सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

Qualification Pack

Four Wheeler Service Lead Technician

QP Code: ASC/Q1403

Version: 2.0

NSQF Level: 5

Automotive Skills Development Council || 153, GF, Okhla Industrial Area, Phase 3
New Delhi 110020

Contents

ASC/Q1403: Four Wheeler Service Lead Technician 3
Brief Job Description 3
Applicable National Occupational Standards (NOS) 3
Compulsory NOS 3
Qualification Pack (QP) Parameters 3
ASC/N9813: Manage work and resources 5
ASC/N9812: Interact effectively with team, customers and others 12
ASC/N1404: Carry out diagnosis on four wheeler vehicle for repair requirements 17
ASC/N1405: Carry out service, repair and overhauling of mechanical systems in four wheeler vehicle 25
ASC/N1438: Carry out service, repair and overhauling of electrical and electronic systems in the four wheeler vehicle 32
Assessment Guidelines and Weightage 38
Assessment Guidelines 38
Assessment Weightage 39
Acronyms 40
Glossary 41

Qualification Pack

ASC/Q1403: Four Wheeler Service Lead Technician

Brief Job Description

The individual in this job is responsible for service, repair, overhauling and diagnosis with a wide range of specialization for mechanical, electrical and electronic faults in four wheeler vehicles.

Personal Attributes

The person should be organised, team-oriented and have the ability to work independently for long hours in adverse conditions. They should be result-oriented, keen observers and have an eye for detail and quality.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ASC/N9813: Manage work and resources (Service)
2. ASC/N9812: Interact effectively with team, customers and others
3. ASC/N1404: Carry out diagnosis on four wheeler vehicle for repair requirements
4. ASC/N1405: Carry out service, repair and overhauling of mechanical systems in four wheeler vehicle
5. ASC/N1438: Carry out service, repair and overhauling of electrical and electronic systems in the four wheeler vehicle

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3115.0602

Minimum Educational Qualification & Experience	10th Class + 2 years I.T.I (Mechanic Auto Electrical and Electronics/Diesel Mechanic/ Mechanic Motor Vehicle (MMV) with 2 years relevant experience OR 12th Class with 4 Years of relevant experience OR 3 years Diploma from recognised body (Mechanical/Electrical/Electronics/Automobile) after Class 12th OR Certificate-NSQF (Four Wheeler Service Technician Level 4) with 2 Years of relevant experience
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	LMV Driving Licence
Minimum Job Entry Age	20 Years
Last Reviewed On	27/05/2021
Next Review Date	27/05/2026
NSQC Approval Date	27/05/2021
Version	2.0
Reference code on NQR	2021/AUT/ASDC/04227
NQR Version	1.0

ASC/N9801: Manage work and resources

Description

This NOS unit is about implementing safety, planning work, adopting sustainable practices for optimising use of resources.

Scope

The scope covers the following :

- Maintain safe and secure working environment
- Ensure work as per quality standards
- Material/energy/electricity conservation practices
- Effective waste management/recycling practices
- Ensure a healthy and hygienic workplace

Elements and Performance Criteria

Maintain safe and secure working environment

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

PC1. ensure that the team complies with organisation's health, safety, security policies and procedures

PC2. identify the risks and hazards associated with work activities, their causes and prevention as per organisation's policy

PC3. encourage team to report any identified breaches in health, safety, and security policies and procedures to the designated person

Ensure work as per quality standards

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

PC4. ensure work area is kept clean and tidy

PC5. identify individual work requirements and provide necessary instructions to the team

PC6. ensure the team works as per the assigned and agreed requirements

PC7. identify work which fails the requirements, specified quality standards and ensure timely corrective action is taken

PC8. implement ways and guide the team to manage time, resources and cost effectively

PC9. train the team on skill level advancement to develop expertise in their work

PC10. ensure that the team understands accountability for timely completion of tasks

PC11. analyse and validate the problem accurately and communicate different possible solutions to the problem

Material/energy/electricity conservation practices

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

PC12. identify ways to optimize usage of electricity/other source of energy and material including water in various tasks/activities/processes

PC13. ensure that the team uses resources in a responsible manner

PC14. ensure that the team periodically checks for spills/leakages around the work area and take corrective actions or escalate to appropriate authority if unable to rectify

PC15. supervise team to carry out routine cleaning of tools, machine and equipment

PC16. ensure that the team periodically checks if the equipment/machines are maintained and functioning normally before commencing work and take corrective action wherever required

Effective waste management/recycling practices

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

PC17. identify recyclable, non-recyclable and hazardous waste generated

PC18. ensure the team segregates waste into different categories

PC19. ensure proper disposal of non-recyclable waste

PC20. ensure recyclable and reusable material is deposited at identified location

PC21. ensure the team follows processes specified for disposal of hazardous waste

Ensure a healthy and hygienic workplace

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

PC22. ensure workplace, equipment, restrooms etc. are sanitized regularly

PC23. promote awareness about hygiene and sanitation regulations

PC24. check availability of running water, hand wash and alcohol-based sanitizers at workplace

PC25. support employees to cope with stress, anxiety etc.

