

## Qualification Pack



# Automotive Engine Repair Technician Level 4

QP Code: ASC/Q1409

Version: 1.0

NSQF Level: 4

Automotive Skills Development Council || 153, Gr Floor, Okhla Industrial Area, Phase - III, Leela  
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## Qualification Pack

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## Qualification Pack

### ASC/Q1409: Automotive Engine Repair Technician Level 4

#### Brief Job Description

An Auto Engine Repair Technician is responsible for the repair of vehicle engines and aggregates

#### 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 as well. The individual must have a technical bend of mind to understand the technical aspects related to engine and allied aggregates (like turbocharger), which would also help in understanding the fault diagnosis in the engine. Keeping oneself abreast of the latest developments and newer technologies used in the mechanical systems of engine 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/N1418: Carry out repairs of engine and other related mechanical aggregates](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Automotive Vehicle Service
<b>Occupation</b>	Technical Service and Repair
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/7213.0201
<b>Minimum Educational Qualification &amp; Experience</b>	I.T.I (Automobile ) with 3-5 years of experience For other qualifications
<b>Minimum Level of Education for Training in School</b>	

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<b>Pre-Requisite License or Training</b>	On the job training: Desirable for ASDC Auto Engine Repair Technician Certificate or Diploma in Automotive Repair Compulsory for all other qualifications
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	10/06/2013
<b>Next Review Date</b>	31/03/2021
<b>Deactivation Date</b>	31/03/2021
<b>NSQC Approval Date</b>	20/07/2015
<b>Version</b>	1.0

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### 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

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- 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

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

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### National Occupational Standards (NOS) Parameters

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

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### 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

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- 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

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### Assessment Criteria

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

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### National Occupational Standards (NOS) Parameters

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

## Qualification Pack

### 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

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- 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

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### 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>	<b>25</b>	<b>75</b>	-	-
<b>PC1.</b> comply with organisations current health,safety and security policies and procedures	3	9	-	-
<b>PC2.</b> report any identified breaches in health,safety, and security policies and procedures to the designated person	3	10	-	-
<b>PC3..</b> 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	-	-
<b>PC4.</b> identify and correct any hazards like illness, accidents, fires or any other natural calamity safely and within the limits of individuals authority	5	10	-	-
<b>PC5.</b> 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	-	-
<b>PC6.</b> follow organisations emergency procedures for accidents, fires or any other natural calamity	3	10	-	-
<b>PC7.</b> identify and recommend opportunities for improving health,safety, and security to the designated person	3	8	-	-
<b>PC8.</b> complete all health and safety records are updates and procedures well defined	2	9	-	-
<b>NOS Total</b>	<b>25</b>	<b>75</b>	-	-

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### National Occupational Standards (NOS) Parameters

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

## Qualification Pack

# ASC/N1418: Carry out repairs of engine and other related mechanical aggregates

## Description

This NOS unit is about an individual carrying out, repairs activities in the engine and other allied mechanical aggregates (like turbocharger).

## Scope

This unit/task covers the following:

- carry out service and repair activities in the engine and other related mechanical aggregates (like turbocharger)
- carry out disassembly and assembly of the engine and its aggregates to solve the problems in the vehicle due to some fault in the engine aggregates

## Elements and Performance Criteria

### *Carry out the repair and assemble / disassemble of the engine & related aggregates*

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

- PC1.** . understand the auto component manufacturer specifications related to the various engine components/ aggregates in the vehicle (including turbocharger)
- PC2.** . follow standard operating procedures for using workshop tools and equipment for service and repairs of engine and its aggregates
- PC3.** . conduct test drives to assess need for repairs, calibration or any other adjustments in the engine and its related mechanical aggregates
- PC4.** . review the job card and understand work to be carried out in the engine and related aggregates
- PC5.** . in case of non-routine service or repair, confirm tasks to be carried out with superior
- PC6.** . ensure that the correct spare parts, lubricants, tools and other materials required have been obtained
- PC7.** . calibrate, align and adjust settings, alignment and other tolerance levels relevant to the following engine and allied aggregates: engine and aggregates (including flywheel) allied engine aggregates (like radiator etc.) air intake and exhaust systems like (like turbocharger, intercooler etc.) cooling & lubrication system fuel ignition system (like injectors, fuel injection high pressure lines etc.) transmission system (including gearbox, differential, propeller shaft and axles) steering system clutch and brake assembly electrical and electronic components (related to engine including alternator, wire harness etc.)
- PC8.** . repair and replace: cylinder block cylinder head piston liner piston (including piston rings) crankshaft (including main and BE journal) camshaft connecting rod air compressor flywheel (including ring gear and damper) fuel systems (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system steering system various lubrication systems connected to the engine

