

## Qualification Pack



# Electric Vehicle Test Engineer

QP Code: ASC/Q8406

Version: 2.0

NSQF Level: 4.5

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## Qualification Pack

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### ASC/Q8406: Electric Vehicle Test Engineer

#### Brief Job Description

The individual in this job is responsible for conducting various types of tests on the electric vehicle inside the laboratory as well as on the road.

#### Personal Attributes

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

#### Applicable National Occupational Standards (NOS)

##### Compulsory NOS:

1. [ASC/N9810: Manage work and resources \(Manufacturing\)](#)
2. [DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)
3. [ASC/N9805: Interpret engineering drawing](#)
4. [ASC/N8410: Perform testing of electric vehicle](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Research & Development
<b>Occupation</b>	Automotive Product Testing and Validation
<b>Country</b>	India
<b>NSQF Level</b>	4.5
<b>Credits</b>	17
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/7231.0201

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<b>Minimum Educational Qualification &amp; Experience</b>	10th grade pass with 3 Years of experience of relevant experience OR Completed 3-year diploma (after 10th) OR Completed 2nd year diploma after 12th OR Pursuing 1st year of UG (of B.E/B.Tech and continuous education)
<b>Minimum Level of Education for Training in School</b>	
<b>Pre-Requisite License or Training</b>	Valid Driving License
<b>Minimum Job Entry Age</b>	21 Years
<b>Last Reviewed On</b>	NA
<b>Next Review Date</b>	24/06/2026
<b>NSQC Approval Date</b>	24/06/2021
<b>Version</b>	2.0
<b>Reference code on NQR</b>	2021/AUT/ASDC/04300
<b>NQR Version</b>	2

## Qualification Pack

### ASC/N9810: Manage work and resources (Manufacturing)

#### Description

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

#### Scope

The scope covers the following :

- Maintain safe and secure working environment
- Maintain Health and Hygiene
- Effective waste management practices
- Material/energy conservation practices

#### Elements and Performance Criteria

##### *Maintain safe and secure working environment*

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

- PC1.** identify hazardous activities and the possible causes of risks or accidents in the workplace
- PC2.** implement safe working practices for dealing with hazards to ensure safety of self and others
- PC3.** conduct regular checks of the machines with support of the maintenance team to identify potential hazards
- PC4.** ensure that all the tools/equipment/fasteners/spare parts are arranged as per specifications/utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions
- PC5.** organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices
- PC6.** fill daily check sheet to report improvements done and risks identified
- PC7.** ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others
- PC8.** report any identified breaches in health, safety and security policies and procedures to the designated person

##### *Maintain Health and Hygiene*

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

- PC9.** ensure workplace, equipment, restrooms etc. are sanitized regularly
- PC10.** ensure team is aware about hygiene and sanitation regulations and following them on the shop floor
- PC11.** ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace
- PC12.** report advanced hygiene and sanitation issues to appropriate authority
- PC13.** follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc
- PC14.** wear and dispose PPEs regularly and appropriately

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### *Effective waste management practices*

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

**PC15.** ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP

**PC16.** ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste

### *Material/energy conservation practices*

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

**PC17.** ensure malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively

**PC18.** prepare and analyze material and energy audit reports to decipher excessive consumption of material and water

**PC19.** identify possibilities of using renewable energy and environment friendly fuels

**PC20.** identify processes where material and energy/electricity utilization can be optimized

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

**KU1.** organisation procedures for health, safety and security, individual role and responsibilities in this context

**KU2.** the organisation's emergency procedures for different emergency situations and the importance of following the same

**KU3.** evacuation procedures for workers and visitors

**KU4.** how and when to report hazards as well as the limits of responsibility for dealing with hazards

**KU5.** potential hazards, risks and threats based on the nature of work

**KU6.** various types of fire extinguisher

**KU7.** various types of safety signs and their meaning

**KU8.** appropriate first aid treatment relevant to different condition e.g. bleeding, minor burns, eye injuries etc.

**KU9.** relevant standards, procedures and policies related to 5S followed in the company

**KU10.** the various materials used and their storage norms

**KU11.** importance of efficient utilisation of material and water

**KU12.** basics of electricity and prevalent energy efficient devices

**KU13.** common practices of conserving electricity

**KU14.** common sources and ways to minimize pollution

**KU15.** categorisation of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics

**KU16.** waste management techniques

**KU17.** significance of greening

## Generic Skills (GS)

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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.** inform/report to concerned person in case of any problem
- GS6.** make timely decisions for efficient utilization of resources
- GS7.** write reports such as accident report, in at least English/regional language