PC26. wear and dispose PPEs regularly and appropriately

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. different types of health and safety hazards that can be found in the workplace, risks and threats based on the nature of work

KU2. company defined workplace hazards and rules/regulation for maintaining health, safety and security at workplace

KU3. breaches in health, safety and security as well as procedures to report the same

KU4. workshop layout with electrical, hydraulic and thermal equipment used

KU5. the organisation's emergency procedures for different emergency situations and the importance of following the same

KU6. ways of time and cost management

KU7. ways to manage efficient utilisation of energy, material and water in the process

KU8. ways to recognize common electrical problems and common practices of conserving electricity

KU9. usage of different colours of dustbins and categorization of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics

KU10. organisations procedures for minimizing waste

KU11. waste management and methods of waste disposal

KU12. common sources of pollution and ways to minimize it

KU13. different ways for skill level advancement to develop expertise

KU14. key performance indicators for the new tasks
KU15. timelines and goals set by the manager
KU16. importance of quality and timely delivery of the product/service
KU17. organisation's policies to maintain personal health and hygiene at workplace
KU18. significance of greening

Generic Skills (GS)

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

GS1. read instructions/guidelines/procedures
GS2. listen effectively and orally communicate information
GS3. ask for clarification and advice from the concerned person
GS4. maintain positive and effective relationships with colleagues and customers
GS5. evaluate the possible solution(s) to the problem
GS6. complete written work with attention to detail
GS7. modify work practices to improve them
GS8. work with supervisors/team members to carry out work related tasks
GS9. complete tasks efficiently and accurately within stipulated time
GS10. make timely decisions for efficient utilization of resources
GS11. be punctual and utilize time
GS12. evaluate strategies to maintain, enhance or reduce the intensity of heightened emotional response

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain safe and secure working environment	7	5	-	4
PC1. ensure that the team complies with organisation's health, safety, security policies and procedures	2	2	-	1
PC2. identify the risks and hazards associated with work activities, their causes and prevention as per organisation's policy	3	2	-	2
PC3. encourage team to report any identified breaches in health, safety, and security policies and procedures to the designated person	2	1	-	1
Ensure work as per quality standards	15	8	-	5
PC4. ensure work area is kept clean and tidy	2	1	-	-
PC5. identify individual work requirements and provide necessary instructions to the team	2	1	-	1
PC6. ensure the team works as per the assigned and agreed requirements	1	1	-	-
PC7. identify work which fails the requirements, specified quality standards and ensure timely corrective action is taken	3	2	-	2
PC8. implement ways and guide the team to manage time, resources and cost effectively	2	-	-	-
PC9. train the team on skill level advancement to develop expertise in their work	2	1	-	1
PC10. ensure that the team understands accountability for timely completion of tasks	2	-	-	-
PC11. analyse and validate the problem accurately and communicate different possible solutions to the problem	1	2	-	1
Material/energy/electricity conservation practices	10	6	-	4

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. identify ways to optimize usage of electricity/other source of energy and material including water in various tasks/activities/processes	2	2	-	2
PC13. ensure that the team uses resources in a responsible manner	2	1	-	-
PC14. ensure that the team periodically checks for spills/leakages around the work area and take corrective actions or escalate to appropriate authority if unable to rectify	2	1	-	1
PC15. supervise team to carry out routine cleaning of tools, machine and equipment	2	1	-	-
PC16. ensure that the team periodically checks if the equipment/machines are maintained and functioning normally before commencing work and take corrective action wherever required	2	1	-	1
Effective waste management/recycling practices	10	6	-	4
PC17. identify recyclable, non-recyclable and hazardous waste generated	2	2	-	1
PC18. ensure the team segregates waste into different categories	2	1	-	1
PC19. ensure proper disposal of non-recyclable waste	2	1	-	-
PC20. ensure recyclable and reusable material is deposited at identified location	2	1	-	1
PC21. ensure the team follows processes specified for disposal of hazardous waste	2	1	-	1
Ensure a healthy and hygienic workplace	8	5	-	3
PC22. ensure workplace, equipment, restrooms etc. are sanitized regularly	2	1	-	-
PC23. promote awareness about hygiene and sanitation regulations	2	1	-	1
PC24. check availability of running water, hand wash and alcohol-based sanitizers at workplace	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC25. support employees to cope with stress, anxiety etc.	1	1	-	1
PC26. wear and dispose PPEs regularly and appropriately	2	1	-	1
NOS Total	**50**	**30**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N9801
NOS Name	Manage work and resources
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	27/05/2021
Next Review Date	27/05/2026
NSQC Clearance Date	27/05/2021

ASC/N9802: Interact effectively with team, customers and others

Description

This unit is about communicating with team members, superior and others.