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- PC9.** . carry out repair activities on the engine aggregates safely to ensure: no damage to the vehicle or other vehicles no damage to vehicle components and systems no contact with hazardous materials
- PC10.** . dismantle, assess, repair, clean, replace, adjust and reassemble vehicle mechanical engine aggregates
- PC11.** . identify and change engine components requiring change due to continuous wear and tear(including oil and air filters)
- PC12.** . ensure all dismantled engine components are cleaned and conditioned prior to reassembly
- PC13.** . ensure disposal of materials (including waste oil, scrap of failed parts/ aggregates) in accordance with the organisations policies
- PC14.** . refill correct grade of coolants, lubricants, engine oil and other fluids in the engine aggregates as per OEM guidelines
- PC15.** . understand the various precautions to be taken to avoid damage to the vehicle and its components while working on the engine aggregates and sub-assemblies
- PC16.** . record all service and repairs carried out on the engine and allied aggregates and ensure completeness of tasks assigned before releasing vehicle for the next repair or maintenance procedure
- PC17.** . ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary
- PC18.** . ensure any malfunctions observed in tools and equipment are reported to the concerned persons
- PC19.** . ensure any other repair requirements observed in the other components/ aggregates systems (like engine, gear box etc.) while repairing/ overhauling of braking systems are reported to Supervisor/ Service Advisor for further inspection by other specialists
- PC20.** . use resources responsibly (e.g. use of grease and other consumables)
- PC21.** . measure/ inspect the machining or any other repair done from an outside source/ local machining garages
- PC22.** . recognise when to seek assistance from a senior technician in case of diagnosis of the engine related aggregates
- PC23.** . 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)
- PC24.** . 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 for servicing and repair of the engine components and aggregates in the vehicle
- KU2.** standard schedules and checklists recommended by the OEM for servicing and repair of the engine components and aggregates in the vehicle
- KU3.** identification codes, nomenclature of various engine components and aggregates in a vehicle

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- KU4.** correct and appropriate grade of engine oil, coolant or lubricant to be used for the corresponding engine variants as specified by the OEM/ Engine Manufacturer
- KU5.** standard operating procedures recommended by the Dealership/ Suppliers/OEM for using tools and equipment to be followed related to various engine aggregates and components in a vehicle as per the Tool Manufacturer instructions
- KU6.** standard operating procedures for rectification of errors in information (e.g. rectification of job card, reissue of correct tools and equipment etc.)
- KU7.** safety requirements for equipment and components prescribed by the OEM (e.g. preventing/ dealing with oil spillage and inflammable materials)
- KU8.** documentation requirements for each procedure carried out as part of roles and responsibilities as specified by OEM/ auto component manufacturer
- KU9.** organisational and professional code of ethics and standards of practice
- KU10.** safety, health and environmental policies and regulations for the workplace as well as for automotive trade in general(e.g. safe working practices inside pits/ under vehicles)
- KU11.** the basic technology used for various types of engine and allied aggregates: working cycle (2 stroke and 4 stroke) fuel (petrol, diesel, CNG, LPG, electric/ hybrid types) cylinder type - single cylinder - multi cylinder (including inline, straight, horizontal, inline V shape) cooling system (air or water cooled)
- KU12.** the functioning of of various components and component systems in the engine and its aggregates(including the various repair requirements) including: air intake and exhaust systems - air filter - turbocharger - intercooler - exhaust and intake manifold - intake and exhaust valve cooling system - water pump fuel system - fuel tank - fuel injectors - FIP (fuel injection pump) lubrication system - oil pump (including pressure relieve valve) - oil filter & heat exchanger
- KU13.** the functioning of other aggregates (other than engine and allied aggregates) including : clutch assembly transmission systems (manual, automatic etc.) hydraulic and pneumatic system brake system drive-train assembly steering system suspension system electrical, ignition, electronic and air-conditioning system etc.
- KU14.** typical causes and symptoms of operational faults and failures of a vehicle which are related to engine and it aggregates : poor pickup HEOC (high engine oil consumption) low power generation low oil pressure blow-by excessive black smoke noisy turbocharger oil leakage unusual noise from the engine or allied aggregates any other complaint/ fault related to mainly the engine and its aggregates
- KU15.** the tools used to assess deviations from specifications during routine servicing, including use of: pressure indicators: fuel pressure testers, manifold gauge sets, oil pressuregauges, tire pressure gauges etc. pullers: ball joint separators, bearing pullers, gear puller tools, slidehammers etc. specialty wrenches: alignment wrenches, chain wrenches, locking wrenches,lug wrenches etc. trim or moulding tools: carbon scrapers, gasket scrapers, scrapers, spoonsetc. measuring equipment: vernier calipers, micrometre, feeler gauges, multimetre,flow metre, temp gauge, dial gauge etc. other tools: hand tools, power tools, lifting and jacking equipment,tensioning equipment, brake roller tester, chassis dynamometer, suspensionactivation, security activator etc. tools for other tasks such as cleaning of vehicles, tools, equipment andworkshop