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain safe and secure working environment</i>	<b>20</b>	<b>13</b>	-	<b>8</b>
<b>PC1.</b> identify hazardous activities and the possible causes of risks or accidents in the workplace	4	2	-	2
<b>PC2.</b> implement safe working practices for dealing with hazards to ensure safety of self and others	3	1	-	2
<b>PC3.</b> conduct regular checks of the machines with support of the maintenance team to identify potential hazards	2	2	-	1
<b>PC4.</b> ensure that all the tools/equipment/fasteners/spare parts are arranged as per specifications/utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions	3	2	-	1
<b>PC5.</b> organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices	2	-	-	-
<b>PC6.</b> fill daily check sheet to report improvements done and risks identified	2	2	-	-
<b>PC7.</b> ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others	2	2	-	1
<b>PC8.</b> report any identified breaches in health, safety and security policies and procedures to the designated person	2	2	-	1
<i>Maintain Health and Hygiene</i>	<b>13</b>	<b>7</b>	-	<b>5</b>
<b>PC9.</b> ensure workplace, equipment, restrooms etc. are sanitized regularly	3	2	-	1
<b>PC10.</b> ensure team is aware about hygiene and sanitation regulations and following them on the shop floor	2	1	-	-
<b>PC11.</b> ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace	2	2	-	1



### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC12.</b> report advanced hygiene and sanitation issues to appropriate authority	1	1	-	1
<b>PC13.</b> follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc	2	1	-	1
<b>PC14.</b> wear and dispose PPEs regularly and appropriately	3	-	-	1
<i>Effective waste management practices</i>	<b>6</b>	<b>4</b>	-	<b>1</b>
<b>PC15.</b> ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP	3	2	-	-
<b>PC16.</b> ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste	3	2	-	1
<i>Material/energy conservation practices</i>	<b>11</b>	<b>6</b>	-	<b>6</b>
<b>PC17.</b> ensure malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively	2	2	-	1
<b>PC18.</b> prepare and analyze material and energy audit reports to decipher excessive consumption of material and water	3	2	-	1
<b>PC19.</b> identify possibilities of using renewable energy and environment friendly fuels	3	1	-	2
<b>PC20.</b> identify processes where material and energy/electricity utilization can be optimized	3	1	-	2
<b>NOS Total</b>	<b>50</b>	<b>30</b>	-	<b>20</b>

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### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N9810
<b>NOS Name</b>	Manage work and resources (Manufacturing)
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	5
<b>Credits</b>	2
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	31/08/2021
<b>Next Review Date</b>	31/08/2024
<b>NSQC Clearance Date</b>	31/08/2021

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### DGT/VSQ/N0102: Employability Skills (60 Hours)

#### Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

#### Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

#### Elements and Performance Criteria

##### *Introduction to Employability Skills*

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

- PC1.** identify employability skills required for jobs in various industries
- PC2.** identify and explore learning and employability portals

##### *Constitutional values - Citizenship*

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

- PC3.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC4.** follow environmentally sustainable practices

##### *Becoming a Professional in the 21st Century*

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

- PC5.** recognize the significance of 21st Century Skills for employment
- PC6.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

##### *Basic English Skills*

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

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- PC7.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC8.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC9.** write short messages, notes, letters, e-mails etc. in English

### *Career Development & Goal Setting*

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

- PC10.** understand the difference between job and career
- PC11.** prepare a career development plan with short- and long-term goals, based on aptitude

### *Communication Skills*

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

- PC12.** follow verbal and non-verbal communication etiquette and active listening techniques in various settings
- PC13.** work collaboratively with others in a team

### *Diversity & Inclusion*

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

- PC14.** communicate and behave appropriately with all genders and PwD
- PC15.** escalate any issues related to sexual harassment at workplace according to POSH Act

### *Financial and Legal Literacy*

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

- PC16.** select financial institutions, products and services as per requirement
- PC17.** carry out offline and online financial transactions, safely and securely
- PC18.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC19.** identify relevant rights and laws and use legal aids to fight against legal exploitation

### *Essential Digital Skills*

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

- PC20.** operate digital devices and carry out basic internet operations securely and safely
- PC21.** use e- mail and social media platforms and virtual collaboration tools to work effectively
- PC22.** use basic features of word processor, spreadsheets, and presentations

### *Entrepreneurship*

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

- PC23.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC24.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC25.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

### *Customer Service*

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

- PC26.** identify different types of customers
- PC27.** identify and respond to customer requests and needs in a professional manner.