Scope

The scope covers the following :

- Communicate effectively with team members
- Interact with superiors
- Respect gender and ability differences

Elements and Performance Criteria

Communicate effectively with team members

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

PC1. implement ways to share information with team members in line with organisational requirements

PC2. ensure that work requirements are clearly communicated to the team members through all means including face-to-face, telephonic and written

PC3. manage and co-ordinate with team members to integrate work as per requirements

PC4. work in a way that show respect for all team members and customers

PC5. carry out commitments made to team members and let them know in good time if there is any discrepancy with reasons

PC6. resolve conflicts within the team members at work to achieve smooth workflow

PC7. guide the team members to follow the organisation's policies and procedures

PC8. ensure team goals are given preference over individual goals

PC9. respect personal space of colleagues and customers

Interact with superiors

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

PC10. report progress on job allocated and team performance to the superiors

PC11. escalate problems to superiors that cannot be handled

PC12. train the team members to report completed work and receive feedback on work done

PC13. encourage team members to rectify errors as per feedback and minimize mistakes in future

Respect gender and ability differences

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

PC14. ensure team shows sensitivity towards all genders and PwD

PC15. adjust communication styles to reflect gender sensitivity and sensitivity towards person with disability

PC16. help PwD team members to overcome the challenges, if asked

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the importance of effective communication and establishing good working relationships with team members and superiors
KU2. different methods of communication as per the circumstances
KU3. gender based concepts, issues and legislation
KU4. organisation standards and guidelines to be followed for PwD
KU5. rights and duties at workplace with respect to PwD
KU6. organisation policies and procedures pertaining to written and verbal communication

Generic Skills (GS)

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

GS1. read safety instructions/guidelines
GS2. modify work practices to improve them
GS3. work with supervisors/team members to carry out work related tasks
GS4. complete tasks efficiently and accurately within stipulated time
GS5. make timely decisions for efficient utilization of resources
GS6. read instructions/guidelines/procedures
GS7. write in English/any one language

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Communicate effectively with team members	20	14	-	8
PC1. implement ways to share information with team members in line with organisational requirements	2	2	-	-
PC2. ensure that work requirements are clearly communicated to the team members through all means including face-to-face, telephonic and written	2	2	-	2
PC3. manage and co-ordinate with team members to integrate work as per requirements	2	1	-	2
PC4. work in a way that show respect for all team members and customers	3	1	-	2
PC5. carry out commitments made to team members and let them know in good time if there is any discrepancy with reasons	2	2	-	-
PC6. resolve conflicts within the team members at work to achieve smooth workflow	3	2	-	-
PC7. guide the team members to follow the organisation's policies and procedures	2	1	-	-
PC8. ensure team goals are given preference over individual goals	2	1	-	-
PC9. respect personal space of colleagues and customers	2	2	-	2
Interact with superiors	18	10	-	7
PC10. report progress on job allocated and team performance to the superiors	4	3	-	2
PC11. escalate problems to superiors that cannot be handled	4	2	-	1
PC12. train the team members to report completed work and receive feedback on work done	5	2	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. encourage team members to rectify errors as per feedback and minimize mistakes in future	5	3	-	2
Respect gender and ability differences	12	6	-	5
PC14. ensure team shows sensitivity towards all genders and PwD	4	2	-	2
PC15. adjust communication styles to reflect gender sensitivity and sensitivity towards person with disability	4	2	-	2
PC16. help PwD team members to overcome the challenges, if asked	4	2	-	1
NOS Total	**50**	**30**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N9802
NOS Name	Interact effectively with team, customers and others
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	27/05/2021
Next Review Date	27/05/2026
NSQC Clearance Date	27/05/2021

ASC/N1404: Carry out diagnosis on four wheeler vehicle for repair requirements

Description

This NOS unit is about diagnosing the mechanical and electrical/electronic aggregates in a vehicle and proposing repair to be carried out.

Scope

The scope covers the following :

- Inspect and identify/validate faults
- Prepare to perform diagnostic tests
- Perform tests to identify the root cause of fault
- Conclude the repair solution for the fault

Elements and Performance Criteria

Inspect and identify/validate faults

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

PC1. review the job card, obtain required information from customer/service advisor to assess service and repair requirements

PC2. identify the auto components related to the various aggregates in the vehicle

PC3. check the functioning of vehicle systems such as mechanical and electrical systems, air conditioning system etc.

PC4. conduct test drive to check vehicle performance and identify/validate the faults

PC5. conduct visual inspection to assess defects such as external impact/bend/leak/incorrect fluid level/wear & tear etc.

PC6. determine the precise location of faults in vehicle systems

PC7. report the malfunctions/repairs in the vehicle beyond own scope to the concerned person

Prepare to perform diagnostic tests

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

PC8. place the vehicle on suitable platform according to nature of job to be performed

PC9. ensure workshop tools/measuring devices/equipment required for fault diagnosis in vehicle systems are collected and checked for their condition and calibration

PC10. report the malfunctions if any, in the tools/equipment to the person concerned for rectification

PC11. ensure tools/equipment are placed in an organised manner for maintaining a safe and tidy workstation

PC12. wear PPE according to nature of job to be performed

Perform tests to identify the root cause of fault

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

PC13. take precautions to avoid damage to the vehicle and its components during diagnosis or troubleshooting the faults

PC14. follow OEM SOP and standard safety procedures while handling tool/equipment, vehicle component, fluids, hazardous substances and while working in hazardous environments

PC15. use checklists and OEM Standard Operating Procedures (SOPs) to understand if the fault is because of improper servicing, poor lubrication, low level of fluids, premature component failure, loose/poor contacts of pins in wiring harness connectors and their connection, improper driving style etc.

PC16. apply the appropriate device/equipment to make inspection and diagnose deficiencies/faults in various systems such as engine management system, force induction, emission and exhaust system, vehicle body electrical/electronic systems, braking and stability control systems, steering, suspension and drive line systems, etc.