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- KU16.** how to repair, routine service and maintenance of the major aggregates within the engine including: cylinder block cylinder head piston liner piston (including piston rings) crankshaft (including main and BE journal) camshaft connecting rod air compressor flywheel (including ring gear and damper) fuel systems (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system
- KU17.** how to select the right materials for the job such as seals, sealants, fittings, gaskets, joints, fasteners etc.
- KU18.** how to carry out routine maintenance including: checking engine condition in the vehicle against OEM specifications to identify damage, corrosion, wear and tear, fluid levels, leaks and other problems in serviceability make adjustments to settings, alignment and tolerance levels relevant to: - engine and aggregates (including flywheel) - allied engine aggregates (like radiator etc.) - air intake & exhaust system like (like turbocharger, intercooler etc.) - cooling & lubrication system - fuel ignition system (like injectors, fuel injection high pressure lines etc.)- transmission system (including gearbox, differential, propeller shaft and axles)- steering system- clutch and brake assembly- electrical and electronic components (related to engine including alternator, wire harness etc.)
- KU19.** how to measure/ inspect the machining or any other repair done from an outside source/ local machining garages on the various engine aggregates (like machining of the piston, cylinder head, cylinder block)
- KU20.** how to carry out the full overhaul of the engines (with support from the other technicians and machine shops from local garages)
- KU21.** the various sources of information available for assessing service and repair requirements of the engine and allied aggregates in a vehicle including: diagnostic displays visual inspections test drives various manuals from OEM and engine manufacturer vehicle/equipment manufacturer specifications standard operating procedures
- KU22.** procedures recommended by the OEM and Dealership to be used during routine servicing of the various engine and its aggregates
- KU23.** the type and quality of components specified by the OEM for use as replacement parts
- KU24.** The correct and appropriate grade of engine oil, coolant or lubricants for the corresponding engine variants as specified by the OEM/ engine manufacturer for use
- KU25.** corrective action to be taken for common engine and aggregate system faults and failures
- KU26.** faults and failures in the engine and allied aggregates that necessitate replacement of components and other units
- KU27.** how to dispose -off replaced failed components and changed oil, lubricant, grease etc. in accordance with safety, health and environmental policies and regulations
- KU28.** precautions to be taken to ensure the following while working on the engine aggregates and components (including specific precautions to be taken when working with alternative fuel/ hybrid vehicles): no damage to the electrical / other advanced systems (in case of hybrid/ electrical vehicles) no damage to the vehicle on which work is being done along with other vehicles parked besides no damage to vehicle components sub-assemblies and other systems (other than the engine aggregates on which the repair is being done) no contact with hazardous materials
- KU29.** when to ask for assistance from a superior