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**PC28.** follow appropriate hygiene and grooming standards

*Getting ready for apprenticeship & Jobs*

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

**PC29.** create a professional Curriculum vitae (Résumé)

**PC30.** search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

**PC31.** apply to identified job openings using offline /online methods as per requirement

**PC32.** answer questions politely, with clarity and confidence, during recruitment and selection

**PC33.** identify apprenticeship opportunities and register for it as per guidelines and requirements

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

**KU1.** need for employability skills and different learning and employability related portals

**KU2.** various constitutional and personal values

**KU3.** different environmentally sustainable practices and their importance

**KU4.** Twenty first (21st) century skills and their importance

**KU5.** how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

**KU6.** importance of career development and setting long- and short-term goals

**KU7.** about effective communication

**KU8.** POSH Act

**KU9.** Gender sensitivity and inclusivity

**KU10.** different types of financial institutes, products, and services

**KU11.** how to compute income and expenditure

**KU12.** importance of maintaining safety and security in offline and online financial transactions

**KU13.** different legal rights and laws

**KU14.** different types of digital devices and the procedure to operate them safely and securely

**KU15.** how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

**KU16.** how to identify business opportunities

**KU17.** types and needs of customers

**KU18.** how to apply for a job and prepare for an interview

**KU19.** apprenticeship scheme and the process of registering on apprenticeship portal

## Generic Skills (GS)

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

**GS1.** read and write different types of documents/instructions/correspondence

**GS2.** communicate effectively using appropriate language in formal and informal settings

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- GS3.** behave politely and appropriately with all
- GS4.** how to work in a virtual mode
- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	<b>1</b>	<b>1</b>	-	-
<b>PC1.</b> identify employability skills required for jobs in various industries	-	-	-	-
<b>PC2.</b> identify and explore learning and employability portals	-	-	-	-
<i>Constitutional values - Citizenship</i>	<b>1</b>	<b>1</b>	-	-
<b>PC3.</b> recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
<b>PC4.</b> follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	<b>2</b>	<b>4</b>	-	-
<b>PC5.</b> recognize the significance of 21st Century Skills for employment	-	-	-	-
<b>PC6.</b> practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
<i>Basic English Skills</i>	<b>2</b>	<b>3</b>	-	-
<b>PC7.</b> use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
<b>PC8.</b> read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
<b>PC9.</b> write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development &amp; Goal Setting</i>	<b>1</b>	<b>2</b>	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10.</b> understand the difference between job and career	-	-	-	-
<b>PC11.</b> prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	<b>2</b>	<b>2</b>	-	-
<b>PC12.</b> follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
<b>PC13.</b> work collaboratively with others in a team	-	-	-	-
<i>Diversity &amp; Inclusion</i>	<b>1</b>	<b>2</b>	-	-
<b>PC14.</b> communicate and behave appropriately with all genders and PwD	-	-	-	-
<b>PC15.</b> escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	<b>2</b>	<b>3</b>	-	-
<b>PC16.</b> select financial institutions, products and services as per requirement	-	-	-	-
<b>PC17.</b> carry out offline and online financial transactions, safely and securely	-	-	-	-
<b>PC18.</b> identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
<b>PC19.</b> identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	<b>3</b>	<b>4</b>	-	-
<b>PC20.</b> operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
<b>PC21.</b> use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
<b>PC22.</b> use basic features of word processor, spreadsheets, and presentations	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Entrepreneurship</i>	<b>2</b>	<b>3</b>	-	-
<b>PC23.</b> identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
<b>PC24.</b> develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
<b>PC25.</b> identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	<b>1</b>	<b>2</b>	-	-
<b>PC26.</b> identify different types of customers	-	-	-	-
<b>PC27.</b> identify and respond to customer requests and needs in a professional manner.	-	-	-	-
<b>PC28.</b> follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship &amp; Jobs</i>	<b>2</b>	<b>3</b>	-	-
<b>PC29.</b> create a professional Curriculum vitae (Résumé)	-	-	-	-
<b>PC30.</b> search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
<b>PC31.</b> apply to identified job openings using offline /online methods as per requirement	-	-	-	-
<b>PC32.</b> answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
<b>PC33.</b> identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
<b>NOS Total</b>	<b>20</b>	<b>30</b>	-	-