PC17. use manufacturer's and component supplier's specifications to identify duplicate or defective component/parts which cannot be detected during visual inspection

PC18. follow SOP set out for troubleshooting and perform tests using various mechanical, electrical/electronic measuring devices/testers/diagnostic tools/software to identify/isolate a fault

PC19. diagnose indirect faults if any, in vehicle's mechanical, electrical and electronic systems as per OEM SOP

PC20. report the malfunctions in the vehicle where solution is not available or in case of new premature failures, to the concerned person along with preliminary diagnostic details and respond to issues or questions arising

PC21. dismantle and reassemble aggregates of a vehicle for fault diagnosis

Conclude the repair solution for the fault

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

PC22. maintain the documentation related to inspections and troubleshooting performed on the vehicle

PC23. interpret inspection, measurement and test results as required

PC24. compare results of diagnostic inspections/tests with vehicle specifications and regulatory requirements

PC25. validate the options for repair or replacement

PC26. prepare final proposal regarding repair/replacement, repairing process and time requirements with justification

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the automotive industry in India, workshop structure and role and responsibilities of different people in the workshop

KU2. SOP for receiving vehicles, opening job card, allocation of work, invoicing, vehicle delivery, handling complaints etc.

KU3. different components/aggregates as well as auto component manufacturer's specifications for the same

KU4. technology used in functioning of various electrical, mechanical systems of the vehicle and their integration such as engine management systems (petrol, diesel, gas and hybrid), engine mechanical systems, forced induction, emission and exhaust systems, body electrical and electronic system, transmission system, brake and stability control system, air-conditioning systems, active & passive safety system, media and other systems self-starter, alternator, charging systems etc.

KU5. interconnection of systems with each other and effect of one system on other systems

KU6. fundamental terms, laws and principles used in vehicles such as: voltage, current (AC/DC/HV), resistance, power, capacitance, inductance, discrete electronic components, radio frequency, torque, traction, OHM's law, pascal's law, law of levers etc., automotive communication protocols such as Controller Area Network (CAN), Local Interconnect Network(LIN), Media Oriented Systems Transport(MOST) etc.

KU7. use of relevant measuring device/equipment and interpretation of all relevant mathematical calculations

KU8. various electrical and electronic signals such as electrical inputs, outputs, voltage, pulse-width modulation, digital signal (including infrared and fiber optics) etc.

KU9. symbols, units and terms used in wiring diagrams associated with electrical/electric systems/components of the vehicle

KU10. how to use computer, on-line application and OEM technical information/assistance portals

KU11. 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, and tolerance limits of components

KU12. industry standards required for inspection and fault reporting in oral, written, and electronic formats

KU13. typical symptoms of common faults and failures in vehicle mechanical, electrical and electronic systems

KU14. various types of health and safety hazards commonly present in the work environment such as physical hazards, electrical hazards, chemical hazards, fire hazards, equipment related hazards, health hazards, etc.

KU15. safety, health and environmental policies and regulations for the work place as well as for automotive trade in general

KU16. safety requirements recommended by the OEM for handling tool/equipment, hazardous substances and while working in hazardous environments

KU17. legal regulations that need to be considered for handling hybrid vehicles in the workshop

KU18. occupational Safety and Health (OSH) measures required for working on vehicles

KU19. various methods to dispose-off replaced failed components/parts, fluids and hazardous substances

KU20. Standard Operating Procedures (SOPs) of the organization/ dealership for inspection and diagnosis of faults in a vehicle as prescribed by the OEM/components manufacturer

KU21. SOP recommended by OEM for using tools/equipment for diagnosis or troubleshooting such as special service tools, measuring instrument, volt meters, ammeters, ohmmeters, battery tester, dedicated and computer based diagnostic equipment, oscilloscopes etc.

KU22. different types of errors or defects in the tools/equipment

KU23. documentation requirements for each procedure carried out as part of roles and responsibilities as specified by OEM/ auto component manufacturer

KU24. organizational/professional code of ethics and standards of practice

Generic Skills (GS)

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

GS1. read and interpret workplace related documentation

GS2. communicate using terms, names, grades and other nomenclature pertaining to the automotive trade

GS3. analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiency

GS4. identify potential workplace problem and take suitable action

GS5. read various sources of information available for assessing service and repair requirements

