.** plan work assigned on a daily basis and provide estimates of time required for each piece of work
- GS8.** organise the workplace and work according to the principles of 5S
- GS9.** prioritize actions to achieve required outcomes
- GS10.** interpret the needs of customers
- GS11.** provide customer and personal services
- GS12.** ensure that customer needs are assessed and satisfactory service is provided
- GS13.** recognise a workplace problem or a potential problem and take action
- GS14.** determine problems needing priority action
- GS15.** refer problems outside area of responsibility to appropriate person
- GS16.** gather information and provide assistance as required to solve problems
- GS17.** use a range of problem-solving techniques
- GS18.** develop practical responses to common breakdowns in workplace systems and procedures
- GS19.** analyse the complexity of work to determine if they can successfully carry them out and if required, escalate to a superior
- GS20.** analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Advanced repair and overhauling of engine and mechanical aggregates</i>	25	75	-	-
PC1. . ensure that the correct spare parts, lubricants, tools and other materials required have been obtained	2	4	-	-
PC2. . service, repair and overhaul: engine and fuel system (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system brake system clutch assembly gearbox, drive-train assembly and transmission systems (manual, automatic etc.) steering system suspension system electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit tyres and wheels cooling system hydraulic and pneumatic system various lubrication systems	3	7	-	-
PC3.. carry out service, repair and overhauling activities safely to ensure: no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials	2	6	-	-
PC4.. remove, refit and test electrical components for normal operation following body repair activities	2	7	-	-
PC5.. dismantle, assess, repair, clean, replace, adjust and reassemble vehicle mechanical, electric and electronic units	2	7	-	-
PC6.. ensure all dismantled components are cleaned and conditioned prior to reassembly	1	3	-	-
PC7. . conduct routine and non-routine inspections for vehicle fitness assessment, emission testing, safety assessment and post-repair serviceability assessment	2	6	-	-
PC8. . ensure disposal of materials in accordance with the organisations policies	1	4	-	-
PC9. . ensure, in consultation with the service advisor, approval of the customer on all repairs carried out	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. . record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure	1	4	-	-
PC11.. follow standard operating procedures for using workshop tools and equipment	1	3	-	-
PC12. . ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary	1	4	-	-
PC13. . ensure any malfunctions observed in tools and equipment are reported to the concerned persons	1	3	-	-
PC14. . use resources responsibly (e.g. use of grease and other consumables)	1	3	-	-
PC15.. assist junior technicians in their work	1	3	-	-
PC16.. inform the relevant persons where repairs are economically or technically infeasible	1	3	-	-
PC17. . utilise any computer-based applications relevant to repairs and installations	1	3	-	-
PC18.. ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)	1	2	-	-
NOS Total	25	75	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1409
NOS Name	Carry out servicing, repairs and overhauling of a vehicle (Advanced)
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	12/06/2013
Next Review Date	12/06/2015
NSQC Clearance Date	

ASC/N1410: Carry out electrical and electronic repairs and overhauling of a vehicle (Advanced)

Description

This NOS unit is about an individual carrying out repairs and overhauling of electrical and electronic systems of a vehicle.

Scope

This unit/task covers the following:

- repair and overhauling of electrical and electronic systems

Elements and Performance Criteria

Advanced repair and overhauling of electrical & electronic systems

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

- PC1.** . ensure that the correct spare parts, lubricants, tools and other materials required have been obtained

- PC2. .** repair and overhaul: stability/steering/ suspension systems (including electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems) electric over hydraulic systems (including garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control etc.) engine management systems (including fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop diesel engine management systems) transmission/driveline systems (including clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials, mechatronic modules and multi-class Bus systems) braking systems (including ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems) safety systems (including fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting and windscreen wipers control) monitoring/protection systems (including display types such as LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems) convenience and entertainment systems (including audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems) theft deterrent systems (including remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems) electric and hybrid vehicle systems (including battery technology, motor drive systems, motor controllers, air conditioning systems, electronic protection systems and multi-class Bus systems) climate control systems (including air conditioning, heating, blending systems and multi-class Bus systems) gearbox, drive-train assembly and transmission systems (manual, automatic etc.) electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit hydraulic and pneumatic system
- PC3..** repair all electrical and electronic faults including direct faults in: input sensors output actuators wiring harnesses computer systems calibration/adjustment specifications component specifications component assembly component damage system modifications
- PC4. .** repair indirect faults caused by the influence of external systems (electrical and electronic)
- PC5. .** carry out service, repair and overhauling activities safely to ensure: no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials
- PC6. .** remove, refit and test electrical componentry for normal operation following body repair activities
- PC7. .** dismantle, assess, repair, clean, replace, adjust and reassemble vehicle electric and electronic units
- PC8. .** ensure all dismantled components are cleaned and conditioned prior to reassembly
- PC9..** conduct routine and non-routine inspections for vehicle fitness assessment, emission testing, safety assessment and post-repair serviceability assessment
- PC10. .** ensure disposal of materials in accordance with the organisations policies
- PC11..** ensure, in consultation with the service advisor, approval of the customer on all repairs carried out