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### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	DGT/VSQ/N0102
<b>NOS Name</b>	Employability Skills (60 Hours)
<b>Sector</b>	Cross Sectoral
<b>Sub-Sector</b>	Professional Skills
<b>Occupation</b>	Employability
<b>NSQF Level</b>	4
<b>Credits</b>	2
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	31/01/2024
<b>Next Review Date</b>	31/01/2027
<b>NSQC Clearance Date</b>	31/01/2024

## Qualification Pack

### ASC/N9805: Interpret engineering drawing

#### Description

This NOS unit is about reading and interpreting all concepts, symbols, methods, views, etc. of engineering drawing.

#### Scope

The scope covers the following :

- Interpret information from various views, projection, 2D and 3D shapes
- Identify drawing standards and symbols
- Modification and storage of drawing

#### Elements and Performance Criteria

##### *Interpret information from various views, projection, 2D and 3D shapes*

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

- PC1.** interpret engineering drawing's uniqueness, dimensions and important features in 2D and 3D shapes
- PC2.** identify the difference between 2D and 3D shapes
- PC3.** explain difference between first angle projection and third angle projection in mechanical engineering drawing
- PC4.** interpret all the 3 axes (x, y and z axis) and geometrical shapes (cones, cylinder, sphere, cuboid, etc) on to a 2D and 3D projection
- PC5.** identify details of the machine component which are not clearly visible by interpreting section views

##### *Identify drawing standards and symbols*

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

- PC6.** interpret Geometric Dimensioning and Tolerancing (GD&T) symbols in the drawings
- PC7.** interpret symbols of Radius, controlled radius, spherical radius, diameter, spherical diameter, square, counterbore, spotface, depth, countersink, "by", maximum dimension, minimum dimension, reference, dimension origin etc
- PC8.** identify the sequence of operations which enables the selection and prioritization of the datums
- PC9.** read and interpret information from Tolerance Zone boundaries for part features in terms of shape and size

##### *Modification and storage of drawing*

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

- PC10.** observe any modification, changes required in the drawing and communicate the same to the concerned team in the organization
- PC11.** store the drawings in an easily accessible place, avoiding damage from moisture, chemicals and fire

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### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant organisational standards such as work standard, Standard Operating Procedure, quality process, maintenance standards etc. followed in the company
- KU2.** importance of cycle-time and required output as per work order and work instructions
- KU3.** drawing standards used by the company
- KU4.** use of drawing tools such as scales, compass, types of pencils, CAD and CAM software etc.
- KU5.** the basics of engineering drawing, orthographic projection, isometric projection, GD&T etc.
- KU6.** importance of various projections, views, symbols and dimensions of drawing
- KU7.** use of geometric shapes like lines, angles, circles, etc for interpreting the drawing

### Generic Skills (GS)

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

- GS1.** read and interpret workplace related drawing
- GS2.** communicate the changes and requirements to supervisor by using relevant drawing terms and nomenclature
- GS3.** attentively listen and comprehend the information given by the supervisor/team members
- GS4.** write in English/regional language
- GS5.** recognise problem in drawing and take suitable action
- GS6.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Interpret information from various views, projection, 2D and 3D shapes</i>	<b>21</b>	<b>11</b>	-	<b>10</b>
<b>PC1.</b> interpret engineering drawing's uniqueness, dimensions and important features in 2D and 3D shapes	5	3	-	2
<b>PC2.</b> identify the difference between 2D and 3D shapes	4	2	-	2
<b>PC3.</b> explain difference between first angle projection and third angle projection in mechanical engineering drawing	4	-	-	2
<b>PC4.</b> interpret all the 3 axes (x, y and z axis) and geometrical shapes (cones, cylinder, sphere, cuboid, etc) on to a 2D and 3D projection	5	3	-	2
<b>PC5.</b> identify details of the machine component which are not clearly visible by interpreting section views	3	3	-	2
<i>Identify drawing standards and symbols</i>	<b>23</b>	<b>15</b>	-	<b>8</b>
<b>PC6.</b> interpret Geometric Dimensioning and Tolerancing (GD&T) symbols in the drawings	6	4	-	2
<b>PC7.</b> interpret symbols of Radius, controlled radius, spherical radius, diameter, spherical diameter, square, counterbore, spotface, depth, countersink, "by", maximum dimension, minimum dimension, reference, dimension origin etc	6	4	-	2
<b>PC8.</b> identify the sequence of operations which enables the selection and prioritization of the datums	5	3	-	2
<b>PC9.</b> read and interpret information from Tolerance Zone boundaries for part features in terms of shape and size	6	4	-	2
<i>Modification and storage of drawing</i>	<b>6</b>	<b>4</b>	-	<b>2</b>