GS6. write in English/regional language

GS7. plan work according to the required schedule and location

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Inspect and identify/validate faults	5	10	-	5
PC1. review the job card, obtain required information from customer/service advisor to assess service and repair requirements	-	1	-	-
PC2. identify the auto components related to the various aggregates in the vehicle	1	1	-	1
PC3. check the functioning of vehicle systems such as mechanical and electrical systems, air conditioning system etc.	2	1	-	1
PC4. conduct test drive to check vehicle performance and identify/validate the faults	-	2	-	-
PC5. conduct visual inspection to assess defects such as external impact/bend/leak/incorrect fluid level/wear & tear etc.	2	2	-	1
PC6. determine the precise location of faults in vehicle systems	-	2	-	2
PC7. report the malfunctions/repairs in the vehicle beyond own scope to the concerned person	-	1	-	-
Prepare to perform diagnostic tests	5	10	-	4
PC8. place the vehicle on suitable platform according to nature of job to be performed	-	2	-	-
PC9. ensure workshop tools/measuring devices/equipment required for fault diagnosis in vehicle systems are collected and checked for their condition and calibration	2	2	-	2
PC10. report the malfunctions if any, in the tools/equipment to the person concerned for rectification	1	2	-	1
PC11. ensure tools/equipment are placed in an organised manner for maintaining a safe and tidy workstation	-	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. wear PPE according to nature of job to be performed	2	2	-	1
Perform tests to identify the root cause of fault	15	20	-	7
PC13. take precautions to avoid damage to the vehicle and its components during diagnosis or troubleshooting the faults	1	1	-	1
PC14. follow OEM SOP and standard safety procedures while handling tool/equipment, vehicle component, fluids, hazardous substances and while working in hazardous environments	2	2	-	-
PC15. use checklists and OEM Standard Operating Procedures (SOPs) to understand if the fault is because of improper servicing, poor lubrication, low level of fluids, premature component failure, loose/poor contacts of pins in wiring harness connectors and their connection, improper driving style etc.	2	2	-	-
PC16. apply the appropriate device/equipment to make inspection and diagnose deficiencies/faults in various systems such as engine management system, force induction, emission and exhaust system, vehicle body electrical/electronic systems, braking and stability control systems, steering, suspension and drive line systems, etc.	2	3	-	2
PC17. use manufacturer's and component supplier's specifications to identify duplicate or defective component/parts which cannot be detected during visual inspection	2	2	-	-
PC18. follow SOP set out for troubleshooting and perform tests using various mechanical, electrical/electronic measuring devices/testers/diagnostic tools/software to identify/isolate a fault	2	2	-	1
PC19. diagnose indirect faults if any, in vehicle's mechanical, electrical and electronic systems as per OEM SOP	2	2	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC20. report the malfunctions in the vehicle where solution is not available or in case of new premature failures, to the concerned person along with preliminary diagnostic details and respond to issues or questions arising	2	3	-	1
PC21. dismantle and reassemble aggregates of a vehicle for fault diagnosis	-	3	-	-
Conclude the repair solution for the fault	5	10	-	4
PC22. maintain the documentation related to inspections and troubleshooting performed on the vehicle	-	2	-	-
PC23. interpret inspection, measurement and test results as required	2	2	-	1
PC24. compare results of diagnostic inspections/tests with vehicle specifications and regulatory requirements	2	2	-	2
PC25. validate the options for repair or replacement	1	2	-	1
PC26. prepare final proposal regarding repair/replacement, repairing process and time requirements with justification	-	2	-	-
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1404
NOS Name	Carry out diagnosis on four wheeler vehicle for repair requirements
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	5
Credits	TBD
Version	2.0
Last Reviewed Date	27/05/2021
Next Review Date	27/05/2026
NSQC Clearance Date	27/05/2021

ASC/N1405: Carry out service, repair and overhauling of mechanical systems in four wheeler vehicle

Description

This unit describes the knowledge and skills required in an individual to carry out service, repair and overhauling of mechanical system of a four wheeler vehicle.

Scope

The scope covers the following :

- Prepare to carry out service, repair and overhauling
- Perform service, repairs and overhauling job
- Perform post service/repair routine

Elements and Performance Criteria

Prepare to carry out service, repair and overhauling

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

PC1. review the job card, obtain sufficient information from customer/service advisor to assess service and repair needs of the vehicle

PC2. identify the auto components related to the various aggregates in the vehicle

PC3. place the vehicle on suitable platform according to nature of job to be performed

PC4. conduct visual inspection to assess defects such as any external impact/bend/leak/incorrect level/wear & tear etc.

PC5. ensure workshop tools/measuring devices/equipment required for the job are collected and check their condition/calibration

PC6. report the malfunctions if any, in the tools/equipment to the person concerned for rectification

PC7. report the malfunctions/repairs in the vehicle beyond own scope to the concerned person

PC8. prepare final proposal regarding repair/replacement, repairing process and time requirements with justification

PC9. ensure tools/equipment are placed in an organised manner for maintaining safe and tidy workstation

PC10. wear PPE according to nature of job to be performed

Perform service, repairs and overhauling job

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

PC11. take precautions to avoid damage to the vehicle and its components while working on various aggregates

PC12. follow OEM SOP and standard safety procedures while handling tool/equipment, vehicle component, fluids, hazardous substances and while working in hazardous environments

PC13. remove parts relevant to various mechanical aggregates and place them securely as specified by OEM

PC14. dismantle mechanical aggregates, if required and report additional repair requirement

PC15. test mechanical components post removal wherever applicable as per OEM SOP

PC16. clean and condition dismantled components, including mechanical and electrical aggregates, prior to assembly

PC17. perform service/repair/replacement/calibration/overhauling of mechanical system/aggregate such as engine, transmission, running systems, etc. including power assisted braking & steering systems

PC18. repair indirect faults in mechanical aggregate due to other system/component

PC19. maintain the documentation related to inspection, servicing and repair of the vehicle

Perform post service/repair routine

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

PC20. check the performance of vehicle/aggregate post repair and report to supervisor/service advisor if further inspection is required by another specialist

PC21. ensure completeness of tasks assigned before releasing the vehicle for the next procedure

PC22. dispose off materials such as waste oil, scrap of failed parts/aggregates, as per organisation's policies

PC23. ensure all tools, auxiliary material and other equipment is removed from the work site

PC24. perform scheduled checks, calibration and timely repairs for workshop tools, equipment and workstations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the automotive industry in India, workshop structure and role and responsibilities of different people in the workshop

KU2. Standard Operating Procedures (SOP) for receiving vehicles, opening job card, allocation of work, invoicing, vehicle delivery, handling complaints, etc.