- PC12.** . record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure
- PC13..** follow standard operating procedures for using workshop tools and equipment
- PC14..** ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary
- PC15.** . ensure any malfunctions observed in tools and equipment are reported to the concerned persons
- PC16.** . use resources responsibly (e.g. use of grease and other consumables)
- PC17..** request assistance from a senior technician when required
- PC18..** assist junior technicians in their work
- PC19.** . inform the relevant persons where repairs are economically or technically infeasible
- PC20..** utilise any computer-based applications relevant to repairs and installations
- PC21..** ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** standard operating procedures for servicing, repair and replacement of parts
- KU2.** safety requirements for equipment and components prescribed by the OEM(e.g. preventing/ dealing with oil spillage and inflammable materials)
- KU3.** identification codes, nomenclature and grades of lubricants, components and aggregates
- KU4.** standard operating procedures recommended by the dealership/ suppliers/ OEM for using tools and equipment
- KU5.** standard operating procedures for rectification of errors in information (e.g. rectification of job card, reissue of correct tools and equipment etc.)
- KU6.** documentation requirements for each procedure carried out
- KU7.** organisational and professional code of ethics and standards of practice
- KU8.** safety, health and environmental policies and regulations for the workplace and the general automotive trade(e.g. safe working practices inside pits/ under vehicles)
- KU9.** regulatory requirements for vehicles including road safety, refrigerant handling, fuel storage and other requirements
- KU10.** operating specifications provided by the OEM for limits, fits and tolerances relating to engine electrical, electronic and hydraulic and fluid systems for the vehicle
- KU11.** the basic technology used in and functioning of various components and aggregates of the vehicle including: engines and fuel system (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system brake system clutch assembly gearbox, drive-train assembly and transmission systems (manual, automatic etc.) steering system suspension system electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit tyres and wheels cooling system hydraulic and pneumatic system various lubrication systems

- KU12.** basic principles of: Ohms Law, voltage, power, current (AC/DC) resistance, magnetism, electromagnetism and electromagnetic induction etc. vehicle earthing and earthing methods vehicle engine systems (e.g. types, applications and operation of sensors, actuators, etc.) types of circuit protection and their use electrical safety procedures the operation of warning, charging and starter circuits symbols, units and terms associated with electric systems and components battery charging electrical/electronic control systems operation of electronic and electric engine systems (including electrical component function, electrical inputs, outputs, voltages and oscilloscope patterns, digital and fiber optics principles) electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families, and radio frequency
- KU13.** the tools used to assess and confirm technical faults that cannot be determined through a visual inspection, including use of: organic light emitting displays anti-lock braking system abs/air bag scan tools, automotive scanners, graphing scanners, modular diagnostic information systems pressure indicators: fuel pressure testers, manifold gauge sets, oil pressure gauges, tire pressure gauges pullers: ball joint separators, bearing pullers, gear puller tools, slide hammers specialty wrenches: alignment wrenches, chain wrenches, locking wrenches, lug wrenches trim or moulding tools: carbon scrapers, gasket scrapers, scrapers, spoons measuring equipment: venire callipers, micrometer, feeler gauges, flow metre, temp gauge, dial gauge, analogue and digital multi-meters, lab oscilloscopes, data scanners, test lights, test LEDs, pulse generators etc. electrical and electronic testing equipment: volt meters, ammeters, ohmmeters, battery testing equipment, dedicated and computer based diagnostic equipment, oscilloscopes etc. other tools: hand tools, power tools, lifting and jacking equipment, tensioning equipment, laptops, brake roller tester, chassis dynamometer, suspension activation, security activator etc. tools for other tasks such as cleaning of vehicles, tools, equipment and workshop
- KU14.** how to select the right materials for the job such as seals, sealants, fittings, gaskets, joints, fasteners etc.
- KU15.** how to modify and repair electric and electronic systems to correct faults including: varying the performance of DC motors to meet changes in operational requirements varying the performance of alternators to meet changes in operational requirements changing the electrical sequenced operating order of electric over hydraulic systems converting vehicle from ground to insulated return external modification (not within the computer) to a digital computer management system that enhances the system performance(e.g. modification to an electronic engine management system, improving the performance of an ECU controlled engine cooling fan system that necessitates changes to relay circuitry) external modification (not within the computer) to a digital computer management system, utilizing electronic circuit design, development, manufacture, trial, evaluation, improvement, and commissioning, that enhances the system performance (e.g. development of an electronic control unit to delay engine crank whilst sounding an alarm warning of impending start of hazardous equipment) internal modification (within the computer) to a digital computer management system, utilizing electronic circuit design, reprogramming, development, manufacture, trial, evaluation, improvement, and commissioning that enhances the system performance (e.g. rectifying an original internal computer design/operating deficiency, disabling a function no longer required by customer etc.)
- KU16.** the various sources of information available for assessing serviceability of the vehicle including: diagnostic displays visual inspections test drives vehicle/equipment manufacturer specifications standard operating procedures
- KU17.** how to dismantle, assess, repair, clean, condition, replace, adjust and reassemble and test electronic and electric components for correct operation