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10.</b> observe any modification, changes required in the drawing and communicate the same to the concerned team in the organization	3	2	-	1
<b>PC11.</b> store the drawings in an easily accessible place, avoiding damage from moisture, chemicals and fire	3	2	-	1
<b>NOS Total</b>	<b>50</b>	<b>30</b>	-	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N9805
<b>NOS Name</b>	Interpret engineering drawing
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	4
<b>Credits</b>	1
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	31/08/2021
<b>Next Review Date</b>	31/08/2024
<b>NSQC Clearance Date</b>	31/08/2021

## Qualification Pack

### ASC/N8410: Perform testing of electric vehicle

#### Description

This NOS is about performing various tests of electric vehicles and its aggregates in various system evaluation laboratories and on road

#### Scope

The scope covers the following :

- Prepare for testing process
- Perform inspection and repairing of vehicle and its components
- Test vehicle and its components for faults in laboratory
- Conduct testing of vehicle under running condition
- Perform post-testing activities

#### Elements and Performance Criteria

##### *Prepare for testing process*

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

- PC1.** interpret the vehicle drawings, testing sheet and coordinate with the superior for confirming the testing tasks and type of tests required to be conducted on the component or on the vehicle
- PC2.** identify, select and arrange the testing equipment, measuring instruments, gauges, parts etc. required during the testing process
- PC3.** check the tools, gauges and testing apparatus for defects and calibration status before use
- PC4.** identify the testing parameters which need to be measured during the test procedure

##### *Perform inspection and repairing of vehicle and its components*

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

- PC5.** follow safety practices recommended by organisation during inspection and testing process
- PC6.** conduct test drive to assess the need for repairs, calibration or any other adjustments in the electrical and mechanical components of the vehicle
- PC7.** dismantle and reassemble aggregates of the vehicle for fault diagnosis
- PC8.** conduct visual inspection of the bundled wiring, circuits, Integrated Circuits (IC's), Printed Circuit Boards (PCB's), wiring harnesses etc. for wear and tear, damage etc.
- PC9.** check the connections of the instruments like sensors, actuators, instrument clusters, ECU, motors and other electronic circuits
- PC10.** calibrate, align and adjust the settings of vehicle components as per the SOP and organisational standards
- PC11.** ensure part clearances as specified in the Work Instructions (WI)/Standard Operating Processes (SOP)

##### *Test vehicle and its components for faults in laboratory*

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

- PC12.** set the test apparatus as per the selected testing process and SOPs/WI



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- PC13.** connect the various data capturing meters and gauges such as load cells, pneumatic/PLC testing gauges, strain gauges, displacement transducers, accelerometers, GPS data collection devices and data loggers to capture the data points
- PC14.** diagnose faults in the various sensors, actuators, power supply lines, electronic circuits and aggregates etc. in a vehicle by following senior's instructions
- PC15.** conduct various tests as per Automotive Industry Standard (AIS) 38, 39, 40, 41, 48, 49 and short circuit/open circuit test under the supervision of the Electric Vehicle test supervisor
- PC16.** record observations/ readings as per the parameters mentioned in the testing manual/WI
- PC17.** make minor modification in test setup/ vehicle/component under testing to take reading under different scenarios as per the requirement
- PC18.** conduct battery tests like abuse, altitude, electrochemical impedance spectroscopy (SoH)
- PC19.** observe any deviations, noise or vibrations during the testing process and inform the Electric Vehicle test supervisor about the same
- PC20.** change or repair the vehicle components as per requirement

### *Conduct testing of vehicle under running condition*

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

- PC21.** check motor and converter status, battery charge health and status, oil/lubricant level, cooling water level, tyre pressure, etc. before starting the on road testing of the vehicle prototype as per the checklist and testing manual
- PC22.** check working of all the safety features and system warning indicators showing system failures, loose connections, malfunctioning, etc. of vehicle as per the vehicle safety check list and testing manual