KU3. different components/aggregates as well as auto component manufacturer's specifications for the same

KU4. basic technology used in and functioning of various mechanical systems and components of the vehicle such as engine, drive train, running system, various lubrication system, hydraulic/pneumatic systems, cooling system, etc.

KU5. interconnection of systems with each other and one system's effect on other

KU6. fundamental terms, laws and principles such as Pascal law, law of inertia, Archimedes law of lever, gravitation, friction, thermal conduction, etc.

KU7. SOP recommended by OEM for using diagnostic and troubleshooting tools/equipment related to mechanical component/aggregate such as special service tools, measuring instrument, pressure indicators/gauges, air bleeding equipment, etc.

KU8. different types of errors or defects in the tools/equipment

KU9. various sources of information available for vehicle/equipment manufacturer specifications, tolerance limits of components and options for repair or replacement.

KU10. OEM's SOPs for service, repair and overhauling of mechanical aggregate of the vehicle

KU11. standard schedules and checklists recommended by the OEM/auto component manufacturer for servicing of mechanical component/aggregate in the vehicle

KU12. various methods for removal, dismantling, cleaning, adjusting, reassembling and testing of mechanical components for proper functioning

KU13. type and quality of consumables/materials used for the job such as seals, sealant, fasteners, lubricants etc.

KU14. various types of health and safety hazards commonly present in the work environment such as physical hazards, electrical hazards, chemical hazards, fire hazards, equipment related hazards, health hazards, etc.

KU15. safety, health and environmental policies and regulations for the work place as well as for automotive trade in general

KU16. safety requirements recommended by the OEM for handling tool/equipment, hazardous substances and while working in hazardous environments

KU17. legal regulations that need to be considered for handling hybrid vehicle in the workshop

KU18. Occupational Safety and Health (OSH) measures required for working on vehicles

KU19. various methods to dispose-off replaced failed components/parts, fluids and hazardous substances

KU20. organisational/professional code of ethics and standards of practice

KU21. documentation requirements for each procedure carried out as part of roles and responsibilities as specified by OEM/auto component manufacturer

Generic Skills (GS)

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

GS1. read and interpret workplace related documentation

GS2. interpret the needs of customers by understanding the key issues

GS3. communicate using terms, names, grades and other nomenclature pertaining to the automotive trade

GS4. analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently

GS5. identify potential workplace problem and take suitable action

GS6. read various sources of information available for servicing, repairs and overhauling procedures.

GS7. read policies and regulations pertinent to the job, including OEM guidelines, Health and Safety instructions etc. while working on the Vehicle and its aggregates

GS8. write in English/regional language

GS9. communicate effectively at the workplace

GS10. plan work according to the required schedule and location

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare to carry out service, repair and overhauling	10	20	-	8
PC1. review the job card, obtain sufficient information from customer/service advisor to assess service and repair needs of the vehicle	1	2	-	-
PC2. identify the auto components related to the various aggregates in the vehicle	1	2	-	2
PC3. place the vehicle on suitable platform according to nature of job to be performed	1	3	-	-
PC4. conduct visual inspection to assess defects such as any external impact/bend/leak/incorrect level/wear & tear etc.	1	3	-	2
PC5. ensure workshop tools/measuring devices/equipment required for the job are collected and check their condition/calibration	1	1	-	-
PC6. report the malfunctions if any, in the tools/equipment to the person concerned for rectification	1	2	-	2
PC7. report the malfunctions/repairs in the vehicle beyond own scope to the concerned person	1	1	-	-
PC8. prepare final proposal regarding repair/replacement, repairing process and time requirements with justification	1	2	-	-
PC9. ensure tools/equipment are placed in an organised manner for maintaining safe and tidy workstation	1	2	-	-
PC10. wear PPE according to nature of job to be performed	1	2	-	2
Perform service, repairs and overhauling job	15	20	-	7
PC11. take precautions to avoid damage to the vehicle and its components while working on various aggregates	1	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. follow OEM SOP and standard safety procedures while handling tool/equipment, vehicle component, fluids, hazardous substances and while working in hazardous environments	2	3	-	2
PC13. remove parts relevant to various mechanical aggregates and place them securely as specified by OEM	1	2	-	-
PC14. dismantle mechanical aggregates, if required and report additional repair requirement	-	2	-	-
PC15. test mechanical components post removal wherever applicable as per OEM SOP	2	3	-	1
PC16. clean and condition dismantled components, including mechanical and electrical aggregates, prior to assembly	2	2	-	-
PC17. perform service/repair/replacement/calibration/overhauling of mechanical system/aggregate such as engine, transmission, running systems, etc. including power assisted braking & steering systems	3	2	-	2
PC18. repair indirect faults in mechanical aggregate due to other system/component	2	2	-	1
PC19. maintain the documentation related to inspection, servicing and repair of the vehicle	2	2	-	-
Perform post service/repair routine	**5**	**10**	**-**	**5**
PC20. check the performance of vehicle/aggregate post repair and report to supervisor/service advisor if further inspection is required by another specialist	-	3	-	2
PC21. ensure completeness of tasks assigned before releasing the vehicle for the next procedure	-	1	-	-
PC22. dispose off materials such as waste oil, scrap of failed parts/aggregates, as per organisation's policies	2	3	-	2
PC23. ensure all tools, auxiliary material and other equipment is removed from the work site	1	3	-	-
PC24. perform scheduled checks, calibration and timely repairs for workshop tools, equipment and workstations	2	-	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	30	50	-	20