- KU18.** how to dispose of replaced components in accordance with safety, health and environmental policies and regulations
- KU19.** precautions to be taken to ensure the following while working (including specific precautions to be taken when working with alternative fuel/ hybrid vehicles): no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials

Generic Skills (GS)

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

- GS1.** complete and maintain workplace records
- GS2.** write in at least one language
- GS3.** read and interpret workplace related documentation
- GS4.** clearly communicate workplace information and ideas with workplace colleagues, including use of automotive terms
- GS5.** communicate with colleagues and customers to handle verbal enquiries, such as clarifying instructions and responding to requests for information
- GS6.** be proactive and creative in responding to workplace problems, changes and challenges
- GS7.** plan work assigned on a daily basis and provide estimates of time required for each piece of work
- GS8.** organise the workplace and work according to the principles of 5S
- GS9.** prioritise actions to achieve required outcomes
- GS10.** interpret the needs of customers
- GS11.** ensure that customer needs are assessed and satisfactory service is provided
- GS12.** recognise a workplace problem or a potential problem and take action
- GS13.** determine problems needing priority action
- GS14.** refer problems outside area of responsibility to appropriate person
- GS15.** gather information and provide assistance as required to solve problems
- GS16.** use a range of problem-solving techniques
- GS17.** develop practical responses to common breakdowns in workplace systems and procedures
- GS18.** analyse the complexity of work to determine if they can successfully carry them out and if required, escalate to a superior
- GS19.** analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Advanced repair and overhauling of electrical & electronic systems</i>	30	70	-	-
PC1. . ensure that the correct spare parts, lubricants, tools and other materials required have been obtained	1	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<p>PC2. . repair and overhaul: stability/steering/ suspension systems (including electronic stability systems, vehicle dynamic control, closed loop electronic steering and multi-class Bus systems) electric over hydraulic systems (including garbage compactors, crane rams, steering control, excavator bucket control, steering rudder control etc.) engine management systems (including fuel cell technology/hydrogen, on line maintenance and remote diagnostics, common rail diesel direct injection, drive by wire, multi-class Bus systems and closed loop diesel engine management systems) transmission/driveline systems (including clutches, torque converters, mechanical and automatic transmissions, drive and power take-off shafts and differentials, mechatronic modules and multi-class Bus systems) braking systems (including ABS, engine brakes, electric retarders, electric trailer brakes, brake by wire and multi-class Bus systems) safety systems (including fire suppressing, work load detecting, tyre pressure control, speed/load limiting, traction control, seat belt pre-tensioning, roll over protection, object detection, navigation aids, intelligent transport systems, intelligent SRS systems, adaptive cruise control, multi-class Bus systems, active and passive collision avoidance, infrared vision, lighting and windscreen wipers control) monitoring/protection systems (including display types such as LCD, VFD, CRT, HUD, re-configurable systems, electronic analogue display, on board diagnostics, remote/wireless monitoring systems and multi-class Bus systems) convenience and entertainment systems (including audio and visual units, compact disks, analogue tapes, radio, speaker types, amplifiers, crossovers, balancers, aerials and multi-class Bus systems) theft deterrent systems (including remote keyless entry (RKE), immobiliser system design, passive entry systems, two way RKE, fingerprint technologies, rolling codes, transmitter and receiver operation, satellite systems) electric and hybrid vehicle systems (including battery technology, motor drive systems, motor controllers, air conditioning systems, electronic protection systems and multi-class Bus systems) climate