### *Perform post-testing activities*

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

- PC23.** maintain and update the records of test results, data log etc. as per SOP
- PC24.** report the malfunctions/repairs in the vehicle beyond own scope to the concerned person
- PC25.** clean and store the tools, equipment and process auxiliaries as per organisational guidelines after completion of work
- PC26.** dispose scrap or waste material in accordance with the company policies and environmental regulations
- PC27.** 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.** company's inspection, testing standards and processes
- KU2.** different components/aggregates of electric vehicle
- KU3.** basic technology used in and functioning of various systems and components of the vehicle such as batteries, body management system, telematics, brake system, air-conditioning systems, active & passive safety system, media and other systems (including electrical machines and devices used in electric vehicles such as: generator, DC/AC and DC/DC converters, AC motor, DC motor, charging systems etc.)
- KU4.** interconnection of systems with each other and effect of one system on other system

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- KU5.** fundamental terms, laws and principles of electricity used in EV 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 communication protocols such as CAN, LIN, etc.
- KU6.** Standard Operating Procedures (SOP) recommended by OEM for using testing equipment, tools, gauges and measuring instruments
- KU7.** symbols, units and terms used in wiring diagrams associated with electrical/electric systems/components of the vehicle
- KU8.** 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
- KU9.** typical symptoms of common faults and failures in vehicle's mechanical, electrical and electronic systems
- KU10.** safety, health and environmental policies and regulations for the work place as well as for automotive trade in general
- KU11.** legal regulations that need to be taken into account for handling electric vehicles in the workshop
- KU12.** various methods for removal, dismantling, cleaning, adjusting, reassembling and testing of components for proper functioning
- KU13.** process for setting up of test benches, test platforms and test apparatus
- KU14.** electrical and electronic testing equipment: volt meters, AM meters, OHM meters, battery testing equipment, dedicated and computer based diagnostic equipment, oscilloscopes, Digital Storage Oscilloscope (DSO), Megger, etc.
- KU15.** mandatory checks required to be conducted on the Electric Vehicle before trial run
- KU16.** different parameters used to evaluate the performance of the automobile
- KU17.** how to read and interpret sketches and electrical engineering drawings
- KU18.** various defects related to running automobiles and their potential impact on the working of the final vehicle
- KU19.** various sources and potential causes of noises and vibrations in the vehicle
- KU20.** various types of tests like vehicle level test, component level test, EMI/EMC test, Accelerated/Highly Accelerated Life Test (HALT/HASS)
- KU21.** process of key joining activities like soldering or welding

## Generic Skills (GS)

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

- GS1.** read and interpret workplace related documentation
- GS2.** communicate effectively at the workplace
- GS3.** prepare reports related to inspection and testing process in English/regional language
- GS4.** recognise a workplace problem and take suitable action
- GS5.** analyse and apply the information gathered from observation, experience, reasoning or communication to act efficiently
- GS6.** complete the assigned tasks as per schedule



## Qualification Pack

**GS7.** plan and organise work according to the work requirements

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for testing process</i>	<b>5</b>	<b>6</b>	-	<b>5</b>
<b>PC1.</b> interpret the vehicle drawings, testing sheet and coordinate with the superior for confirming the testing tasks and type of tests required to be conducted on the component or on the vehicle	1	1	-	1
<b>PC2.</b> identify, select and arrange the testing equipment, measuring instruments, gauges, parts etc. required during the testing process	1	1	-	1
<b>PC3.</b> check the tools, gauges and testing apparatus for defects and calibration status before use	1	2	-	2
<b>PC4.</b> identify the testing parameters which need to be measured during the test procedure	2	2	-	1
<i>Perform inspection and repairing of vehicle and its components</i>	<b>8</b>	<b>16</b>	-	<b>6</b>
<b>PC5.</b> follow safety practices recommended by organisation during inspection and testing process	2	1	-	1
<b>PC6.</b> conduct test drive to assess the need for repairs, calibration or any other adjustments in the electrical and mechanical components of the vehicle	-	2	-	-
<b>PC7.</b> dismantle and reassemble aggregates of the vehicle for fault diagnosis	1	2	-	1
<b>PC8.</b> conduct visual inspection of the bundled wiring, circuits, Integrated Circuits (IC's), Printed Circuit Boards (PCB's), wiring harnesses etc. for wear and tear, damage etc.	2	3	-	1
<b>PC9.</b> check the connections of the instruments like sensors, actuators, instrument clusters, ECU, motors and other electronic circuits	1	3	-	1
<b>PC10.</b> calibrate, align and adjust the settings of vehicle components as per the SOP and organisational standards	1	3	-	1