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1405
NOS Name	Carry out service, repair and overhauling of mechanical systems in four wheeler vehicle
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	5
Credits	TBD
Version	2.0
Last Reviewed Date	27/05/2021
Next Review Date	27/05/2026
NSQC Clearance Date	27/05/2021

ASC/N1438: Carry out service, repair and overhauling of electrical and electronic systems in the four wheeler vehicle

Description

This unit describes the knowledge and skills required in an individual to carry out service, repair and overhauling of electrical and electronic system of a vehicle.

Scope

The scope covers the following :

- Prepare to carry out service, repair and overhauling
- Perform service, repairs and overhauling
- Perform post service/repair routine

Elements and Performance Criteria

Prepare to carry out service, repair and overhauling

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

PC1. review the job card, obtain sufficient information from customer/service advisor to assess service and repair needs of the vehicle

PC2. identify the auto components related to the various aggregates in the vehicle

PC3. place the vehicle on suitable platform according to nature of job to be performed

PC4. conduct visual inspection to assess defects such as any external impact/bend/leak/incorrect level/wear & tear etc.

PC5. ensure workshop tools/measuring devices/equipment required for the job are collected and check their condition/calibration

PC6. report the malfunctions if any, in the tools/equipment to the person concerned for rectification

PC7. prepare final proposal regarding repair/replacement, repairing process and time requirements with justification

PC8. ensure tools/equipment are placed in an organised manner for safe and tidy workstation

PC9. wear PPE according to nature of job to be performed

Perform service, repairs and overhauling

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

PC10. report the malfunctions/repairs in the vehicle beyond own scope to the concerned person

PC11. take precautions to avoid damage to the vehicle and its components while working on various aggregates

PC12. follow OEM SOP and standard safety procedures while handling tool/equipment, vehicle component, fluids, hazardous substances and while working in hazardous environments

PC13. remove parts relevant to various electrical/electronics systems and place them securely as specified by OEM

PC14. dismantle electrical aggregate, if required and report additional repair requirement

PC15. test electrical/electronic components post removal wherever applicable as per OEM SOP

PC16. clean and condition dismantled components, including mechanical and electrical aggregates, prior to assembly

PC17. perform repair of all electrical and electronic faults including direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, system modifications

PC18. repair indirect faults in electrical/electronic aggregate due to other system/component

PC19. maintain the documentation related to inspection, servicing and repair of the vehicle

Perform post service/repair routine

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

PC20. check the performance of vehicle/aggregate post repair and report to supervisor/service advisor if further inspection is required by another specialist

PC21. ensure completeness of tasks assigned before releasing the vehicle for the next procedure

PC22. dispose off materials such as old batteries, scrap of failed parts/aggregates as per organization's policies

PC23. ensure all tools, auxiliary material and other equipment are removed from the work site

PC24. perform scheduled checks, calibration and timely repairs for workshop tools, equipment and workstations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the automotive Industry in India, workshop structure and role and responsibilities of different people in the workshop

KU2. Standard Operating Procedures (SOP) for receiving vehicles, opening job card, allocation of work, invoicing, vehicle delivery, handling complaints, etc.

KU3. different components/aggregates as well as auto component manufacturer's specifications for the same

KU4. fundamental terms, laws and principles of electricity used in electrical & electronic systems such as: principles of storing electrical voltage, ohms law, voltage, current (AC/DC/HV), resistance, power, capacitance, electrostatics, magnetic, inductance, discrete electronic components, and radio frequency (automotive digital computers, automotive communication protocols such as CAN, LIN, etc.)

KU5. basic technology used in and functioning of engine management system, body management system, transmission system, telematics, brake system, air-conditioning systems, active & passive safety system, media and other systems, self-starter, alternator, charging systems etc.

KU6. interconnection of systems with each other and effect of one system on another

KU7. SOP recommended by OEM for using tools and equipment for diagnosis or troubleshooting related to electrical/electronic systems such as special service tools, measuring instrument, volt meters, ammeters, ohmmeters, battery tester, dedicated and computer based diagnostic equipment, etc.

KU8. various sources of information available for assessing service and repair of the vehicle such as diagnostic displays, visual inspections, test drives, vehicle/equipment manufacturer specifications, tolerance limits of components and options for repair or replacement

KU9. SOP for service, repair and overhauling of electrical/electronics aggregate of the vehicle as prescribed by the OEM

KU10. various methods to remove, dismantle, cleaning, adjusting, reassemble and test electrical/electronic components

KU11. type and quality of consumables/materials used for the job such as seals, sealant, fasteners, lubricants etc.