## Generic Skills (GS)

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

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- GS1.** create documentation required on the job (including job cards, work sheets, etc.) regarding the basic details of repair , maintenance and service performed on the engine and its allied aggregates
- GS2.** write any additional requirement of work on the vehicle reported for engine service, maintenance or repair found during the work done as specified in the job card (for e.g. while working on the engine and transmission system, if low level of engine oil/ greasing or coolant, then convey to the superiors)
- GS3.** write in at least one language
- GS4.** read job cards and instructions from Supervisors and the Service Advisor regarding the repair and service of engine aggregates
- GS5.** read various sources of information available for assessing service and repair requirements of the engine aggregates in a vehicle including service manual and diagnostic and visual displays put up in the workshop
- GS6.** read policies and regulations pertinent to the job, including OEM guidelines, Health and Safety instructions etc. while working on the engine and its aggregates
- GS7.** clearly communicate workplace information and ideas with workplace colleagues (verbal & non-verbal)
- GS8.** use terms, names, grades and other nomenclature pertaining to the Automotive trade, tools, specific workshop equipment etc
- GS9.** communicate with colleagues to handle verbal enquiries, such as clarifying instructions and responding to requests for information
- GS10.** interact with the customer through Service Advisor/ Supervisor in case any additional work needs to be done on the engine aggregates as a result of diagnosis of some complaint leading to additional repair in the vehicle in the engine aggregate
- GS11.** analyse information and evaluate results to choose the best solution and solve problems
- GS12.** decide on the repair/ replacement of any engine aggregate post the diagnosis (with help from a superior in case required)
- GS13.** judge when to ask for help from a Superior or senior diagnosis technician
- GS14.** plan work according to the required schedule and location
- GS15.** plan the assigned engine repair work (including the specific engines that needs to be overhauled)and provide estimates of time required for each engine overhaul repair
- GS16.** organise the schedule to complete work on the engine aggregate timely in case other aggregate repairs/ maintenance work is also required to be done
- GS17.** interpret the customer needs basis the complaint which may be as a result of some fault in the engine aggregates (like high engine oil consumption, noisy engine, engine oil leakage)are assessed and every effort is made to resolve the complaints
- GS18.** ensure that the service provided is of the highest order to ensure higher levels of customer satisfaction
- GS19.** ensure timely communication of the additional work on the engine aggregates while carrying out other repairs in the engine aggregates to the Service Advisor/ Supervisor who in turn communicates it to the customer
- GS20.** follow up with the Service Advisor on any unfavourable feedback received from customer on the service and repair on the engine aggregates
- GS21.** recognise a workplace problem or a potential problem and take action (e.g. leaks or oil spills in the workshop)

## Qualification Pack

- GS22.** determine problems needing priority action (e.g. while working on the engine, crank / pistons require machining as they have been worn out, inform the service advisor or supervisor for urgent action)
- GS23.** refer problems outside area of responsibility to appropriate person (e.g. unavailability of required spare parts or materials in the workshop)
- GS24.** gather information while working on engine aggregate/ components and take appropriate action, by consulting superiors
- GS25.** assess repairs required based on technical faults identified as specified in the job card/ supervisor notes
- GS26.** refer complex problems (outside the current scope of work) to a superior in case any additional work requirement comes up
- GS27.** analyse, evaluate and apply the information gathered from observation, experience, reasoning, or communication to act efficiently
- GS28.** use the diagnosis results to take an appropriate decision on repair/ replacement of engine aggregates in consultation with the supervisor/ aggregate specialist/ service advisor