control systems (including air conditioning, heating, blending systems and multi-class Bus systems) gearbox, drive-train assembly and transmission systems (manual, automatic etc.) electrical wire harness, lighting, ignition, electronic and air-conditioning systems etc. electronic active and passive safety, media, comfort and convenience, supplementary restraint systems (SRS), networking and other systems electronic control unit hydraulic and pneumatic system</p>	3	6	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC3.. repair all electrical and electronic faults including direct faults in: input sensors output actuators wiring harnesses computer systems calibration/adjustment specifications component specifications component assembly component damage system modifications	3	6	-	-
PC4. . repair indirect faults caused by the influence of external systems (electrical and electronic)	2	5	-	-
PC5. . carry out service, repair and overhauling activities safely to ensure: no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials	2	5	-	-
PC6. . remove, refit and test electrical componentry for normal operation following body repair activities	2	6	-	-
PC7. . dismantle, assess, repair, clean, replace, adjust and reassemble vehicle electric and electronic units	2	5	-	-
PC8. . ensure all dismantled components are cleaned and conditioned prior to reassembly	1	3	-	-
PC9.. conduct routine and non-routine inspections for vehicle fitness assessment, emission testing, safety assessment and post-repair serviceability assessment	2	4	-	-
PC10. . ensure disposal of materials in accordance with the organisations policies	1	3	-	-
PC11.. ensure, in consultation with the service advisor, approval of the customer on all repairs carried out	1	2	-	-
PC12. . record all service and repairs carried out and ensure completeness of tasks assigned before releasing vehicle for the next procedure	1	2	-	-
PC13.. follow standard operating procedures for using workshop tools and equipment	1	2	-	-
PC14.. ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary	1	3	-	-
PC15. . ensure any malfunctions observed in tools and equipment are reported to the concerned persons	1	2	-	-
PC16. . use resources responsibly (e.g. use of grease and other consumables)	1	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17.. request assistance from a senior technician when required	1	2	-	-
PC18.. assist junior technicians in their work	1	2	-	-
PC19. . inform the relevant persons where repairs are economically or technically infeasible	1	2	-	-
PC20.. utilise any computer-based applications relevant to repairs and installations	1	2	-	-
PC21.. ensure that trainings organized by the OEM from time-to-time are attended and knowledge levels are upgraded (esp. in case of newly launched products, product refreshes)	1	2	-	-
NOS Total	30	70	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1410
NOS Name	Carry out electrical and electronic repairs and overhauling of a vehicle (Advanced)
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	12/06/2013
Next Review Date	12/06/2015
NSQF Clearance Date	28/09/2015

ASC/N1411: Liaise with external automotive stakeholders

Description

This OS unit is about an individual liaising with external automotive stakeholders.

Scope

This unit/task covers the following:

- liaise with ancillary and OEM dealers, auto component field service team and repair workshops for service related processes

Elements and Performance Criteria

Liaise with external automotive stakeholders

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

- PC1.** . establish a process for gathering technical information from the field
- PC2.** . identify technical problems with products (tools, spare parts, components etc.)
- PC3.** . assist the service centre in solving persistent technical problems arising from tools, spare parts, components etc.
- PC4.** . communicate market demand to OEM service function through market product report
- PC5.** . handle persistent customer complaints and technical queries, document and report them to OEM service function
- PC6.** . handle persistent problems and technical issues arising with vehicles, tools, components and spare parts
- PC7..** provide technical feedback on failure of automotive components and new complaints
- PC8.** . handle problems related to break down of vehicles
- PC9.** . manage the availability of spare parts