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC11.</b> ensure part clearances as specified in the Work Instructions (WI)/Standard Operating Processes (SOP)	1	2	-	1
<i>Test vehicle and its components for faults in laboratory</i>	<b>13</b>	<b>23</b>	-	<b>6</b>
<b>PC12.</b> set the test apparatus as per the selected testing process and SOPs/WI	2	6	-	1
<b>PC13.</b> connect the various data capturing meters and gauges such as load cells, pneumatic/PLC testing gauges, strain gauges, displacement transducers, accelerometers, GPS data collection devices and data loggers to capture the data points	1	2	-	1
<b>PC14.</b> diagnose faults in the various sensors, actuators, power supply lines, electronic circuits and aggregates etc. in a vehicle by following senior's instructions	2	3	-	-
<b>PC15.</b> conduct various tests as per Automotive Industry Standard (AIS) 38, 39, 40, 41, 48, 49 and short circuit/open circuit test under the supervision of the Electric Vehicle test supervisor	2	3	-	1
<b>PC16.</b> record observations/ readings as per the parameters mentioned in the testing manual/WI	2	2	-	1
<b>PC17.</b> make minor modification in test setup/ vehicle/component under testing to take reading under different scenarios as per the requirement	2	3	-	1
<b>PC18.</b> conduct battery tests like abuse, altitude, electrochemical impedance spectroscopy (SoH)	1	2	-	1
<b>PC19.</b> observe any deviations, noise or vibrations during the testing process and inform the Electric Vehicle test supervisor about the same	1	1	-	-
<b>PC20.</b> change or repair the vehicle components as per requirement	-	1	-	-
<i>Conduct testing of vehicle under running condition</i>	<b>1</b>	<b>1</b>	-	<b>1</b>

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC21.</b> check motor and converter status, battery charge health and status, oil/lubricant level, cooling water level, tyre pressure, etc. before starting the on road testing of the vehicle prototype as per the checklist and testing manual	-	1	-	1
<b>PC22.</b> check working of all the safety features and system warning indicators showing system failures, loose connections, malfunctioning, etc. of vehicle as per the vehicle safety check list and testing manual	1	-	-	-
<i>Perform post-testing activities</i>	<b>3</b>	<b>4</b>	-	<b>2</b>
<b>PC23.</b> maintain and update the records of test results, data log etc. as per SOP	-	1	-	-
<b>PC24.</b> report the malfunctions/repairs in the vehicle beyond own scope to the concerned person	1	-	-	-
<b>PC25.</b> clean and store the tools, equipment and process auxiliaries as per organisational guidelines after completion of work	1	1	-	-
<b>PC26.</b> dispose scrap or waste material in accordance with the company policies and environmental regulations	-	1	-	1
<b>PC27.</b> perform scheduled checks, calibration and timely repairs for workshop tools, equipment and workstations	1	1	-	1
<b>NOS Total</b>	<b>30</b>	<b>50</b>	-	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N8410
<b>NOS Name</b>	Perform testing of electric vehicle
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Research & Development
<b>Occupation</b>	Automotive Product Testing and Validation
<b>NSQF Level</b>	4.5
<b>Credits</b>	12
<b>Version</b>	2.0
<b>Last Reviewed Date</b>	NA
<b>Next Review Date</b>	24/06/2026
<b>NSQC Clearance Date</b>	24/06/2021

## 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

## 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/N9810.Manage work and resources (Manufacturing)	50	30	-	20	100	10
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	5
ASC/N9805.Interpret engineering drawing	50	30	-	20	100	10
ASC/N8410.Perform testing of electric vehicle	30	50	-	20	100	75
<b>Total</b>	<b>150</b>	<b>140</b>	<b>-</b>	<b>60</b>	<b>350</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
<b>PPE</b>	Personal Protective Equipment
<b>PwD</b>	Person with Disability
<b>SOP</b>	Standard Operating Practices
<b>GD&amp;T</b>	Geometric Dimensioning & Tolerancing
<b>CAD</b>	Computer-Aided Drafting
<b>CAM</b>	Computer-Aided Manufacturing
<b>SOP</b>	Standard Operating Procedure
<b>GD&amp;T</b>	Geometric Dimensioning & Tolerancing
<b>CAD</b>	Computer-Aided Drafting
<b>CAM</b>	Computer-Aided Manufacturing

## 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.