KU12. various types of health and safety hazards commonly present in the work environment such as physical hazards, electrical hazards, chemical hazards, fire hazards, equipment related hazards, health hazards, etc.

KU13. safety, health and environmental policies and regulations for the work place as well as for automotive trade in general

KU14. safety requirements recommended by the OEM for handling tool/equipment, hazardous substances and while working in hazardous environments

KU15. legal regulations that need to be considered for handling hybrid vehicles in the workshop

KU16. Occupational Safety and Health (OSH) measures required for working on vehicles

KU17. various methods to dispose-off replaced failed components/parts, fluids and hazardous substances

KU18. organisational/professional code of ethics and standards of practice

KU19. documentation requirements for each procedure carried out as part of roles and responsibilities as specified by OEM/auto component manufacturer

Generic Skills (GS)

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

GS1. read and interpret workplace related documentation

GS2. interpret the needs of customers by understanding the key issues

GS3. communicate using terms, names, grades and other nomenclature pertaining to the automotive trade

GS4. analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently

GS5. identify potential workplace problem and take suitable action

GS6. write in English/regional language

GS7. communicate effectively at the workplace

GS8. plan work according to the required schedule and location

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare to carry out service, repair and overhauling	10	20	-	8
PC1. review the job card, obtain sufficient information from customer/service advisor to assess service and repair needs of the vehicle	-	2	-	-
PC2. identify the auto components related to the various aggregates in the vehicle	1	2	-	2
PC3. place the vehicle on suitable platform according to nature of job to be performed	1	3	-	-
PC4. conduct visual inspection to assess defects such as any external impact/bend/leak/incorrect level/wear & tear etc.	2	3	-	2
PC5. ensure workshop tools/measuring devices/equipment required for the job are collected and check their condition/calibration	1	1	-	-
PC6. report the malfunctions if any, in the tools/equipment to the person concerned for rectification	2	2	-	2
PC7. prepare final proposal regarding repair/replacement, repairing process and time requirements with justification	1	3	-	1
PC8. ensure tools/equipment are placed in an organised manner for safe and tidy workstation	1	2	-	-
PC9. wear PPE according to nature of job to be performed	1	2	-	1
Perform service, repairs and overhauling	15	20	-	7
PC10. report the malfunctions/repairs in the vehicle beyond own scope to the concerned person	-	2	-	-
PC11. take precautions to avoid damage to the vehicle and its components while working on various aggregates	1	1	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. follow OEM SOP and standard safety procedures while handling tool/equipment, vehicle component, fluids, hazardous substances and while working in hazardous environments	2	3	-	2
PC13. remove parts relevant to various electrical/electronics systems and place them securely as specified by OEM	1	2	-	-
PC14. dismantle electrical aggregate, if required and report additional repair requirement	-	2	-	-
PC15. test electrical/electronic components post removal wherever applicable as per OEM SOP	2	3	-	1
PC16. clean and condition dismantled components, including mechanical and electrical aggregates, prior to assembly	2	1	-	-
PC17. perform repair of all electrical and electronic faults including direct faults in input sensors, output actuators, wiring harnesses, computer systems, calibration/adjustment specifications, component specifications, component assembly, system modifications	3	2	-	2
PC18. repair indirect faults in electrical/electronic aggregate due to other system/component	2	2	-	1
PC19. maintain the documentation related to inspection, servicing and repair of the vehicle	2	2	-	-
Perform post service/repair routine	**5**	**10**	**-**	**5**
PC20. check the performance of vehicle/aggregate post repair and report to supervisor/service advisor if further inspection is required by another specialist	-	3	-	2
PC21. ensure completeness of tasks assigned before releasing the vehicle for the next procedure	-	1	-	-
PC22. dispose off materials such as old batteries, scrap of failed parts/aggregates as per organization's policies	2	3	-	2
PC23. ensure all tools, auxiliary material and other equipment are removed from the work site	1	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. perform scheduled checks, calibration and timely repairs for workshop tools, equipment and workstations	2	-	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N1438
NOS Name	Carry out service, repair and overhauling of electrical and electronic systems in the four wheeler vehicle
Sector	Automotive
Sub-Sector	Automotive Vehicle Service
Occupation	Technical Service & Repair
NSQF Level	5
Credits	TBD
Version	1.0
Last Reviewed Date	27/05/2021
Next Review Date	27/05/2026
NSQC Clearance Date	27/05/2021

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training centre based on these criteria.

5. In case of successfully passing only certain number of NOSs, the trainee is eligible to take

subsequent assessment on the balance NOS's to pass the Qualification Pack.

6. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack

Minimum Aggregate Passing % at QP Level : 70

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

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N9801.Manage work and resources (Service)	50	30	-	20	100	15
ASC/N9802.Interact effectively with team, customers and others	50	30	-	20	100	10
ASC/N1404.Carry out diagnosis on four wheeler vehicle for repair requirements	30	50	-	20	100	25
ASC/N1405.Carry out service, repair and overhauling of mechanical systems in four wheeler vehicle	30	50	-	20	100	25
ASC/N1438.Carry out service, repair and overhauling of electrical and electronic systems in the four wheeler vehicle	30	50	-	20	100	25
Total	**190**	**210**	**-**	**100**	**500**	**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.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.