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** standard operating procedures of the organisation/ dealership for inspection, servicing and repair of vehicles
- KU2.** standard operating procedures for servicing, repair and replacement of parts mandated by the OEM
- KU3.** safety requirements for equipment and components prescribed by the OEM
- KU4.** documentation requirements for each procedure carried out as part of roles and responsibilities
- KU5.** organisational and professional code of ethics and standards of practice
- KU6.** safety and health policies and regulations for the workplace
- KU7.** how to monitor product performance by gathering feedbacks
- KU8.** technical problems related with a particular breakdown situation

- KU9.** the fault correction required and whom to contact in case of sudden breakdown or a persistent problem
- KU10.** how to check and manage availability of key spare parts, other accessories and vital components
- KU11.** how to liaison and coordinate with automotive spare parts manager, sales function and the OEM plant for the assigned area
- KU12.** technical issues pertaining to continued or persistent customer complaints

Generic Skills (GS)

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

- GS1.** complete and maintain workplace records
- GS2.** write in at least one language
- GS3.** read and interpret workplace related documentation
- GS4.** clearly communicate workplace information and ideas with workplace colleagues (verbal and non-verbal), including use of automotive terms
- GS5.** communicate with colleagues and customers to handle verbal enquiries, such as clarifying instructions and responding to requests for information
- GS6.** be proactive and creative in responding to workplace problems, changes and challenges
- GS7.** plan work assigned on a daily basis and provide estimates of time required for each piece of work
- GS8.** prioritise actions to achieve required outcomes
- GS9.** interpret the needs of customers
- GS10.** provide customer and personal services
- GS11.** ensure that customer needs are assessed and satisfactory service is provided
- GS12.** recognise a workplace problem or a potential problem and take action
- GS13.** determine problems needing priority action
- GS14.** refer problems outside area of responsibility to appropriate person
- GS15.** gather information and provide assistance as required to solve problems
- GS16.** use a range of problem-solving techniques
- GS17.** develop practical responses to common breakdowns in workplace systems and procedures
- GS18.** analyse the complexity of work to determine if they can successfully carry them out
- GS19.** analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Liaise with external automotive stakeholders</i>	30	70	-	-
PC1. . establish a process for gathering technical information from the field	3	8	-	-
PC2. . identify technical problems with products (tools, spare parts, components etc.)	3	7	-	-
PC3. . assist the service centre in solving persistent technical problems arising from tools, spare parts, components etc.	3	8	-	-
PC4. . communicate market demand to OEM service function through market product report	3	7	-	-
PC5. . handle persistent customer complaints and technical queries, document and report them to OEM service function	4	9	-	-
PC6. . handle persistent problems and technical issues arising with vehicles, tools, components and spare parts	4	9	-	-
PC7. . provide technical feedback on failure of automotive components and new complaints	4	8	-	-
PC8. . handle problems related to break down of vehicles	3	7	-	-
PC9. . manage the availability of spare parts	3	7	-	-
NOS Total	30	70	-	-

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1411
NOS Name	Liaise with external automotive stakeholders
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	6
Credits	TBD
Version	1.0
Last Reviewed Date	12/06/2013
Next Review Date	12/06/2013
NSQC Clearance Date	28/09/2015

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.

Recommended Pass % : 75

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0001.Plan and organise work to meet expected outcomes	25	75	-	-	100	10
ASC/N0002.Work effectively in a team	25	75	-	-	100	10
ASC/N0003.Maintain a healthy,safe and secure working environment	25	75	-	-	100	10

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N1407.Carry out advanced diagnosis of vehicle for engine and other mechanical repairs requirement	30	70	-	-	100	15
ASC/N1408.Carry out complete and advanced level diagnosis of vehicle for electrical and electronic repairs requirements	30	70	-	-	100	20
ASC/N1409.Carry out servicing, repairs and overhauling of a vehicle (Advanced)	25	75	-	-	100	20
ASC/N1410.Carry out electrical and electronic repairs and overhauling of a vehicle (Advanced)	30	70	-	-	100	10
ASC/N1411.Liaise with external automotive stakeholders	30	70	-	-	100	5
Total	220	580	-	-	800	100

Acronyms

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

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.
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.

<p>Organisational Context</p>	<p>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.</p>
<p>Technical Knowledge</p>	<p>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</p>
<p>Core Skills/ Generic Skills (GS)</p>	<p>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.</p>
<p>Electives</p>	<p>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.</p>
<p>Options</p>	<p>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.</p>