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Carry out the repair and assemble / disassemble of the engine &amp; related aggregates</i>	<b>30</b>	<b>70</b>	-	-
<b>PC1.</b> . understand the auto component manufacturer specifications related to the various engine components/ aggregates in the vehicle (including turbocharger)	2	3	-	-
<b>PC2.</b> . follow standard operating procedures for using workshop tools and equipment for service and repairs of engine and its aggregates	1	2	-	-
<b>PC3.</b> . conduct test drives to assess need for repairs, calibration or any other adjustments in the engine and its related mechanical aggregates	1	3	-	-
<b>PC4.</b> . review the job card and understand work to be carried out in the engine and related aggregates	1	3	-	-
<b>PC5.</b> . in case of non-routine service or repair, confirm tasks to be carried out with superior	1	2	-	-
<b>PC6.</b> . ensure that the correct spare parts, lubricants, tools and other materials required have been obtained	1	2	-	-
<b>PC7.</b> . calibrate, align and adjust settings, alignment and other tolerance levels relevant to the following engine and allied aggregates: engine and aggregates (including flywheel) allied engine aggregates (like radiator etc.) air intake and exhaust systems like (like turbocharger, intercooler etc.) cooling & lubrication system fuel ignition system (like injectors, fuel injection high pressure lines etc.) transmission system (including gearbox, differential, propeller shaft and axles) steering system clutch and brake assembly electrical and electronic components (related to engine including alternator, wire harness etc.)	2	3	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC8.</b> . repair and replace: cylinder block cylinder head piston liner piston (including piston rings) crankshaft (including main and BE journal) camshaft connecting rod air compressor flywheel (including ring gear and damper) fuel systems (diesel, petrol, electrical, gas etc.) radiator emission and exhaust system steering system various lubrication systems connected to the engine	2	5	-	-
<b>PC9.</b> . carry out repair activities on the engine aggregates 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	-	-
<b>PC10.</b> . dismantle, assess, repair, clean, replace, adjust and reassemble vehicle mechanical engine aggregates	2	5	-	-
<b>PC11..</b> identify and change engine components requiring change due to continuous wear and tear(including oil and air filters)	2	4	-	-
<b>PC12..</b> ensure all dismantled engine components are cleaned and conditioned prior to reassembly	1	3	-	-
<b>PC13.</b> . ensure disposal of materials (including waste oil, scrap of failed parts/ aggregates) in accordance with the organisations policies	1	3	-	-
<b>PC14.</b> . refill correct grade of coolants, lubricants, engine oil and other fluids in the engine aggregates as per OEM guidelines	1	3	-	-
<b>PC15..</b> understand the various precautions to be taken to avoid damage to the vehicle and its components while working on the engine aggregates and sub-assemblies	1	2	-	-
<b>PC16.</b> . record all service and repairs carried out on the engine and allied aggregates and ensure completeness of tasks assigned before releasing vehicle for the next repair or maintenance procedure	1	2	-	-
<b>PC17..</b> ensure all workshop tools, equipment and workstations are adequately maintained by carrying out scheduled checks, calibration and timely repairs where necessary	1	3	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC18..</b> ensure any malfunctions observed in tools and equipment are reported to the concerned persons	1	2	-	-
<b>PC19..</b> ensure any other repair requirements observed in the other components/ aggregates systems (like engine, gear box etc.) while repairing/ overhauling of braking systems are reported to Supervisor/ Service Advisor for further inspection by other specialists	1	3	-	-
<b>PC20. .</b> use resources responsibly (e.g. use of grease and other consumables)	1	2	-	-
<b>PC21..</b> measure/ inspect the machining or any other repair done from an outside source/ local machining garages	1	3	-	-
<b>PC22..</b> recognise when to seek assistance from a senior technician in case of diagnosis of the engine related aggregates	1	2	-	-
<b>PC23. .</b> 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	-	-
<b>PC24..</b> 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	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N1418
<b>NOS Name</b>	Carry out repairs of engine and other related mechanical aggregates
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Sales and Service
<b>Occupation</b>	Technical Service & Repair
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	10/06/2013
<b>Next Review Date</b>	31/12/2015
<b>NSQC Clearance Date</b>	24/07/2015

## Qualification Pack

### Assessment Guidelines and Assessment Weightage

#### Assessment Guidelines

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

#### Minimum Aggregate Passing % at QP Level : 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/N0001.Plan and organise work to meet expected outcomes	25	75	-	-	100	10
ASC/N0002.Work effectively in a team	25	75	-	-	100	15
ASC/N0003.Maintain a healthy,safe and secure working environment	25	75	-	-	100	15

### Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N1418.Carry out repairs of engine and other related mechanical aggregates	30	70	-	-	100	60
<b>Total</b>	<b>105</b>	<b>295</b>	<b>-</b>	<b>-</b>	<b>400</b>	<b>100</b>

## Qualification Pack

### Acronyms

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

## Qualification Pack

### Glossary

<b>Sector</b>	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.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards (OS)</b>	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.
<b>Performance Criteria (PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards (NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack (QP)</b>	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.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	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.
<b>Scope</b>	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

## Qualification Pack

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